# DPM PHOTONICS

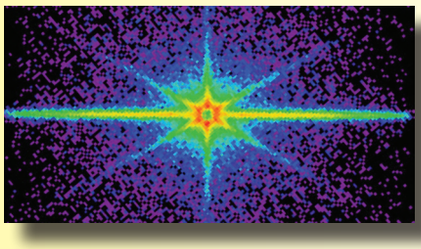
## *Precision Optics Catalog*



DPM PHOTONICS

*P.O. Box 3002 · Vernon, CT 06066 · Tel: (860) 872-6573 · Fax: (860) 454-4217*

# Welcome to DPM Photonics...



## Company Background

DPM Photonics was founded in February 2009, offering consulting services in the areas of fiber optics, fiber-based components, fiber lasers/amplifiers, precision optics and optical design. Recognizing that users in these areas have a variety of needs often requiring custom/specialty products, DPM Photonics expanded its business later in 2009 to incorporate representation services for companies who provide not only standard photonic-based products but have many years of experience with custom-product design and manufacturing. The synergy between the products offered by our corporate partners and the experience of our team make DPM Photonics a unique vendor that can discuss customer needs on a technical level as well as support custom product development. We have been of service to many globally-located companies including major corporations, start-up ventures and universities. DPM Photonics is also a recognized vendor for both Government agencies & Government contractors.

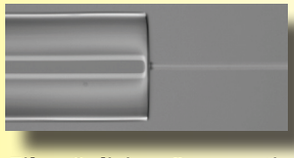
## Our Mission

**The mission of DPM Photonics is to provide customers with a diversified range of products and services supporting the field of medium- to high-power active optical devices.**

*By offering standard & custom product solutions and consulting services, via courteous and attentive interactions, we strive to satisfy both customers and their requirements.*

***Precision Optics***

***Fiber-based Components***



***Fiber Splicing, Preparation and Bundling***

## Why buy from DPM Photonics?

There are many vendor choices for photonics products. Here are some reasons why a growing number of companies have chosen to work with DPM Photonics:

- **Expertise with the products represented—can talk "technical."**
- **Custom products are of high quality, having reasonable turn-around times and prices.**
- **Wide range of product offerings means ordering from several product areas can be done through one vendor.**
- **DPM Photonics is a non-competing entity that can provide dedicated consulting services or product development discussions.**
- **DPM Photonics and its partners are fully committed to customer satisfaction.**

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# Precision Optics: *A Definition of Quality*

***The term "precision optics" has become such a common label that the true implications have become obscured.***

Optics designated as "precise" often lack the reliability and reproducibility expected of precision products. Consistency of fabrication, for both optics and mechanical parts, is paramount and has equal importance to a cleverly designed lens. We take great pride, therefore, to introduce you to the products within this catalog.

All optics products offered by DPM Photonics can truly be classified as precision optics. All optical assemblies for the UV, visible and near-IR are manufactured in the USA using the highest quality goods and standard fabrication practices to ensure design tolerances are consistently met. Capabilities are:

- **ISO-certified and NIF-qualified optical fabrication**
- **1/8 wave or better on surface figure**
- **1 wave radius accuracy**
- **Repeatable centering to less than 1 minute of arc**
- **Scratch-dig of 10:5**

All lens systems are air-spaced and have appropriate multilayer A/R coatings for minimum insertion loss and high damage resistance. UV-grade fused silica is used exclusively in all UV lenses and in most visible/1064nm lens assemblies. Infrasil103 is used in optics designed for the 2 micron wavelength range.

The old saying "***You get what you pay for***" is certainly true when high optical performance is required. Our cost structure, however, allows us to offer high-power precision optics at prices that compare favorably to those of lesser quality components.

If you have special requirements not met by our standard products within this catalog, please contact us with your specifications. Design and manufacture of custom products has been one of our largest strengths for over 20 years; we can provide optics that satisfy your needs with favorable turn-around times.

DPM Photonics is proud to offer products from Photonic Devices, Inc., which enters its third decade as a global supplier of precision optical and opto-mechanical products. Excellent product-quality, dedicated customer service and a longstanding customer loyalty base have distinguished Photonic Devices for over 20 years. All optical assemblies for the UV, visible and near- IR are manufactured in the USA using the highest quality goods and standard fabrication practices to ensure design tolerances are consistently met.

Photonic Devices Inc.

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# Beam Expanders

## Superior Performance and Repeatability

***With over 50 standard models, DPM Photonics offers one of the largest selections of Galilean beam expanders available. High power handing, minimum beam deformation, excellent manufacturing reproducibility and affordability have maintained the popularity of these globally-supplied beam expanders for over 20 years. Made with pride in the USA.***

- Power handling > 1 kW CW (> 200 W CW for $CO_2$ models)
- Computer designed for minimum wavefront distortion
- All models are compatible with the MG001 Series of Alignment Gimbal Mounts
- Standard wavelengths: offered from 266 nm to 10.6 microns.

## *NEW PRODUCT!* 18x Expander (1064 nm)

The 16-GBE18-18x-1064 is specifically designed to expand the small diameter collimated-output beams (1 mm or less) from isolator-coupled fiber lasers.

- Computer-designed fused silica optics with V-type A/R coatings provide low insertion loss (< 0.5%) and diffraction limited performance
- Adjustable air-spacing allows translation of output lens element without rotation
- Proprietary wave compression mounting of input lens element minimizes stress

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| 16-GBE18-18x-1064 | 1064 | 18 | 167.7 | 5/18 |

## 06-GBE36 Series

Providing industry-leading quality at reasonable cost, these high damage resistant, two- and three-element Galilean models provide both excellent wavefront and larger output apertures. Beam expander magnifications of the 06-GBE36 series can be varied by interchanging the input lens assembly. Ideal for both solid state and fiber-based lasers.

***06-GBE36-12x-1064***

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| 06-GBE36-8X-532 | 532 | 8.0 | 156.5 | 8.8/36 |
| 06-GBE36-10X-532 | 532 | 10.0 | 161.0 | 8.8/36 |
| 06-GBE36-12X-532 | 532 | 12.0 | 162.9 | 8.8/36 |
| 06-GBE36-5x-1064 | 1064 | 5.0 | 144.4 | 7/36 |
| 06-GBE36-6x-1064 | 1064 | 6.0 | 148.7 | 6/36 |
| 06-GBE36-8X-1064 | 1064 | 8.0 | 159.8 | 8.8/36 |
| 06-GBE36-10X-1064 | 1064 | 10.0 | 164.5 | 8.8/36 |
| 06-GBE36-12X-1064 | 1064 | 12.0 | 166.3 | 8.8/36 |

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# Beam Expanders

## 06-GBE23 Series

***06-GBE23-3x-355 with 1.5x Pre-Expander***

The 06-GBE23 Series of Galilean beam expanders is designed specifically for low magnification of laser beams with input diameters as large as 6 mm. Although low cost, these precision optical devices are ideally suited for matching the laser with the scanning or focusing optics used in a variety of materials processing applications, including:

- *Laser Marking & Engraving*
- *Laser Printing Systems*
- *Laser Scanning Systems*
- *Laser Welding*

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| 06-GBE23-3X-266 | 266 | 3.0 | 112.4 | 8.8/23 |
| 06-GBE23-5X-266 | 266 | 5.0 | 111.8 | 8.8/23 |
| 06-GBE23-6X-266 | 266 | 6.0 | 133.8 | 8.8/23 |
| 06-GBE23-8X-266 | 266 | 8.0 | 125.0 | 8.8/23 |
| 06-GBE23-10X-266 | 266 | 10.0 | 128.3 | 8.8/23 |
| 06-GBE23-3X-355 | 355 | 3.0 | 116.6 | 8.8/23 |
| 06-GBE23-5X-355 | 355 | 5.0 | 116.0 | 8.8/23 |
| 06-GBE23-6X-355 | 355 | 6.0 | 139.4 | 8.8/23 |
| 06-GBE23-8X-355 | 355 | 8.0 | 130.0 | 8.8/23 |
| 06-GBE23-10X-355 | 355 | 10.0 | 133.1 | 8.8/23 |
| 06-GBE23-2X-532 | 532 | 2.0 | 92.4 | 8.8/23 |
| 06-GBE23-2.5X-532 | 532 | 2.5 | 93.5 | 8.8/23 |
| 06-GBE23-3X-532 | 532 | 3.0 | 119.2 | 8.8/23 |
| 06-GBE23-4X-532 | 532 | 4.0 | 112.5 | 8.8/23 |
| 06-GBE23-5X-532 | 532 | 5.0 | 119.1 | 8.8/23 |
| 06-GBE23-6X-532 | 532 | 6.0 | 143.3 | 8.8/23 |
| 06-GBE23-8X-532 | 532 | 8.0 | 127.7 | 8.8/23 |
| 06-GBE23-2X-1064 | 1064 | 2.0 | 94.1 | 8.8/23 |
| 06-GBE23-2.5X-1064 | 1064 | 2.5 | 95.3 | 8.8/23 |
| 06-GBE23-3X-1064 | 1064 | 3.0 | 122.2 | 8.8/23 |
| 06-GBE23-4X-1064 | 1064 | 4.0 | 114.8 | 8.8/23 |
| 06-GBE23-5X-1064 | 1064 | 5.0 | 121.5 | 8.8/23 |
| 06-GBE23-6X-1064 | 1064 | 6.0 | 146.3 | 8.8/23 |
| 06-GBE23-8X-1064 | 1064 | 8.0 | 130.3 | 8.8/23 |

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# Beam Expanders

## 46-GBE23 Series

*46-GBE23*

The 46-GBE23 series provides relatively large input apertures at lower magnifications. Computer-designed fused silica elements and V-type A/R coatings provide diffraction limited performance with low insertion loss. Air spaces between lenses are fixed for best collimation.

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| 46-GBE23-1.5X-266 | 266 | 1.5 | 57.7 | 17/23 |
| 46-GBE23-1.5X-355 | 355 | 1.5 | 59.8 | 17/23 |
| 46-GBE23-1.5X-532 | 532 | 1.5 | 61.8 | 17/23 |
| 46-GBE23-1.25X-1064 | 1064 | 1.25 | 35.1 | 17/23 |
| 46-GBE23-1.5X-1064 | 1064 | 1.5 | 62.6 | 15/23 |
| 46-GBE23-3X-1064 | 1064 | 3.0 | 112.2 | 17/23 |

## Removable Pre-Expanders

*1.5x Pre-expander shown with the 06-GBE23 and 06-GBE36 series*

These easy-to-install pre-expanders allow magnification increases of 1.5x for most beam expanders offered by DPM Photonics (all models except those used for $CO_2$ lasers). Operating wavelengths range from 266 nm to 1064 nm.

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| PRE1.5X-266 | 266 | 1.5 | 23.9 | 5.6/5.6 |
| PRE1.5X-355 | 355 | 1.5 | 23.9 | 5.6/5.6 |
| PRE1.5X-532 | 532 | 1.5 | 23.9 | 4.7/4.7 |
| PRE1.5X-1064 | 1064 | 1.5 | 23.9 | 4.7/4.7 |

## ZBE Series (Zoom Beam Expanders)

*1x-5x Zoom Beam Expander for 355 nm*

Available for the UV and $CO_2$ lasers, these devices offer variable beam expansion up to 5x. Adding a Pre-Expander to the ZBE models operating in the UV range further increases their expansion by 1.5x while still maintaining high power handling and diffraction limited performance.

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| ZBE1X5-266 | 266 | 1-5 Zoom | 117.9-138.3 | 8.0/20 |
| ZBE1X5-355 | 355 | 1-5 Zoom | 117.9-138.2 | 8.0/20 |
| ZBE1.5X4-10.6 | 10600 | 1.5X-4X zoom | 142.0-156.6 | 8.0/30 |

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# Beam Expanders and Accessories

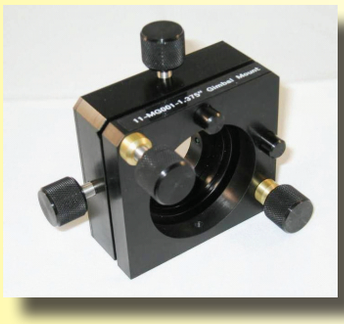
## Beam Expanders for $CO_2$ Lasers

*ZnSe element beam expanders handle up to 200W power*

DPM Photonics offers several beam expanders for use with low to medium power $CO_2$ lasers. These up-collimators are ideally suited to match the laser's output with dual-axis scan systems and flat field lenses for marking and engraving applications. All lens elements are fabricated from ZnSe and are computer-optimized for minimum wavefront deformation. All lens surfaces are anti-reflection coated for 10600 nm for < 2% insertion loss. Although their overall length is preset for best collimation, all models (with exception of the 46-GEB23) allow for translation of the input element, with positive locking and centration of the input lens section, via their radial split-ring housing design.

| Model Number | Wavelength (nm) | Magnification | Overall Length (mm) | CLEAR APERTURE Input/Output (mm) |
|---|---|---|---|---|
| 46-GBE23-1.5X-10.6 | 10600 | 1.5 | 39.4 | 16/23 |
| 06-GBE20-2X-10.6 | 10600 | 2.0 | 71.9 | 8.8/20 |
| 16-GBE23-2X-10.6 | 10600 | 2.0 | 69.6 | 17/23 |
| 06-GBE17-2.5X-10.6 | 10600 | 2.5 | 91.8 | 8.8/17 |
| 06-GBE20-3X-10.6 | 10600 | 3.0 | 92.6 | 8.8/20 |
| 06-GBE20-3.75X-10.6 | 10600 | 3.75 | 93.4 | 8.8/20 |
| 06-GBE36-6X-10.6 | 10600 | 6.0 | 126.9 | 8.8/36 |
| 06-GBE36-10X-10.6 | 10600 | 10.0 | 134.5 | 8.8/36 |

## Alignment Gimbal (Model 11-MG001)



The Model 11-MG001 was specifically designed for the precise alignment of laser beam expanders and focusing optics. Since most laser beams do not propagate along the mechanical axis of a laser rail, four (4) degrees of motion are required to optimize the performance of the mounted optical component. The 11-MG001 combines the features of a gimbal with an X - Y translator, thereby providing the adjustability necessitated by the alignment tolerances of most diffraction-limited optics. This gimbal can be mounted to either a Laser Carriage or Optical Rail slide mount via three #8/32 x 3/8" threaded holes. Standard bore diameters include 1.25", 1.48" and 1.50".

*16-GBE36-3x-1064 Beam Expander Mounted within 11-MG001 Alignment Gimbal*

| | Pitch | Yaw | X (Horizontal) | Y (Vertical) |
|---|---|---|---|---|
| **Adjustment Range** | (+/-) 4° | (+/-) 3° | (+/-) 0.12" | (+/-) 0.15" |
| **Resolution** | 7 sec | 5 sec | 1 micron | 1 micron |

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# High Power Fiber Collimating Lens

## Model 02-M010 High Power Collimating Lenses

***High power handling capability, absence of retro-reflections and aberration correction for large core fibers (up to 1.2 mm) truly differentiate these lenses from other fiber collimators.***

- **Handles power in excess of 1 kW CW**
- **Astigmatic correction over a 4° field**
- **Standard connector receptacles can be mounted to accept large variation in polished fiber angles**
- **Ideal for fiber lasers and fiber-coupled semiconductor diodes**

The Model 02-M010 is a three-element, air-spaced anastigmat designed specifically for collimating the output of large diameter silica fibers (core sizes up to 1.2 mm) used in high power medical and industrial applications. It is equally suitable for collimating the output of Large Mode Area (LMA) and Photonic Crystal (PC) fibers with smaller numerical apertures.

The unique computer-based design of the Model 02-M010 prevents retroreflections near the fiber face while preserving the fiber's output mode without distortion (even at higher throughput powers). All elements are made from either Fused Silica or Infrasil (2 micron wavelength models), with power handling in excess of 1 kW CW.

A wide range of operating wavelengths are available, including 532 nm, 800 nm – 1000 nm (fiber-coupled semiconductor diode lasers), 1064 nm (Nd:YAG, Yb-dopant based Fiber Lasers), 1064nm/1550 nm (Er/Yb-dopant based fiber lasers) and 1800 nm -2200 nm (Thulium and Holmium lasers).

| Model Number | Wavelength (nm) | Coating Type | Effective Focal Length (mm) | NA | Clear Output Aperture (mm) | Input Connector Type |
|---|---|---|---|---|---|---|
| 02-M010-1-532 | 532 | V-Type | 30 | 0.25 | 15 | SMA |
| 02-M010-2-532 | 532 | V-Type | 30 | 0.25 | 15 | LD80/D-80 |
| 02-M010-1-800/1000 | 800-1000 | Broadband | 30 | 0.25 | 15 | SMA |
| 02-M010-2-800/1000 | 800 - 1000 | Broadband | 30 | 0.25 | 15 | LD80/D-80 |
| 02-M010-1-1064 | 1030-1100 | V-Type | 30 | 0.25 | 15 | SMA |
| 02-M010-2-1064 | 1030 - 1100 | V-Type | 30 | 0.25 | 15 | LD80/D-80 |
| 02-M010-1-1064/1550 | 1030-1100 and 1550-1570 | Dual Minimum | 30 | 0.25 | 15 | SMA |
| 02-M010-2-1064/1550 | 1030-1100 and 1550-1570 | Dual Minimum | 30 | 0.25 | 15 | LD80/D-80 |
| 02-M010-1-2000 | 1800-2200 | Broadband | 46 | 0.25 | 23 | SMA |
| 02-M010-2-2000 | 1800 - 2200 | Broadband | 46 | 0.25 | 23 | LD80/D-80 |

***Other input connector types are available; please inquire about other focal lengths and wavelengths.***

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# Focusing Objective Lenses


- **High power handling (> 1 kW CW)**
- **Fused silica and infrasil elements**
- **Computer designed for best possible wavefront**
- **V-coatings at 266 nm, 355 nm and 1064 nm**
- **Dual minimum coatings at 532/1064 nm**
- **Broadband 1800 nm - 2200 nm operation for Infrasil based objectives**
- **Positive lens elements can be assembled in reverse order so focus is opposite threaded end (upon request)**

DPM Photonics offers a variety of positive and negative air-spaced, fused silica, aplanatic lenses. These two- and three-element lenses are corrected for spherical aberration and coma to produce a diffration-limited focus, at a specific laser line, with minimum wavefront distortion. Standard products include objectives for 266 nm, 355 nm, 532 nm, 1064 nm and 2000 nm (other wavelengths and focal lengths are available by request).

| Model Number | Wavelength (nm) | Effective Focal Length (mm) | F/# | Back Focal Length (mm) | Aperture (mm) | Thickness (mm) |
|---|---|---|---|---|---|---|
| 02-023-266 | 266 | 25.13 | 1.44 | 20 | 18 | 19.05 |
| 02-011-355 | 355 | 35.34 | 2.37 | 28.7 | 15 | 13.2 |
| 02-006-355 | 355 | 56.77 | 3.78 | 51.4 | 15 | 12.2 |
| 02-021-532 | 532 | 24.43 | 1.63 | 22.7 | 15 | 14 |
| 02-011-532 | 532 | 36.56 | 2.44 | 29.8 | 15 | 13.2 |
| 02-020-532 | 532 | 44.04 | 2.45 | 34.2 | 18 | 14 |
| 02-006-532 | 532 | 58.64 | 3.91 | 53.2 | 15 | 12.2 |
| 02-007-532 | 532 | 88.59 | 4.03 | 80.7 | 22 | 16.4 |
| 02- 021-1064 | 1064 | 25 | 1.67 | 23.3 | 15 | 14 |
| 02-011-1064 | 1064 | 37.5 | 2.5 | 30.7 | 15 | 13.2 |
| 02-020-1064 | 1064 | 45.17 | 2.51 | 35.2 | 18 | 14 |
| 02-006-1064 | 1064 | 60.07 | 4.04 | 54.6 | 15 | 12.2 |
| 02-007-1064 | 1064 | 90.76 | 4.12 | 82.8 | 22 | 16.4 |
| 02-024-2000 | 1800 - 2000 | 25.5 | 1.66 | 24.4 | 15 | 14.2 |
| 02-025-2000 | 1800 - 2000 | 46 | 2.0 | 22.4 | 23 | 24.1 |
| 02-N09-532 | 532 | -8.74 | -2.91 | 14.2 | 3 | 22.9 |
| 02-N12-532 | 532 | -11.95 | -3.98 | 14.1 | 3 | 20.9 |
| 02-N09-1064 | 1064 | -8.96 | -2.98 | 14.4 | 3 | 22.9 |
| 02-N12-1064 | 1064 | -12.25 | -4.08 | 14.4 | 3 | 20.1 |

*Negative lenses highlighted in red.*

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# Output Fiber Focusing Lens

## Model 02-014 Fiber Focusing Lens

The Model 02-014-1 is an air spaced, computer designed multi-element lens that is diffaction-limited when used with fibers having core diameters as large as 1200 microns. Operational wavelength is 1064nm. The 02-014 reimages the emitting surface of the fiber with a 0.67X demagnification. Focused spot sizes are significantly smaller than those achievable with single-element lenses used in a similar collimating/focusing configuration. All optical elements are fabricated from high laser-damage resistant glasses and are anti-reflection coated for a reflectance less than 0.13% per surface. The working distance between the lens and the target is sufficiently large to allow use of a gas nozzle to enhance the cutting or welding process and to prevent debris from depositing on the lens surface.

| Product ID | 02-014-1 |
|---|---|
| *Wavelength (nm)* | 1000 - 1100 |
| *F/Number* | 1.41 |
| *Effective Numerical Aperture* | 0.36 |
| *Maximum Loss, % (Absorption)* | 0.5 |
| *Maximum Loss, % (Total)* | 1.3 |
| *Effective Focal Length (mm)* | 40.6 |
| *Back Focal Length (mm)* | 65 |
| *Magnification* | -0.677 |

- **Maximum lateral abberations of less than 20 microns**
- **Larger working distance enables use with taller target surfaces and reduces gas/particle contamination**
- **Low absorption, high index glass for minimum lens heating**
- **Capable of handling in excess of 1 kW**
- **Ideal for welding, cutting, drilling and other materials processing applications**
- **SMA connector standard; LD-80 and FC connectors also available. Angle-polished fibers can be accommodated**

***Outer housing with fiber receptacle, fine focus adjustment and gas nozzle is an available accessory.***

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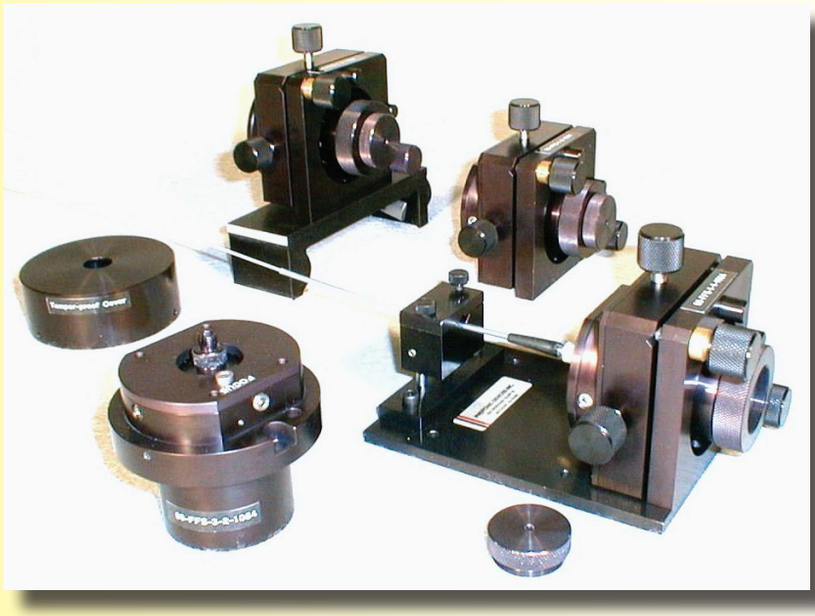
# Input Fiber Focusing Systems



## 08-FFS Series: Input Fiber Focusing Systems

Models 08-FFS-1 and 08-FFS-2 are complete opto-mechanical assemblies that provide a stable "industrial strength" means for coupling the output of high-power, high-divergence lasers to multimode silica fibers. All models are capable of handling several kilowatts of power (CW or average). Primarily designed for use with Nd:YAG lasers, these systems can, with the appropriate anti-reflection coatings, also be used with Alexandrite, Ti:Saphhire and other lasers that emit within the active spectral range of fused silica.

A beam waist, accurately predicted by the product of the focal length (mm) and beam divergence (mrad), is provided by a computer-designed 3-element aplanatic focusing optic. A precise focus knob (40 pictch) translates the lens without rotating it, thereby preventing lateral variation of the focal point. A 1/4" thick aluminum baseplate is standard; mounting to a laser carraige is an available option.

- **A 3-element, air spaced aplanatic focusing optic corrected for both spherical aberation and coma.**
- **Computer-designed lens elements**
- **A rugged, stable, state-of-the-art gimbal/translation stage with alignment correction in θ, Φ, X and Y, with independent X-Y adjustment on the fiber receptacle**
- **SMA, LD-80 or D-80 screw in/screw out fiber receptacles (other connectors available on request)**
- **Fiber receptacle is positioned in X and Y with 56-pitch tamper resistant screws**
- **Applications include: welding, cutting, soldering, drilling, scientific and medical**

| Product ID | Wavelength (nm) | Maximum Beam Diameter (mm) | Input Fiber NA, Maximum | Effective Focal Length (mm) |
|---|---|---|---|---|
| 08-FFS-1-355 | 355 | 15 | 0.25 | 37.5 |
| 08-FFS-1-532 | 532 | 15 | 0.25 | 37.5 |
| 08-FFS-1-1064 | 1064 | 15 | 0.25 | 37.5 |
| 08-FFS-2-532 | 532 | 15 | 0.3 | 25 |
| 08-FFS-2-1064 | 1064 | 15 | 0.3 | 25 |

***Please see DPM Photonics website for additional information when specifying a focusing system***

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# F-Theta Scan Lenses for $CO_2$ Lasers


## 03-Series Flat-Field Scan Lenses

- **Computer designed for minimal wavefront distortion and best focus**
- **True F-theta performance**
- **Scan Field widths from 36 mm to 140 mm**
- **Applications include laser marking & engraving, materials processing**

The 03 Series of F-theta scanning lenses is designed to provide diffraction-limited optical performance over relatively large fields. Their multiple-lens-element design provide smaller focus spot sizes with virtually no deviation over the entire field and are, therefore, superior to single-element scan lenses. Air-spacing and anti-reflection coatings allow for optical power handling capability in excess of several hundred watts for models using all ZnSe elements. Input laser beams between 10 mm and 14mm are recommended.

| Product ID | 03-36FT-52-10.6 | 03-54FT-77-10.6 | 03-108FT-126-10.6 | 03-140FT-157-10.6 |
|---|---|---|---|---|
| *Lens Material* | ZnSe & Ge | ZnSe | ZnSe | ZnSe |
| *Scan Field, Circle/Square (mm)* | 36/25.4 | 54/38.1 | 108/76.2 | 140/100 |
| *Maximum Scan Angle, Circle/Square (Degrees)* | 40/28 | 40/28 | 50/36.2 | 52/36.6 |
| *Effective Focal Length (mm)* | 51.9 | 77.6 | 126 | 157 |
| *Back Working Distance (mm)* | 48.5 | 84.4 | 136 | 174.6 |
| *Entrance Pupil Diameter (mm)* | 15 | 17 | 17 | 17 |
| *Input Beam Diameter, Maximum (mm)* | 10 | 10 | 14 | 14 |
| *Focus Size, Field Center/Edge (mm)* | 86/90 | 72/80 | 180/196 | 220/240 |
| *Pupil Distance (mm)* | 27.8 | 16 | 30.1 | 29.5 |
| *X-Mirror Distance (M1+M2, mm)* | 37 | 26 | 35 | 35.5 |
| *Recommended Mirror Separation M1 (mm)* | 20.3 | 14 | 16 | 16 |
| *Mounting Dimension (mm)* | 50.75, Diameter | M85x1 | M85x1 | M85x1 |
| *Overall Housing Length (mm)* | 11.4 | 33.4 | 37.1 | 39.1 |
| *Maximum Deviation From Telecentricity (Degrees)* | 7 | 7.5 | 11 | 12.5 |

***When the requirement for best resolution can be relaxed, the square field coverage may be increased by a factor of 1.4 by overdriving the scan mirrors and reducing the diameter of the input beam to prevent vignetting.***

DPM PHOTONICS

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