

**Minimo<sup>®</sup>**

Motor

KX313

**OPERATION MANUAL**

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Products are subject to change without notice.

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** MINITOR CO., LTD. JAPAN**

## Introduction

Thank you for purchasing Minimo ONE Series Ver. 3 KX313.

Read this manual carefully for your safety prior to use.

Along with this manual, read manuals of head, Power Pack and foot switch, if used, carefully for your understanding of each function.

Keep this manual in place reach to easily.



Download this manual from our website if lost.

## Precautions

- This manual indicates symbols and signal words intending to avoid dangerous operation and handling for potential hazards and accident that could result in personal injury or damage to the product.
- For your safety use, read this manual and manuals of power pack and foot switch before use.
- Keep this manual in place any operator can reach to easily and whenever refer to.
- Use this product with Minitor's power pack.



### ■ Symbols

The symbols on this manual indicate as following:









 Operation must be done.	 Operation is prohibited.
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### ■ Warning and Caution





Possible hazards and damages by wrong handling are classified as Warning and Caution in accordance with seriousness of risk.

 <b>Warning</b> Operation causing of significant and dangerous accident possibly resulting in death or serious injury.	 <b>Caution</b> Operation possibly causing of injury or physical damage on the product.
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





### ⚠ Warning

- **Keep turning power switch of power pack off when connecting handpiece.**   
○ May cause of fire, electric shock and / or malfunction.
- **Do not use damaged straight cord.**   
○ May cause of fire, electric shock and / or malfunction.
- **Hold motor (handpiece) tight when turning switch on.**   
○ May cause of injury and damage on tool by bouncing of motor (handpiece).
- **Communication spark may occur while motor is rotating. Do not use the products near inflammable and explosive material such as thinner and gasoline.**   
○ May cause of fire and / or malfunction.
- **Prevent this product from cutting oil, water, oil mist, etc.**   
○ May cause of fire, electric shock and / or malfunction.
- **Do not touch rotating object such as Santan Tool, collet chuck, etc. during operation.**   
○ May cause of injury and damage on tool.
- **Wear protective glasses for eye protection and respirator to prevent from dust.**   
○ May cause of unexpected damage due to chip and dust.
- **Do not press ON button on DC MOTOR selector and hand selector while collet chuck is in open.**   
○ Motor may be overheated by energization in condition that motor is locked and may cause of fire and / or malfunction.

### ⚠ Warning

- **Confirm if handpiece works properly after turning DC MOTOR selector or hand selector on.**   
○ May cause of fire and / or electric shock by overheating motor in case motor was not working.  
Cause motor does not work: collet chuck in open, malfunction of handpiece, motor or power pack, etc.
- **In case abnormal noise, smoke and / or bad smell occurred, turn power switch off and unplug AC power cord.**   
○ May cause of fire and / or electric shock.
- **Do not disassemble and / or remodel.**   
○ May cause of fire, electric shock and / or malfunction.  
○ May cause of significant influence on safety and performance.
- **Ask us for repairing.**   
○ May cause of fire, electric shock and / or malfunction.  
○ May cause of significant influence on safety and performance.

### ⚠ Caution

- **Do not disassemble and assemble this product.**   
○ May cause of damage and / or malfunction.
- **Use this product in condition without condensation.**   
○ May cause of fire, electric shock and / or malfunction.
- **Use this product within temperature from 0°C to 40°C.**   
○ May cause of damage and / or malfunction.
- **Do not use this product near device generating electric noise unusually.**   
○ May cause of damage and / or malfunction.
- **Unplug the AC power cord of power pack for your safety while cleaning.**   
○ May cause of electric shock and / or malfunction.
- **Do not drop and / or hit this product.**   
○ May cause of damage and / or malfunction.
- **Do not use this product under environment generating corrosive gas . (chlorine gas, hydrogen sulfide, sulfurous acid gas, etc.)**   
○ May cause of fire, electric shock and / or malfunction.
- **Follow the instruction of your local government for disposing this product.**   
○ May cause of damage and / or malfunction.
- **Keep this product away from children.**   
○ May cause of damage and / or malfunction.
- **Turn power switch of power pack off and unplug AC power cord for your safety while leaving a workshop.**   
○ May cause of fire, electric shock and / or malfunction.
- **Prevent dust, oil, water, etc. from entering inside. If liquid and / or foreign substances entered, turn power switch off, unplug AC power cord and ask us for repairing.**   
○ May cause of fire, electric shock and / or malfunction.
- **Unplug AC power cord for your safety while replacing carbon brushes and other parts.**   
○ May cause of electric shock and / or malfunction.
- **Do not loosen joint ring while motor is rotating.**   
○ May cause of malfunction.
- **Do not connect any other controller and motor drive power than Minitor products.**   
○ May cause of malfunction and / or failure.

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## 1. Components

Check all items inside.

Motor 1 piece



Fig. 1

Carbon Brushes 1 set  
(2 pieces)

Motor	Carbon Brushes
KX313	KE-580



Fig. 2

Operation Manual



### 【Connectable Power Pack】

Minimo ONE Series Ver. 3 Power Pack.  
C2013 / C2113 / C2213

**Caution** ■ This product cannot be used with power pack other than Ver. 3's.

Ask Minitor if you would like to connect Ver. 3 motor and Ver. 2 power pack (C2012 / C2112 / C2212).

## 2. Features

- Motor Identification Function  
Appropriate motor output can be identified by only connecting to power pack.
- Separated Type Motor  
Motor and head can be separated. Easy to set handpiece matching purpose by replacing head.

## 3. Specifications

Table 1 Specifications and Compatibility Table of Head

Power Pack	Motor				Head								Clamp Head			Joint	
	One Series	Ver. 2	Ver. 3	Max Speed [min <sup>-1</sup> ]	H011	H021	H031	H041	H211	H221	H231	H311	MX52	MX53	FX91	ET51	MG03
					H013	H023	H033	H043	H213	H223	H233	H313					
C2013 C2113 C2213	KV11H	KV112H	KV113H	50,000	○	○											
	KV21H	KV212H	—	40,000	○	○		○									
	KM11H	KM112H	KM113H	35,000	○	○		○									○
	KM21H	KM212H	KM113M	30,000	○	○	○	○						○	○	○	○
			KM213H	30,000	○	○	○	○						○	○	○	○
	KV21	KV212	—	25,000	○	○								○	○	○	○
	KM11	KM112	KM113	20,000	○	○	○	○						○	○	○	○
			KM113L	15,000	○	○	○	○						○	○	○	○
	KM21	KM212	KM213	15,000	○	○	○	○	○	○	○			○	○	○	○
	—	—	KX313	10,000	○	○	○	○	○	○	○			○	○	○	○
			KM212L	8,000	○	○	○	○	○	○	○			○	○	○	○
			KM213L	8,000	○	○	○	○	○	○	○			○	○	○	○
	KM11G	KM112G	KM113G	6,600	○	○	○	○	○	○	○			○	○	○	○

C2013 C2113 C2213	One Series	Ver. 2	Ver. 3	Max Speed [min <sup>-1</sup> ]	Speed Range [rpm]
	RE11	RE112	RE113	—	3,500
	RE21	RE212	RE213	—	7,000
	BS31	BS312	BS313	700	—

○ Compatible combination  
Percentage of output level is indicated on digital display of power pack while connecting to RECIPRON and Mini Belt Sander.

### ■ Risk Avoidance Function by Overloading

Overloading is applied to avoid risk in case of fixed loading, activating handpiece in condition that collet chuck is in open (motor-locked condition), etc.

- Overloading in normal condition
  - Motor in working ⇒ Overload warning (5 sec.) ⇒ Overloading (suspended)
- Overloading in motor-locked condition
  - Motor-locked condition ⇒ Motor activated ⇒ Overload warning (5 sec.) ⇒ Overloading (suspended)
- Overloading in fixed loading condition
  - Fixed loading condition (15 sec.) ⇒ Overload warning (5 sec.) ⇒ Overloading (suspended)

## 4. Names

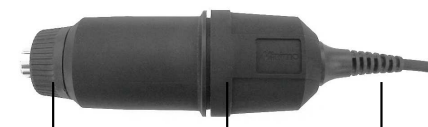


Fig. 3



Fig. 4

## 5 Operations

### 5-1. How to Attach Head on Motor

- 1) Insert connecting part inside of head into tip part of motor along groove.
- 2) Tighten joint ring for fixing head on motor until thread part between head and joint ring is out of sight. (There is still approx. 1 mm gap between head and joint ring although tightened.)

\* There are 4 grooves on tip part of motor. Select any groove and fix head on motor.

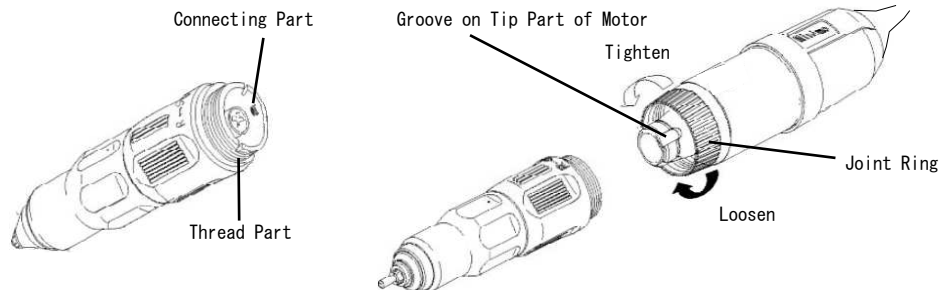
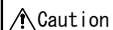


Fig. 5

Fig. 6



Caution

- Unplug straight cord from power pack when mounting head on motor.
- In case joint ring is not rotated even though thread part still can be seen, try again from 1). Thread part may be damaged if rotated forcefully.
- Do not rotate joint ring while handpiece is running.
- Use compatible head only (see Fig. 1). May cause of malfunction.

### 5-2. Connecting to Power Pack

Connect plug of motor to DC MOTOR connection terminal.



Caution

- Do not turn hand switch on during replacing Sentan Tool.

## 6. Replacement of Carbon Brushes and Straight Cord

Replacement of Carbon Brushes			
Replacement of Straight Cord			
①	①	Unplug straight cord from power pack.	-
②	②	Remove raised countersunk head screw and pull out motor body from motor cap.	Fig. 8
-	③	Hold connector of straight cord and pull out it straight from motor body.	Fig. 9
③	-	Remove pan head screw and carbon brushes.	Fig. 10
④	-	Insert new carbon brushes and fix them by pan head screws.	-
-	④	Insert connector of straight cord straight along with pins of motor body. (In case replacing straight cord, replace to new one.)	Fig. 11
⑤	⑤	Confirm position of threaded hole, insert motor body into motor cap and tighten raised countersunk head screw.	-



Fig. 8



Fig. 9

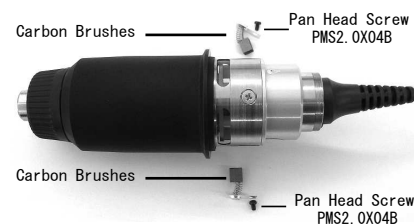


Fig. 10

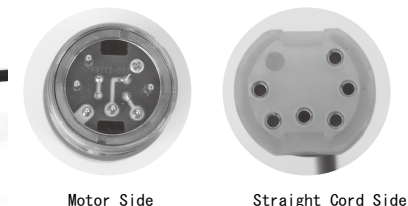
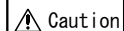


Fig. 11



Caution

- Make sure to use specified carbon brushes.
- Increase rotation speed of motor from low speed slowly after replacement of carbon brushes and confirm if anything is wrong.
- Make sure to unplug straight cord from power pack when replacing carbon brushes.

**7. Optional Accessory (Refer to product catalog for more information)**

Carbon Brushes 1 set (2 pieces)



Motor	Carbon Brushes
KX313	KE-580

Rubber Cradle RM11



**8. Before Asking for Repairing**

Condition	Check if	Measure
Motor does not run.	Power switch of power pack is OFF.	Turn power switch of power pack ON.
	Carbon brushes are consumed.	Replace carbon brushes to specified ones.
	Collet chuck of handpiece is in open position.	Close collet chuck of handpiece.
Overheating while motor is running.	Dust, etc. are stuck on handpiece.	Remove dust, etc.
	Handpiece is used with excessive load.	Use motor within range of white LED indicating range of use on load meter.
High vibration and / or abnormal noise from handpiece.	Same malfunction is occurred in low rotation speed.	Ask for repairing.

If you still have a trouble after applying measure, malfunction is considered. Ask for repairing.  
 If you have any question or need further assistance, please contact the store you purchased or us.

**9. Maintenance**

- Check if there is any damage on case, cord, etc.
  - Check if dust, oil, water, etc. are stuck.
- Inspection and maintenance are regularly needed.

⚠ Warning	■ May cause of accident and / or malfunction if inspection and maintenance are not provided regularly.
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