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32		XQT-01 分划元件、测微尺 XQT-01 Scale Element and Micrometer
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企业简介

上海星庆光学仪器有限公司成立于1992年，是一家专注于高精度光学零部件和精密光学仪器的研发、生产和销售的高科技企业。公司经过多年的发展壮大，现已在上海金山建立了独立的生产基地，总面积超过3000平方米，并拥有一支由80余名员工组成的团队，其中包括30名工程技术人员。公司配备了百余台（套）先进的加工和测试设备，具备强大的研发和制造能力，是国家认证的高新技术企业。

公司不仅拥有全套传统光学加工设备，还引进了先进的2米机械臂柔性抛光设备和1米加工范围的真空离子束抛光机。公司拥有的进口球面反射标准镜F0.75 RS，PV精度达到 $1/50\lambda$ ，基于此自主研发并生产了全系列球面和平面干涉仪标准镜，产品经过市场多年验证，广受好评。公司生产的光学零部件还包括各种高、中、低精度的光学平面、棱镜、球面透镜、非球面透镜及抛

物镜、轮胎镜等非球面反光镜，以及红外材料加工和分划元件制作等。

公司自主开发的光学仪器包括：多种口径的激光球面干涉仪及其配套球面标准镜、在线测量用各种口径激光平面干涉仪、光学比较测角仪、内调焦望远镜（平行光管）、工业测量显微镜、开关电源冷光源、CCD适配镜、数码适配镜等系列产品。近期，公司正在研发的产品包括中红外激光球面干涉仪、短相干球面干涉仪、超大行程立式球面干涉仪、掠射平面检测仪、非接触测量球径仪和在线测量用投影仪，在线测量用投影仪等产品。

公司始终以高质量的产品、及时的交货期和优质的服务为目标，致力于树立一流企业的形象，并凭借显著的价格优势与更多新老客户建立长期合作关系。

COMPANY PROFILE



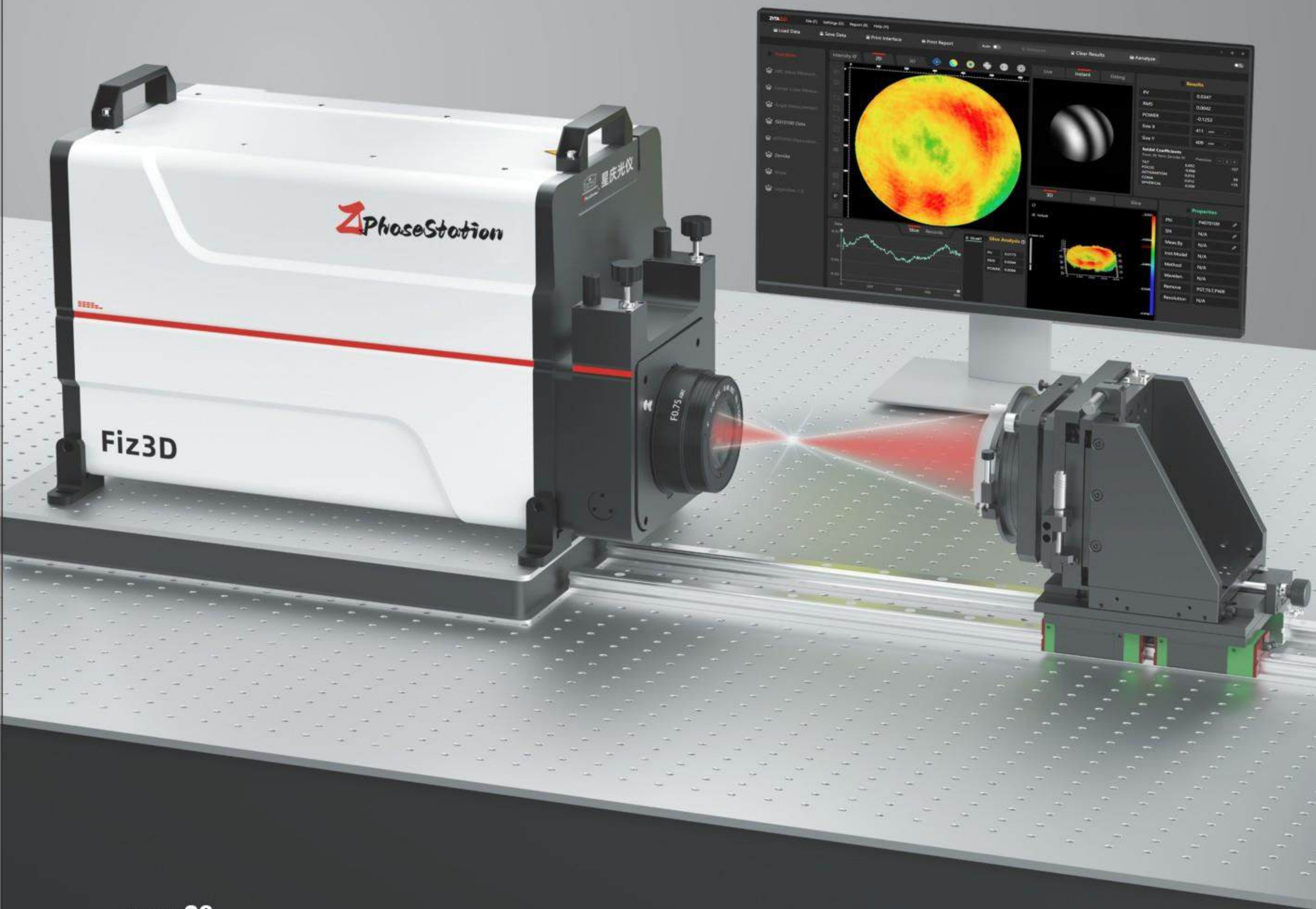
Shanghai Xingqing Optical Instrument Co., Ltd. was founded in 1992 and has since evolved into a High-Tech Enterprise specializing in the research, development, production, and distribution of High-Precision Optical Components and Precision Optical Instruments. Over the years, the company has expanded significantly and now owns an independent facility located in JINSHAN DISTRICT, SHANGHAI, covering over 3,000 square meters. The company employs more than 80 staff members, including 30 Engineering and Technical Professionals. Equipped with over 100 advanced processing and testing devices, the company boasts robust R&D and manufacturing capabilities. It is a National Certified High-Tech Enterprise.

The Company is equipped with a comprehensive suite of Traditional Optical Processing Machinery and has introduced 2-Meter Robotic Arm Flexible Polishing Equipment and a 1-Meter Processing Range Vacuum Ion Beam Polishing Machine. The Company owns an Imported F0.75 RS Spherical Reflecting Standard Mirror, which boasts a PV Accuracy of $1/50\lambda$. Based on this, the Company has successfully developed and manufactured a full range of Spherical and Planar Interferometer Standard Mirrors. These products have been extensively validated by the market over many years and have received widespread acclaim. The Optical Components produced by the Company encompass a wide variety of High-, Medium-, and Low-Precision Optical Planes, Prisms, Spherical Lenses, Aspheric Lenses, Parabolic Mirrors, Toroidal Mirrors, and other Aspheric Reflecting Mirrors, as well as Infrared Material Processing and Reticle Element Fabrication.

The Company has independently developed a comprehensive range of Optical Instruments, including Laser Spherical Interferometers of various apertures with their matching Transmission Sphere, online measurement Laser Plane Interferometers of different apertures, Optical Comparative Goniometers, internal focusing Telescopes (Autocollimators), Industrial Measurement Microscopes, cold light sources for switching circuits, CCD Adapter Lenses, Digital Adapter Lenses, and other product series. Recently, the Company has also embarked on the development of new products such as Mid-Infrared Laser Spherical Interferometers, Short Coherence Spherical Interferometers, ultra-large range Vertical Spherical Interferometers, Grazing Incidence Plane Detectors, non-contact measurement Spherometers, and online measurement Projectors. The Company has consistently strived to provide high-quality products, timely deliveries, and superior services. We are dedicated to establishing the image of a first-class enterprise and fostering long-term cooperative relationships with both new and existing customers by leveraging our significant pricing advantages.

数字化干涉系统
ZPhaseStation® Interferometer Analysis System

一台机器可测量多种工件
通过更换不同的镜头平面、凹面、凸面.....尽在掌握，从1993年开始制造平面干涉仪超过25年的光学设计和制造经验久负盛名的光学参考镜制造商倾尽全力推出的新一代产品。



规格及参数 Technical Data

• 主机

型号	测量尺寸(圆形-直径) (注1)	立式使用	卧式使用
Type100	102 mm	√	√
Type150	152.4 mm	√	√
Type250	250 mm	√	√
Type340 (注2)	340 mm	√	√
Type450	457.2 mm	×	√
Type600	609.6 mm	×	√

注1: 在80% 直径以内使用时，可以获得更好的测量效果。
注2: 推荐卧式使用，立式使用时会降低精度。

• 测量软件

PhaseStation软件模块	扫描方式	单平面干涉 (注1)	双平面干涉 (注2)
PhaseStation Static (注3)	无	√	×
PhaseStation PSI	压电振镜	√	×
PhaseStation MST	波长调谐	√	√

注1: 适用于大部分工件。
注2: 通常适用于透明工件，同时对上表面下表面厚度进行测量。
注3: 基础版本，不推荐用于高精度测量。

• 测量精度 Measurement Accuracy

型号	Type 100~250	Type 340	Type 450~600
绝对精度PV (注1)	31.64nm或1/20λ (注2)	42.19nm或1/15λ	63.28nm或1/10λ
重复精度 RMS (±2σ) (注3)	0.6nm或1/1000λ	0.8nm或1/750λ	1.2nm或1/500λ

注1: 绝对精度被定义为“参考镜的绝对精度”，实际测量的绝对精度 = 绝对精度 + 重复精度。
注2: λ被定义为氦氖激光器的波长 632.8 nm。
注3: 重复精度定义为相同条件下100次连续测量，95%置信区间(≈±2σ)内的结果允差。
注4: 非平面参考镜的精度通常低于平面参考镜，具体数值请联系销售人员确认。
注5: 该精度为ZphaseStation提供的标准平面参考镜的精度，更高精度需求请联系销售人员。

测试环境 Test Environment	样品放置于气浮隔振桌上，样品距离参考镜100mm，光路被遮光罩包裹，房间内空调关闭，以避免气流扰动。 The sample is placed on the air-float vibration isolation table, with a distance of 100mm between the sample and the transmission flat. The optical path is enclosed by a light shield, and the air conditioning in the room is turned off to avoid airflow disturbance.
被测物 Test Object	直径小于参考镜的80%，平面反射工件，反射率4%±1%，PV精度高于50nm，RMS精度高于10nm。 The workpiece should be plane mirror with a diameter less than 80% of the transmission flat. It has a reflectivity of 4%±1%, a PV accuracy better than 50nm, and an RMS accuracy better than 10nm.

球面干涉仪
平面干涉仪
动态干涉仪
其他仪器
机械臂抛光系统
光学冷加工产品

XQ10J-GIV 生产端立式干涉仪

XQ10J-GIV Production-Oriented Vertical Interferometer

用途
Purpose

检测光学元件表面精度;
测量光学元件曲率半径;
检测光学材料均匀性

Assess the Surface Accuracy of Optical Components,
Measure the Radius of Curvature of Optical Elements,
Evaluate the Homogeneity of Optical Materials.

特点
Feature

高效率、高精度;
操作简单;

High Efficiency and Precision;
User-Friendly Operation;

可选附件
Optional
Accessories

曲率半径测量系统;
条纹分析软件;
干涉仪工作台

Radius of Curvature Measurement System,
Interference Fringe Analysis System
Interferometer Workbench.



技术参数 Technical Parameters

测定方法 Measurement Methodology	菲索干涉原理 Fizeau-type
口径 Clear Aperture	Φ102mm/150mm
标准面精度 Transmission And Reference Surface Error	优于λ/20(@632.8nm)
光源 Light Source	进口氦氖激光器(632.8nm) He-Ne Laser
电源 Power Supply	AC100V~240V 50/60HZ
外形尺寸 Overall Dimensions	600*1200*2240mm
整机重量 Machine Weight	200kg

XQ6J-GI 60mm 口径激光球面干涉仪

XQ6J-GI 60mm Laser Sphere Interferometer

用XQ6J-GI型球面干涉仪主要用于精密光学平面和球面的面型测量、球面曲率半径测量、光学系统波前测量以及光学材料均匀性测量。作为光学元件加工厂、光学仪器生产厂、高等院校、职工培训机构及计量单位必备的光学检测设备,该仪器具有以下特点:功能全面、操作简便且经济高效。此外,该仪器能够在同一平台上实现球面零件曲率半径R值和面形精度的测量,从而省去了制作标准样板的需求,并有效降低了生产成本。

The XQ6J-GI Spherical Interferometer is primarily used for measurements of surface form of precision optical flat and spherical surfaces, spherical curvature radius, optical system wavefront, and optical material uniformity. As an essential optical inspection equipment for optical component manufacturing factories, optical instrument production factories, universities, vocational training institutions, and metrology units, this instrument boasts the following characteristics: comprehensive functionality, easy operation, and cost-effectiveness. Furthermore, this instrument can measure the curvature radius and surface form accuracy of spherical parts on the same platform, eliminating the need for fabricating standard templates and effectively reducing production costs.

规格及参数 Technical Data

型号 Model	XQ6J-GI
干涉原理 Interferometer Configuration	菲索型 Fizeau-type
口径 Clear Aperture	60mm
光源 Light Source	半导体激光器(635nm) LD 635nm
光路切换 Optical Path Switching	对准与测试切换 Alignment/Video
标准镜 Transmission And Reference Spheres	F0.6 F0.7 F1.0 F1.4 F2.1 F2.8 F5.6 F8.1 F8.4D F15 F115 F145
标准镜头精度 Transmission And Reference Surface Error	λ/20(@632.8nm)
电源 Power Supply	220V/50HZ
仪器尺寸 Overall dimension	270*360*1100mm



球面干涉仪

平面干涉仪

动态干涉仪

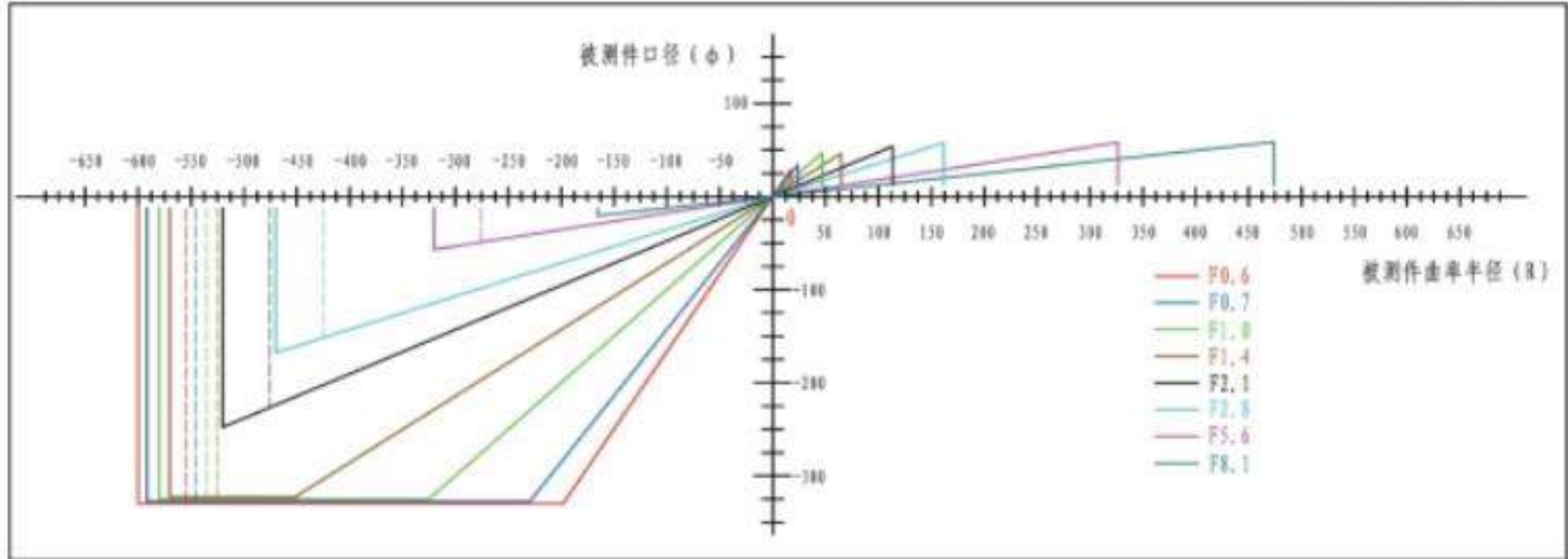
其他仪器

机械臂抛光系统

光学冷加工产品

XQJ 系列干涉仪标准镜

XQJ Series Interferometer Transmission Sphere/Flat



用途：适用于各型号进口干涉仪配套球面标准镜、平面标准镜，使仪器扩展使用范围，满足高精度面形精度的检测需求。

Application: Compatible with transmission flats & spheres, reference flats & spheres for various models of imported interferometers, expands instrument application range, meets high-precision surface figure accuracy detection requirements.

技术参数 Technical Parameters

60mm标准镜（支持定制）

标准款参考标准面的面形偏差(PV)值小于 30nm($\lambda/20$, @632.8nm)

60mm Transmission Sphere/Flat (customizable)

高精度款参考标准面的面形偏差(PV)值小于 20nm($\lambda/30$, @632.8nm)

F数 F/Number	标准曲面率半径 Radius of The Transmission Sphere	曲率半径测量范围 Radius Measurement Range		最大口径测量范围 Maximum Aperture Measurement Range	
		凸 Convex	凹 Concave	凸 Convex	凹 Concave
F0.6	17.458	1~16.8	1~140	25.5	99
F0.7	24	2~23.3	2~155	31	99
F1.0	47.1	3~46.67	4~245	43	99
F1.4	64.4	3~63.56	4~355	43	99
F2.0	113.573	4~112	5~485	54	99
F2.1D	+149.994	-	152~980	-	99
F2.8	161.63	5~160	6~385	56	99
F4.2	241.77	8~240	12~370	57	99
F5.6	326.6	8~325	14~300	57	81
F8.1	474.212	10~473	16~150	57	50
F8.4D	510.55	-	512~980	-	60
F15	913.673	12~910	-	60	-

4寸标准镜（支持定制）

标准款参考标准面的面形偏差(PV)值小于 30nm($\lambda/20$, @632.8nm)

4-inch Transmission Sphere/Flat (customizable)

高精度款参考标准面的面形偏差(PV)值小于 20nm($\lambda/30$, @632.8nm)

F数 F/Number	标准曲面率半径 Radius of The Transmission Sphere	曲率半径测量范围 Radius Measurement Range		最大口径测量范围 Maximum Aperture Measurement Range	
		凸 Convex	凹 Concave	凸 Convex	凹 Concave
F0.65	38.738	3~38	3~ X	61	1.538X
F0.75	48.082	4~48	4~ X	64	1.333X
F1.0	79.992	6~79.9	6~ X	80	1.00X
F1.5	122.77	6~122.7	10~ X	80	0.667X
F2.1	192.09	7~192	12~ X	91	0.476X
F3.3	308.379	7~308	12~ X	93	0.303X
F4.2	390.77	8~390	14~ X	93	0.238X
F4.9D	+459.279	-	460~ X	-	0.204X
F5	490	8~488	14~X	97	0.20X
F6D	+640.48	-	641~ X	-	0.167X
F6.2	610.256	10~610	16~ X	98	0.161X
F7.1	703.29	10~702	16~X	101	0.141X
F8.1	802.146	10~802	16~ X	101	0.123X
F10.7	1039.27	12~1038	18~ X	101	0.093X
F11.6	1148.334	12~1148	100~ X	101	0.086X
F10D	+1012.611	-	1214~X	-	0.10X
F12D	+1213	-	1214 ~ X	-	0.083X
F15	1510.3	14 ~ 1510	130 ~ X	102	0.067X
F16.8D	+1750	-	1752~X	-	0.0595X
F19.2D	1888.2	-	1890~X	-	0.0521X
F23	2376.61	20 ~ 2376	150 ~ X	102	0.043X
F25	2540	20~2538	150~X	102	0.040X
F ∞	∞	∞	∞	102	

6寸标准镜（支持定制）

标准款参考标准面的面形偏差(PV)值小于 30nm($\lambda/20$, @632.8nm)

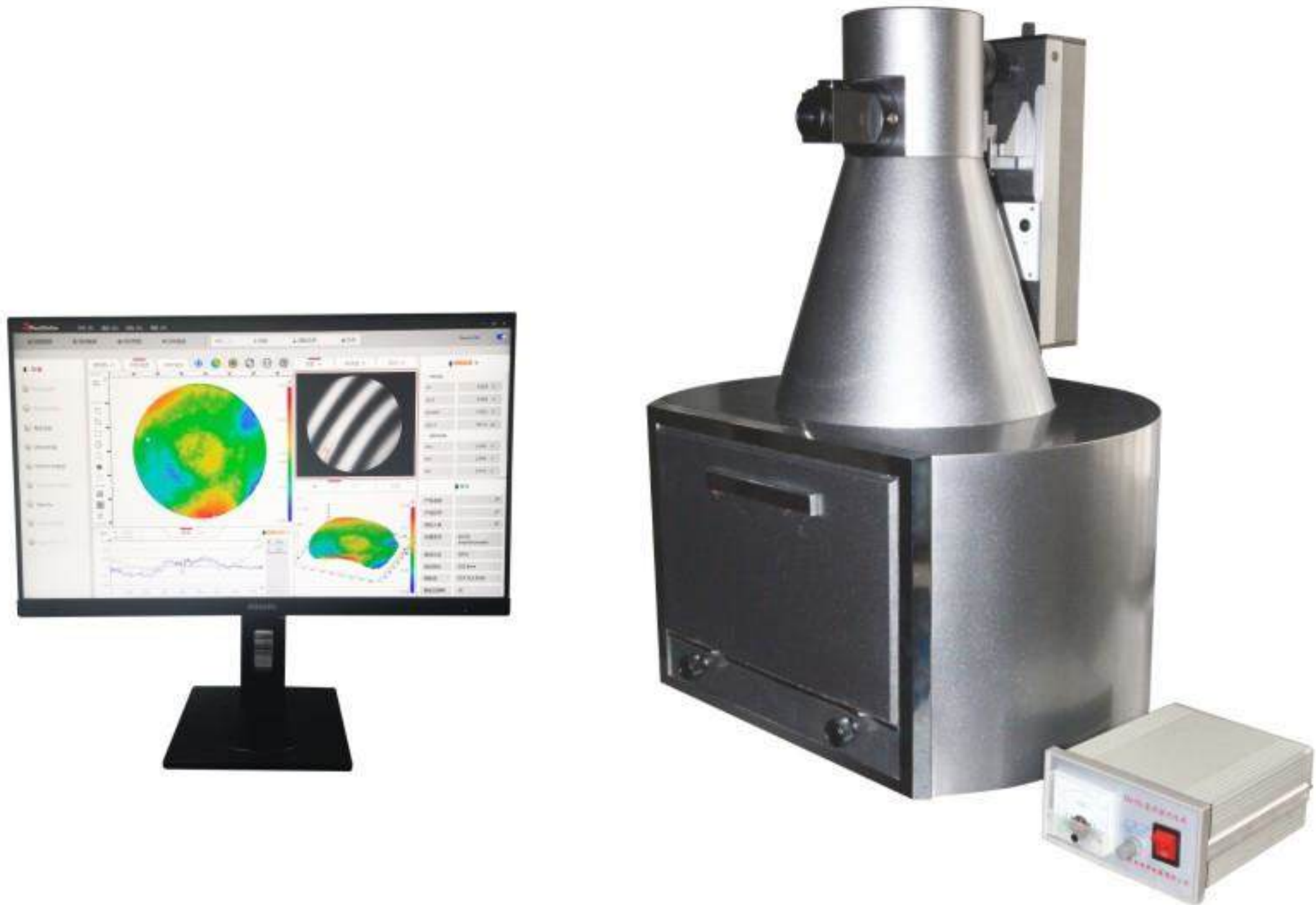
6-inch Transmission Sphere/Flat (customizable)

高精度款参考标准面的面形偏差(PV)值小于 20nm($\lambda/30$, @632.8nm)

F数 F/Number	标准曲面率半径 Radius of The Transmission Sphere	曲率半径测量范围 Radius Measurement Range		最大口径测量范围 Maximum Aperture Measurement Range	
		凸 Convex	凹 Concave	凸 Convex	凹 Concave
F0.8	80.127	5 ~ 80	5 ~ X	100	1.25X
F1.1	127.23	6 ~ 127	6 ~ X	115	0.91X
F2.2	292.382	7 ~ 292	7 ~ X	132	0.46X
F3.6	499.8	8 ~ 499	8 ~ X	138	0.28X
F4.2	600	8~599	8~X	142.6	0.24X
F5.5	791.6	9 ~ 791	9 ~ X	143	0.18X
F7.6	1111.3	12 ~ 1111	12 ~ X	146	0.13X
F11	1642.96	14~1642	14~X	149.2	0.91X
F15	2271.99	16~2271	16~X	150	0.0667X
F18D	+2731.15	-	20~X	-	0.0554X
F20	3000	20 ~ 3000	20 ~ X	150	0.05X
F30	4476.122	22~4475	22~X	150	0.0333X
F ∞	∞	∞	∞	154	

平面干涉仪

XQ15-GI/II 通用型（数字）激光平面干涉仪
XQ15-GI/II General-Purpose (Digital) Laser Plane Interferometer



- 特点: 1.卓越硬件性能: 延续卓越防震性能、极高的条纹锁定精度与优异视场清晰度, 确保测量基础稳定可靠。
- 2.强大环境适应性: 生产环境适应性优于市场同类产品, 保障复杂工况下的测量一致性。
- 3.高效大容量设计: 宽敞工作室为大尺寸镜面或批量检测提供便利, 提升检测效率。
- 4.智能数字化分析 (核心升级): 搭载先进软件分析系统, 实现:
- 自动化数据处理: 显著减少人工判读时间与误差
 - 实时分析与可视化: 即时呈现测量结果、趋势图与关键参数。
 - 智能算法支持: 提升测量精度与重复性, 支持更复杂的数据分析。
 - 数字化报告与管理: 一键生成专业报告, 测量数据可存储、追溯、导出, 便于质量管理与分析决策。

技术参数 Technical Parameters

第一标准平面(A面) Transmission Flat(A)	直径D1=Φ146mm, 平面的面形偏差(PV)小于0.03um(λ/20) working dia.D=Φ146mm, PV<0.03μm(λ/20, @632.8nm)
第二标准平面(B面) Reference Flat(B)	直径D2=Φ140mm, 平面的面形偏差(PV)小于0.03um(λ/20) working dia.D=Φ140mm, PV<0.03μm(λ/20, @632.8nm)
准直系统 Optical Collimation System	工作直径Φ146mm, 焦距f=400mm working dia.D=Φ146mm, focal length f=400mm
光源规格 Light source	激光ZN260(He-Ne)
数字分析系统 Digital Analysis System	机械移相PSI-Zphasetation
干涉室尺寸 Working space size	Φ300x180mm

XQ15-GIII 实用型激光平面干涉仪
XQ15-GIII Practical Laser Plane Interferometer



特点: 在保留XQ15-G I激光平面干涉仪原有用途及特点的基础上, 进一步提升其实用性和适用范围。该仪器不仅适用于大批量生产单位的生产车间和平面度、高精度平行度(角度)测量, 还特别适合大平板生产流水线中的快速筛选应用。

Feature: On the Basis of Retaining the Original Functionalities and Characteristics of the XQ15-GI Laser Plane Interferometer, its Practicality and Application Scope have been Significantly Enhanced. This Instrument is Suitable Not Only for Production Workshops in Mass Production Units and for Measuring Flatness and High-Precision Parallelism (Angles), but Also Particularly for Rapid Screening Applications on Production Lines of Large-Scale Flat Surfaces.

技术参数 Technical Parameters

第一标准平面(A面) Transmission Flat (A)	直径D1=Φ146mm, 平面的面形偏差 (PV)小于0.03μm(λ/20) working dia. D=Φ 146mm, PV<0.03μm(λ/20@632.8nm)
第二标准平面(B面) Reference Flat (B)	工作直径D=Φ140mm, 平面的面形偏差小于0.03μm(λ/20) working dia. D=Φ 140mm, PV<0.03μm(λ/20@632.8nm)
准直系统 Optical Collimation System	工作直径Φ146mm, 焦距f=400mm working dia. D=Φ146mm, focal length f=400mm
光源规格 Light Source	激光ZN260(He-Ne) Laser ZN260(He-Ne)
最大适用尺寸 Working Space Size	Φ500x250mm