GESTER
TOTAL TESTING SOLUTION

GT-KB03

DIN ABRASION TESTER

Operating manual

GESTER INTERNATIONAL CO.,LTD

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Thank you for choosing the Gester Product. Please read this information guide carefully to be able to safely install, use and maintain your product

CONTENTS

COMPANY HISTORY

GESTER is a professional research, designing, manufacturing company, with the purpose of providing cost effective solutions for various industrial measuring applications, including: Textile, Fabric, Toy, Yarn, leather, Footwear, Furniture industries. Our company has grown to be a major international industrial testing equipment corporation with a long history, integrating development, production and distribution of testing equipments throughout China and International. All the products meet with: ISO, ASTM, AATCC, BS, EN, DIN, JIS and other requirable standards.

GESTER International has the factory in Dongguan of Guandong and the company in Fujian of China and Hongkong. To provide our customers with better overall solution laboratory, including laboratory design, planning, renovation and equipment selection, installation, training, maintenance, Comparative testing management system, such as one-stop authentication technology services.

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SAFETY INSTRUCTIONS

Due to the potential hazards associated with any electrical instrument it is important that the user is familiar with the instructions covering the capabilities, and the operation of the instrument. The user should ensure that all reasonable safety precautions are followed and if in any doubt should seek professional advice before proceeding.

The instrument is designed for use by suitably trained, competent personnel in a controlled working environment and is intended for use as a universal wear tester only.

The instrument contains moving parts and while all reasonable steps have been taken to protect personnel associated with these moving parts, incorrect or mis-use of the instrument could result in injury.
Consideration should be given to the nature of these moving parts before setting up the instrument.

The instrument is intended to be used in a residential, commercial and light industrial environment as laid down in EN 50081-1.

WARNING

This unit contains moving parts and hazardous live voltages. Under no circumstance should the user try to prevent or restrict the movement of parts or gain access to the internal circuitry, either personally or with the aid of foreign bodies.
All ventilation slots must be kept clear.

PROVISION FOR LIFTING AND CARRYING

When unpacking or moving this unit extreme care is required, owing to its physical construction and weight.
It is recommended that accepted lifting and carrying procedures are employed and that personnel wear the appropriate protective equipment e.g. safety shoes.
If the unit is to be moved an appreciable distance/height it is recommended that it is moved via a suitable vehicle e.g. a fork lift truck.

OPERATING ENVIRONMENT

This unit is intended to be used in a residential, commercial and light industrial environment as laid down in BSEN 50081-1 and BSEN 50082-1.
The following list gives examples of locations in which the instrument might be located; workshops, laboratories and service centers. Locations which are considered to be commercial or light industrial.

CLIMATIC ENVIRONMENT

The unit is intended to operate within the following conditions

i) Temp 23-35 deg Celsius
ii) Humidity 30-80% RH
iii) Altitude Up to2000m above sea level.

ELECTRICAL INFORMATION

This unit complies with BSEN 61010-1 1993 safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

INSTALLATION CATEGORY AND POLLUTION DEGREE

Installation category III
Pollution Degree 2

SECTION 1 INTRODUCTION

Application

The tester is applied to determine the abrasion resistance of polyester sole, adult shoe sole and polymer sheet material.

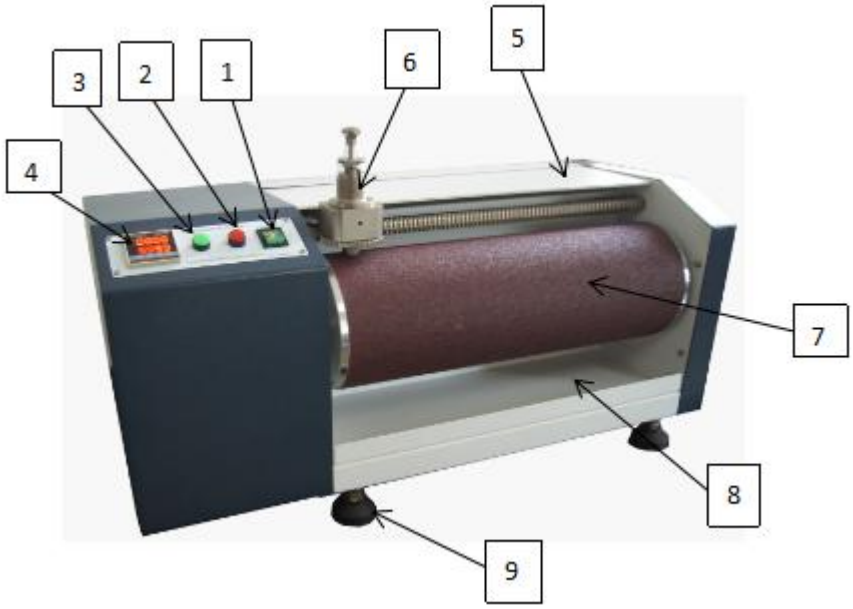
Principle

- Under the regulated contact pressure and a given area, it determines the abrasion value when the sample is rubbed on a certain level sandpaper.
- Sand paper is pasted on cylinder surface, and the sample is pressed by the cylinder with sand paper, then make the sample horizontal movement along the cylinder. Abrasion produces at one end of Cylindrical specimen, measure quality loss value of the sample, and Amount of volume abrasion value is calculated by the density of the sample.

Standards

- The tester meets standards of DIN-53516,JIS-K6369 ,JIS K6264-2,GB/T 20991 section 8.3,GB/T 20265,GB20266-2006,GB/T 9867,EN ISO 20344 section 8.3,AS/NZS 2210.2 section 8.3,ISO 4649,SATRA TM174,BS903-A9 Method A,ASTM D5963(the tester can be designed as customer special requirement or standard).

Machine picture



1.Power switch
2.Stop
3. Start
4.Counter
5.Cover
6.Holder
7.Sand paper
8.Catch tray
9.Foot margin

Specification

Item	Standard
Load	2.5 ± 0.1 N; 5.0 ± 0.1N; 10.0 ± 0.2 N
Holder lateral displacement	4.2 ± 0.04 mm/cylinder every circle
Cylinder	∅ 150 ± 0.2 mm , length 500 mm
Cylinder rotation speed	40 ± 1r/min
Abrasion distance	40 ± 0.2 m is equal to 84 circle s of the cylinder
Dip angle	3°(Sample holder central axis and the drum rotation direction vertical angle).
Sand paper	Granularity 60 #, Average thickness 1 ± 0.2 mm,Width at least 400 mm
Volume (about)	75 cm × 40 cm × 40 cm
Weight (about)	61 kg
Power supply	1 ∮ AC 220V (as county or appointed)

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SECTION 2 INSTALLATION

✧ Power condition：Please install correct power supply according to the marking on the tester brand.

Danger

The input voltage error range is within ±10% , ensure the tester grounded correctly, to prevent the harm of leakage.

※The machine shall be grounded indeed,to ensure test normally and operator safety.

✧ Working environment Requirement: temperature 15 ~ 30℃,relevant humidity below 80%.

✧ This machine should be laid on a level and stable platform for installation and location.

SECTION 3 SAMPLE PREPARATION

✧ Test instrument appliance preparation.(Test equipment is given priority to with the actual parts list, if not indicated below test used in appliances, please customer should bring along their own)

➢ Electronic balance(Accurate to 1 mg)
➢ DIN drilling machine
➢ Special DIN double-sided adhesive
➢ Hairbrush
➢ mucilage glue
➢ DIN standard glue
➢ Sample Smooth machine.
➢ cross screwdriver
➢ corresponding socket head
➢ sandpaper:60#, length 473mm, width is more than 400mm but not exceed expansion cylinder length.

✧ Sample preparation:

➢ Take the standard glue:

- To ensure the standard gule is within period of validity,or it cannot be used.
- Use the DIN drilling to cut a sample with diameter 16 ± 0.2 mm,thickness more than 6mm from DIN standard glue.(no scar,no hollow)

【Note】

- The standard glue can be Sulfide forming with standard model directly or use DIN drilling machine to cut,but allow the blanking.
- The standard glue shall be adhesive in the material with thickness 3mm,not less than 80 IRHD hardness, ϕ 16 mm.(such as rosin gum).That can help secure standard glue on the holder,and increase standard glue life time at the same time.

- standard glue amount: take 6 samples.
- standard glue standard condition:Please put the sample in a environment with temperature 23 ± 2℃,relative humidity 65 ± 2 % more than 16 hours before the test begin.

✧ Sampling:

- Use DIN drilling machine to cut sample with diameter 16 ± 0.2 mm from difference parts of the material.
- Thickness 6 ~ 14 mm,rub it and surface is smooth,vertical sample Axis has no obvious pattern .(SATRA standard)
- Diameter 16.0 ± 0.2 mm,thickness more than 6 mm(DIN standard).
- Diameter16.0 ± 0.2 mm,thickness 6 mm ~ 12 mm(GB,ISO,BS standard).
- Diameter 16.2 ± 0.2 mm,thickness more than 6 mm (JIS standard).

【Note】

- The standard glue can be Sulfide forming with standard model directly or use DIN drilling machine to cut,but allow the blanking.
- Take the sample from the under test material ,if flaky material,the cutting sample is at least 50mm distance from the Manufacturing side. For the finished shoes sole,you shall cut the sample in the smooth area(such as sole front end unpatterned part,Sole central,heel inside place) which is more than 16mm ,if the bottom has Solid layer(such as PU (poly urethane),you shall avoid these place during selecting the sample,if cut the solid layer,you can tear up this layer before test.
- If the test material surface has 0.5mm depth pattern,it's impossible to cut the sample without pattern ,you need to purchase a smooth machine to smooth the surface.If the surface is rubbed,the sample shall be in the normal temperature 16 hours,then for test.
- Sample thickness is less than 2mm,not suitable for this tester.
- Sample thickness more than 2mm and less than 6mm,you need to use adaptive viscose.Paste to the sample to a material with The hardness of not less than 80 IRHD,Φ16 mm (such as resin adhesive),make the thickness more than 6mm,but the total thickness shall not more than 14mm.
- If the sample is more than 14mm,you need to buy a smooth machine to smooth the material reverse side thickness less than 10 ± 4 mm.
- If the sample is loose soft and empty,it's better to paste each sample to a thickness less than 80 IRHD,Φ16 mm,thickness about 3 mm material (such as resin adhesive).that can secure the sample to the holder,make the sample will not be deformation.But the total thickness shall not exceed 14mm.

➢ Sample number: choose three samples to make test.

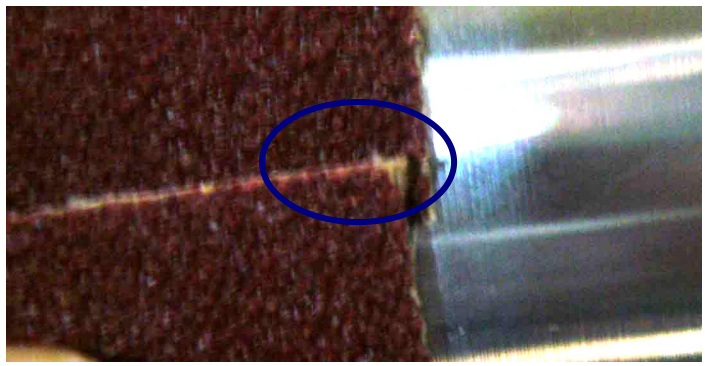
➢ The standard state of standard rubber: before testing, the sample should be stayed on temperature 23 ± 2 ℃ , relative humidity 65±2% stayed 16 hours.

SECTION 4 OPERATION

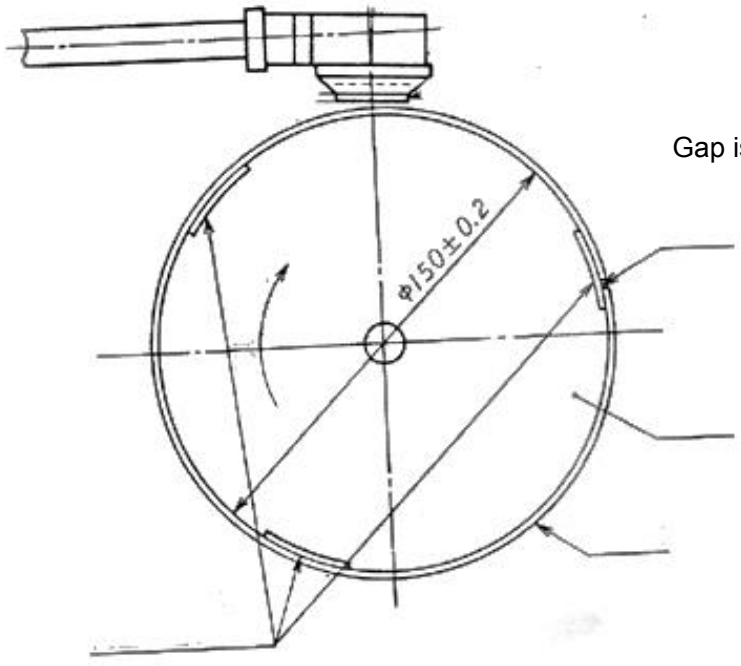
✧ Installed abrasive paper (before installation, please put gloves, the fingers were not galled by sand)

➢ Get abrasive paper that length is 473 ± 1mm and width is 400 mm at least. But those

two items does not exceed roller, the average thickness is about 1.0 ± 0.2 mm.



- Get three bars double-face tape that is equal to roller, the thickness is 0.2mm at most, the width is 50mm, add them on roller well-distributed. At some time, every double-face tape will be parallel with axial lead of roller; one bar was stick on the two side layup of abrasive paper.
- When fixed abrasive paper, the direction should be same both marking arrow direction of abrasive paper back and test operation, it should be stick on roller tightly, the front and back two sides of abrasive paper should be aligned, at some time, the two short side should is parallel with roller axis.
- When abrasive paper two sides were stick, the gap is not exceed 2mm, but it won not be coincided.



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➢ Abrasive papers will be rough after changing; it must be polished by round metal block. (No load condition)

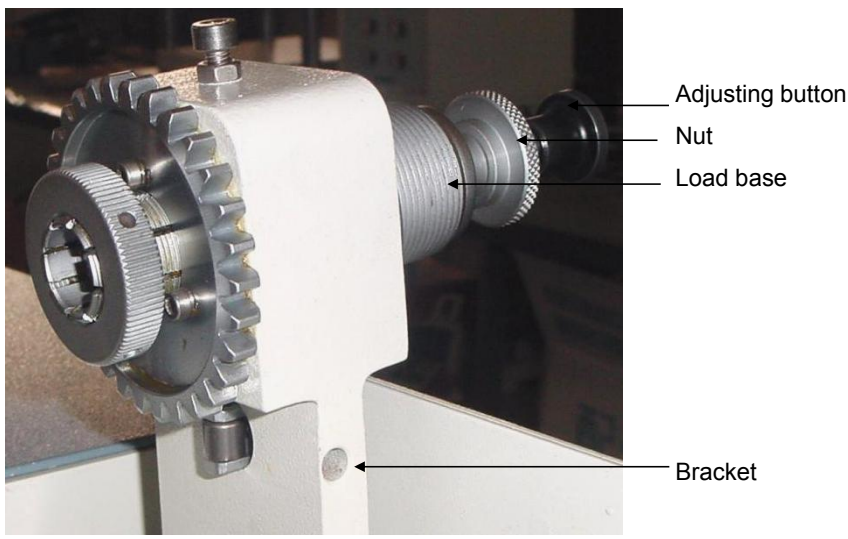
【Note】

■ Roller must be no dust and clean. When changing old abrasive paper, the double-face tape on roller should be swept clearly. The abrasive paper is clean after polishing.

■ When sticking abrasive paper, please use fine abrasive paper to polish the two sides joint of abrasive paste face.

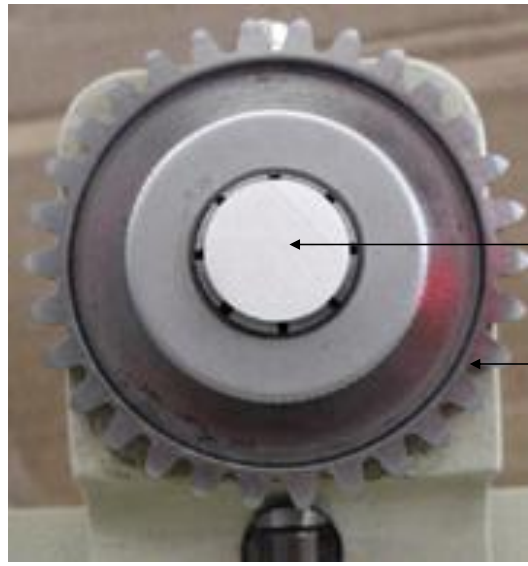
➢ The testing method of using standard rubber to modify the abrasive paper consumptions, and insure it whether keeps in 180 mg ~ 220 mg:

✧ Pick up the whole bracket upward to original site, the following is the picture:

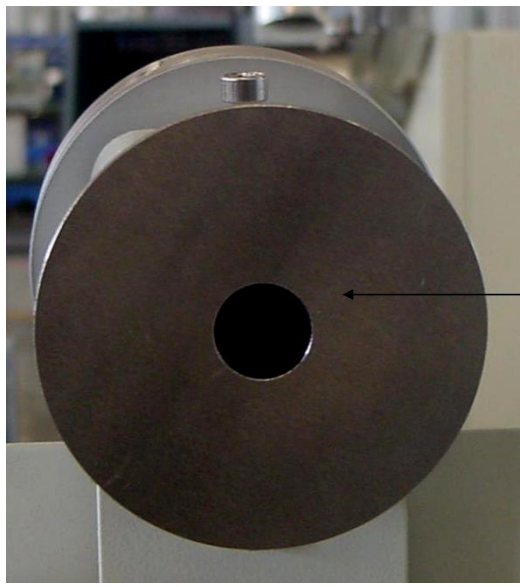


✧ Grip standard rubber

➢ Loosing screw nut at the anti-clockwise direction, the collet will became large, and put standard rubber(the standard rubber can be used, but the thickness or the total thickness of standard rubber stick on the rubber materials shall be more than 6mm) into collet inner, pressing sample and locking screw nut at the clockwise direction.



➢ Put the metal that thickness is 2 mm on well-equipment standard rubber, adjusting bolt at the anti-clockwise or clockwise direction, standard rubber is parallel with metal thickness chunk (let the standard rubber show collet about 2 ± 0.2 mm)



✧ Moving whole bracket to original site, and put it on guide rod pulley just like picture seven.

✧ Put weight of the 2.5N and 5.0N on load seat, just like picture 8.

Danger

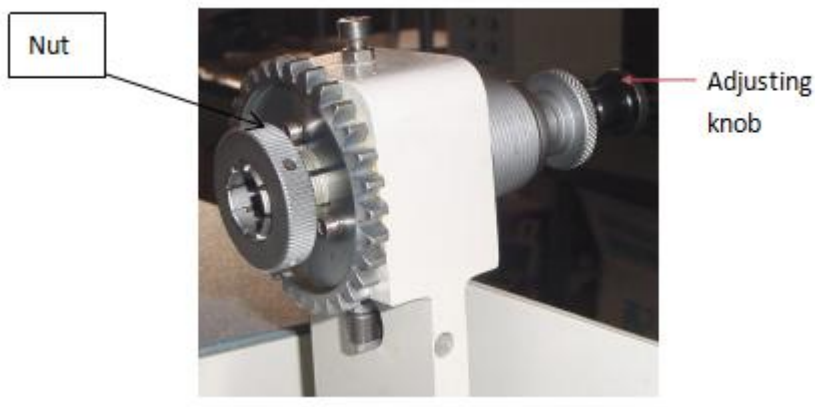
■ Avoid hurting operator, when gripped sample and installed abrasive paper, it should be not supply power.

✧ Start Test：

➢ Put the pipe of the cleaner onto the interface, Let moving pipe of cleaner stay in the original place during testing and there is 1mm between sandpaper and pipe.

➢ Contact the right switch power supply,start button”POWER”(as picture2-4),push button”START”(as picture2-2). Pre-grinding first, make sure the sandpaper can match the Standard rubberpre-grinding.After half of the pre-grinding,push button”STOP”(as picture 2-3),stop means in the middle of the guide pulley on the red horizon Standard,mark on the standard plastic clip head.

➢ Push forward adjusting knob hardly (as picture5) or unscrew the nut in a counterclockwise direction(as picture6), from standard rubber rod clamp head to remove surface residual colloidal particles, and weighed in the balance (W1), accurate to 1 mg.



- Then make it back to the starting point until the whole bracket backward bracket can move freely, holding the weighed standard rubber in 2.5.3 again,note: the standard glue mark on front side.
- Push button “START”again(as picture2-2). Begin to grind to 40 m trip (84 RPM), the machine will automatically filed after the whole trip.
- Take off the standard from clamp head, get rid of surface residual colloidal particles, weighed in the balance (W2) again. Accurate to 1 mg.

NOTE:

- Clean sandpaper with a brush while is grinding.
- You must unscrew the screws or it can not rotate.

- Test at least three standards, take the average.
- Using the following formula to calculate the standard quality of rubber abrasion: Q = W1 - W2

NOTE:

1.Analyze the abrasion weight of sand paper,determine whether the abrasion weight of sand paper at 180 mg to 220 mg.

2.If the sand abrasion said quality is greater than 220 mg of sand paper is too thick

3.If the sand abrasion said the weight is more than 220mg of sandpaper,it is too rough,you must use a piece of round metal to grind again(without any load),after

that,you should clean the dust,then use the standard rubber to test until the abrasion

Weight reaches 180 mg to 220 mg according to the above way. If the weight of sand abrasion is less than 180 mg should be abandoned.

✧ Test Sample:

➢ To test sample after we known abrasion weight of standard rubber.

➢ Reduce the weight of testing samples (such as the operation of standard rubber).Test three samples, take the average.

➢ Calculate the abrasion weight of samples, △m=the weight of the sample after preliminary grinding (half the itinerary) - the weight of the sample after testing(the whole itinerary)

NOTE:

- During the sample's test, according to the material on the actual situation,the sample and sandpaper grinding should be matched.
- Using the standard rubber you should check whether the sand abrasion is in the range of 180mg~220mg regularly（sample testing two to three times. Finally calculated volume abrasion with the test standard weight of rubber abrasion of mg.

➢ Use electronic balance to test sample's proportion (S).

➢ After finished testing, switch off the power.

✧ Evaluation of result:

Substitute the number into the following formula,calculate value of abrasion A(mm^3).

$$A=\frac{\triangle m \times 200mg}{Q \times S}$$

△ m: the weight of sample abrasion,mg;

Q: the weight of standard rubber abrasion,mg;

S: the proportion of sample,(mg/ mm^3)

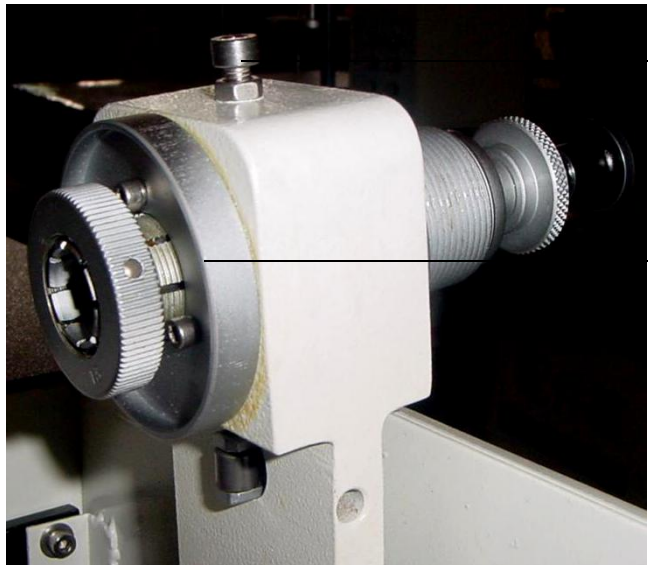
Notes

- Due to the low wear resistance of test materials (such as small particles of rubber, EVA and polyether type of polyurethane) can be reduced from 10.0 ± 0.2 N to 5.0 ± 0.1 N
- Reduce revolution from 84 to 43, relative displacement between materials and sand paper is 20 m, sample abrasion is mass multiply two.

【Attention】

■ If left 20m trip lever is equipped, please take down the left landing block, get off the up and down blocks on the left side with screwdriver, take out the sideling end of left 20m trip lever, aims at the red line on the guide pulley, then fix it. Ensure that the right landing block is fixed on the trip lever.

- When you want to make the sample non-rotation, do as the picture 7,take down the gear with six angle,change the round wheel of company attachment, and fix it on the clamp head, at the same time, lock screws on the holder.



SECTION 5 CALIBRATION PROCEDURE

■ Calibration Item: Roller rotation speed, sample holder horizontal scroll displacement, load, central axis angle of the sample holder.

- Calibration Appliance: stopwatch, vernier caliper, pressure gauge, angle gauge.
- Calibration Period: One year.
- Calibration steps:

➢ Cylinder rotation speed calibration method:

When start the tester, press the stopwatch at the same time, record stopwatch time and calculate the error value with standard roller speed.

Attention

- Sign on the cylinder at the beginning to be good for calculating rotation speed and the value also can be got by using the revolution counter measurement.

➢ The sample holder horizontal movement displacement calibration method:

Start the tester, when the cylinder rotates a revolution,using vernier caliper measures the sample holder horizontal moving distance, record vernier caliper display value, And calculate the error value with standard mobile displacement.

➢ Loading calibration method:

1. Using one end of filament to fix sample holder chuck center, then use pressure gauge hooking the other end of filament for vertical extension until the sample holder clamp is completely out of the roller 2-5 mm.
2. Record the show value of the pressure gauge, and calculate the error value with the standard load.

➢ Central axis angle of sample holder calibration method:

Adjust the sample holder horizontality(using spirit level),angle gauge put above the sample holder.

Record the angle gauge display value,and calculate the error value with the standard sample holder.

Attention

During the calibration, if the error value between the measured value and the set value is out of the permissible range(Refer to the inspection report), please contact service department of our company.

SECTION 6 MAINTAIN PROCEDURE

- Clean : keep the instrument clean anytime, Use cotton cloth to wipe the machine abrasion dust before or after test to keep it clean.
- Rust-proof: regularly spray rust-proof oil on machine metal surface.
- Lubrication : Regularly fill lubricating oil on machine drive parts (normal lubricating oil can be chosen).

SECTION 7 TROUBEL SHOOTING

Fault Situation	Possible Cause	Solution
• Connect the plug to the proper power,power on ,control panel is not display.	• No power supply • Plug connection is getting loosen or breakage. • Power switch connection is getting loosen or breakage. • Control circuit board and the mainboard connection is getting loosen or breakage. • The fuse burn out	• Please ask for the electrician to check and recover the power supply. • rewiring. • rewiring. • rewiring. • Change the fuse with the same capacity.
• There is big abnormal noise when the machine is working .	• The transmission part of the lack of lubricating oil • The transmission rack and pinion bad cooperation	• Add lubricating oil. • Add lubricating oil or readjustment.
• The pressure can't do adjustment.	• Oil-water separate • Air supply is not on	• Change the oil-water separate with the same standard. • Check the turn on the air supply.
• The fuse burn out frequently, out of use.	• The input voltage is abnormal • Motor abnormal	• Please ask the electrician to check and recover the normal power supply. . • Motor damage, maintain or change motor .

• Power input,press START key,the machine cannot working normally.	• Control circuit board is damaged • Fuse burn out. • Inverter wiring loose or broke • Frequency converter damage • Motor wiring loose or break • bearing failure • motor failure • Transmission parts and wheel gear stuck .	• Change circuit board • Change the fuse with the same capacity. • rewiring • Change • Rewiring on the Control circuit board. • Change bearing. • Maintain or change the motor with the same type. • Add lubricating oil or readjustment.;
• Test speed can not reach the standard value.	• Display panel is damaged • Frequency converter damage	• Replace the display board . • Replace the frequency converter.

SECTION 8 PACKING LIST

ITEM	AMOUNT	UNIT	REMARK
Main machine	1	unit	
Manual	1	unit	
Quality of Certificate	1	unit	
Weight-2.5N	1	unit	
Weight-5N	1	unit	
Premilling sheet metal	1	unit	
Standard ground rubber	2	unit	
Sampling knife	1	unit	
Power line	1	unit	

SERIAL NUMBER_____

DATE _____