

# Fiber Optic Componments



**ACURI**

Acuri Technology Co., Ltd.

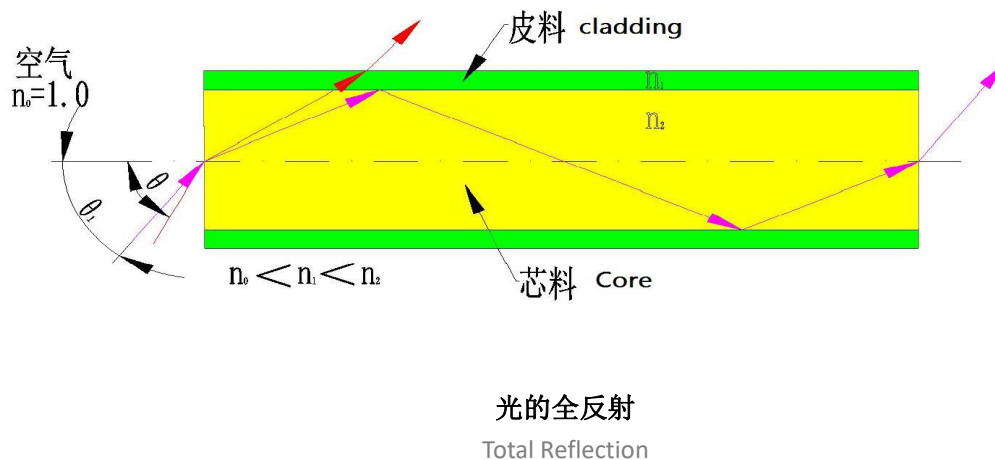
## Product Internal Construction

Fiber Optic Plate (hereinafter referred to FOP) is a glass product composed of many optical fibers, and is made by the processes as fiber arranging, fiber screen pressing, and cold working. It can transmit the optical image from one side to the other with high resolution in “zero” thickness , as shown in the pictures.



The basic structure of an FOP consists of a single fiber that conveys light and EMA glass that absorbs light leaking from the fiber and increase the contrast.

In each single fiber, light is conveyed by total reflection that occurs at the boundary between the core glass and the cladding glass due to the difference in their refractive index. For light that does not totally reflect and exits the fiber is absorbed by the EMA glass. This feature allows optical images to transmit through each fiber without high resolution.



# Fiber Optic Plate

## Performance

Optical image information transmission.

## Principle

The image which is pressed against one end of the FOP will be resolved to the correspondent pixels by millions of fibers, then the regular arrayed fibers will transmit the pixels information correspondently to the other end of FOP, and the combining pixels will be imaged at the output window according to the original arrangement.



## Features

High transmission efficiency, Clear image transmission(High resolution), “Zero” optical distance, Simple and compact optical design.

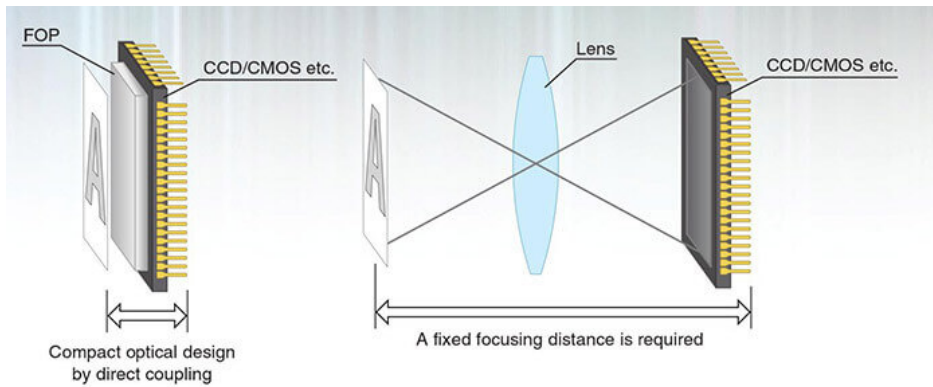
## Specifications

项目 Item		典型参数 Typical Specification	备注 Remark
光纤尺寸/Fiber Size		6um	1) 可定制丝径 2um-200um 或更大; Fiber size can be customized from 2um to 200um or larger.
理论数值孔径 Numerical Aperture		≥1.0	
真空度/Vacuum Tightness		$< 2.026 \times 10^{-12} \text{ Pa} \cdot \text{m}^3 \cdot \text{s}^{-1}$	
平均热膨胀系数 Average Thermal Expansion Coefficient		(20°C-300°C) (87±5) × 10 <sup>-7</sup> /°C	2) 可定制理论数值孔径 0.15-1.0;
透过率 Transmission	准直透过率 Collimated light Transmission	≥65%	Numerical aperture can be customized from 0.15 to 1.0. 3) 可定制芯皮比 75: 25, 65: 35, 或根据要求;
	朗伯光透过率 Lambertian Light Transmission	≥57%	

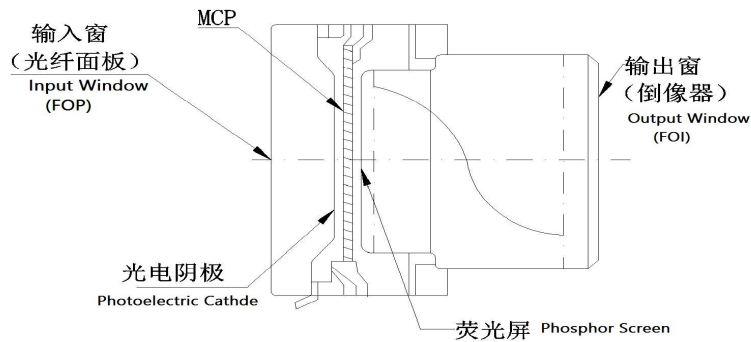
畸变 Distortion	剪切畸变/Shear Distortion	< 30μm	Core:cladding ratio can be 75:25 and 65:35 or customized. 4) 单丝结构: 圆丝或方丝. Fiber shape: round or square. 5) 其他性能指标及外形尺寸可按要求订制. The other specifications and dimensions can be customized according to the requirements.
	蛇变/Gross Distortion	≤40μm	
像位移/Frame Runout		<100μm	
分辨率/Resolution		≥100 lp/mm on axis	

## Applications

### ① Image coupling



### ② As the input and output window element of the image, FOP can be applied to the image intensifier of low-light-level night vision instrument

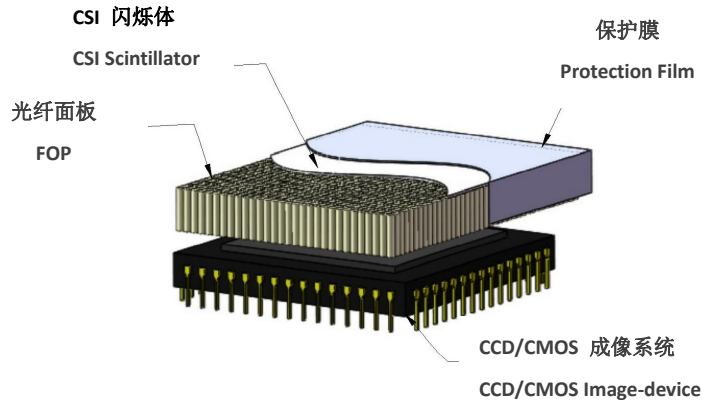


双近贴式像增强器结构原理图  
Principle Diagram Of Double Proximity Image-Intensifier

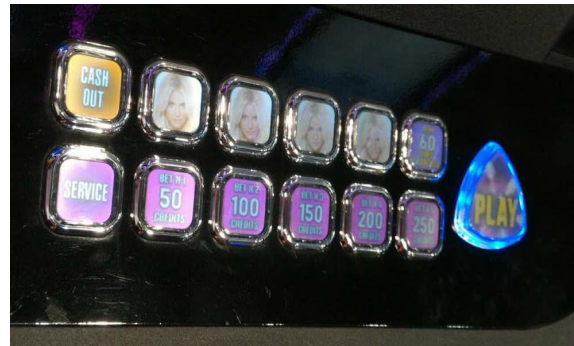
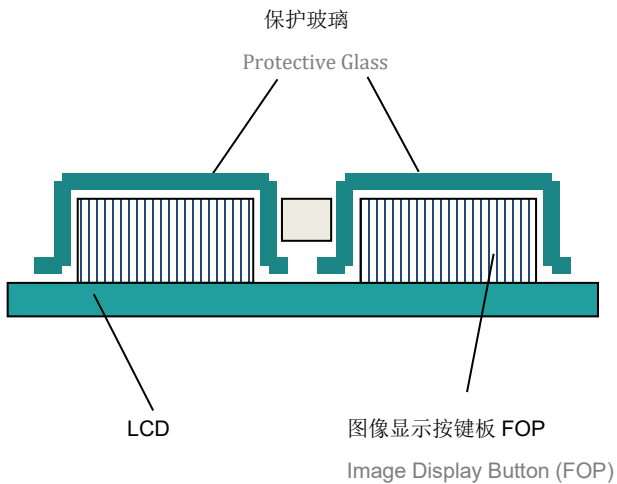
③ As the imaging element with CCD, FOP can be applied to the new-type fingerprint identification instrument



④ Medical Devices (X-ray Scintillator with FOP)



⑤ Image Display Buttons (Dynamic display buttons of gambling machine, Buttons of audio controller etc.)



# Fiber Optic Inverter

## Performance

FOI is used for optical image information transmission. It can invert the image to 180°.

## Principle

The image which is pressed against one end of the FOI will be resolved to the correspondent pixels by millions of fibers, then the regular arrayed fibers will transmit the pixels information correspondently to the other end of FOI, the pixels are reversed to 180° with the inversion of fibers while transmitting and combined to 180° inverted image on the output window.



## Features

Inverting the image, High transmission efficiency, Clear image transmission(High resolution), "Zero" optical distance.

## Specifications

项目 Item	典型参数 Typical Specification	备注 Remark
光纤尺寸 Fiber Size	6um	1) 可定制丝径 4um, 6um 或根据客户需求; Fiber size can be customized to 4um, 6um or according to customers' requirement. 2)其他性能指标及外形尺寸可按要求订制. The other specifications
理论数值孔径 Numerical Aperture	≥1.0	
扭转角/Inverting Angle	180°±1°	
平均热膨胀系数 Average Thermal Expansion Coefficient	(20℃-300℃) (87±5) ×10 <sup>-7</sup> /℃	
透过率 Transmission	准直透过率 Collimated light Transmission	

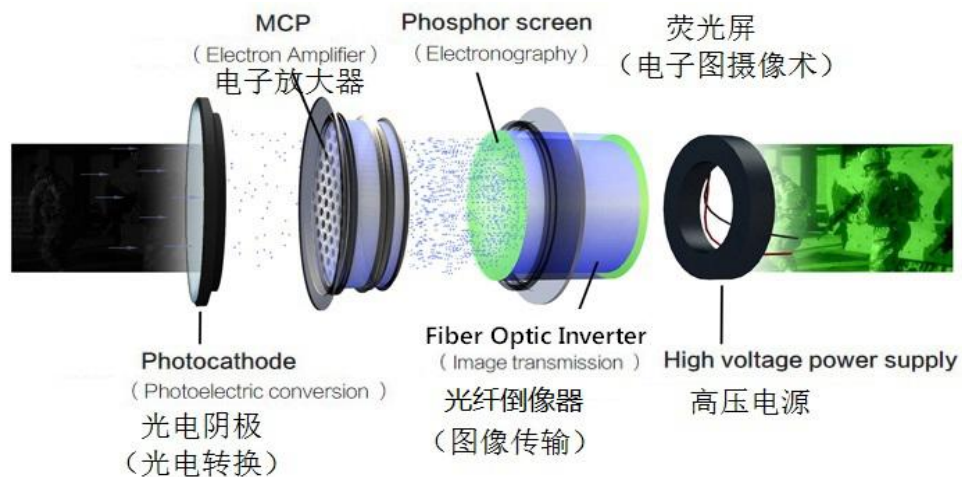
	朗伯光透过率 Lambertian Light Transmission	≥57%	and dimensions can be customized according to the requirements.
畸变 Distortion	剪切畸变 Shear Distortion	< 30μm	
	蛇变 Gross Distortion	≤40μm	
像位移/Frame runout		<125μm	
分辨率/Resolution		≥100 lp/mm on axis ≥90 lp/mm on edge	

## Applications

As the output window element, FOI can be applied to the image intensifier of the low-light-level night vision device (image intensifier tube).



Image Intensifier Tube



# Fiber Optic Taper

## Performance

FOT is used for optical image information transmission. It can enlarge or reduce the image.

## Principle

The image which is pressed against one end of the FOT will be resolved to the correspondent pixels by millions of fibers, then the regular arrayed fibers will transmit the pixels information correspondently to the other end of FOT. The pixels will be enlarged or dwindled with the change of fiber diameter, and will be imaged at the output window according to the original arrangement.



## Features

Enlarge or dwindle image, High transmission efficiency, Clear image transmission(High resolution), "Zero" optical distance, Small optical design.

## Specifications

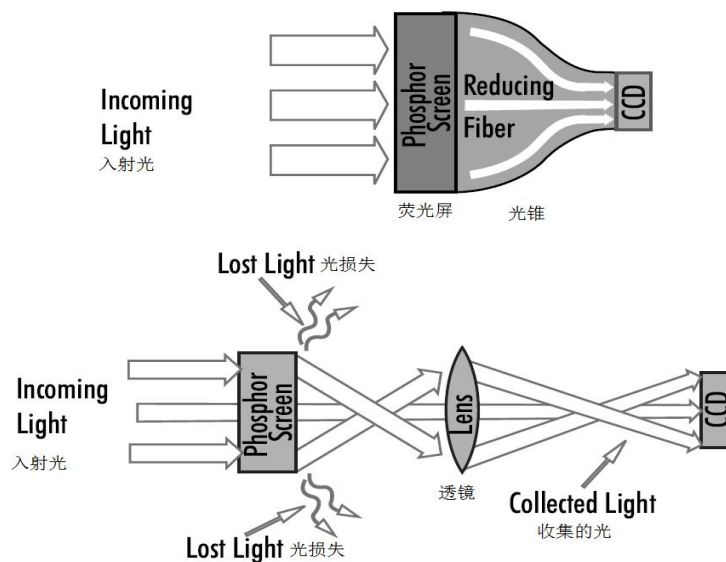
项目 Item	典型参数 Typical Specification	备注 Remark
光纤尺寸 Fiber Size	6um	1) 可定制丝径 4um, 6um 或根据客户需求; Fiber size can be customized to 4um, 6um or according to customers' requirement. 2) 单丝结构: 圆丝或方丝; Fiber shape: round or square 3) 其他性能指标及外形尺寸
理论数值孔 (小端) Numerical Aperture (Small End)	≥1.0	
放大比 Magnification	定制 Customized	
平均热膨胀系数 Average Thermal Expansion Coefficient	(20°C-300°C) (87±5) ×10 <sup>-7</sup> /°C	
透过率	准直透过率	

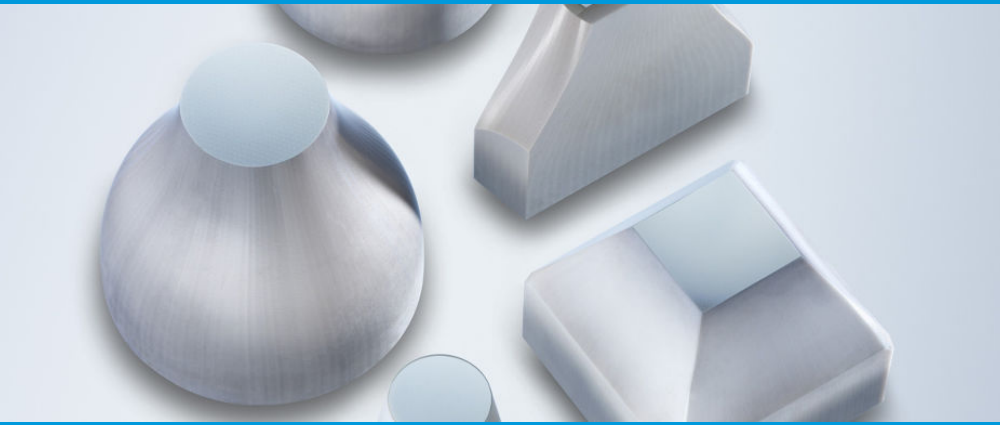


Transmission	Collimated light Transmission		可按要求订制。 The other specifications and dimensions can be customized according to the requirements.
	朗伯光透过 Lambertian Light Transmission	≥57%	
畸变 Distortion	剪切畸变/Shear Distortion	< 30μm	
	蛇变/Gross Distortion	≤2% (useful area)	
	桶形/Barrel	≤3.0% (useful area)	
	枕形/Pincushion	≤3.0% (useful area)	
像位移 Frame run-out		<250μm	
分辨 Resolution		≥100 lp/mm on axis ≥90 lp/mm on edge	

## Applications

- ① The small end of FOT is coupled with CCD. It can be applied to the low-light-level camera tube
- ② As the transmission element between fingerprint and CCD, FOT is applied to the new-type fingerprint identification instrument
- ③ The large end of FOT is plated with scintillator, and the small end coupled with CCD and applied to the imaging survey of invisible light and high-energy radiation such as x-ray camera, radiation imaging detector etc. FOT is also widely used in the field of medical treatment image technology and molecular biology, such as biological information study of small living animals, γ-ray camera, x-ray tomography, and Positron emission tomography Instrument





- Medical and dental devices**
- Display and scientific imaging**
- Military night vision aids**
- Novel commercial and industrial applications**



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