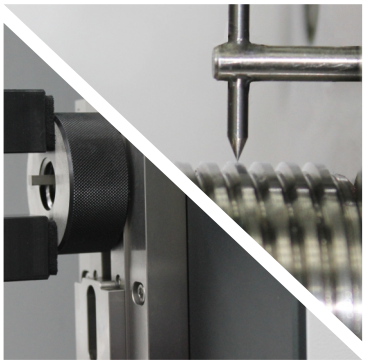
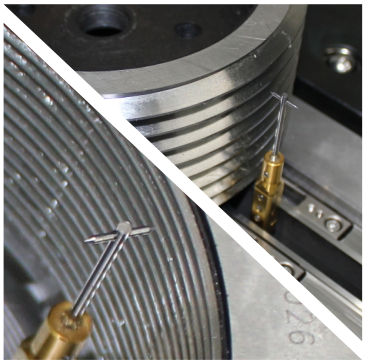
CHOTEST

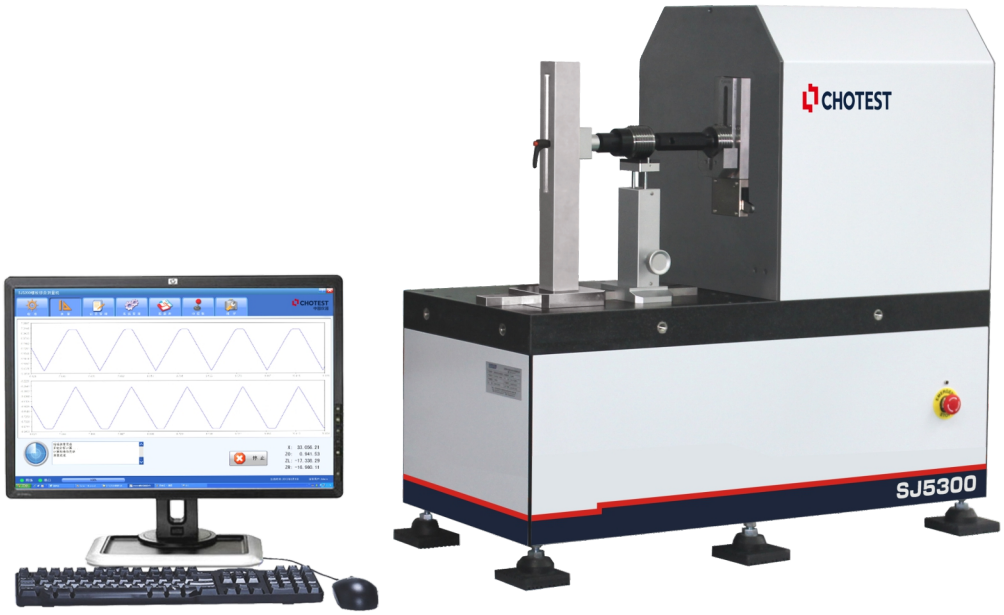




Universal Thread Measuring Machine

Chotest Technology Inc.

In 2 min,
measure all parameters of plug or ring gauge



Functions

1. Thread measurement function

1) Full-automatic measurement for comprehensive parameters of cylindrical thread plug gauges, cylindrical thread ring gauges, taper thread plug gauges, taper thread ring gauges, plain ring gauges, plain plug gauges and other gauges with internal & external dimensions, including virtual pitch diameter , single pitch diameter, basic pitch diameter, major diameter, minor diameter, thread pitch, thread angle, half of thread angle, flank straightness, lead angle, taper, etc.

2) Can measure trapezoidal thread, buttress thread, sawtooth thread and other large-slope thread, as well as ordinary thread.

3) Can measure comprehensive parameters of single thread and multiple thread

4) Measure various thread gauges according to GB, ISO, BS, ANSI, DIN, JIS standards. With comprehensive and professional thread standards in database, it meets requirements of most customers.

5) Automatically generate test results according to relevant regulations and standards.

6) After one time measurement, the software can records various parameters of thread and display data of any position, in addition it generates the thread curve, relevant parameters and analysis chart automatically.

7) Measuring probe and workholder are identified automatically, which avoids collision of measuring probe caused by operating errors.

8) One-sided or two-sided measurement and analysis for gauges.

9) Controller for measuring pin positioning: with an easy-to-use buttons control box, the operation is more flexible.

10) User-friendly English software system and simple & convenient operation.

11) Test results are saved automatically with name of measuring series number + size of measuring gauge + type of measuring gauge, which can be recognized easily. With centralized database management for measuring records, the user can query and manage the measuring records according to object type, testing institution, manufacturing number, inspector, submitted institution, equipment number, inspection date, effective date, etc.

12) Can print multiple selected test records or test certificates from database at a time.

13) Can export test data to Word, Excel, AutoCAD (optional) files

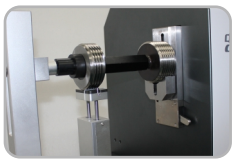
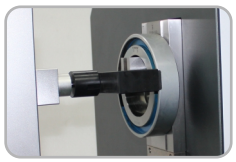
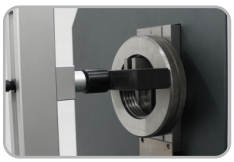
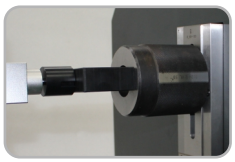
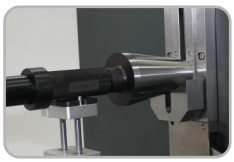
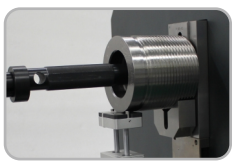
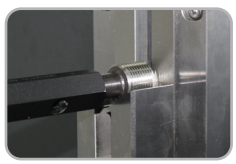
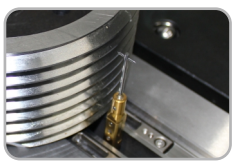
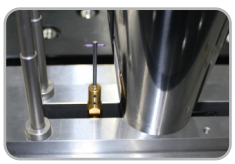
14) Data backup and restore

15) Output reports in a variety of formats in Word or PDF, particularly the format can be customized.

16) Can customize measuring standards according to requirements of customer(optional)

17) Extra analysis & algorithm can be uploaded for special thread, especially for thrust thread, which is suitable for customization and development of thread gauges.

Application:


2. One sided or two-sided profile measurement

1) Scan measurement: T-shaped Measuring probe contacts and measures surface of test object. The machine measures and inspects profile, two-dimensional dimension, two-dimensional displacement of the test object. Particularly, it can direct measure holes, grooves and other special part which can not be measured by traditional measuring instruments, moreover, it can qualify the data according to corresponding standard, or describe surface contour curve. The measurement is fast with reliable test result.

2) Graphical analysis: Based on profile shape data measured by the machine, the system assesses arc, angle, tilt and distance etc. by using fitting method, consequently, system can measure shape parameters including radius, diameter, grooves distance, angle, gradient, embossment, horizontal distance, vertical distance, etc. It includes basic element factor calculation, multiple element factors calculation, unit calculation, coordinate control, marking tolerance, etc.

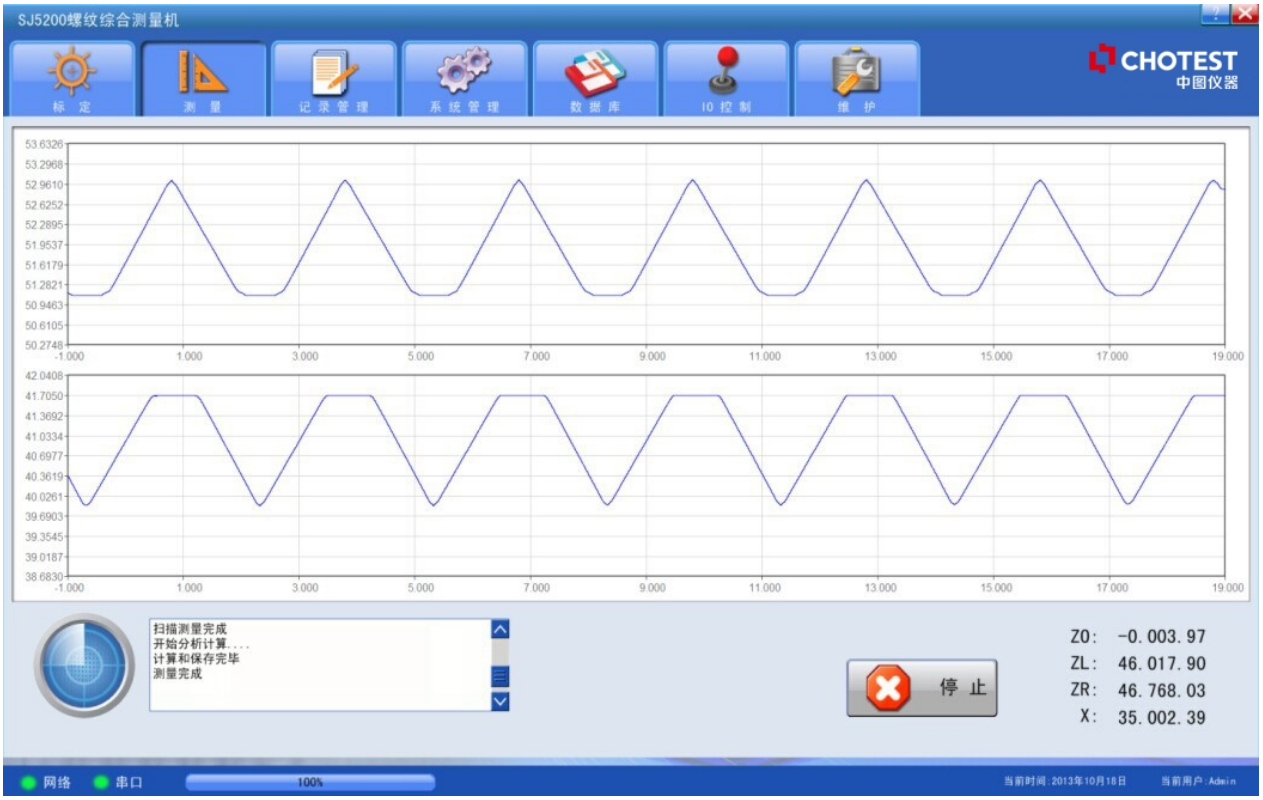
3) The user can select local elements of graphics, then the system can measure and calculate the coordinate, distance between points and lines, arc center, arc acme, as well as assess roundness, straightness, parallelism and other shape and position tolerance.

4) Can export the measured data to Auto CAD or Excel for further analysis, or use its contour function for further

Features

1. Full-automated measurement

Without human intervention, the machine implements measurement and evaluation of all thread parameters in 2 min, finally displays all measuring results. According to built-in thread standards, the system generates the test report automatically. That significantly simplifies the operator's work as well as improves the measuring efficiency, quality and accuracy.



2. High accuracy, high stability and high repeatability

1) Leading high-speed multi-channel, high-precision linear encoder system: The resolution of linear encoder is up to 0.01um and its repeatability is less than 0.1um.

2) Accurate control system of measuring force: Stable and reliable contact measurement is achieved by accurate control system of measuring force, in addition, error resulted from unstable measuring force is reduced. Its measuring force is much less than the one of similar machine from other company. The small measuring force helps to improve duration of Measuring probe(more than 10,000 times), as well as avoid scratching the gauges.

3) Precision air-bearing guide rail system: Master key manufacturing technology of precision air-bearing guide rail system with no wear, micro friction.

4) Special manufacture of key part: Measuring values are acquired truly and accurately by using high-rigid and deformation-free Measuring probes made from imported special materials

5) Ingenious balance arm technology: it eliminates swing of guide rail, which ensures orthogonal stability of coordinate system in measurement.

6) Precision mechanical design experience and manufacturing, assembling ability: The company has been designing and manufacturing precision instruments for more than 10 years; A number of R & D engineers who have rich experience in the designning and manufacturing of precision instruments and a group of skilled technicians for machining, assembling ensure sophisticated producing technology; There are dvanced inspecting, processing equipments in the factory.

3. Simple, humanized design

With quick workholders for thread and user-friendly software UI, without complex adjustment process as well as manual recording, the operator can be trained to use it within a few minutes. Operation of the machine is extremely simple.

1) Provide user with Simple, practical, fast operating interface thanks to 10 years accumulated designing experience in metering software.

2) With built-in various thread standards, the software can record and process the data in measurement, finally generate the test result automatically.

3) Wide application: can measure most of thread gauges.

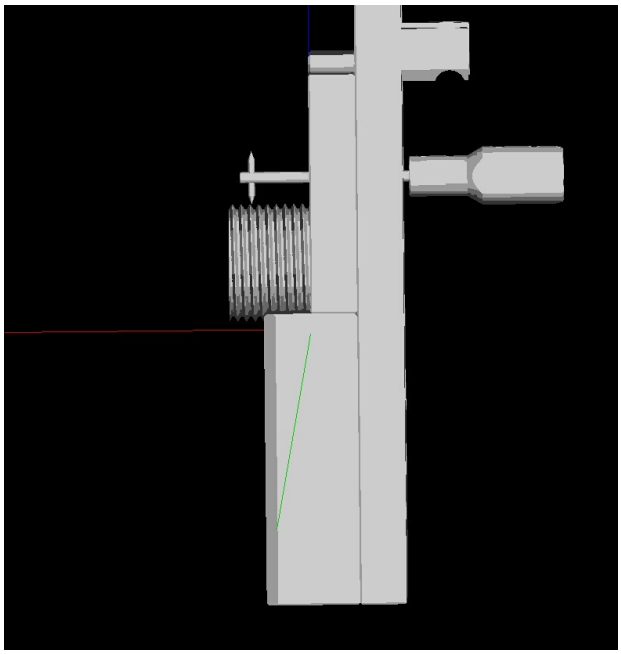
4) User-friendly Russia software system and simple & convenient operation.

5) Output reports in a variety of formats in Word or PDF; Can print multiple selected test records or test certificates from database at the same time

6) All test records can be kept in the database of computer thanks to large capacity storage technology.

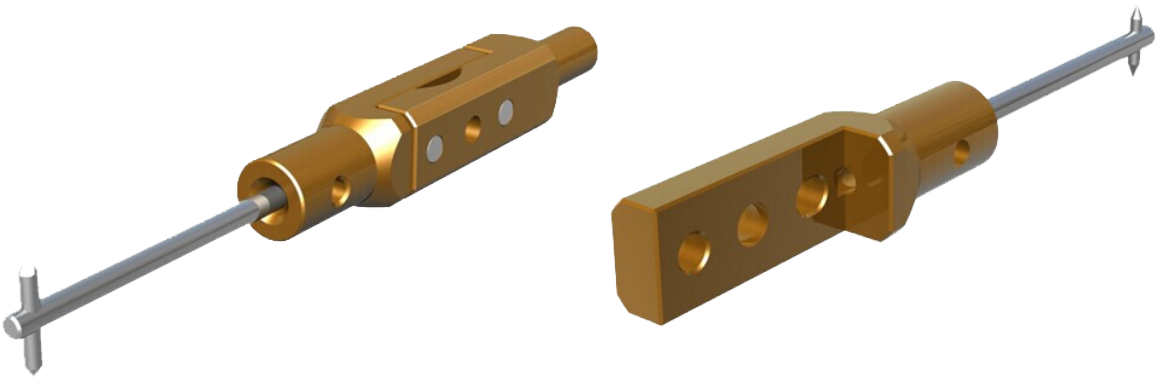
4. 3D navigation function

3D navigation graphics of Measuring probe, workholder and workpiece is built by applying 3D graphics technology, which realizes real-time & multi-angle display, consequently, probability of collision of Measuring probe is minimized. The operating convenience, accuracy, safety and reliability are improved greatly.



5. Convenient and accurate replacement of Measuring probe

In the innovative structure for installation of Measuring probe, the pin holder is fixed vertically(the pin holder aligns cross section of thread). This structure eliminates errors caused by repeated installation, so with excellent repeatability it ensures high accurate measurements .

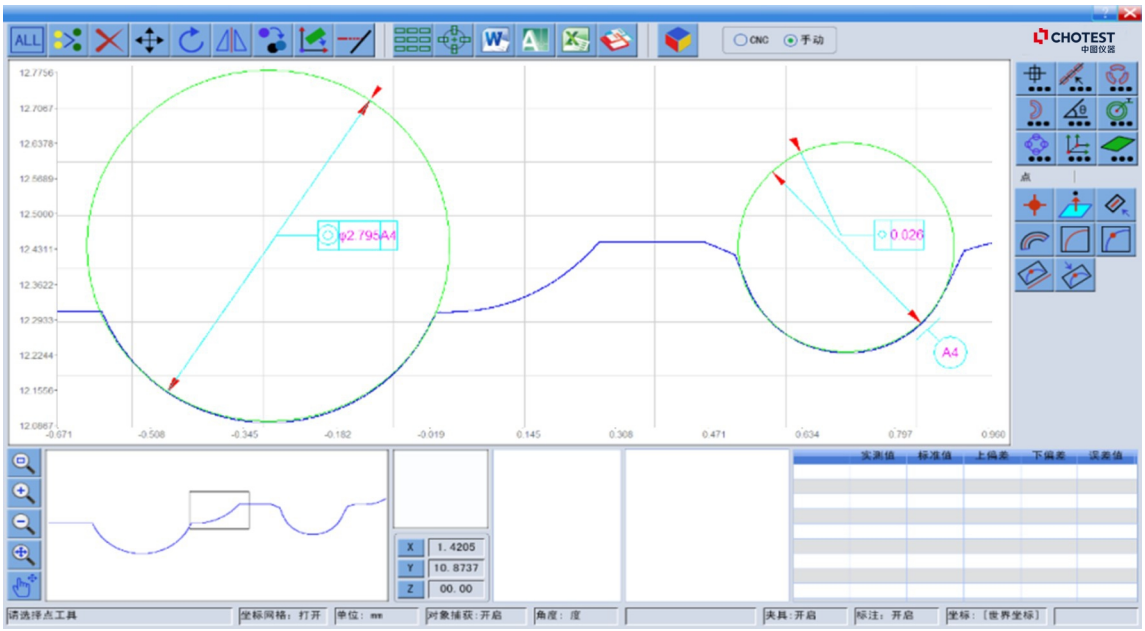


6. Combined workholder

Decrease the frequently-used workholders from 4 to 2 by applying Two-in-one and three-in-one ones without gasket and heel block. All these workholders can be used for measuring both thread ring gauges and thread plug gauges. By reducing frequency of installation&uninstallation&calibration of different workholders, the operation is more simple and the work is more efficient, in addition risk of operating errors is down much.

7. One-sided, two-sided profile measurement and analysis function

Some special gauges and workpieces can be measured and analyzed by profile measurement and analysis function. Moreover, the measured data can be exported to AutoCAD, Excel for further analysis.



8. Automatic identification of workholders, measuring probes

The system can identify the workholders, measuring probes automatically, which avoids measuring probe collision result from fault manual operation.

Standards

By now there are 100 standards of thread in Universal Thread Measuring Machines, and more standards are being edited. Part of Thread standards is as follows,

Thread Standards			
No.	Standard No.	No.	Standard No.
1	GB/T 13576-2008(GOST 10278-1981)	41	API Spec 5B：10-2008
2	ANSI/ASME B1.20.1-1983	42	NFPA 1963-2003
3	JB/T 10031-1999	43	ASME B1.20.7-1991
4	ZB J42 037-1989	44	ANSI/ASME B1.1-2003
5	BS 919-2：	45	BS 919-2：2007
6	GB/T 3934-2003	46	BS 919-2：2007
7	QB/T 2554-2010	47	BS 21：1985
8	ASME B1.2-1983	48	BS EN ISO 228-2：2003
9	GB/T 3934-2003	49	BS 919-1：2007
10	GB/T 1957-2006	50	BS 919-3：2007
11	GB/T 11853-2003	51	BS EN 10226-3：2005
12	GB/T 11854-2003	52	BS 2779-1986
13	GB/T 10922-2006	53	ISO 1502-1996
14	GB/T 22091.1-2008	54	ISO 228-2：1987
15	ISO 7-2：2000(国标)	55	ISO 7-2：2000
16	GB/T 197-1981	56	ISO/R 1938-1971
17	GB/T 197-2003	57	DIN ISO 1502-1996
18	GB/T 8124-2003	58	DIN 7162：1965
19	GB/T 4749-2003	59	DIN 7150-2：2007
20	GB/T 22512.2-2008	60	DIN 2999：1973
21	GB/T 22512.2-2008	61	DIN EN ISO 228-2：2003
22	GB/T 9253.2-1999	62	DIN EN 10226-3：2005
23	GB/T 8336-2011	63	DIN 158-2：1997
24	GB/T 8336-1998	64	DIN 405-3-1997
25	GB/T 1483.1-2008	65	JIS B0251-1998
26	GB/T 5796.4-2005	66	JIS B0251-2008
27	JB/T 10971-2010	67	JIS B0251-1975
28	JB/T 10588-2006	68	JIS B0254-1985
29	JB/T 10588-2006	69	JIS B0254-1985
30	JB/T 10865-2008	70	JIS B0253-1985
31	JB/T 10031-1999	71	JIS B0253-1985
32	ANSI/ASME B1.2-1983	72	Q/20197304-4.210009-1999
33	ASME B1.20.1-1983-R2001	73	Q/20197304-4.210010-2000
34	ASME B1.20.5：1991	74	ASME B1.5-1997
35	ASME B1.20.1-1983-R2001	75	ASME B1.8-1988
36	ASME B1.5-1997	76	HB 6827-1993
37	ASME B1.8-1988	77	QJ 2761-1995
38	ASME B1.5-1997	78	MT/T 521-2006
39	API Spec 7-2 Preferred：01-2008	79	GB/T 8336-1987
40	API Spec 7-2：Non Preferred：01-2008	80	GB/T 8124-2004

Parameters

SJ5500

Item No	SJ5500-200	SJ5500-300	SJ5500-400	SJ5500-500	SJ5500-600
Outside meas. range	(1. 0～250)mm	(1.0～350)mm	(1.0～450)mm	(1.0～550)mm	(1.0～620)mm
Inside meas. range	(2. 5～250)mm	(2. 5～350)mm	(2. 5～450)mm	(2. 5～550)mm	(2. 5～620)mm
Max measuring length	250mm				
Min thread pitch	0.1mm				
Weight	2000kg				
Dimension	(2000×900×910)mm				
Measuring uncertainty:					
Cylindrical or Taper thread ring gauge(Minor diameter>2.5mm, half of thread angle≥27°)					
Minor diameter	3.0 + L/200μm				
Actual pitch diameter	3.0 + L/200μm				
Thread pitch	0.8 + L/200μm				
Cylindrical or Taper thread plug gauge (Major diameter>1mm, half of thread angle≥27°)					
Major diameter	2.9 + L/200μm				
Actual pitch diameter	2.9 + L/200μm				
Thread pitch	0.8 + L/200μm				
Plain ring / plug gauge	2.0 + L/200μm				
Other measurement	2.0 + L/200μm				

SJ5200

Item No	SJ5200-60	SJ5200-100	SJ5200-160
Outside meas. range	(1. 0-50)mm	(1.0-90)mm	(1.0-150)mm
Inside meas. range	(2.5-60)mm	(2.5-100)mm	(2.5-160)mm
Max measuring length	60mm	60mm	60mm
Min thread pitch	0.1mm	0.1mm	0.1mm
Weight	200kg	250kg	300kg
Dimension	100×45×100cm	100×45×100cm	100×45×113cm
Measuring uncertainty:			
Cylindrical or Taper thread ring gauge(Minor diameter>2.5mm, half of thread angle≥27°)			
Minor diameter	(2.5 + L/200)μm	(3.0 + L/200)μm	(3.0 + L/200)μm
Actual pitch diameter	(2.5 + L/200)μm	(3.0 + L/200)μm	(3.0 + L/200)μm
Thread pitch	(0.75 + L/200)μm	(0.75 + L/200)μm	(0.75 + L/200)μm
Cylindrical or Taper thread plug gauge (Major diameter>1mm, half of thread angle≥27°)			
Major diameter	(2.0 + L/200)μm	(2.5 + L/200)μm	(2.5 + L/200)μm
Actual pitch diameter	(2.0 + L/200)μm	(2.5 + L/200)μm	(2.5 + L/200)μm
Thread pitch	(0.75 + L/200)μm	(0.75 + L/200)μm	(0.75 + L/200)μm
Plain cylindrical or Taper gauge(Diameter>10mm)			
Plain ring gauge	(1.0 + L/200)μm	(1.5 + L/200)μm	(1.5 + L/200)μm
Plain plug gauge	(1.0 + L/200)μm	(1.5 + L/200)μm	(1.5 + L/200)μm
Plain cylindrical or Taper gauge(Diameter from 1mm to 10mm)			
Plain ring gauge	(1.5 + L/200)μm	(2.0 + L/200)μm	(2.0 + L/200)μm
Plain plug gauge	(1.5 + L/200)μm	(2.0 + L/200)μm	(2.0 + L/200)μm

SJ5300

Thread gauge measurement			
Item No	SJ5300-60	SJ5300-100	SJ5300-160
Outside measuring range	(1. 0-50)mm	(1.0-90)mm	(1.0-150)mm
Inside measuring range	(2.5-60)mm	(2.5-100)mm	(2.5-160)mm
Max measuring length	75mm	75mm	75mm
Min thread pitch	0.1mm	0.1mm	0.1mm
Weight	200kg	250kg	300kg
Dimension	100×45×100cm	100×45×100cm	100×45×113cm
Measuring uncertainty:			
Cylindrical or Taper thread ring gauge(Minor diameter>2.5mm, half of thread angle≥27°)			
Minor diameter	(2.5 + L/200)μm	(3.0 + L/200)μm	(3.0 + L/200)μm
Actual pitch diameter	(2.5 + L/200)μm	(3.0 + L/200)μm	(3.0 + L/200)μm
Thread pitch	(0.75 + L/200)μm	(0.75 + L/200)μm	(0.75 + L/200)μm
Cylindrical or Taper thread plug gauge（Major diameter>1mm, half of thread angle≥27°)			
Major diameter	(2.0 + L/200)μm	(2.5 + L/200)μm	(2.5 + L/200)μm
Actual pitch diameter	(2.0 + L/200)μm	(2.5 + L/200)μm	(2.5 + L/200)μm
Thread pitch	(0.75 + L/200)μm	(0.75 + L/200)μm	(0.75 + L/200)μm
Plain cylindrical or Taper gauge(Diameter>10mm)			
Plain ring gauge	(1.0 + L/200)μm	(1.5 + L/200)μm	(1.5 + L/200)μm
Plain plug gauge	(1.0 + L/200)μm	(1.5 + L/200)μm	(1.5 + L/200)μm
Plain cylindrical or Taper gauge(Diameter from 1mm to 10mm)			
Plain ring gauge	(1.5 + L/200)μm	(2.0 + L/200)μm	(2.0 + L/200)μm
Plain plug gauge	(1.5 + L/200)μm	(2.0 + L/200)μm	(2.0 + L/200)μm
Profile measurement:			
Outside measuring range	(0～50)mm	(0～90)mm	(0～150)mm
Inside measuring range	(2.5～60)mm	(2.5～100)mm	(2.5～160)mm
Resolution of X, Z axis	0.01μm		
Accuracy of X axis	±(1.5+L/100)μm		
Accuracy of Z axis	±(1.5+L/100)μm		
Gradient	75°(T-shaped probe)		
Measuring force	(40～150)mN adjustable		
Measuring speed	(0.01～2)mm/s		

Configuration

Configuration of SJ5200/SJ5500

Standard configuration

1. SJ5200/SJ5500 host machine
2. Workholders
3. Measuring probes group
4. Calibration gauges
5. Standard plain ring gauges
6. Standard plain plug gauges
7. Built-in regulations and standards
8. Measuring software
9. Computer
10. HP color laser printer
11. Aluminum alloy suitcase for accessories
12. User manual
13. Product certification and warranty card

Optional configuration of SJ5200

1. Software module for trapezoidal thread measurement
2. Software module for buttress thread measurement
3. Measuring probes for trapezoidal thread measurement
4. Measuring balls for buttress thread measurement
5. Software module for profile measurement
6. Object table for profile measurement
7. Other workholders
8. Water-free, oil-free, silent pressure supply system
9. Electronic moistureproof case
10. Marble workbench
11. Summer or winter laboratory uniform

Optional configuration of SJ5500

1. Software module for trapezoidal thread measurement
2. Software module for buttress thread measurement
3. Measuring probes for trapezoidal thread measurement
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Configuration of SJ5300

Standard configuration

1. SJ5200/SJ5500 host machine
2. Workholders
3. Measuring probes group
4. Software module for trapezoidal thread measurement
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6. Software module for profile measurement
7. Calibration gauges
8. Standard plain ring gauges
9. Standard plain plug gauges
10. Built-in regulations and standards
11. Measuring software
12. Computer
13. HP color laser printer
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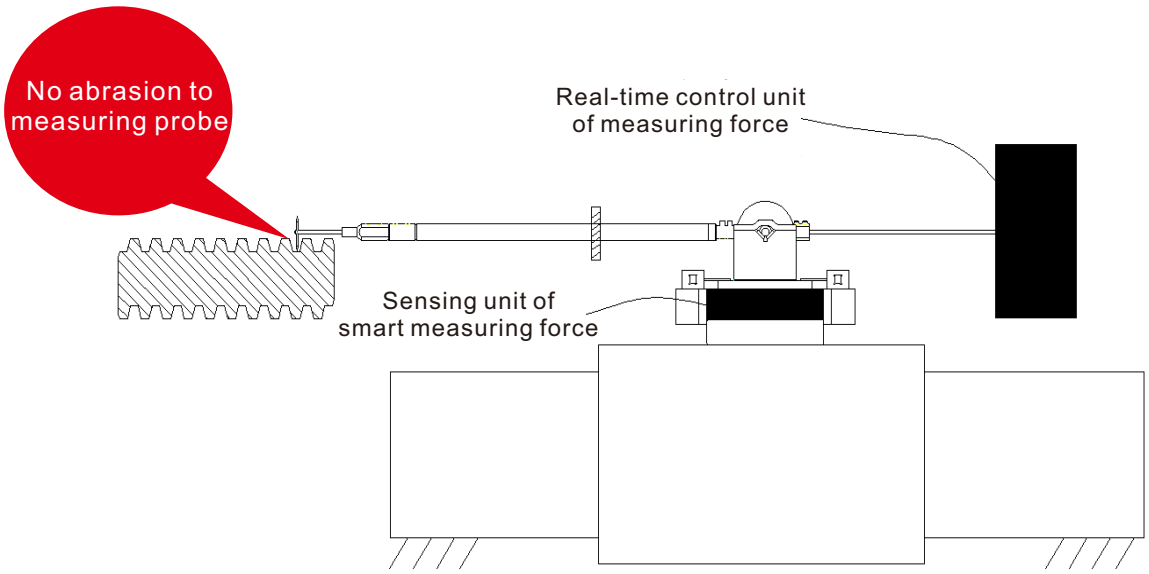
Optional configuration

1. Software module for buttress thread measurement
2. Measuring balls for buttress thread measurement
3. Object table for profile measurement
4. Water-free, oil-free, silent pressure supply system
5. Electronic moistureproof case
6. Marble workbench
7. Summer or winter laboratory uniform

Technology innovation

1. SmartTouch intelligent scanning technology

By using real-time control device and intelligent sensing device for measuring force, the problem of abrasion of measuring pin is solved, particularly large-slope thread can be direct measured. The measuring force is adjustable from 0.1~10gf by real-time control device which can adjust measuring force accurately. Resolution of intelligent sensing device is up to 0.1gf, which can help to protect measuring pin very well.



SmartTouch technology solution

1) The revolutionary climbing ability: The measuring force of SJ5200 is only 3gf (or even smaller, 1 ~ 2gf), which is a quarter of similar machines (I*C machine:14gf).; 85 ° uphill and 87 ° downhill measuring are achieved thanks to the micro measuring force and accurate measuring force control. This new technology lays the foundation of precision measurements of trapezoidal thread, buttress thread, saw-tooth thread.

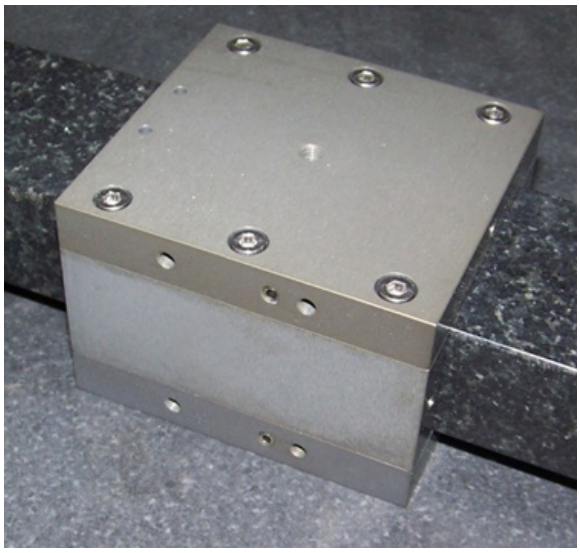
2) Trure constant measuring force: The measuring force at any position and any bevel of workpicec is exact same.

3) Slove the problem of abrasion of measuring pin: The measuring pin is almost wearproof by accurate measuring force control; Intelligent obstacle avoidance together with real-time measuring force monitoring and controlling can protect the measuring pin well.

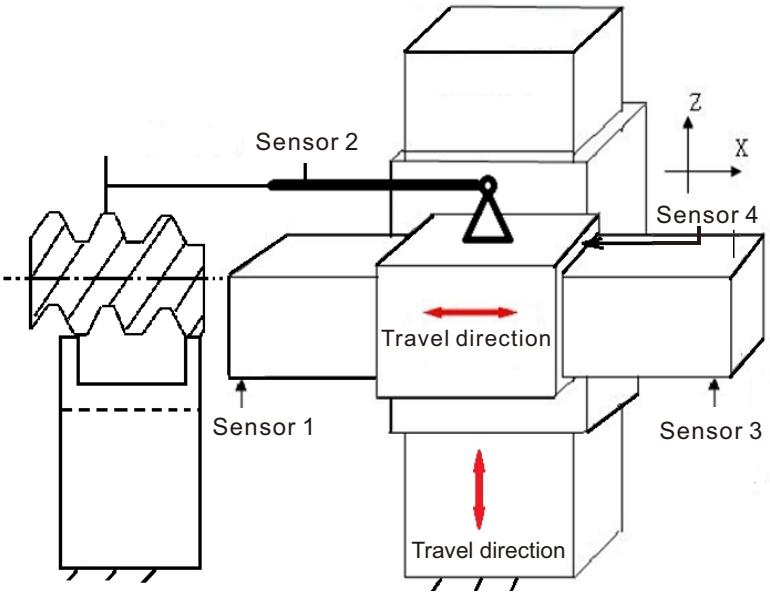
4) Intelligent variable speed: The system can change the scanning speed automatically according to different tooth type, which helps to achieve data uniform distribution of any surface, so that the analysis algorithm is more reliable.

2. Precision air-bearing guide rail system

The guide rail works stably and reliably by using precision air-bearing guide rail system with micro friction and no abrasion.



Air-bearing guide rail



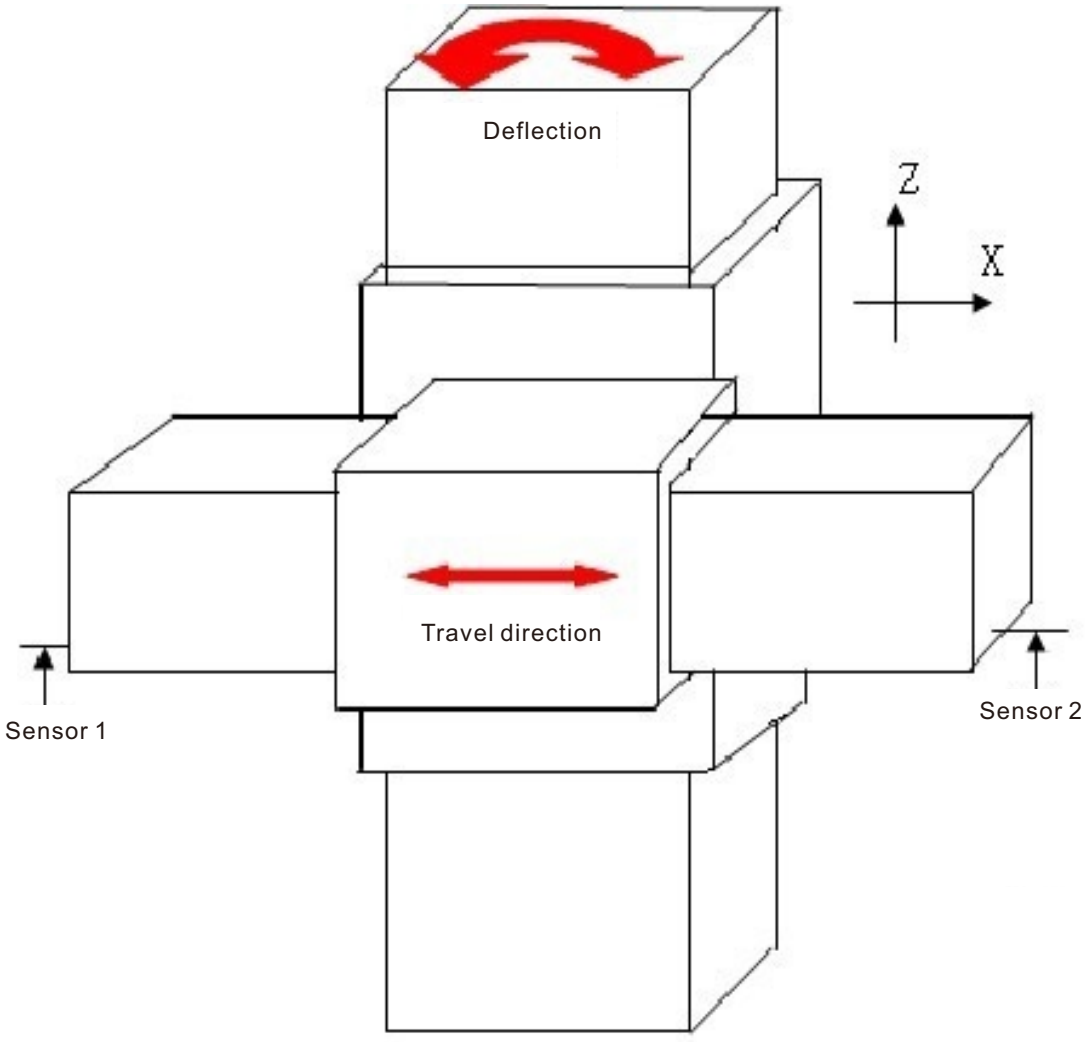
Work principle of Air-bearing guide rail system

Features of precision air-bearing guide rail system:

- Travel linear accuracy 1um
- Repeated positioning accuracy
- Perpendicularity error of X axis and Z axis

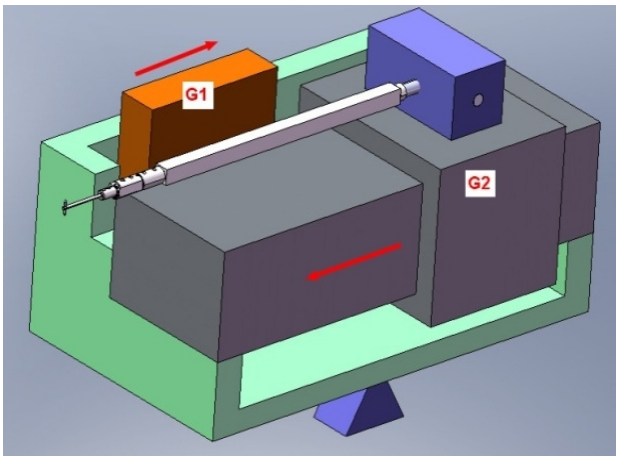
3. Ingenious balancing mechanism technology

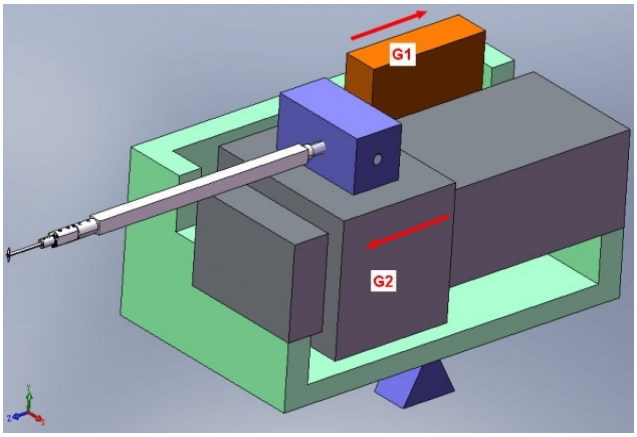
When air-bearing slider bears the extra force in one direction, the whole guide rail system will deflect because the air film of sliding sleeve inclines in one direction and adjustment ability is insufficient, as shown in figure below,

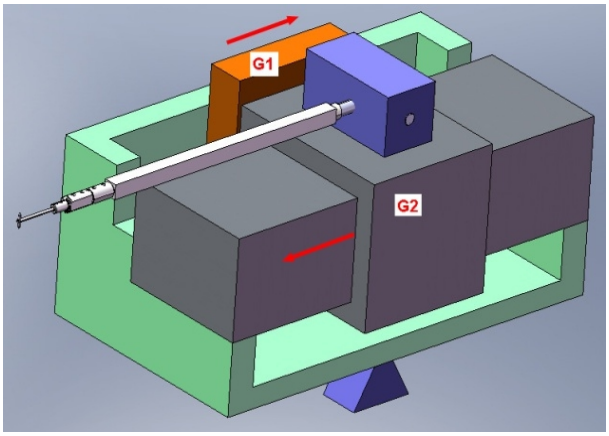


Balancing mechanism principle

The problem of Z-axis swing while X-axis movement is solved by using ingenious balancing mechanism. Swing of Z axis guide rail is less than 0.5μm while X axis moves under entire measuring length in scanning, but it is 6μm for the similar machine from other company.







Balancing mechanism principle

There is a balancing unit G1 in air-bearing guide rail system. When air-bearing sleeve G2 of X axis travels, G1 and G2 move to opposite direction, particularly the weight of G1 and G2 is the exact same, consequently, Air-bearing guide rail system is always balanceable.

Performance comparison

Many enterprises and metrology institutes have purchased Chotest Universal Thread Measuring machine since these machines launched. And positive feedback have been awarded by these customers after they use for a while.

The uncertainty of our machines for pitch diameter is 2.5+L/200 μm. Its performance and accuracy is equivalent to the similar machine from Europe, even better in some ways. For example, measuring force of Chotest machines is far less than similar one from Europe, so the trapezoidal thread, buttress thread, sawtooth thread can be directly measured, moreover the probe and thread gauges are protected from abrasion.

The performance comparison between Chotest machine and the similar one from Europe is shown as follows,

No.	Item	The imported	Chotest machine
1	Measuring force	0.14N	With SmartTouch real-time intelligent control technology, the measuring force is variable 0.01~0.09N in scanning. Particularly both gauges and workpieces can be measured.
2	Wear of probe	Easy to wear	Probe is protected by micro measuring force and SmartTouch real-time intelligent control technology, so probe is prevented from abrasion.
3	Standards of thread	Twenty normal standards	Support common standard, such as GB, ISO, ANSI,DIN, JIS, BS etc. At present there are ninety nine standards in the database, and more standards are being edited. Particularly the user-defined standards are supported.
4	Profile measurement	None	Profile measurement function is optional, which can measure profile and 2D size then analyze the shape data, calculate the shape parameter, evaluate geometric tolerance.
5	Special algorithm	Cannot analyze and calculate special thread, such as 30°wedge locking thread	Can analyze and calculate special tread, such as 30°wedge locking thread
6	Slope scanning	Cannot scan more than 75°slope, such as trapezoidal thread	The measuring force is variable from 0.01 to 0.09 in real time thank to the unique SmartTouch control technology, which achieves the same contact force on any position and any slope. This is the basis for accurate measurement of thread trapezoidal thread, buttress thread, serrated thread, etc.
7	Balance of guide rail system	Swing of Z axis guide rail is 6μm while X axis moves under entire measuring length.	The problem of Z-axis swing while X-axis movement is solved by using ingenious balancing mechanism. Swing of Z axis guide rail is 0.5μm while X axis moves under entire measuring length. (Patent No. ZL 2013 2 0826149.6)

8	Linear encoder system	Because the Linear encoder system connects mechanically, there are errors of connection and transmission	No error of connection and transmission for applying non-contact Linear encoder system.
9	Workholders	A lot kinds of workholders, gaskets and heel blocks. It is easy to suffer faults caused by manual operating errors.	Decrease the frequently-used workholders from 4 to 2 by applying Two-in-one and three-in-one ones without gasket and heel block. The operation is more simple and the work is more efficient, in addition risk of operating errors is down much.
10	Probe installation	The installation and localization is not reliability. Repeatability is 10~20μm	Innovated installation structure. Installation repeatability is 5μm.
11	Probe identification	None	Workholder and probe identified automatically by the system, which avoids probe collision result from fault manual selection.
12	ButtonBox	None	The machien is equipped with a ButtonBox for flexible manual operation.
13	3D navigation	None	3D navigation graphics of measuring pin, workholder and workpiece is built by applying 3D graphics technology, which realizes real-time & multi-angle display, consequently, probability of collision of measuring pin is minimized.
14	Operation procedure	Very tedious	humanized operating wizzard helps operators to operate the machine easily.
15	Record management	File management is primitive	All test records are stored in database. It is convenient to query and manage.
16	Report format	Only PDF format	Output various Word reports with different format, and support user-defined report.

Extract of application

- Thread plug gauge
- Shell thread plug gauge
- Thread ring gauge
- Shell thread ring gauge
- American Standard unified thread gauge
- 55 ° non-sealing pipe thread plug gauge
- 55 ° non-sealing pipe thread ring gauge
- Thread sealing pipe thread with Regulation（RB）
- Wei's taper pipe thread gauges
- Brunel taper pipe thread gauges
- ACME taper pipe thread gauge
- DIN thread gauge
- JIS thread gauge
- Special thread gauges for gas cylinders
- National(US) Pipe Straight Mechnical(NPSM)

API SPEC 5B series gauge

- Oil pipe thread gauge
- Oil pipe taper gauge
- Oil pipe taper master gauge
- Oil casing thread gauge
- Oil casing taper gauge
- Oil casing taper master gauge
- Oil pipeline gauge

API SPEC7-2 series gauge

- Numeric oil drill pipe joint thread gauge
- Numeric oil drill pipe joint thread master gauge
- Regular type oil drill pipe joint thread gauge
- Regular type oil drill pipe joint thread master gauge
- Full bore type oil drill pipe joint thread gauge
- Full bore type oil drill pipe joint thread master gauge
- API SPEC 11B series gauge
- Rod thread gauge
- Double pin plug gauge
- Double taper plug gauge
- Incompetence plain plug gauge
- Plain master ring gauge
- Trapezoidal thread plug gauge