



成都工具研究所有限公司  
CHENGDU TOOL RESEARCH INSTITUTE CO.,LTD

## ZD系列磨加工主动测量系统

ZD Series Active Measuring System for Grinding Process

-----精密磨削在线测量首选  
-----Best Choice of Precise Grinding for In-process Application

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国机集团

工研

1956—2014

# 目录

## CONTENTS



工研

成都工具研究所有限公司  
CHENGDU TOOL RESEARCH INSTITUTE CO., LTD.

### 简介篇

公司简介 ..... P8-9

### 荣誉篇

荣誉证书 ..... P10-11

### 产品篇

ZD1200 ..... P12-13

主动测量放大器 ..... P12-13

ZD1200A ..... P14-15

主动测量放大器 ..... P14-15

ZD2200 ..... P16-17

主动测量放大器 ..... P16-17

ZD2200A ..... P18-19

主动测量放大器 ..... P18-19

外径测量头 ..... P20-21

内径小尺寸测量头 ..... P22

内径测量头 ..... P23

配件 ..... P24-P25

主动量仪选型表 ..... P26-P27

### Profile Articles

Company Profile ..... P8-9

### Honours Articles

Honorary Certificate ..... P10-11

### Product Chapter

ZD1200 ..... P12-13

Active Measuring Amplifier ..... P12-13

ZD1200A ..... P14-15

Active Measuring Amplifier ..... P14-15

ZD2200 ..... P16-17

Active Measuring Amplifier ..... P16-17

ZD2200A ..... P18-19

Active Measuring Amplifier ..... P18-19

Measuring Head for Outer Diameter ..... P20-21

Measuring Head for Inner Diameter-Small Size ..... P22

Measuring Head for Inner Diameter ..... P23

Accessories ..... P24-P25

Selection Model of Active Measuring Gauge ..... P26-P27

## 行业地位 Industry Status

成都工具研究所是我国工具行业科研、技术的领头羊、行业归口所，以下组织挂靠在所内：

中国机械工业金属切削刀具技术协会  
中国机床工具工业协会分会  
中国仪器仪表学会机械量测试仪器学会  
国家刀具质量监测中心  
机械工业量具量仪产品质量监督检测中心  
国家进出口商品检验检疫刀具认可实验室  
国家进出口商品检验检疫量具量仪认可实验室  
科技成果检测鉴定国家级检测机构（刀具）  
科技成果检测鉴定国家级检测机构（量具量仪）  
全国刀具标准化技术委员会秘书处  
全国量具量仪标准化技术委员会秘书处  
ISO/TC 29（工具）P成员国内归口单位  
ISO/TC213（产品的几何和几何技术规范及检验）P成员国内归口单位  
CNACL 国家认可实验室  
《工具技术》杂志社国家精密工具生产促进中心  
中国机械工业金属切削刀具技术协会  
中国机械工程学会生产工程分会切削专业委员会  
四川省机械工程学加工专业委员会

## 人力资源 Human Resources

全所共有职工580余人，其中科技人员320人，有突出贡献的国家专家3人，享受国家政府津贴26人，省部级专家15人，研究员级高级工程师27人，高级工程师103人，高级会计师、高级经济师10人，中级技术人员140人，硕士研究生14人，大中专生146人，专业涉及机械、金属材料、电子、计算机、机电一体化等专业。

## 科研成果 Scientific Research Achievements

科研成果

自成都工具研究所成立以来，主要取得以下科研成果：

- 一、国家发明奖三项：
  - 齿轮整体误差测量新技术 发明二等奖
  - 单晶金刚石砂轮工艺及材料 发明二等奖
  - 无限寿命性能高速钢 发明三等奖
- 二、国家科技进步奖八项
  - 量具刀具产品标准的制定和贯彻 二等奖
  - 中模数硬合金齿轮滚刀 三等奖
  - 立方氮化硼磨盘机理及其应用 三等奖
  - 涂层硬质合金刀片成型技术及装备研究 三等奖
  - QPQ盐浴复合处理技术及成套设备 二等奖
  - 机电一体化发展预测与综合设计（合作项目） 三等奖
  - 材料动态断裂性能研究及其在刀具机械零件上的应用（合作项目） 三等奖
  - 机械工业共性数据库（合作项目） 二等奖
- 三、省部级科技进步奖
  - 121项（略）

## Industry Status

Chengdu Tool Research Institute is a leading scientific research and technology center in China tool industry. It also works as a supporting institute for the following organizations:

China Metal Cutting Tool Engineering Association  
China Machine Tool & Tool Builder's Association Tools Branch  
China Instrument and Control Society  
National Tool Quality Supervision and Monitoring Center  
Mechanical Industrial Measuring Instrument Products Quality Supervision Testing Center  
China Import and Export Commodity Inspection Bureau Tool Accredited laboratory  
China Import and Export Commodity Inspection Bureau Measuring Instrument for Laboratory Accreditation  
Scientific and Technological Achievements Identification of National Inspection Agency (tool)  
Science and Technology Achievements Inspection level Inspection Agency (measuring)  
The Tool Standardization Technical Committee Secretariat  
The Measuring Tool and Instrument Standardization Technical Committee Secretariat  
ISO/TC 29 (tool) P members internally controlled unit  
ISO/TC213 (geometry and geometry specification and inspection of products) P members internally controlled  
CNACL National Laboratory Accreditation  
National Precision Tool Productivity Promotion Center  
China Metal Cutting Tool Engineering Association  
China Institute of Mechanical Engineering, Production Engineering Branch, Cutting Committee  
Sichuan Mechanical Engineering Society Machine Processing Professional Committee

## Human Resources

CTRI has more than 580 employees, including 320 scientific technical personnel, with 3 state-level experts with outstanding contribution, 26 recipients of government special allowance, 15 provincial experts, 27 research fellow class senior engineers, 103 senior engineers, 10 senior accountants and senior economists, 140 intermediate technical personnel, 14 postgraduate students and 146 junior college graduate students, majoring in machinery, metal material, electronics, computer, mechatronics, etc.

## Scientific Research Achievements

Followings are main scientific achievements since the foundation of CIRT:

- 一、Three National Invention Awards
  - The second prize in new technology of integrated deviation measuring gear invention
  - The second prize in mono-crystalline diamond brazing technology and solder invention
  - The third prize in Wuxi easy grinding high speed steel
- 二、Eight "the national science and technology progress awards"
  - The second prize in the formulation and implementation of measuring tool products standard
  - The third prize in the module of carbide gear hob
  - The third prize in PCBN mechanism and application
  - The third prize in researching coated carbide inserts integrated technology and equipment
  - The second prize in composite treatment technology for QPQ salt bath and complete sets of equipment
  - The third prize in Electromechanical integration development prediction and comprehensive analysis (cooperated projects)
  - Research on dynamic fracture properties of materials and its application in the typical mechanical parts on the (cooperated project) The third prize
  - The second prize in Machinery industry common database (cooperated, projects)
- 三、The Provincial Department of Science and Technology Progress Award
  - 121 items (omission)



工研

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## 核心竞争力 Competitive Advantage

目前成都工具研究所已在刀具材料、精密复杂成形刀具与数控刀具设计加工技术、刀具表面强化改性技术与装备、大型精密量仪设计制造、激光测量及光电传感器技术以及计算机软件等技术领域，形成了独特的整体、核心成套技术优势，初步构成了以硬质合金石油管螺纹铣刀、硬质合金槽形铣刀、超硬刀具、刀具表面强化技术及装备、齿轮测量仪、激光测量仪等六项主导产品，包含30多项核心、高新技术产品的产品技术结构，这些产品和技术大都处于国内领先或国际先进水平。

## 质量控制 Quality Control

质量认证：ISO9001:2000

质量方针：以技术创新为先导，以质量管理为保证，以持续改进为核心，以顾客满意为目标。

质量目标

- ★ 贯彻ISO9001：2000标准，通过ISO9001：2000质量管理体系认证，并保持体系有效运行。
- ★ 技术创新不断，每年设计开发新产品或新项目2项以上。
- ★ 以质量管理为保证，加强过程控制，实施持续改进，产品质量精益求精，确保产品出厂合格率达100%。三年内使主导产品合格率提高到95%以上，成品交检批次合格率95%。
- ★ 以顾客为关注焦点，增进顾客满意，三年内使顾客满意率达98%以上，顾客投诉解决率达100%。
- ★ 顾客重大投诉为零，重大质量事故为零，重大设备安全事故为零。

## 服务管理 Service Management

服务宗旨：全心全意为用户服务

服务承诺：尽可能满足用户的合理需求

服务标准：快速、及时、有效，向用户提供一流产品和一流服务

## 企业合作 Business Cooperation

与联合国合作建立中国量仪基地

与德国Klingelnberg公司合作，建设轮齿测量技术出口德国

广泛与国内公司进行技术交流与合作

与国内大专院校、大型企业进行广泛的技术交流与合作

与英国普华永道咨询公司合作，全面提升企业形象和管理能力

## Competitive Advantage

Chengdu Tool Research Institute has formed completed and unique technical competitive advantages in tool material, precise and complex shaped cutter and NC tool design and processing technology, cutting tool surface modification and strengthening technology and equipment, large-scale design precision instrument manufacturing, laser and photoelectric sensor technology and computer software technology. It initially formed six leading products including carbide threading tools for oil pipe, carbide precision special-shaped inserts, super hard cutting tools, tool surface strengthening technology and equipment, gear measuring instrument, laser measuring instrument. Those products are supported by more than 30 core, high-tech products technology structure and most of these products and technology are leading technologies in the domestic and international advanced level

## Quality Control

ISO9001:2000

Quality Certification: ISO9001:2000

Quality policy: to make technical innovation as the guide, the quality of management as the guarantee, continuous improvement as the core and take customer satisfaction as the goal.

The quality objectives:

- ★ Carrying out the standard of ISO9001:2000, obtain the ISO9001:2000 quality management system certification, and keep the system running effectively.
- ★ Technology innovation, design and develop more than 2 new products or new projects each year
- ★ Quality management system certification, and keep the system running effectively to guarantee the quality management, strengthen the process control, carry out continuous improvement, refine on product quality to ensure 100% products manufactured pass rate. Increase leading products pass rate to 95% in three years and the finished product inspection pass rate to 95%.
- ★ Customer focused, improve customers' satisfaction, rate to 98% in three years and solve customers' complaint.
- ★ Decrease customer major complaints to zero, a major quality accidents to zero, zero accident of major equipment.

## Service Management

Service Tanel: Serve customers wholeheartedly

Service Commitment: Meet users' reasonable requirement as much as possible

Service Standard: Provide first-class products and service for customers, quickly, timely, effectively

## Business Cooperation

★ Established China instrument base with the U. N.

★ Exported the bevel gear measuring technology to Germany, with Klingelnberg company (Germany)

★ Widely carry out technology exchanges and cooperation with foreign companies

★ Widely carry out technological exchanges and cooperation with domestic universities and large enterprises of China

★ Cooperate with PricewaterhouseCoopers Consulting (Britain), comprehensively promote CTRI's image and management ability



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## About As

[公司简介] Company Profile

成都工具研究所于2010年8月更名为“成都工具研究所有限公司”，创建于1956年，1965年从哈尔滨迁至成都，是原国家机械工业部直属的我国工具行业唯一的综合性科研机构，一直是我国工具行业的技术归口单位，是省市“高新技术企业”、“国家精密工具工程技术研究中心”的依托单位，1999年进入中国机械工业集团公司，改制为科技型企业。2000年首次通过ISO9001质量管理体系认证。2009年首次通过ISO14001环境管理体系认证。主要从事精密切削刀具、刀具材料、精密测量仪器和表面改性技术等领域的共性基础技术研究及高技术产品的开发、生产、销售及技术咨询、技术服务。成果转让、进出口业务等。现有职工572人，平均年龄38岁，其中：高级职称112人，中级职称208人，国家级突出贡献专家3人，享受政府津贴22人，直接参与研究开发的科技人员达200余人，获得国家发明奖3项、国家级科技进步奖6项、部省科技进步与成果奖140余项，2006年以来取得11项国内专利，其中发明专利8项。

Chengdu Tool Research Institute was founded in 1956 and renamed as "Chengdu Tool Research Institute Co., Ltd" in Aug 2010. CTRI was moved to Chengdu from Harbin in 1965. It was formerly under the direction of China's Machinery Ministry and was considered as the only comprehensive scientific research institution, the bellwether and centralized R&D institution in China's tool industry, a provincial "high-tech enterprise", the supporting institution of State Precision Tool Engineering Technology Research Center. It was later approved into China Machinery Equipment (Group) Company and transferred into a scientific and technical enterprise in 1999. Subsequently in 2000, it acquired the ISO9001 Quality Certificate. And it passed ISO14001 Environmental Management System Certification in 2009. It is principally engaged in common technology research in the field of precision cutting tools, cutting tool materials, precision measuring gauges and surface modification etc. Besides, it also deals with high technological products researching, manufacturing, selling, technological consulting and service, scientific achievements transferring, import and export business etc. CTRI currently has 572 employees, the average age is 38 years old, including 112 senior engineers, 208 junior engineers, 22 receivers of governmental allowance, 3 state-level experts with outstanding contribution and over 200 technical personnel directly involved in research and development. CTRI has three National Invention Prizes, six National Prizes for Progress in Science and Technology, over 140 Provincial and Ministry Prizes for Progress in Science and Technology. CTRI has achieved 11 patent in China, including 8 invention patent since 2006.



TOOL RESEARCH

成都工具研究所有限公司磨加工主动测量系统（ZD系列）采用国际先进磨加工在线测量技术与自主研发为一体，具有超过三十年的在线检测产品研发生产经验。所研发生产的主动量仪产品已广泛应用于各种轴类零件精密磨加工、各种轴承类零件精密磨加工、汽车齿轮内孔精密磨加工、平面磨加工等加工领域。

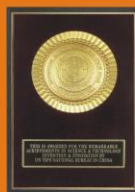
提高生产效率，减少维修费用是生产过程中的关键因素。工件加工或机器状态的实时控制是最佳的解决方案。ZD系列主动测量系统采用相对测量的原理，在磨削过程中实时测量被加工工件与标准工件的几何尺寸差值，通过预先设置的阈值向加工设备发出精确的逻辑控制信号，确保加工过程的顺利进行。ZD系列产品具有测量精度高、坚固耐用、适用范围广等几大特点，是精密磨削加工过程中理想的在线检测系统。

The active measuring system (ZD series) produced by CTRI employs internationally advanced in-process measuring technology in combination with independent R & D. CTRI has over 30 years' manufacturing experience in measuring products for in-process application. The in-process measuring gauges developed have been mainly applied in fine grinding of various spindles, bearing parts, inner hole of automobile gear, plain grinding and other processing fields.

Increased productivity and reduced maintenance costs are key elements of the industrial process. The optimum solution is real-time control of work piece processing and machine conditions. ZD series active measuring system employs relative measurement principle to compare different physical dimensions between work piece and the standard work-piece, giving logical control signals to the grinding machine through pre-fixed values to ensure smooth machining process. ZD series products present characteristics such as high measuring accuracy, strong durability and wide ranges of application, making it an ideal in-process measuring system in precision grinding process.

# About As

[荣誉证书] Honorary Certificate



# HONORARY

## CERTIFICATE



### ZD1200主动测量放大器 ZD 1200-Active Measuring Amplifier

针对不同的加工环境和被加工工件类型，ZD系列主动测量系统提供了种类繁多的电子测量放大器单元，具有超高的测量精度和可操作性。

ZD series active measuring system provides various of electronic amplifier units with extremely high precision according to different process conditions and types of work-pieces.



配置项目 Configuration	参数 Parameters
放大器显示方式 Amplifier Display	指针表盘式 Meter with scale
I/O	继电器型/光耦隔离型 Relay/ Opto-isolated
仪器供电电源 Power supply	100-110VAC, 200-220VAC, 工频50Hz 100-110VAC, 200-220VAC/Frequency: 50Hz
输入/输出接口形式 Input/Output Interface	12芯航空输入插座/20芯矩形输出插座 12 pin aviation inlet socket 20 pin rectangular outlet socket
与机床NC接口线 NC interface wire with the machine	4m
放大器电源线 Power line	3m
放大器外形尺寸 Physical dimensions of the amplifier	214(宽)*140(高)*172(深)(不含旋钮插座) 214(W)*130(H)*172(D) (mm) (the height of knobs is not included)
应用范围 Application range	外径、内径 Inner and outer diameter

#### 技术规格 Technical Specification

结构 Structure	独立式 Cabinet
通道数 Number of channels	1-2通道(AIR GAP电感测量头) 1-2 channels (air-gap inductive measuring head)
测量循环 Measuring cycles	在线磨削 In-process grinding
显示范围 Display range	+500um——10um
显示分辨率 Display Resolution	1um
电气稳定性 Electrical Stability	0.8um/6h
输出逻辑控制点数 Number of Output Logical Control	4



### ZD1200A主动测量放大器

ZD 1200A-Active Measuring Amplifier



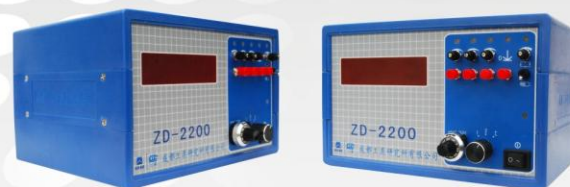
配置项目 Configuration	参数 Parameters
放大器显示方式 Amplifier Display	指针表盘式 Meter with scale
修正值显示 Correction Value	数字式 Digital display
I/O	继电器型/光耦隔离型 Relay/Photo-coupled
仪器供电电源 Power supply	100-110VAC $\pm$ 10%、200-220VAC $\pm$ 10%、工频50HZ 100-110VAC; 200-220VAC Frequency: 50HZ
输入/输出接口形式 Input/Output Interface	10芯卡扣式输入插座/16芯矩形输出插座 10 pin clamped inlet socket 16 pin rectangular outlet socket
与机床NC接口线 NC interface wire with the machine	4m
放大器电源线 Power line	3m
放大器外形尺寸 Physical dimensions of the amplifier	214(宽)*140(高)*172(深)(不含旋钮插座) 214(W)*140(H)*172(D) (the height of knobs is not included)
应用范围 Application range	外径、内径 Inner and outer diameter

#### 技术规格 Technical Specification

结构 Structure	独立式 Cabinet
通道数 Number of channels	1-2通道(AIR GAP电感测量头) 1-2 channels (Air-Gap inductive measuring head)
测量循环 Measuring cycle	在线磨削 In-process grinding
显示范围 Display range	依据探头制造 +500um——-10um Based on the scale of the existing meter.
修正值范围 Correction Value Range	1um档+59um——59um、0.5um档+20um——20um 0.1um档+20um——20um 1.0um scale +59um——59um 0.5um scale +20um——20um 0.1um scale +20um——20um
修正值档位 Correction scale	1um、0.5um、0.1um
显示分辨率 Display Resolution	1um
电气稳定性 Electrical Stability	0.8um/6h
输出逻辑控制点数 Number of Output Logical Control	4

### ZD2200主动测量放大器

ZD 2200-Active Measuring Amplifier



配置项目 Configuration	参数 Parameters
放大器显示方式 Amplifier display	数字式 Digital display
I/O	继电器型/光耦隔离型 Relay/Opto-isolated
仪器供电电源 Power supply	100-110VAC $\pm$ 10%、200-220VAC $\pm$ 10%、工频50HZ 100-110VAC、200-220VAC frequency: 50Hz
输入/输出接口形式 Input/Output interface	12芯航空输入插座/20芯矩形输出插座 12 pin aviation inlet socket/20 pin rectangular outlet socket
与机床NC接口线 NC interface wire with the machine	4m
放大器电源线 Powerline	3m
增值功能 Additional function	收缩功能(S)/记忆功能(I) Retraction (S)/ Memory function(I)
放大器外形尺寸 Physical dimensions	214(宽)*140(高)*172(深)(不含旋钮插座) 214(W)*140(H)*172(D) (mm) (the height of knobs is not included)
应用范围 Application range	外径、内径 Inner and outer diameter

#### 技术规格Technical Specification

结构 Structure	独立式 Cabinet
通道数 Number of channels	1-2通道(AIR GAP电感测量头) 1-2 channels (AIR GAP inductive measuring heads)
测量循环 Measuring cycles	在线磨削 In-process grinding
显示范围 Display range	$\pm 500\mu\text{m}$ — $300\mu\text{m}$
显示分辨率 Resolution	0.3 $\mu\text{m}$
电气稳定性 Electrical Stability	0.8 $\mu\text{m}/6\text{h}$
输出逻辑控制点数 Number of Output Logical Control	4

# ZD2200A主动测量放大器 ZD 2200A-Active Measuring Amplifier



配置项目 Configuration	参数 Parameters
放大器显示方式 Amplifier Display	数字式 Digital display
修正值显示 Correction Value	数字式 Digital display
I/O	继电器型/光耦隔离型 Relay/ Optocoupler
仪器供电电源 Power supply	100-110VAC $\pm$ 10%、200-220VAC $\pm$ 10%；工频50HZ 100-110VAC、200-220VAC frequency: 50HZ
输入/输出接口形式 Input/Output Interface	十芯卡扣式输入插座/16芯矩形输出插座 10 pin clamped inlet socket 16 pin rectangular outlet socket
NC接口线 NC interface wire with the machine	4m
放大器电源线 Power line	3m
增值功能 Additional function	收缩功能(S)/记忆功能(J) Retraction (S)/Memory function (J)
放大器外形尺寸 Physical dimension	214(宽)*140(高)*172(深)(不含按钮插座) 214(W)*140(H)*172(D) (the height of knobs is not included)
应用范围 Application range	外径、内径 Inner and outer diameter

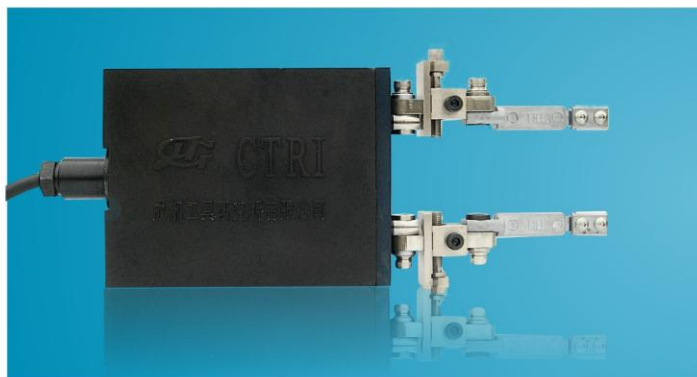
## 技术规格 Technical Specification

结构 Structure	独立式 Standalone
通道数 Number of channels	1-2通道(AIR GAP电感测量头) 1-2 channels (Air-Gap inductive measuring heads)
测量循环 Measuring cycle	在线磨削 In-process grinding
量测范围 Display range	+500um——300um
修正范围 Correction Range	1um档+59um——59um、0.5um档+20um——20um 0.1um档+20um——20um
修正刻度 Correction scale	1um scale +59um——59um 0.5um scale +20um——20um 0.1um scale +20um——20um
修正值位数 Display Resolution	1um、0.5um、0.1um
显示分辨率	0.3um
电气稳定性 Electrical Stability	0.8um/6h
输出逻辑控制点数 Number of Output Logical Control	4

### 外径测量头 Measuring Head for Outer Diameter

电子测量放大器单元与不同类型的CTRI测量头连接, 从而实现磨削加工的尺寸控制和工件定位

Electrical measuring amplifier is connected to different types of measuring heads produced by CTRI to achieve accuracy control and work piece positioning in the grinding process.



基本配置与技术规格 Basic Configuration and Technical Specification

传感器数量/类型 Number and types of sensor	2×AIR GAP
测量范围 Measuring Range	400um
重复精度 Repetitive Precision	≤1um
测量长度 Length of Measuring finger	50mm
预行程 Pre-travel	250±20um
过行程 Over-travel	≥700um
阻尼功能 Damping function	有
测量触头 Measuring contact	天然金刚石 Diamond
测量工件连续/断续表面 Measuring smooth / interrupted surface	可选 Optional
磨削收缩与收缩量 (每个) Measuring retraction / jaw finger	可选: ±0.7mm Optional: ±0.7mm
测力 Measurement Force	连续面 1.3±0.05N 断续面 0.7±0.05N Smooth surface 1.3±0.05N Interrupted surface 0.7±0.05N
电缆线 Cable	3m



## 内径小尺寸测量头

Measuring Head for Inner Diameter-Small Size



基本配置与技术规格 Basic Configuration and Technical Specification

传感器数量/类型 Number and types of sensor	2×AIR GAP
测量范围 Measuring Range	400um
重复精度 Repetitive Precision	≤1um
预行程 Pre-travel	180±20um
过行程 Over-travel	≥500um
阻尼功能 Damping function	有 Yes
调整装置 Micrometric Setting	燕尾游标式 Dovetail slide
测针 Measuring contact	天然金刚石 Diamond
测量工件连续/断续表面 Measuring smooth / interrupted surface	可选 Optional
测力 Measurement Force	0.9N
电缆线 Cable	3m

## 内径测量头

Measuring Head for Inner Diameter



基本配置与技术规格 Basic Configuration and Technical Specification

传感器数量/类型 Number and types of sensor	2×AIR GAP
测量范围 Measuring Range	400um
重复精度 Repetitive Precision	≤1um
测臂长度(调整装置+测杆) Length of Measuring Finger(Micrometric Setting + measuring finger)	85mm
预行程 Pre-travel	200±20um
过行程 Over-travel	≥650um
测量触头 Measuring contact	天然金刚石 Diamond
测量工件连续/断续表面 Measuring smooth / interrupted surface	可选 Optional
阻尼功能 Damping function	有 Yes
测臂收缩与收缩量(单臂) Measuring retraction (per finger)	可选: ≥0.7mm Optional: ≥0.7mm
测力 Measurement Force	1.0N
电缆线 Cable	3.5m

## 附件 Accessories

为保证您的加工顺利进行，ZD系列主动测量系统提供大量的选配附件，让您的加工方式更方便。  
ZD series provide various optional accessories to ensure convenient and smooth machining process.






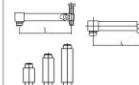


工件形式 Process Mode	名称 Name	编号 Order No.	图示 Paradigms	适配附件 Suitable Accessories
测杆 (材料304) Measuring Finger (Material 304)	L=50mm螺纹测杆 L=50mm thread measuring finger	W50		螺纹触头: L25, L35, 延长杆: Y15, Y25, Y35, 滑台: H50, H75
	L=50mm螺纹偏心测杆 L=50mm thread eccentric measuring finger	Wp50		
	L=68mm螺纹测杆 L=68mm thread measuring finger	W68		
	L=68mm螺纹偏心测杆 L=68mm thread eccentric measuring finger	Wp68		
外径 Diameter	异形测杆 (铝合金) Ø2mm×15mm棒 Ave-shaped Measuring Finger (Aluminum Alloy) Ø2mm×15mm rod	F		微调装置T; 延长杆: Y15, Y25, Y35, 滑台: H50, H75 Micrometric Setting T; extension rod: Y15, Y25, Y35 slide: H50, H75
内径 Diameter	偏心测杆 Eccentric Measuring Finger	NP		微调装置T; 测爪: C9, C14, CD 延长杆: Y15, Y25, Y35, 滑台: H50, H75 Micrometric Setting T; Measuring contact: C9, C14, CD extension rod: Y15, Y25, Y35 slide: H50, H75
	直测杆 Straight Measuring Finger	N		微调装置T; 测爪: C30, CD 延长杆: Y15, Y25, Y35, 滑台: H50, H75 Micrometric Setting T; Measuring contact: C30, CD extension rod: Y15, Y25, Y35 slide: H50, H75
端面 含触头 Planes (contacts included)	L=40mm L=70mm (2mm硬合金球) L=40mm L=70mm (2mm carbide cemented ball)	D40 D70		微调装置T; Micrometric Setting T;
















工件形式 Process Mode	名称 Name	编号 Order No.	图示 Paradigms	适配附件 Suitable Accessories
测爪 材料304 Measuring Paws Material 304	外径 Diameter	L=25mm螺纹触头 L=35mm螺纹触头 L=25mm thread contact L=35mm thread contact	L25 L35	 测杆: W50, Wp50, W68, Wp68; 延长杆: Y15, Y25, Y35; 滑台: H50, H75 Measuring finger: W50, Wp50, W68, Wp68; Extension rod: Y15, Y25, Y35; Slide: H50, H75
	内径 Diameter	内径测爪L=18, H=14; L=18, H=9; L=30.5, H=10; Measuring paws for inner diameter L=18, H=14; L=18, H=9; L=30.5, H=10	C9 C14 C30	微调装置T; 测杆: NP/N; 延长杆: Y15, Y25, Y35 Micrometric Setting T; Measuring finger: NP/N; Extension rod: Y15, Y25, Y35
		后插测爪 Measuring paws for small size inner diameter	CH	微调装置T; Micrometric Setting T;
		断续测爪 Interrupted measuring paws	CD	微调装置T; 测杆: NP/N; 延长杆: Y15, Y25, Y35 Micrometric Setting T; Measuring finger: NP/N; extension rod: Y15, Y25, Y35

工件形式 Process Mode	名称 Name	编号 Order No.	图示 Paradigms	适配附件 Suitable Accessories
延长杆 (材料304) Extension Rod (material 304)	L=15mm(测量范围增加30mm) L=15mm (Measuring range increased by 30mm)	Y15		适用于除大小尺寸 外的所有测量。 Suitable for any measurement except large size and small size measurement
	L=25mm (测量范围增加50mm) L=25mm (Measuring range increased by 50 mm)	Y25		
	L=35mm (测量范围增加70mm) L=35mm (Measuring range increased by 70 mm)	Y35		
微调装置 (材料304) Micrometric Setting (Material 304)	调整范围4mm Adjustment Range 4mm	T		适用于后插测量 Suitable for small size inner diameter
	调整范围15mm Adjustment Range 15mm	T		适用于内径、外径断续面、 端面测量 适用于外径 Suitable for inner and outer diameter, interrupted surface and end surface measurement
	滑台 (液压缸) Slide (cylinder)	L=50mm L=75mm	H50 H75	适用于外径 suitable for outer diameter measurement

主动量仪选型表  
Selection Model of Active Measuring Gauge

测量方式 Measur- ement mode	测量电箱 Electroni Amplifier	测量规 Measuring Head		附件 (选配) Accessories (Optional Configuration)				组合示例 Combination Paradigms
		工件 Work- piece	型号 Specification	测杆、测爪、延长杆、 微调装置、滑台等 Measuring finger, measuring pawls, extension rod, micrometric setting, slide etc.				
外 径 Diameter	ZD-1200 ZD-1200A ZD-2200 ZD-2200A	连续面 Smooth surface	连续面外径测量 (W) Measurement of outer diameter on smooth surface (W)	W50 WP50 W68 WP68	L25 L35	Y15 Y25 Y35		ZD-1200A-W (W50+L25+ Y35+H50)
			连续面外径测量 收张功能 (WS) Measurement of outer diameter on smooth surface with retraction option(WS)					ZD-1200A-WS- W50-L25WS0+L25 +Y35+H50)
		断续面 Interrupted Surface	断续面外径测量 (WD) Measurement of outer diameter on interrupted surface (WD)	T	F	Y15 Y25 Y35		ZD-1200A-WD (T+F+Y35+H50)
			断续面外径测量 收张功能 (WDS) Measurement of outer diameter on interrupted surface with retraction option (WDS)					ZD-1200A-WDS (T+F+Y35+H50)
		大尺寸 Large Size			大尺寸外径测量分体 (D)×2 Measurement of Large size Outer diameter Separated Part(D)×2  大尺寸外径测量收张功能 分体 (WS) ×2 Measurement of Large size Outer diameter with retraction option Separated Part (WS) ×2	按连续面或断续面选配附件 Select suitable accessories according to interrupted surface or uninterrupted surface		
	ZD-1000	连续面 Smooth Surface	连续面外径测量 (W) Measurement of Outer diameter on smooth surface (W)	W50 WP50 W68 WP68	L25 L35	Y15 Y25 Y35		ZD-1000-W (W50+L25+ Y35+H50)

主动量仪选型表  
Selection Model of Active Measuring Gauge

测量方式 Measure ment mode	测量电箱 Electronic Amplifier	测量头 Measuring Head	附件 (选配) Accessories (Optional Configuration)					组合示例 Combination Paradigms	
		工作 Work piece	型号 Specification	测杆、测爪、延长杆、 微调装置、滑台等 Measuring finger, measuring pawls, extension rod, Micrometric Setting, slide etc.					
内 径 Diameter	ZD-1200	连续面 Smooth Surface	连续面内径 测量 (N) Measurement of inner diameter on Smooth Surface (N)	T	NP N	C9 C14 C30	Y15 Y25 Y35	 	ZD-1200A-N (T+NP+C14 +Y35)
	ZD-1200A		连续面内径测量 收张功能 (NS) Measurement of inner diameter on Smooth Surface with retraction option(NS)					 	ZD-1200A-NS (T+NP+C14 +Y35)
	ZD-2200								
	ZD-2200A							 	
	径 Diameter		断续面 Interrupted Surface	断续面内径 测量 (ND) Measurement of inner diameter on interrupted surface (ND)	T	NP N	CD	Y15 Y25 Y35	 
		断续面内径测量 收张功能 (NDS) Measurement of inner diameter on interrupted surface with retraction option (NDS)						 	ZD-1200A-NDS (T+NP+CD+Y35)
		大尺寸 Large Size	大尺寸内径测量 分体 (D)x2 Measurement of Large scale inner diameter Separated part (D) x2	按连续面或断续面选配附件 Select suitable accessories according to interrupted surface or uninterrupted surface					ZD-1200A-N (T+NP+C14+Y35)
			大尺寸内径测量收张 功能分体 (DS)x2 Measurement of Large scale inner diameter with retraction option Separated part (DS) x2						ZD-1200A-NS (T+NP+C14+Y35)
后/端面测量 Rear/Plane Measurement			小尺寸 Small Size	后插测量 (H) Rear-inserted measurement(H)	t		CH	 	ZD-1200A-H (t+CH)
	ZD-2000		端面测量/定位 (D) Plane measurement/ positioning (D)	T		D40 D75	 	ZD-2000-D (T+D75)	

28

PAGE

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PAGE  
\*84