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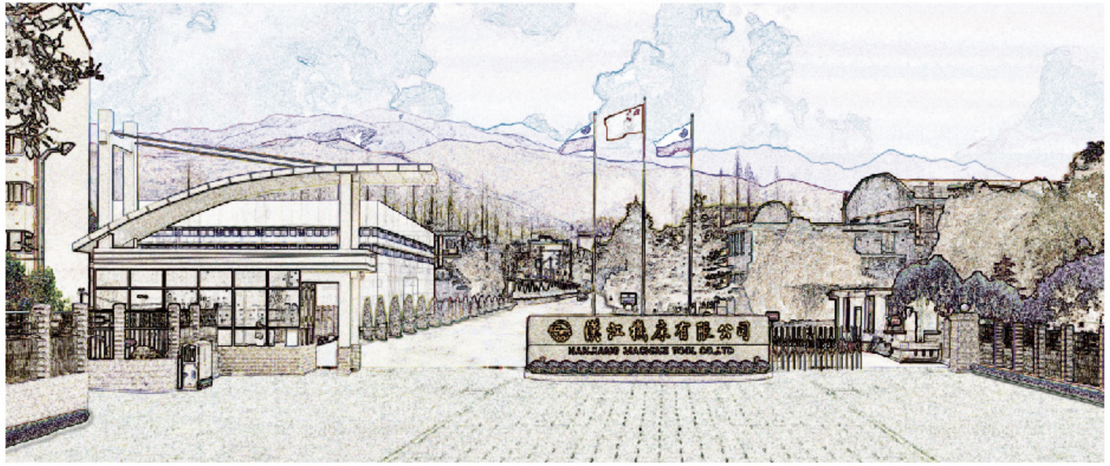

陕西汉江机床有限公司
SHAANXI HANJIANG MACHINE TOOL CO.,LTD

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2023版

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测量仪器系列产品
Measuring Instrument Series

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High precision, high speed, high efficiency

目录 Contents

HJY012
丝杠动态测量仪
Ball Screw Dynamic Measuring Machine

仪器简介

HJY012五米丝杠动态测量仪是检测精密丝杠的大型测量仪器。仪器主要测量长度较长、精度较高的滚珠丝杠导程及行程误差、梯型丝杠的螺旋线误差及螺距误差。

Brief Introduction

HJY012 is a 5–meter dynamic measuring machine designed and made to inspect lead error and spiral travel error of ball screws and trapezoidal screws.

仪器配置

> 采用同步位移绝对值比较原理进行丝杠动态测量，角度测量采用圆光栅，长度测量采用激光尺，量程大、精度高，并具有补偿单元，可完成多种补偿；
> 测量系统的主轴控制系统采用交流伺服电机速度控制方式，选用运动控制器作为伺服系统控制器，可方便地实现对伺服电机的控制；
> 仪器采用铸铁床身；
> 测量架移动导轨采用高精度滚珠加双V型钢导轨形式；
> 配有温度测量装置，可以准确补偿温度对测量的影响。

Mechanical Configurations

> By comparison principle of synchronous displacement absolute value, and with the help of angular encoder and laser ruler, ball screw dynamic precision is measured;
> The rotation spindle driven by servo motor, and spindle speed regulated by motion controller;
> Machine body made up by high quality cast iron;
> Double V–shaped guide rails plus high precision rolling balls adopted for measuring bench to move along;
> Temperature sensor employed to supervise temperature and compensate for the influence on measuring result.

仪器电气配置

直线测量： 激光尺 准确度等级：± 1.0ppm(μ m/m)
旋转编码器：圆光栅 线数：23600
空气温度传感器

Electric Configurations

For linear measurement：laser ruler accuracy: ± 1.0ppm(μ m/m)
For rotary measurement：angular encoder line number：23600
Air temperature sensor

仪器测量精度

> 对测量长度≤2000mm、长径比≤40：1以内的梯形丝杠，仪器可测5级精度；
对测量长度大于2000mm～5000mm的梯形丝杠，仪器可测6级精度。
> 测量滚珠丝杠的导程误差时
对测量长度≤2000mm，长径比≤40：1的滚珠丝杠，仪器可测1级丝杠；
对测量长度大于2000mm～ 4000mm的滚珠丝杠，仪器可测2级精度；
对测量长度大于4000mm～5000mm的滚珠丝杠，仪器可测3级精度。

Measuring Accuracy

For trapezoidal screws:
measuring accuracy:
class 5 (length≤2000mm, ratio of length to diameter≤40：1);
class 6 (length 2000mm–5000mm);
For ball screws:
measuring accuracy:
class 1 (length≤2000mm, ratio of length to diameter≤40：1);
class 2 (length 2000mm–4000mm);
class 3 (length 4000mm–5000mm);

系统软件能实现的功能

> 系统控制：测量仪系统状态运行控制；
> 系统运动参数设置：丝杠参数输入、丝杠测试状态（转速、长度）设置；
> 丝杠行程精度动态测量；
> 导程精度测量误差补偿条件检测（温度补偿）；
> 导程精度测量结果数据处理与分析：2π误差、300误差、全长误差、全长平均行程偏差、合格性判定、检测报告；
> 检测结果输出：模拟量记录曲线输出、数字量化检验曲线与结果的打印输出、屏幕的实时检测状态输出；
> 数据管理：测试对象特征参数检测数据、检验报告、合格性检查等数据的管理。

Soft Program Functions

> System control: to control the measuring system operation;
> Parameter setting： to set up the ball screw parameters being measured, spindle rotation speed, measuring length;
> Measuring execution: to perform the measuring operation as per set parameters;
> Temperature compensation: To supervise the temperature influence on measuring result and then make compensation;
> Data processing and analysis: to process the measuring data and make analysis of the measured ball screw quality (V2π error、V300 error、 full travel and mean travel error);
> Result output: to output the test result as the real–time screen indication;
> Data management: to manage the measured data in the control computer for storage and view.

仪器主要技术参数

> 顶尖距	5300mm
> 最大可测螺纹长度	5000mm
> 中心高	160mm
> 可测螺纹外径	ϕ20～ϕ120mm
> 头架转速范围	10～90r/min
> 可测量导程范围	2～60mm

Main Specifications

> Center Distance	5300mm
> Max. Measuring Length	5000mm
> Center Height	160mm
> Measuring Diameter	ϕ20～ϕ120mm
> Spindle Rotation Speed	10～90r/min
> Measuring Lead	2～60mm

HJY025
丝杠动态测量仪
Ball Screw Dynamic Measuring Machine

仪器简介

本仪器是测量高精度丝杠的精密仪器，主要是用来测量梯形丝杠、滚珠丝杠的螺旋线误差；仪器由交流电机带动头架主轴旋转，拔动被测丝杠同步旋转，通过带动头带动测量架在导轨上移动。

Brief Introduction

This precision measuring machine is designed and made toinspect lead error and spiral travel error of ball screws and trapezoidal screws. Driven by servo motor, the head spindle rotates and takes the measured ball screw to move along the measuring bench guide rails.

仪器配置

> 采用同步位移绝对值比较原理进行丝杠动态测量，角度测量采用圆磁栅，长度测量采用直线光栅，量程大、精度高，并具有补偿单元，可完成多种补偿；
> 测量系统的主轴控制系统采用交流伺服电机速度控制方式，选用运动控制器作为伺服系统控制器，可方便地实现对伺服电机的控制；
> 仪器采用铸铁床身，三点主支承；
> 测量架移动导轨采用高精度钢球滚珠加双V型钢导轨形式；
> 配有温度测量装置，可以准确补偿温度对测量的影响。

Mechanical Configurations

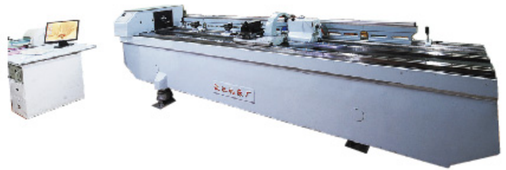
> By comparison principle of synchronous displacement absolute value, and with the help of angular encoder and laser ruler, ball screw dynamic precision is measured;
> The rotation spindle driven by servo motor, and spindle speed regulated by motion controller;
> Machine body made up by high quality cast iron with three –point main supporting;
> Double V–shaped guide rails plus high precision rolling balls adopted for measuring bench to move along;
> Temperature sensor employed to supervise temperature and compensate for the influence on measuring result.

仪器电气配置

直线光栅尺：准确度等级：±3μm
旋转编码器：线数：1400
空气温度传感器

Electric Configurations

Laser ruler: accuracy: ±3μm
Rotary measurement: line number：1400
Air temperature sensor



仪器测量精度

> 对长径比≤40：1以内的梯形丝杠，仪器可测5级精度。
> 测量滚珠丝杠的导程误差时：对长径比≤40：1的滚珠丝杠，仪器可测1级丝杠。

Measuring Accuracy

> For trapezoidal screws:
measuring accuracy: class 5 (ratio of length to diameter≤40：1);

> For ball screws:
measuring accuracy: class 1 (ratio of length to diameter≤40：1);

系统软件能实现的功能

> 系统控制：测量仪系统状态运行控制；
> 系统运动参数设置：丝杠参数输入、丝杠测试状态（转速、长度）设置；
> 丝杠行程精度动态测量；
> 导程精度测量误差补偿条件检测（温度补偿）；
> 导程精度测量结果数据处理与分析：2π误差、300误差、全长误差、全长平均行程偏差、合格性判定、检测报告；
> 检测结果输出：模拟量记录曲线输出、数字量化检验曲线与结果的打印输出、屏幕的实时检测状态输出；
> 数据管理：测试对象特征参数检测数据、检验报告、合格性检查等数据的管理。

Soft Program Functions:

> System control: to control the measuring system operation;
> Parameter setting; to set up the ball screw parameters being measured, spindle rotation speed, measuring length;
> Measuring execution: to perform the measuring operation as per set parameters;
> Temperature compensation: To supervise the temperature influence on measuring result and then make compensation;
> Data processing and analysis: to process the measuring data and make analysis of the measured ball screw quality (V2π error, V300 error, full travel and mean travel error);
> Result output: to output the test result as the real–time screen indication;
> Data management: to manage the measured data in the control computer for storage and view.

仪器主要技术参数

> 顶尖距	1500mm
> 最大可测螺纹长度	1000mm
> 中心高	85mm
> 可测螺纹外径	φ20 ~ φ80mm
> 头架转速范围	5 ~ 50r/min
> 可测量导程范围	2 ~ 40mm

Main Specifications

> Center Distance	1500mm
> Max. Measuring Length	1000mm
> Center Height	85mm
> Measuring Diameter	φ20 ~ φ80mm
> Spindle Rotation Speed	5 ~ 50r/min
> Measuring Lead	2 ~ 40mm

HJY055A
丝杠动态测量仪
Ball Screw Dynamic Measuring Machine

仪器简介

本仪器是测量高精度传动丝杠的精密仪器。主要是用来测量梯形丝杠、滚珠丝杠的螺旋线误差。仪器由交流电机带动头架主轴旋转，拨动被测丝杠同步旋转，通过带动头带动测量架在导轨上移动。

Brief Introduction

This precision measuring machine is designed and made toinspect lead error and spiral travel error of ball screws and trapezoidal screws. Driven by servo motor, the head spindle rotates and takes the measured ball screw to move along the measuring bench guide rails.

仪器配置

> 采用同步位移绝对值比较原理进行丝杠动态测量，角度测量采用圆磁栅，长度测量采用激光尺，量程大、精度高，并具有补偿单元，可完成多种补偿；
> 测量系统的主轴控制系统采用交流伺服电机速度控制方式，选用运动控制器作为伺服系统控制器，可方便地实现对伺服电机的控制；
> 仪器采用铸铁床身，三点主支承；
> 测量架移动导轨采用高精度钢球滚珠加双V型钢导轨形式；
> 配有温度测量装置，可以准确补偿温度对测量的影响。

Mechanical Configurations

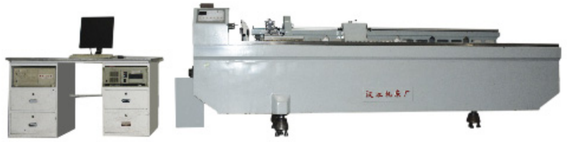
> By comparison principle of synchronous displacement absolute value, and with the help of angular encoder and laser ruler, ball screw dynamic precision is measured;
> The rotation spindle driven by servo motor, and spindle speed regulated by motion controller;
> Machine body made up by high quality cast iron with three–point main supporting;
> Double V–shaped guide rails plus high precision rolling balls adopted for measuring bench to move along;
> Temperature sensor employed to supervise temperature and compensate for the influence on measuring result.

仪器电气配置

直线光栅尺：准确度等级：±3μm；
旋转编码器：线数：1400
空气温度传感器

Electric Configurations

Laser ruler: accuracy: ±3μm
Rotary measurement: line number：1400
Air temperature sensor



仪器测量精度

> 对长径比≤40：1以内的梯形丝杠，仪器可测5级精度。
> 测量滚珠丝杠的导程误差时：对长径比≤40：1的滚珠丝杠，仪器可测1级丝杠。

Measuring Accuracy

> For trapezoidal screws:
measuring accuracy: class 5 (ratio of length to diameter≤40：1);
> For ball screws:
measuring accuracy: class 1 (ratio of length to diameter≤40：1);

系统软件能实现的功能

> 系统控制：测量仪系统状态运行控制；
> 系统运动参数设置：丝杠参数输入、丝杠测试状态（转速、长度）设置；
> 丝杠行程精度动态测量；
> 导程精度测量误差补偿条件检测（温度补偿）；
> 导程精度测量结果数据处理与分析：2π误差、300误差、全长误差、全长平均行程偏差、合格性判定、检测报告；
> 检测结果输出：模拟量记录曲线输出、数字量化检验曲线与结果的打印输出、屏幕的实时检测状态输出；
> 数据管理：测试对象特征参数检测数据、检验报告、合格性检查等数据的管理。

Soft Program Functions:

> System control: to control the measuring system operation;
> Parameter setting; to set up the ball screw parameters being measured, spindle rotation speed, measuring length;
> Measuring execution: to perform the measuring operation as per set parameters;
> Temperature compensation: To supervise the temperature influence on measuring result and then make compensation;
> Data processing and analysis: to process the measuring data and make analysis of the measured ball screw quality (V2π error, V300 error, full travel and mean travel error);
> Result output: to output the test result as the real–time screen indication;
> Data management: to manage the measured data in the control computer for storage and view.

仪器主要技术参数

> 顶尖距	2200mm
> 最大可测螺纹长度	2000mm
> 中心高	160mm
> 可测螺纹外径	φ16～φ80mm
> 头架转速范围	5～50r/min
> 可测量导程范围	2～40mm

Main Specifications

> Center Distance	2200mm
> Max. Measuring Length	2000mm
> Center Height	160mm
> Measuring Diameter	φ16～φ80mm
> Spindle Rotation Speed	5～50r/min
> Measuring Lead	2～40mm

HJY028
丝杠动态测量仪
Ball Screw Dynamic Measuring Machine

仪器简介

本仪器是测量高精度丝杠的精密仪器。主要是用来测量梯形丝杠、滚珠丝杠的螺旋线误差。仪器由交流电机带动头架主轴旋转，拔动被测丝杠同步旋转，通过带动头带动测量架在导轨上移动。

Brief Introduction

This precision measuring machine is designed and made toinspect lead error and spiral travel error of ball screws and trapezoidal screws. Driven by servo motor, the head spindle rotates and takes the measured ball screw to move along the measuring bench guide rails.

仪器配置

> 采用同步位移绝对值比较原理进行丝杠动态测量，角度测量采用圆磁栅，长度测量采用直线光栅，量程大、精度高，并具有补偿单元，可完成多种补偿；
> 测量系统的主轴控制系统采用交流伺服电机速度控制方式，选用运动控制器作为伺服系统控制器，可方便地实现对伺服电机的控制；
> 仪器采用铸铁床身，三点主支承；
> 测量架移动导轨采用高精度钢球滚珠加双V型钢导轨形式；
> 配有温度测量装置，可以准确补偿温度对测量的影响。

Mechanical Configurations

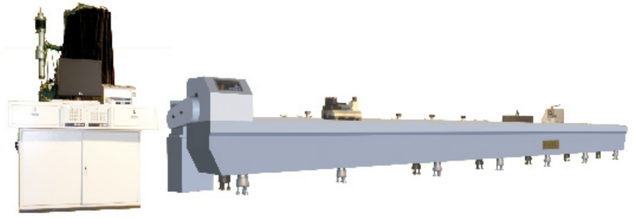
> By comparison principle of synchronous displacement absolute value, and with the help of angular encoder and laser ruler, ball screw dynamic precision is measured;
> The rotation spindle driven by servo motor, and spindle speed regulated by motion controller;
> Machine body made up by high quality cast iron with three –point main supporting;
> Double V–shaped guide rails plus high precision rolling balls adopted for measuring bench to move along;
> Temperature sensor employed to supervise temperature and compensate for the influence on measuring result.

仪器电气配置

直线光栅尺：准确度等级：±3μm
旋转编码器：线数：1400
空气温度传感器

Electric Configurations

Laser ruler: accuracy: ±3μm
Rotary measurement: line number: 1400
Air temperature sensor



仪器测量精度

> 对测量长度≤2000mm、长径比≤40：1以内的梯形丝杠，仪器可测5级精度；
对测量长度大于2000mm～3000mm的梯形丝杠，仪器可测6级精度。
> 测量滚珠丝杠的导程误差时
对测量长度≤2000mm，长径比≤40：1的滚珠丝杠，仪器可测1级丝杠；
对测量长度大于2000mm～3000mm的滚珠丝杠，仪器可测2级精度。

Measuring Accuracy

> For trapezoidal screws:
measuring accuracy:
class 5 (length≤2000mm, ratio of length to diameter≤40：1);
class 6 (length 2000mm–3000mm);
> For ball screws:
measuring accuracy:
class 1 (length≤2000mm, ratio of length to diameter≤40：1);
class 2 (length 2000mm–3000mm);

系统软件能实现的功能

> 系统控制：测量仪系统状态运行控制；
> 系统运动参数设置：丝杠参数输入、丝杠测试状态（转速、长度）设置；
> 丝杠行程精度动态测量；
> 导程精度测量误差补偿条件检测（温度补偿）；
> 导程精度测量结果数据处理与分析：2π误差、300误差、全长误差、全长平均行程偏差、合格性判定、检测报告；
> 检测结果输出：模拟量记录曲线输出、数字量化检验曲线与结果的打印输出、屏幕的实时检测状态输出；
> 数据管理：测试对象特征参数检测数据、检验报告、合格性检查等数据的管理。

仪器主要技术参数

> 顶尖距	3200mm
> 最大可测螺纹长度	3000mm
> 中心高	160mm
> 可测螺纹外径	φ20～φ80mm
> 头架转速范围	5～50r/min
> 可测量导程范围	2～40mm

Soft Program Functions:

> System control: to control the measuring system operation;
> Parameter setting; to set up the ball screw parameters being measured, spindle rotation speed, measuring length;
> Measuring execution: to perform the measuring operation as per set parameters;
> Temperature compensation: To supervise the temperature influence on measuring result and then make compensation;
> Data processing and analysis: to process the measuring data and make analysis of the measured ball screw quality (V2π error, V300 error, full travel and mean travel error);
> Result output: to output the test result as the real–time screen indication;
> Data management: to manage the measured data in the control computer for storage and view.

Main Specifications

> Center Distance	3200mm
> Max. Measuring Length	3000mm
> Center Height	160mm
> Measuring Diameter	φ20～φ80mm
> Spindle Rotation Speed	5～50r/min
> Measuring Lead	2～40mm

HJY050 丝杠动态测量仪
Ball Screw Dynamic Measuring Machine

仪器简介

HJY050十米丝杠动态测量仪是检测精密丝杠的大型测量仪器。仪器主要测量长度较长、精度较高的滚珠丝杠导程及行程误差、梯型丝杠的螺旋线误差。

Brief Introduction

HJY050 is a 10–meter dynamic measuring machine designed and made to inspect lead error and spiral travel error of ball screws and trapezoidal screws.

仪器配置

> 采用同步位移绝对值比较原理进行丝杠动态测量，角度测量采用圆光栅，长度测量采用激光尺，量程大、精度高，并具有补偿单元，可完成多种补偿；
> 测量系统的主轴控制系统采用交流伺服电机速度控制方式，选用运动控制器作为伺服系统控制器，可方便地实现对伺服电机的控制；
> 仪器采用铸铁床身；
> 测量架移动导轨采用高精度滚柱加平–V型导轨形式；
> 配有温度测量装置，可以准确补偿温度对测量的影响。

Mechanical Configurations

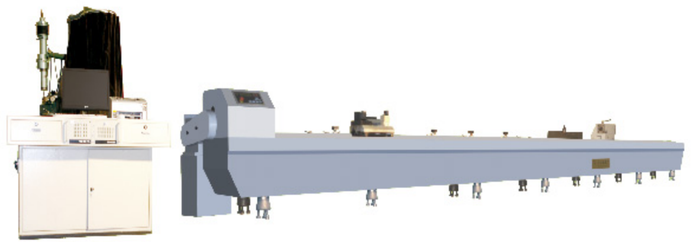
> By comparison principle of synchronous displacement absolute value, and with the help of angular encoder and laser ruler, ball screw dynamic precision is measured;
> The rotation spindle driven by servo motor, and spindle speed regulated by motion controller;
> Machine body made up by high quality cast iron;
> Double V–shaped guide rails plus high precision rolling balls adopted for measuring bench to move along;
> Temperature sensor employed to supervise temperature and compensate for the influence on measuring result.

仪器电气配置

直线测量：激光尺：准确度等级：±1.0ppm(μ m/m)
旋转编码器：圆光栅 线数：23600
空气温度传感器

Electric Configurations

For linear measurement:
laser ruleraccuracy: ±1.0ppm(μ m/m)
For rotary measurement:
angular encoder line number：23600
Air temperature sensor



仪器测量精度

> 本仪器在十米范围内可测P3级精度的丝杠。
> 测量单个导程，仪器允差:0.403 μ m。

Measuring Accuracy

> For ball screws: measuring accuracy: class 3 (length within 10 meter);
> For single lead: tolerance: 0.403 μ m.

系统软件能实现的功能

> 系统控制：测量仪系统状态运行控制；
> 系统运动参数设置：丝杠参数输入、丝杠测试状态（转速、长度）设置；
> 丝杠行程精度动态测量；
> 导程精度测量误差补偿条件检测（温度补偿）；
> 导程精度测量结果数据处理与分析：2π误差、300误差、全长误差、全长平均行程偏差、合格性判定、检测报告；
> 检测结果输出：模拟量记录曲线输出、数字量化检验曲线与结果的打印输出、屏幕的实时检测状态输出；
> 数据管理：测试对象特征参数检测数据、检验报告、合格性检查等数据的管理。

Soft Program Functions:

> System control: to control the measuring system operation;
> Parameter setting; to set up the ball screw parameters being measured, spindle rotation speed, measuring length;
> Measuring execution: to perform the measuring operation as per set parameters;
> Temperature compensation: To supervise the temperature influence on measuring result and then make compensation;
> Data processing and analysis: to process the measuring data and make analysis of the measured ball screw quality (V2π error, V300 error, full travel and mean travel error);
> Result output: to output the test result as the real–time screen indication;
> Data management: to manage the measured data in the control computer for storage and view.

仪器主要技术参数

> 顶尖距	10300mm
> 最大可测螺纹长度	10000mm
> 中心高	230mm
> 可测螺纹外径	ϕ60 ~ ϕ200mm
> 头架转速范围	0 ~ 70r/min
> 可测量导程范围	8 ~ 60mm

Main Specifications

> Center Distance	10300mm
> Max. Measuring Length	10000mm
> Center Height	230mm
> Measuring Diameter	ϕ60 ~ ϕ200mm
> Spindle Rotation Speed	0 ~ 70r/min
> Measuring Lead	8 ~ 60mm

HJY 057
丝杠动态测量仪
Ball Screw Dynamic Measuring Machine

仪器简介
本仪器是测量高精度丝杠的精密仪器。主要是用来测量长度在400mm，直径在φ6～φ25mm以内的梯形丝杠、滚珠丝杠和滚珠丝杠副的螺旋线误差。机床由交流电机带动头架主轴旋转，拨动被测丝杠同步旋转，通过带动头带动测量架在床身导轨上移动。

Brief Introduction
The machine is used to test ball screws and trapezoidal screw φ6～φ25mm in diameter and 400mm in length. Driven by servo motor, the head spindle rotates and take the measured ball screw to move along the measuring bench guide rails.

仪器测量精度
> 测量单圈螺旋线：±0.0007mm
> 测量相邻齿距：
25mm内极限误差 ±0.0007mm
100mm内极限误差 ±0.001mm
300mm内极限误差 ±0.0017mm

Measuring Accuracy
> Pitch error: ±0.0007mm
> adjacent pitch error:
±0.0007mm/25mm length
±0.0001mm/100mm length
±0.0017mm/300mm length

仪器主要技术特点
> 采用同步位移绝对值比较原理进行丝杠动态测量，角度测量采用圆磁栅，长度测量采用光栅，量程大、精度高，并具有补偿单元，可完成多种补偿；
> 测量系统的主轴控制系统采用交流伺服电机速度控制方式，选用运动控制器作为伺服系统控制器，可方便地实现对伺服电机的控制；
> 在滚珠丝杠副的误差评定上，采用最小二乘法求取回归系数、各行程变动量，采用一种高速高精度的优化算法，缩短了运算时间；
> 自主开发的测量控制系统软件，对测量过程、测量数据进行实时监控和处；
> 被测丝杠既是被测元件，又是传动元件，其旋转运动带动测量架移动，提高了测量精度。

Mechanical Configurations
> By comparison principle of synchronous displacement absolute value, and with the help of angular encoder and laser ruler, ball screw dynamic precision is measured;
> The rotation spindle driven by servo motor, and spindle speed regulated by motion controller;
> By high-speed and precision optimization algorithm, ball screw evaluation process completed fast;
> Self-developed measurement program, able to perform measuring operation, data processing and analysis, data management and output;
> The measured ball screw, serving also as a transmission component, take the measuring bench to move when rotating hence measuring accuracy is improved.

仪器主要技术参数

> 顶尖距	500mm
> 最大可测螺纹长度	400mm
> 中心高	85mm
> 可测螺纹外径	φ6～φ25mm
> 测量架最大移动量	500mm
> 测量架移动速度	1～4mm/s
> 头架转速范围	10～60r/min
> 测量架横向移动量	35mm

Main Specifications

> Center Distance	500mm
> Max. Measuring Length	400mm
> Center Height	85mm
> Thread O.D to be measured	φ6～φ25mm
> Max. movement of measuring bench	500mm
> Moving speed of measuring bench	1～4mm/s
> Head spindle speed range	10～60r/min
> Cross traverse of measuring bench	35mm