

SMART CUT 4005

**Precision Low
Speed Diamond
Saw**

Operating Manual

Contents

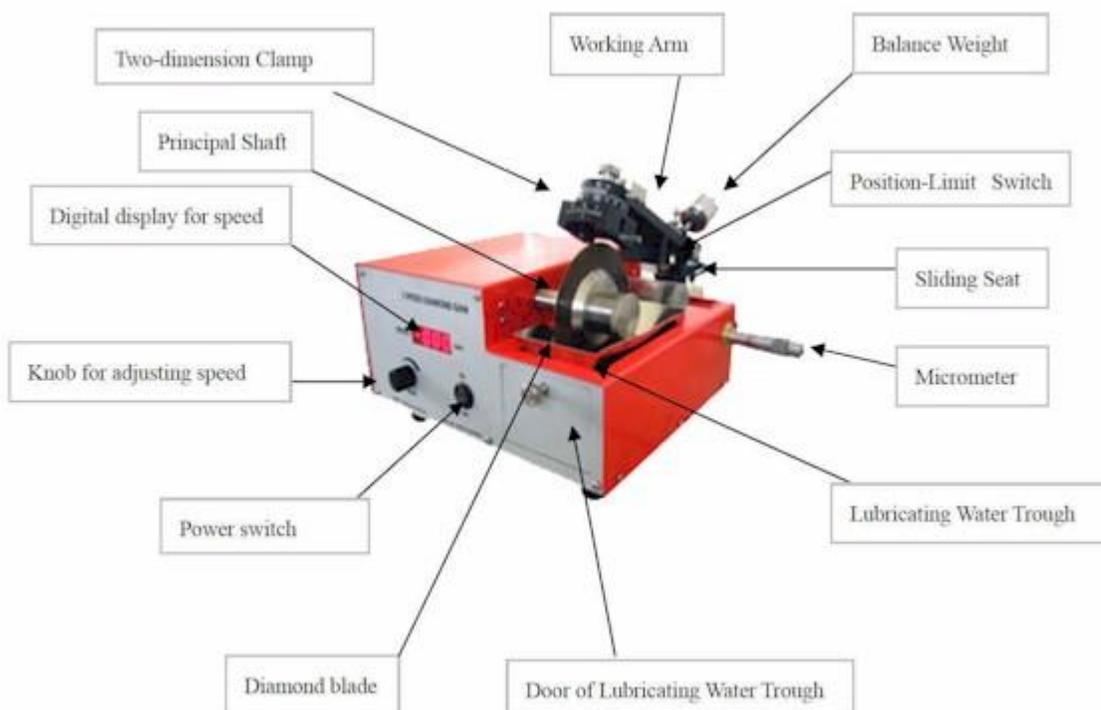
1. Introduction	-----	P.3
2. Structure overview	-----	P.3
3. Main Technical Specifications	-----	P.3
4. Installation	-----	P.4
5. Operation	-----	P.4
6. Maintenance and Safety	-----	P.7
7. Warranty and Support	-----	P.9

1. Introduction

SMART CUT 4005 low speed diamond saw is a perfect tool for cutting / dicing / slicing all kinds of materials, especially for brittle crystals and TEM samples.

The saw is equipped with a two-dimension clamp that makes the sample to be cut located at the best angle. The automatic shut-off design allows the saw to run unattended. The principal shaft is running with high accuracy. The horizontal position of the sample can be fine adjusted forward.

2. SMART CUT 4005 Saw Structure



3. Main Technical Specification:

Item	Unit	Parameter
Max. travel distance	mm	40
Fine-adjusted travel distance	mm	25 (precision: 0.01 mm)
Clamp Width	mm	25
Turning Speed	RPM	0 - 600
OD of the Blade	mm	75 - 100
Power	W	50
Voltage	V	AC 110 - 220
External Dimension	mm	330 x 330 x 230
Weight	Kg	12

4. Installation:

- 4.1. The machine should be installed on a stable desk without shaking.
- 4.2. Please confirm the power source is 110 – 220 V before connecting.
- 4.3. Please clean all parts before putting the blade into the shaft.

5. Operation:

5.1. **Preparation before operation:**

- 5.1.1. Check the stability of the working station that no shaking will be produced in operation.
- 5.1.2 Check power line and make sure the voltage switch is turned on the right voltage position.
- 5.1.3 Check all parts and make sure they are clean enough or it will seriously affect the operation precision.
- 5.1.4 Check the coolant. Add if it is less than 80% full of the tank.
- 5.1.5 Check the position-limit switch if there is in the range to protect the blade and in the good working condition.
- 5.1.6 Check the sliding seat and micrometer if they are moving freely. Make sure the working arm move smoothly without shaking.
- 5.1.7 Let the machine race half minute and check any abnormality before cutting.

Precautions Before Cutting

- 5.2.1. Plug power cable into the power inlet at the back of the saw. The voltage ranges from 110V to 230V. Always unplug power cable before open saw case for any repair.
- 5.2.2 Please choose suitable position for working arm, and tighten the screw before cutting, otherwise micrometer can not work (as Fig. 1)
- 5.2.3 Please check position-limit switch of working arm if it is at suitable position. If position-limit screw is too long it may cause machine to stop running. (as Fig. 2)
- 5.2.4 Please tighten the screws on sample holder for two angle adjustment and sample holding plate (as Fig. 3), otherwise sample may drop down during cutting
- 5.2.5 Before cutting, please choose a comfortable speed. Always adjust speed from lower to higher.
- 5.2.6 The Saw Can be used inside a glovebox with N₂ gas, but no Ar gas.



Swing arm fix sc

Power Inlet

Fig. 1

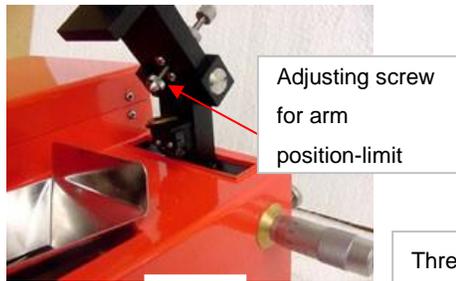


Fig. 2

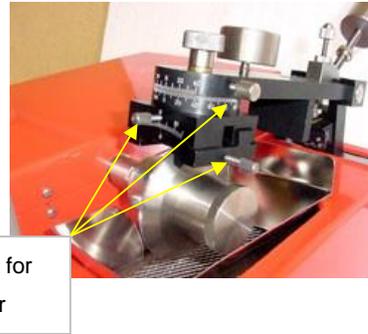


Fig. 3

5.3. Operation Procedure

- 5.3.1. Place an aluminum mounting block onto a heating plate (available at www.mtixtl.com) and heat it to approximately 120°C.
- 5.3.2 Mount the graphite plate onto the aluminum mounting block using low melting point wax provided.
- 5.3.3 Melt another piece of wax on top of the graphite plate where the specimen is to be mounted.
- 5.3.4 Place the specimen onto the wax and graphite plate and remove the entire assembly from the hot plate. Let it cool down for about 2~3 minutes.
- 5.3.5 Place the aluminum block with the mounted specimen into the goniometer specimen holder by loosening the thumbscrew on the side of the goniometer. (Fig.4)

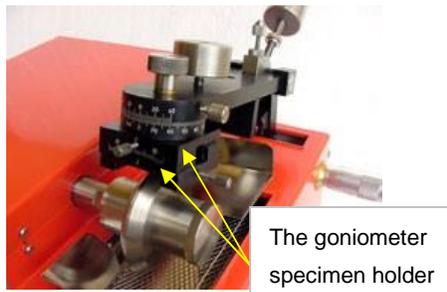


Figure 4

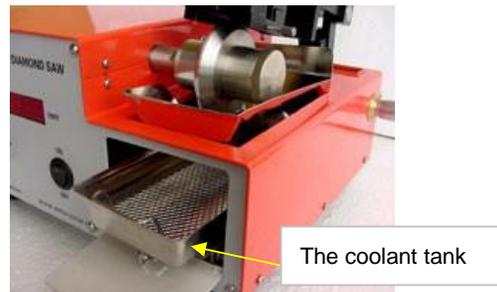


Figure 5

- 5.3.6 Loosen the thumbscrew and finely adjust the specimen position using the micrometer.
- 5.3.7 Tighten the thumbscrew to secure the mounted specimen into the place.
- 5.3.8 Place lubricant (diluted to 30 part water with 1 part lubricant by volume) into coolant tank (Fig.5) until the lubricant covers approximately 10~15 mm (1/2") of the diamond wheel
- 5.3.9 Adjust the automatic shutoff control by adjusting the height of the screw at the rear of the arm assembly. When the screw comes into contact with the metal pads at the base of the arm, an electrical switch shuts off the cutting

wheel. After properly adjusting the screw, tighten the bolt on the shutoff screw to ensure the position of the screw. This will ensure that cutting will stop when the endpoint is reached (Fig 6).

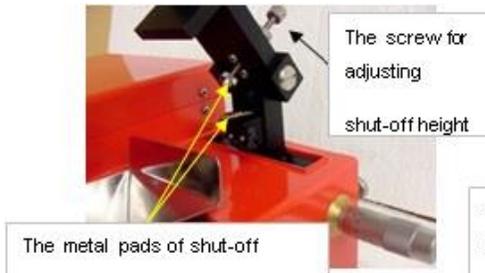


Figure 6

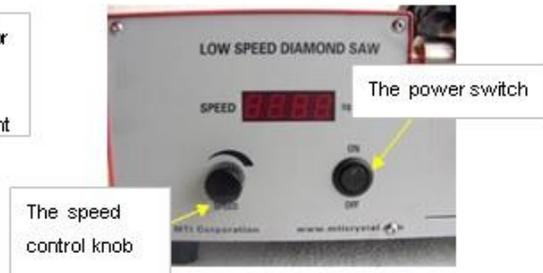


Figure 7

- 5.3.10 Turn the main power switch ON by depressing the switch (Fig. 7).
- 5.3.11 Make sure that the crystal is away from the cutting blade while following adjustments are being made.
- 5.3.12 Adjust the speed using the speed control knob on the front panel. (Fig. 7, the higher speed is better for low hardness material)
- 5.3.13 Gently lower the arm with the specimen onto the diamond wheel very gently to begin cutting of the specimen (Fig. 8).

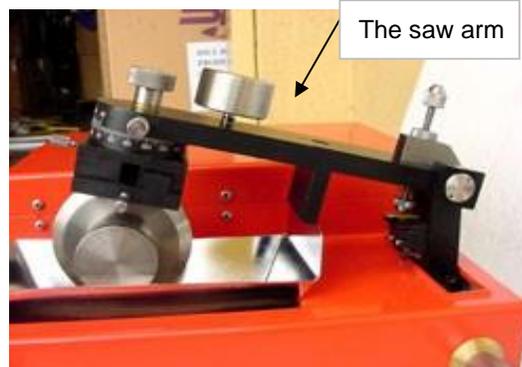


Figure 8

- 5.3.14 Caution: DO NOT allow the arm to slam down onto the cutting wheel, otherwise severe damage to the wheel will result in.
- 5.3.15 When cutting is complete, raise the arm into the up position and turn main power switch OFF.
- 5.3.16 When cutting is complete, raise the arm into the up position and turn main power switch OFF.
- 5.3.17 Raise the arm and remove the entire assembly specimen from the saw. Then put it back onto a hot plate to melt the wax, take off the specimen and make it clean.

5.4. Smart Tips for Using SMART CUT 4005 Saw:

Cutting multi-sample in one time:

You can use multi blades to cut more slices in one time, as shown in Fig. 9. The spacers from 2 mm to 20 mm are available upon request. For 10 mm space, 150 saw can install 4 blades.



Fig.9

Accurate 90 Degree Cutting:

In order to cut perfect 90° sample, better use our cross sample holder, as shown in Fig 10. Using the crossing holder, you can turn sample 90° angle quickly without mistake after first cutting. This precision Crossing Holder costs you \$120/ea.



Fig.10

Digital Display Micrometer for Easy reading

Digital display micrometer head can be installed in 4005 saw, As shown in Fig.11. This will make reading easy and more accurate. But the digital micrometer cost you \$450 more.



Fig.11

6. Adjustment, Maintenance and Safety:

6.1. Adjustment:

- 6.1.1. Clearance adjustment for main bearing: See Fig.12. Loose special nut 2 first and then loose special nut 1 to adjust

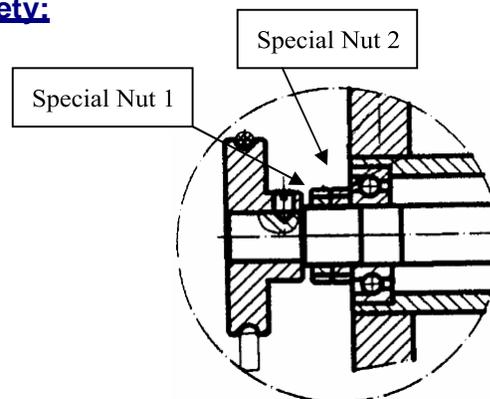


Fig. 12

6.1.2. O-Belt adjustment: See Fig. 13. Open case. Loose nut 1 and nut 2. Move the belt seat following the arrow direction to adjust the O-belt.

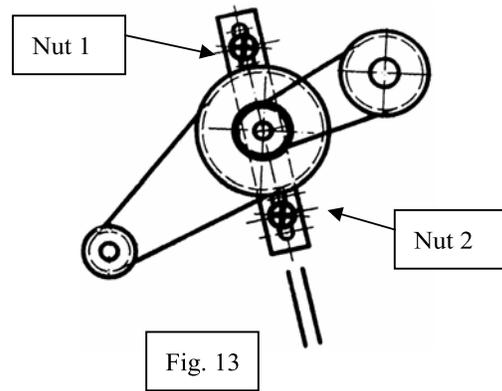


Fig. 13

6.1.3. Adjustment for position-limit switch: See Fig. 14. Turn up or down the position-limit screw to ensure the blade will not cut clamp.

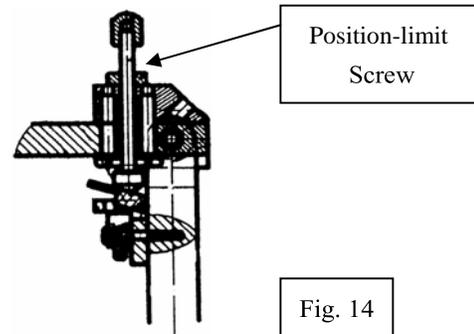


Fig. 14

6.1.4. Two-dimension Clamp Adjustment: See Fig. 15. Adjust the angle of the two-dimension clamp when loosening tightening screw 1. Adjust the horizontal angle of the two-dimension clamp when loosening tightening screw 2 and nut 1.

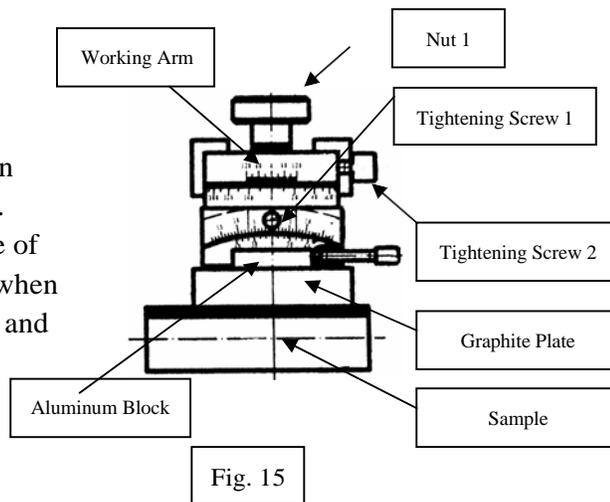


Fig. 15

6.1.5. Extended measurement for micrometer: See Fig. 16. When micrometer (0 – 25 mm) moves to 25 mm, loose screw 2 but keep sliding seat fixed, turn micrometer back to 0, tight screw 2 and that make micrometer measure in 25 – 50 mm range.

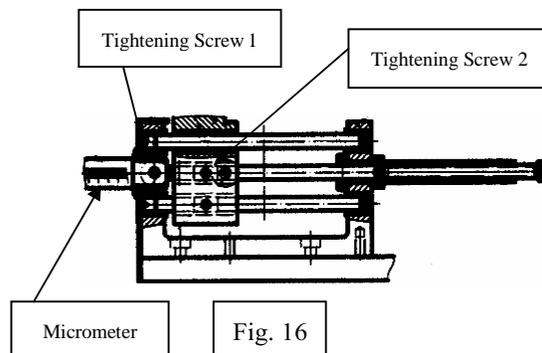


Fig. 16

6.2. Maintenance:

- 6.2.1. Keep lubricating oil between sliding rod and seat. Add No. 30 machine oil 8 hrs each.
- 6.2.2 Keep lubricating oil in the contact surface between up and down bodies of the two-dimension clamp. Add No. 30 machine oil 8 hrs each.
- 6.2.3 Add No. 30 machine oil into spring conduit twice a month.
- 6.2.4 Keep all shafts lubricated with No. 30 machine oil.
- 6.2.5 Clean all parts after working.
- 6.2.6 Let working arm away from position-limit switch after working.

6.3. Safety:

- 6.3.1. Follow the instruction for a safe operation for electrical appliance.
- 6.3.2 Keep your hands away from all turning parts and never touch the blade with your hand when the machine is running.
- 6.3.3 Don't adjust the micrometer and balance weight or remove the water trough when the machine is running.
- 6.3.4 Don't let the cooling water run into the machine inside.
- 6.3.5 After working, lift the working arm, turn the speed setup to "0" and then turn off the machine.

7. Warranty and Support

We provide one year limited warranty from date that we shipped the goods. If you find any defective part caused by manufacturer please feel free to contact us. We will replace defective part and instruct you how to change the part by yourselves during warranty period. However, we are not responsible for any damage or consequence damage caused by misuse.

After warranty, we will continue to provide technical support and spare parts at a reasonable cost.

If you have any question, please contact us at our Engineers will instruct you how to use and maintain the machine.

Standard Package

Part #	Standard items included on package	Qty.	Picture
UKAMLS01	Low Speed Diamond Saw	1 set	
UKAMLS02	Adjustable Balance Weight with Shaft at Back Side	1	
UKAMLS03	Balance Weight at Front Side	1	
UKAMLS25	Goniometric Specimen Holder	1	
UKAMLS05	One Pair of Blade Flanges, 35 mm dia. (1.4")	1	
UKAMLS06	One Pair of Blade Flanges, 46 mm dia. (1.8")	1	
UKAMLS07	One Pair of Blade Flanges, 62 mm dia. (2.45")	1	
UKAMLS08	Graphite Plate	2	
UKAMLS09	Aluminum Plate	2	
UKAMLS010	Wax Rod for Mounting Sample	1 set	

UKAMLS011	One Fuse, Two M4 Screws	1 set	
UKAMLS013	AC Power Cord	1	
UKAMLS014	Screw Driver	1 set	
UKAMLS015	O-ring of Driving Motor	1 set	
UKAMLS016	1 quart of SMART CUT water soluble coolant (advanced materials) formula or Mineral Oil (your choice) mix ration 1:20 (1 part coolant, 20 parts water) will make 5.7 gallons of coolant	1	
UKAMLS017	Lubricant Tub	1	
UKAMLS018	Collection Net	1	
Select Right Wafering Blade for your application	4" x .012" x 1/2" Diamond or CBN Wafering Blade. Sintered (metal bond) any specification. How to select the Right Diamond Wafering Blade for your application >>>	1	
4BC1	4" x .0137" x 1/2" 1A8 diamond wafering blade. all diamond from OD to ID blade will work until there is nothing left from the blade entire OD is consumed (will typically last as much as 3 to 4) blades together	1	
4SicB	4" x .015" (0.4mm) x 1/2" Silicon Carbide cut off blade	1	
4al203	4" x .015" (0.4mm) x 1/2" Alumina Oxide cut off blade	1	

	<p>Dressing Stick (1/2" x 1/2" x 6") alumina oxide - white color</p> <p>120, 220, or 320 grit (depending on your blade selection)</p>	1	
--	---	---	---