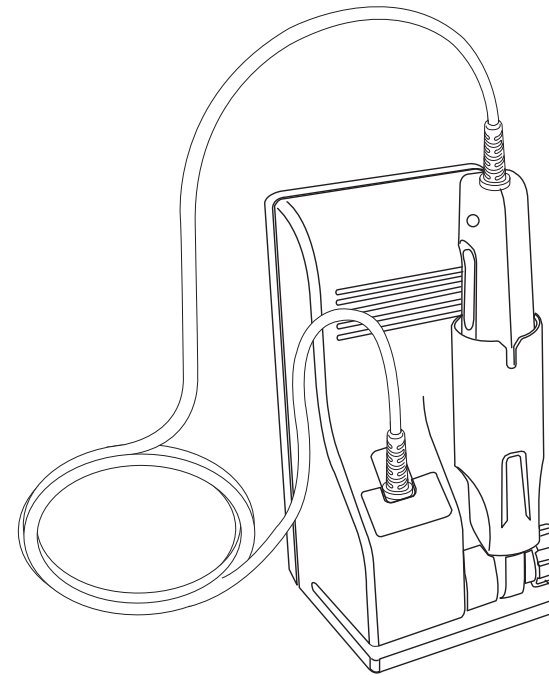


User Guide

Ultrasonic Cutter

ZD-91



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MADE IN JAPAN

Thank you for purchasing this product.

- Be sure to read the entire User Guide in order to operate the product safely and properly.
- Before using the product, make sure to read the Safety Precautions section.

Safety Precautions (read this section before using the product)

This section contains important information for preventing harm to people and preventing property damage during the use of this product.

Definitions of Symbols	
	WARNING Indicates the possibility of accidents that could result in death or serious injury if warnings are not heeded.
	CAUTION Indicates the possibility of minor injury or damage to property if precautions are not heeded.
Examples	
	: This symbol indicates prohibited actions.
	Do Not Disassemble
	Do Not Get Wet
	Do Not Handle With Wet Hands
	: This symbol indicates necessary actions.
	Remove Power Plug

- Reasons why the hand piece becomes hot
 - It has been used for a long period of time.
 - Too much force was applied during cutting.
 - The blade is not securely attached.
 - The blade and blade anchor are dirty.
 - The blade and blade anchor are warped or damaged.

In any case, a major cause is that the blade or blade anchor are not securely attached. A dirty blade anchor results in strange sounds, poor cut performance, or heat generation. Continuous use while the cutter is hot can result in burns. If the plastic section of the hand piece is hot, it can become warped and damaged.

Most problems with operation occur due to a dirty or loose blade and blade anchor. Before requesting repairs, check the blade, blade anchor, and blade anchor screw to make sure they are tightly secured. Also, check the precautions in “Before Using the Cutter” on P.8, and read all the possible problems in “Things to check” on P.16.

A cleaning fee is charged for cleaning the blade, blade anchor, and inside the transducer horn even during the warranty period.

*The blade and blade anchor are disposable items. If ultrasonic vibration is poor even after cleaning these parts, they must be replaced.

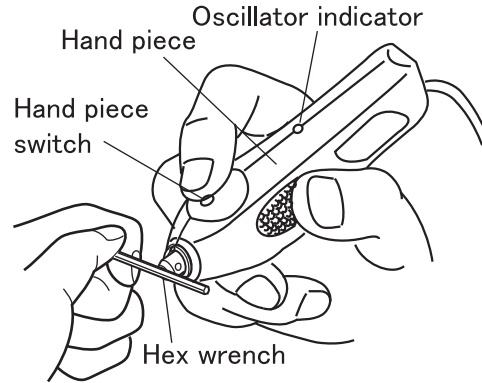
Specifications

Product name & Model number	Ultrasonic cutter ZO-91
Oscillation frequency	40kHz
Power Source	AC adapter INPUT: 100-240 VAC 50/60Hz OUTPUT: 12 VDC
Max. power consumption	Max. 85VA
Ambient temperature	Temperature: 10 to 35 °C (No condensation)
External dimensions	Main unit (Generator): 173mm × 89mm × 76mm (excluding protrusions) Hand-piece: $\phi 32 \times 144$ mm (including hsnf poece csble)
Hand-piece cable	1.6m (straight cable)
Weight	Main unit (Generator): Approx. 300g Hand-piece: Approx. 70g (including hand-piece cable)

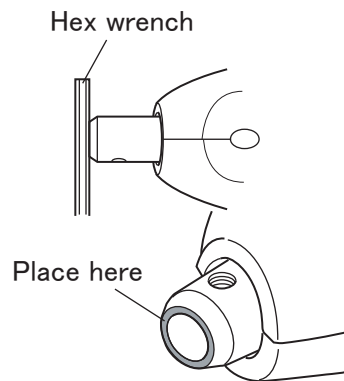
The product specification and appearance are subject to change without notice.

How to check transducer horn vibration

1. Set the main unit power switch to the OFF position.
2. Remove the blade, blade anchor, and blade anchor screw.
3. Set the power switch to the ON position.
4. Place the hex wrench against the end of the transducer horn as shown in the figure, then press the hand piece switch. Keep the cutter running for 5 seconds or less.
5. The transducer horn is working properly if vibration is being transmitted to the hex wrench. Confirm if you can hear a vibrating noise, and the hex wrench moves. After confirming the vibration, press the switch again to stop operation. Set the power switch to the OFF position, then securely reattach the blade, blade anchor, and blade anchor screw.



How to place the wrench
(from above)












- Reasons why vibration is not transmitted to the blade even when pressing the hand piece switch
 - The blade is not securely attached.
 - The blade and blade anchor are dirty.
 - The blade and blade anchor are warped or damaged.
- Reasons why the hand piece is emitting a strange noise and cannot cut
 - The blade is not securely attached.
 - The blade and blade anchor are dirty.
 - The blade and blade anchor are warped or damaged.
 - The wrong blade is being used.
 - You are applying too much force.

⚠ WARNING

Prohibited	This device must not be used by persons lacking sufficient physical strength or mental aptitude, children under eight years old, or those lacking the proper skills or experience unless under the direct supervision or instruction of a person that can take responsibility for safe use.
Prohibited	Do not use this main unit if the power plug is loose in the outlet. Keep the power plug free of dust and moisture. <ul style="list-style-type: none"> ● Failure to do so could result in electric shock, a short circuit, and fire.
Prohibited	Do not forcefully bend, pull on, twist, bunch, or place heavy objects on the power cable, AC adapter cable, or hand piece cable. <ul style="list-style-type: none"> ● Doing so could damage the power cable, AC adapter cable, and hand piece cable, resulting in fire or electric shock.
Do Not Handle With Wet Hands	Never handle any part of this product with wet hands. <ul style="list-style-type: none"> ● Doing so could result in electric shock.
Do Not Get Wet	Do not get the main unit wet, and do not leave it in a place that could become wet. <ul style="list-style-type: none"> ● Doing so could result in malfunction, electric shock, and short circuit. Immediately stop using the main unit if it becomes wet.
Prohibited	Do not use the power plug, power cable, AC adapter, AC adapter cable, or hand piece cable if they are damaged. <ul style="list-style-type: none"> ● Doing so could result in electrical shock, short circuit, and fire.
Remove Power Plug	When not in use, or if the main unit emits a strange smell or smoke, immediately remove the power plug from the outlet. <ul style="list-style-type: none"> ● Failure to do so could result in fire or other accidents.
Prohibited	Do not cut paper soaked with oil, or other highly flammable items. <ul style="list-style-type: none"> ● Doing so could cause a fire, resulting in property damage, burns, and other injuries.
Prohibited	Never touch the blade under any circumstances while the main unit is operating. <ul style="list-style-type: none"> ● Doing so could result in cuts or other injuries.
Prohibited	Do not look closely at the blade or point it at other persons while the main unit is operating. <ul style="list-style-type: none"> ● If the blade is not properly secured it could become detached, resulting in blindness or other injuries.

⚠ WARNING

	<p>Do not cut anything that carries an electrical current.</p> <ul style="list-style-type: none"> ● Doing so could result in electrical shock.
Prohibited	
	<p>When removing the power plug, always make sure to pull the power plug and do not pull the power cable.</p> <ul style="list-style-type: none"> ● Failure to do so could result in fire, electrical shock, or short circuit.
	<p>Do not let children play with the main unit.</p> <ul style="list-style-type: none"> ● Doing so could result in injury or other accidents.
Prohibited	
	<p>Do not let unsupervised children do maintenance or clean the main unit.</p> <ul style="list-style-type: none"> ● Doing so could result in injury or other accidents.
Prohibited	
	<p>Do not modify or disassemble the main unit.</p> <ul style="list-style-type: none"> ● Never disassemble, repair, or modify the main unit. ● Doing so could result in fire, electrical shock, or short circuit.
Do Not Disassemble	
	<p>Do not insert pins, wires, or other metal objects into any of the openings or gaps in the main unit.</p> <ul style="list-style-type: none"> ● Doing so could result in fire, electrical shock, or short circuit.
Prohibited	
	<p>Never use the main unit in the following environments.</p> <ul style="list-style-type: none"> * Areas subject to direct sunlight and high temperatures * Areas subject to dust, dirt, and corrosive gases * Areas subject to strong vibrations or shocks * Wet locations, or areas subject to high humidity ● Doing so could result in malfunction, or even fire, electrical shock, short circuit, or other serious accidents.
Prohibited	
	<p>Make sure the hand piece does not fall off when carrying the main unit.</p> <ul style="list-style-type: none"> ● When carrying the main unit, either remove the blade or attach the protective cap and insert the hand piece into the hand piece holder until you hear a click to ensure that it does not fall off. ● Failure to do so could result in injury.
	<p>When working with the Ultrasonic Cutter, it may produce substances that can affect the human body.</p> <p>Make sure the materials you working with are safe by requesting the SDS (Safety Data Sheet) from the manufacturer, or asking them directly about the materials.</p>

Troubleshooting

Things to check

- If the cutter is not working properly, check the following items before requesting repairs.

Problem	Item to check	Solution
The main unit does not turn on. (The power indicator is not activated)	● Is the AC adapter correctly connected?	Connect the AC adapter correctly.
	● Are you using the designated AC adapter?	Use the designated AC adapter.
	● Is the power plug connected to an outlet?	Connect to a 220V AC power source.
Vibration does not occur even when the hand piece switch is pressed.	● Is the power switch in the ON position?	Set the power switch to the ON position.
	● Are you pressing and holding the hand piece switch?	Press and release the hand piece switch once to start operation.
	● Is the horn vibrating?	Follow the instructions for checking horn vibration (see P.17).
	● Is the oscillator indicator blinking?	High temperature shut-off mode is activated. Wait until the hand piece has cooled down before attempting to use it.
The hand piece is emitting a strange noise.	● Is the blade securely attached?	Make sure the blade is securely attached.
	● Is the blade bent or creased?	Replace the blade, blade anchor, anchor screw, or clean the inside of the transducer horn.
Cannot cut.	● Is the blade anchor dirty, warped, or damaged?	Replace the blade, blade anchor, anchor screw, or clean the inside of the transducer horn.
	● Are there foreign objects on the blade or transducer horn?	Only use designated blades.
The hand piece is hot.	● Are you using a non-designated blade?	Only use designated blades.
	● Have you been using it for a long period of time?	The hand piece becomes hot if used for long periods of time (approximately 10 minutes). Turn the power OFF and wait until it has cooled down before attempting to use it.
	● Have you been using it in High mode for a long period of time?	When using High mode, the hand piece becomes hot quicker than in Normal mode. Wait until it has cooled down.
	● Have you used unnecessary force when cutting?	This ultrasonic cutter is intended for light work. Make sure to hold it correctly and do not apply unnecessary force when cutting.
	● Are the blade and blade anchor securely attached?	Make sure the blade is securely attached.
The ultrasonic vibration suddenly stopped, and the cutter does not work.	● Are the blade, blade anchor, or inside of the transducer horn dirty?	Replace the blade, blade anchor, blade anchor screw, or clean the inside of the transducer horn.
	● Have you used unnecessary force when cutting?	The blade is stuck. Loosen the blade and then try again.
	● Is the oscillator indicator blinking?	High temperature shut-off mode is activated. Wait until the hand piece has cooled down before attempting to use it.
	● Is the power indicator blinking?	The safety shut-off function has been activated. Turn the power switch to the OFF position, check the blade anchor, and turn the power ON again.

Cleaning

Cleaning the transducer horn

- The transducer horn may experience the following problems if it is not cleaned sufficiently.

Make sure to clean it regularly

- The hand piece becomes hot quickly
 - *The inside temperature of the hand piece tends to rise quickly during operation, and the mode easily switches to high temperature shut-off mode.
- The cutting performance is poor.
 - *This is an important part that secures the blade and transducer.
Dirt and other foreign objects inhibit transmission of vibration to the blade.
- Strange noises
 - *Dirt and other foreign objects can make vibration unstable, causing strange noises.

Replacement of blade anchor and blade anchor screw

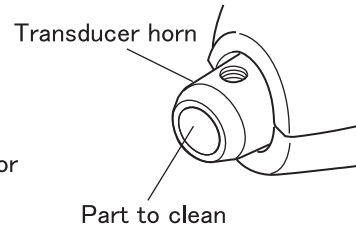
- Dirt may become stuck to the blade anchor and blade anchor screw during operation, resulting in abrasion.
Replace these parts if they become dirty or abraded.

Cleaning the cutter

- Recommended method

1. Before cleaning, always make sure that the main unit power is turned to OFF. (Remove the power plug from the outlet.)
2. Use the maintenance set (SB01) to remove foreign objects from inside the horn.

- ⊘ Do not use organic solvents such as alcohol to clean anything other than the transducer horn.
- ⊘ Never wash the main unit or hand piece.
- ⊘ Make sure there are no foreign objects or scratches in the blade anchor slit or blade anchor slot. These can result in incorrect vibration or malfunctions to the blade anchor.



3. Use a cotton swab to remove any dirt from the interior.

! WARNING



Prohibited

- Do not use the main unit near electronic devices which require precision control or use weak signals such as pacemakers.
 - The main unit can interfere with such electronic devices, resulting in malfunctions of such electronic devices.

! CAUTION



Prohibited

- Do not spray or clean the main unit, hand piece, or AC adapter with alcohol or other organic solvents. (Insecticides, cosmetics, cleaning agents, etc.)
 - Doing so could deteriorate plastic or painted parts resulting in damage.



Remove
Power Plug

- Remove the power plug from the outlet when attaching or removing the blade, or cleaning the main unit.
 - Failure to do so could result in injury.



Prohibited

- Do not touch the blade to any items you do not want to cut.
 - Doing so could result in injury or property damage.



- Check the blade to make sure it is securely attached and that it is not damaged.
 - Using a damaged blade can result in malfunction or accidents.



- Only use designated blades.
 - Using other blades can be extremely dangerous, as they do not vibrate properly, resulting in malfunction, blade defects, or detachment.



- Do not dispose used blades as a general waste. Be sure to follow designated local laws and dispose the blades properly as hazardous materials.



Prohibited

- Do not store the hand piece in the holder with the hand piece switch in the ON position.
 - The hand piece may become hot, resulting in malfunction or injury.



Prohibited

- When changing the output conversion switch position, make sure that the main unit is in standby mode (see P.13).
 - Failure to do so could result in malfunction.



Prohibited

- Do not carry the main unit by holding only the power cable or hand piece.
 - Doing so could result in malfunction or accidents.

⚠ CAUTION



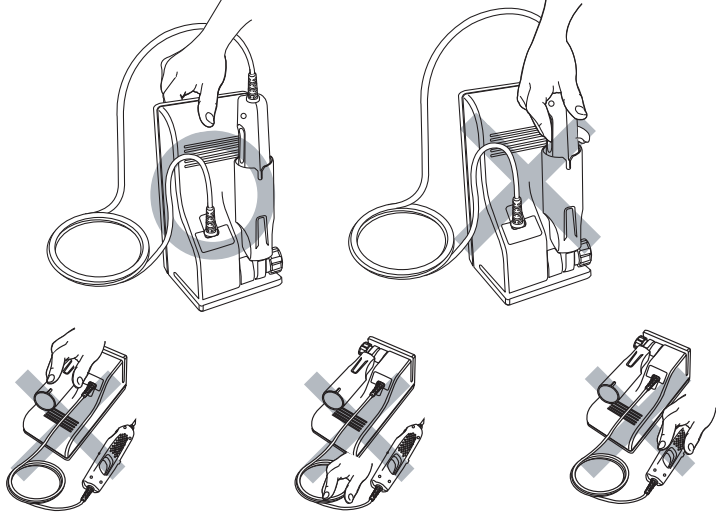
Do not place the main unit up side down. Do not subject the main unit to strong shock.
Prohibited ● Doing so could result in malfunction.

Hold the main unit properly when carrying it.

● Carrying the main unit by the hand piece or cable can result in dropping it, causing accidents and malfunctions.

Correct way to hold main unit

Incorrect way to hold main unit



Hold the hand piece properly.

● Do not apply unnecessary force to the tip of the blade. Doing so could result in malfunction.

Correct way to hold

Incorrect way to hold



*Do not apply unnecessary force to the tip of the blade.

How to use the cutter

1. Set the power switch to the ON position and confirm that the LED of power indicator lights up.
 - * The oscillator indicator (green) on the hand piece remains off.
2. Begin operation.

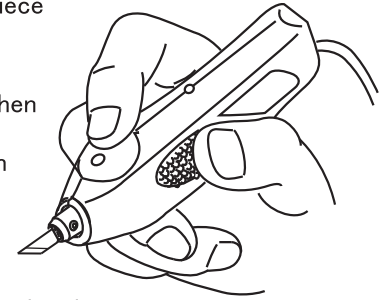
In standby mode, the cutter begins operating when the hand piece switch is pressed once.

 - * There is no need to press and hold the switch unlike the previous products (ZO-40 and USW-334).
 - * The oscillator indicator (green) on the hand piece lights up.
 - * After the cutter is turned on via the switch, the hand piece may vibrate slightly. The cutter stops vibrating when you begin cutting.
3. Turn the cutter off.

Press the hand piece switch once to stop operation and switch to standby mode.

If the main unit is operating for approximately 10 minutes, it stops operating and switches to standby mode.

 - * The oscillator indicator (green) on the hand piece remains off in standby mode.
 - If the temperature inside the hand piece becomes higher than permissible value during operation, the mode switches to high temperature shut-off mode.
 - * The oscillator indicator (green) on the hand piece blinks in high temperature shut-off mode.
 - If the circuits are overloaded during operation, it will activate the safety shut-off function, and the power indicator begins blinking.
 - * Only the power indicator blinks (other indicators do not).



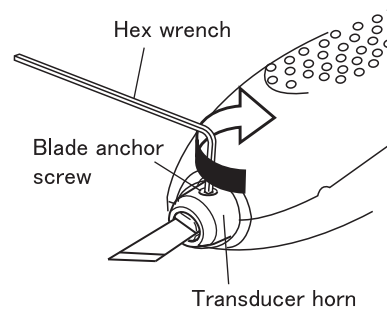
Output conversion switch

- * When changing the output conversion switch position, make sure the main unit is in standby mode.
- Normal mode
This mode is for normal use.
- High mode
This mode amplifies output for enhanced cutting performance compared to Normal mode.
When a material is too difficult to cut in Normal mode, switch to High mode. However, because this mode produces more internal heat in the hand piece compared to Normal mode, the mode switches to high temperature shut-off mode after a short period of time (approximately 5 minutes).
Using High mode for a long period of time or continuously may result in malfunction.

How to Use the Cutter

Preparations

1. Insert the power cable into the AC adapter unit.
2. Insert the power plug into an outlet.
3. Insert the AC adapter plug into the AC adapter jack of the main unit (oscillator).
4. Check if the blade is properly attached to the hand piece.
5. Tighten any loose blade anchor screws.



Status descriptions

■ Standby mode

Set the power switch to the ON position, and the LED of power indicator (green) lights up.

* The oscillator indicator (green) on the hand piece remains off.

■ Operating

The transducer is emitting vibration.

* The oscillator indicator (green) on the hand piece lights up.

■ High temperature shut-off mode

The temperature inside the hand piece becomes higher than operating temperature during operation.

* The hand piece switch does not operate in this state.

* The oscillator indicator (green) on the hand piece blinks.

* When the main unit cools down to operating temperature, the oscillator indicator turns off and the mode switches to standby mode.

■ Blinking power indicator

The circuits are overloaded and the safety shut-off function has been activated.

* The hand piece switch does not operate in this state.

* The LED of power indicator (green) blinks.

* The mode switches to this mode when the blade anchor screw is too loose or when more than the expected force is used for cutting.

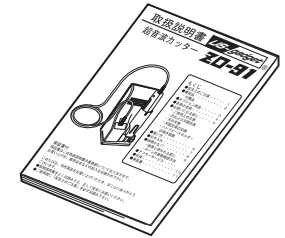
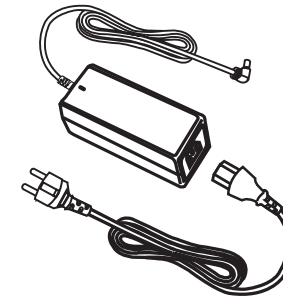
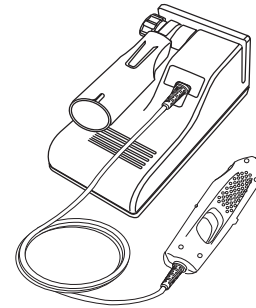
* The main unit will not automatically reset. Set the power switch to the OFF position, tighten the blade anchor screw, and turn the power ON again.

Main Contents

Main unit [ZO-91]

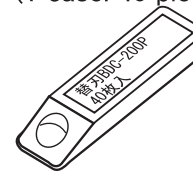
AC adapter [FY1203000]

User Guide



Supplied Items

BDC-200P
(1 case: 40 pieces)



Hex wrench (1)
[RR02]



Blade anchor screw (3)
[HB03]
(M3.0 × 3)



Protective cap



Blade anchor (1)
[ZH04]



⚠ Do not use blades with holes as they can break during use and become dangerous.



Optional Items

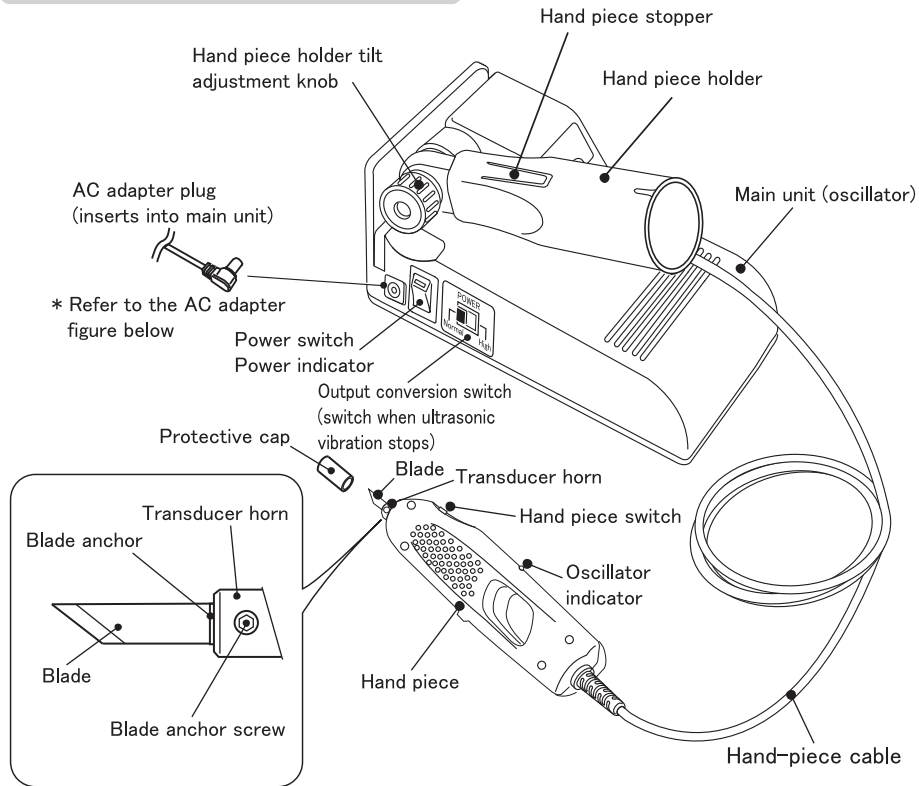
(A) Maintenance set
(Cleaning swab x 1
Cleaning swab file x 3)
[SB01]

(B) Cleaning swab file
(10 pieces)
[SB02]

(C) Cutter mat (1 sheet)
150 x 200 x 3 mm (HWD)
[CM02]

Part Names

Main unit



AC adapter

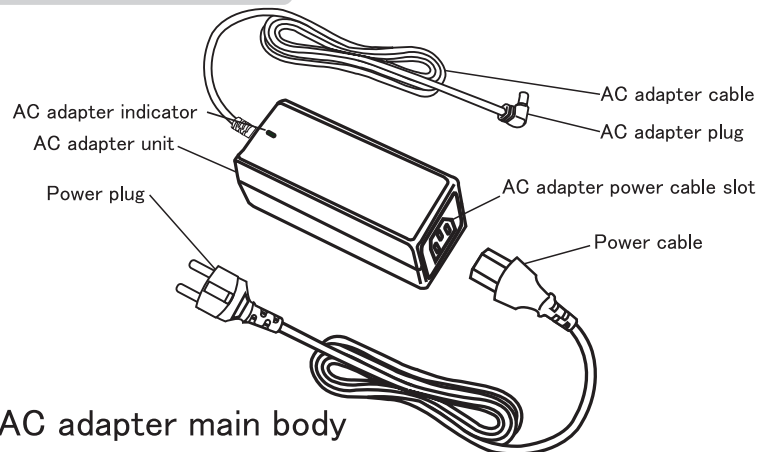
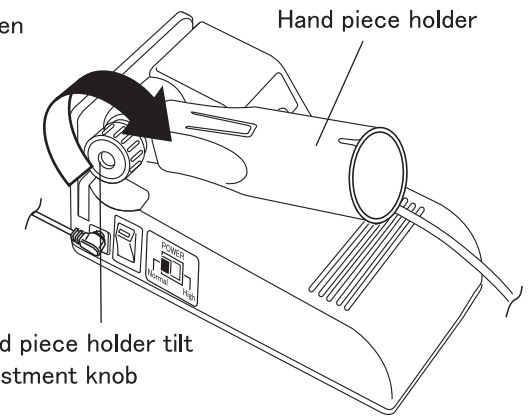


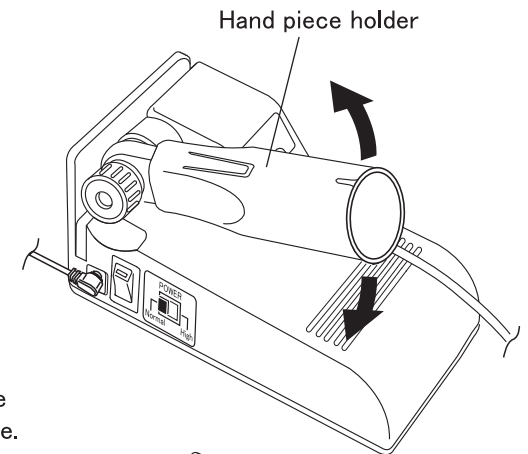
Figure of AC adapter main body

Hand piece holder tilt adjustment

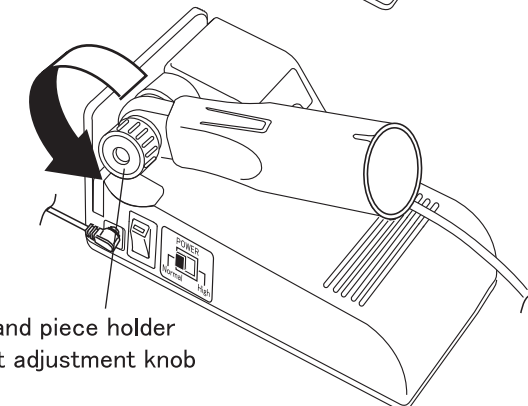
1. Turn the hand piece holder tilt adjustment knob clockwise to loosen slightly.



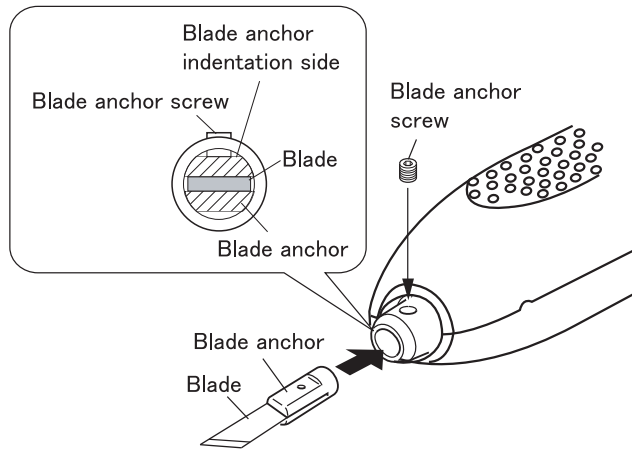
2. Adjust the hand piece holder tilt angle to desired position.



3. Turn the hand piece holder tilt adjustment knob counter clockwise and tighten it until it does not move.

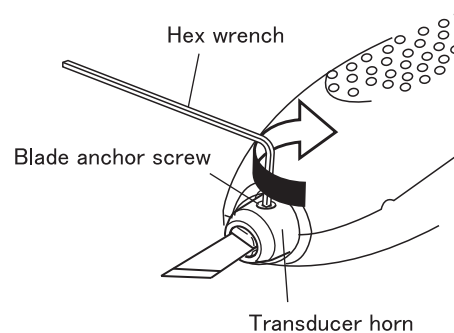


- Align the new blade anchor with the hole on the blade anchor screw and the indentation on the blade anchor.



- Make sure the blade and blade anchor are inserted firmly, then use the supplied hex wrench to securely tighten the blade anchor screw.

- !** Make sure the blade anchor screw is securely tightened. (Tightening torque is approximately 60cN·m)
If the blade anchor screw is loose, the blade may fly off, resulting in injury. It could also result in poor cutting performance and malfunction.



Before Using the Cutter

Precautions during use

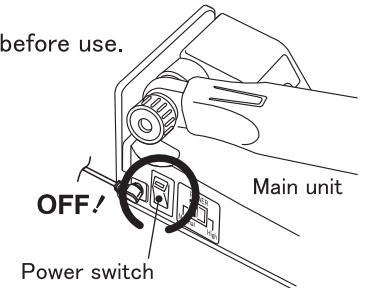
- The Ultrasonic Cutter cuts better than regular cutters. Exercise adequate caution when using the cutter.
- Be sure to use eye and hand protection when using the cutter or changing the blade.
- Harmful gas may be emitted depending on the materials being cut. Always use a mask in a well-ventilated area.

Replacing the power cable

- Make sure the main unit power is off.
- Remove the power plug from the outlet, and then the power cable from the AC adapter.

Blades and anchors

- If the blade and blade anchor are not securely fastened to the transducer horn, the ultrasonic vibration is not transmitted to the blade.
 - Make sure the blade and blade anchor are securely fastened before use.
- Dirt on the blade or blade anchor can generate heat, strange noises, or result in damage.
 - Make sure the blade and blade anchor are clean before use. Replace the blade if it is dirty. (See P.8 and P.10)



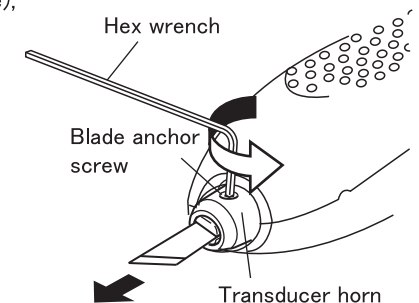
Replacing the blade

Remove the power plug from the outlet when attaching or removing the blade, or cleaning the main unit.

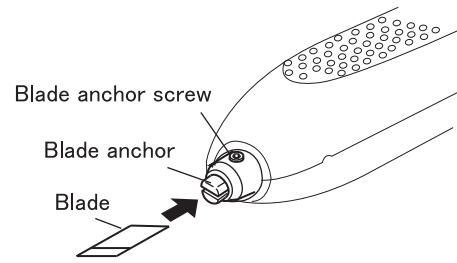
- Make sure the power switch is in the OFF position.
- Use the supplied hex wrench to loosen the blade anchor screw on the transducer horn (metal fixture on the end of the hand piece), then remove the blade.

- !** Exercise adequate caution to avoid cutting or stabbing yourself when handling the blade.

- !** The blade, blade anchor, blade anchor screw and transducer horn are will be extremely hot directly after using the cutter. Exercise adequate caution to avoid burns.



3. Place the base of the replacement blade as shown in the figure on the right, and insert it all the way into the blade anchor.



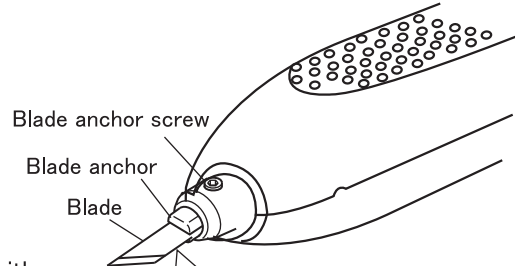
! Make sure the tip and base of the blade are correctly oriented.

! Only use designated blades. Using other blades can be extremely dangerous, as they do not vibrate properly, resulting in malfunction, blade defects, or detachment.

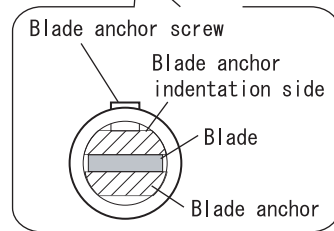
⊘ Do not use blades with holes as they can be dangerous.



4. Align the hole on the blade anchor screw with the indentation on the blade anchor.



5. Make sure the blade and blade anchor are inserted firmly, then use the supplied hex wrench to securely tighten the blade anchor screw.



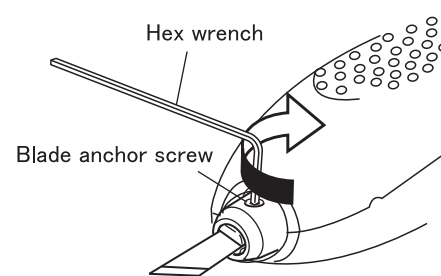
! Make sure the blade anchor screw is securely tightened. (Tightening torque is approximately 60cN·m) If the blade anchor screw is loose, the blade may fly off, resulting in injury. It could also result in poor cutting performance and malfunction.

! Replace the anchor screw if it has become stripped.

! Replace the hex wrench if the end has become abraded, making it difficult to tighten the blade anchor screw.

! If it is impossible to remove the blade anchor screw, request repairs rather than attempting to remove it yourself.

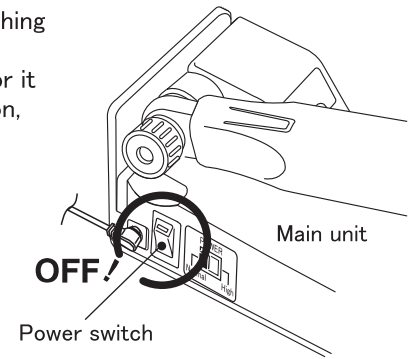
! Replacing the blade when the transducer horn is hot may result in a loose screw once it cools down. Check the screw before use and tighten if necessary.



Replacing the blade anchor

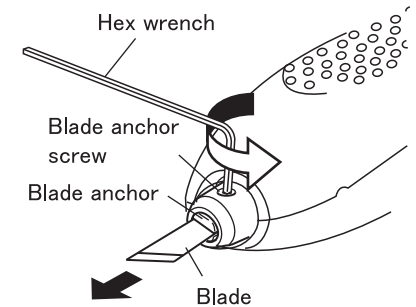
Remove the power plug from the outlet when attaching or removing the blade, or cleaning the main unit. If the blade becomes warped or difficult to insert, or it makes a strange sound from the tip during operation, replace it with a new blade.

1. Make sure the power switch is in the OFF position.



2. Use the supplied hex wrench to loosen the blade anchor screw securing the blade anchor, and then remove the blade anchor and the blade.

! Exercise adequate caution so as not to cut or stab yourself when handling the blade.



! The blade, blade anchor, blade anchor screws, and transducer horn are extremely hot directly after using the cutter. Exercise adequate caution to avoid burns.

