

V-Step Modules

Efficient fiber coupling of high-power diode lasers!

ingeneric

V-Step Module

Coupling of emitter arrays into fibers



General Description

The V-Step Module permits an emitter array to be coupled efficiently to multi-mode fibers. This module transforms the unsymmetrical beams from the emitters in fast and slow-axis into a symmetrical profile with the same level of divergence in both directions of propagation. The advantages this brings, include the outstanding efficiency of the module, variability with regard to the number and form of the emitters which can be coupled in, the diameter of the fibers and the ease with which it can be mounted. The V-Step principle guarantees the highest levels of efficiency for diode lasers.

Advantages

- highest coupling efficiency
- symmetrized beam with symmetrical focus
- fiber diameter from 0.05 mm to 1.0 mm
- easy to mount
- passive alignment
- highest level of precision and uniformity
- long term stability
- optimized design



Service

On request we would be pleased to develop and manufacture coupling modules with customized design for your specific application.

For easy and reliable mounting we offer our modules with customized base plate adapted to your specific laser design.

Quality

We operate a 100% quality control policy. Every single optical element as well as the complete module are characterized as they move along the production line. By testing the modules in an environment



identical to the conditions they will encounter in industrial practice, we ensure that there is no discrepancy between our test results and the results subsequently achieved when our modules are used within their intended application at your site. In conjunction with our sophisticated manufacturing technology, this guarantees the production of modules with unsurpassed coupling characteristics.

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V-Step Module

Coupling characteristics



Specification Data

Specification	NE	WE [mm]	PE [mm]	Smile [μm]	Fiber diameter [μm]	Efficiency [%]
V-19-100-500-F100-XB	19	0.10	0.50	< 1	200	>65
V-19-100-500-F200-XB	19	0.10	0.50	< 1	200	> 82
V-19-100-500-F400-HB	19	0.10	0.50	< 1	400	> 82
V-19-150-500-F200-XB	19	0.15	0.50	< 1	200	> 71
V-19-150-500-F400-XB	19	0.15	0.50	< 1	400	> 83
V-19-150-500-F400-HB	19	0.15	0.50	< 1	400	> 83
V-16-200-400-F200-XB	16	0.20	0.40	< 1	200	> 80
V-16-200-400-F400-HB	16	0.20	0.40	< 1	400	> 80
V-16-200-400-F600-HB	16	0.20	0.40	< 1	600	> 80
V-12-150-500-F150-XB	12	0.15	0.50	< 1	150	> 75
V-12-100-500-F100-XB	12	0.10	0.50	< 1	100	> 80
V-6-100-1000-F50-XB	6	0.1	1.00	< 1	50	> 80
V-33-100-300-F200-XB	33	0.10	0.30	< 1	200	> 70
V-33-100-300-F400-XB	33	0.10	0.30	< 1	400	> 75
V-33-100-300-F600-HB	33	0.10	0.30	< 1	600	> 80
V-50-100-200-F400-XB	50	0.10	0.20	< 1	400	> 75
V-50-100-200-F600-HB	50	0.10	0.20	< 1	600	> 80

Module Dimension*

L x W x H = 70 mm x 24 mm x 15 mm

* Dimension without FAC and coupling asphere.

NE: Number of emitters

WE: Size of emitters

PE: Pitch of emitters

L: Length of V-module (+/- 0.1 mm)

H: Height of V-module (+/- 0.1 mm)

W: Width of V-Module (+/- 0.1 mm)

Assumptions for given efficiency:

Smile of emitter array: < 1 μm

Slow-axis divergence: < 10° (FWHM)

NA of fiber: 0.2

Efficiency measured in focal spot

Options

Customized design for alternative emitter array

Customized base plate

Customized coating for different wavelength (standard coating @ 808 nm)

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Coupling Efficiencies

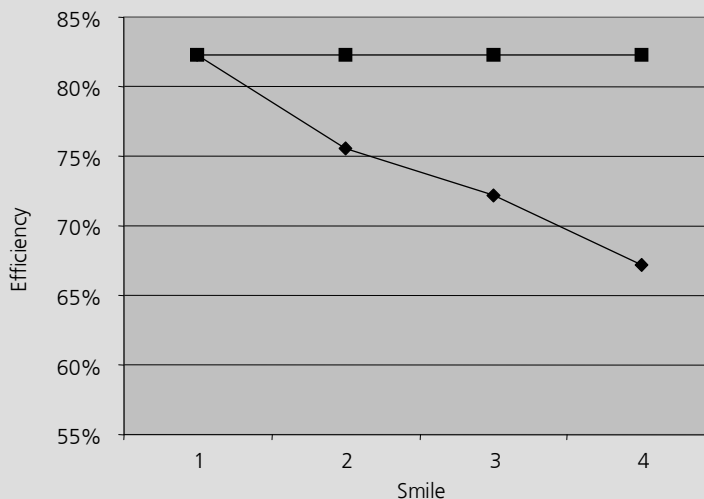
Depending on fiber diameter and the diode characteristics the coupling efficiencies differ. The diagrams depict the coupling efficiencies achievable with different diodes, characterized according to the specific smile of the diode.

The coupling efficiencies refer to measurements at the focal spot.

Diode Array with 20% FF

- ◆ **V19-100-500-F200-XB**
Fiber diameter: 200 μm
- **V19-100-500-F400-HB**
Fiber diameter: 400 μm

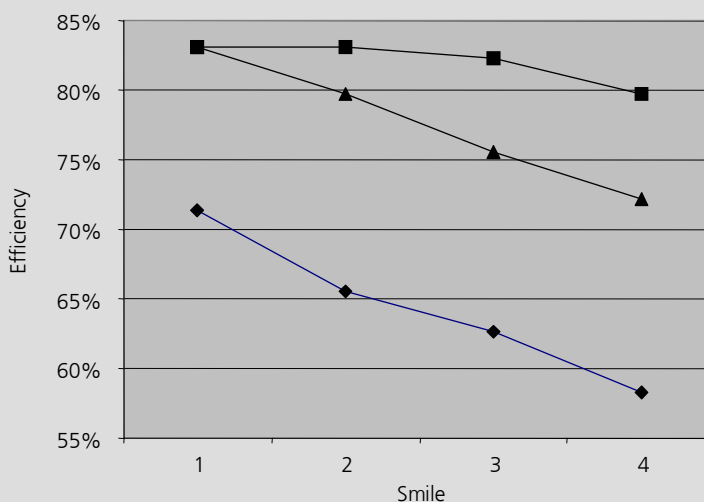
The V-Step modules are delivered with a FAC (quality grade of FAC corresponds to given specification). The XB module is delivered with an additional coupling asphere.



Diode Array with 30% FF

- ◆ **V19-150-500-F200-XB**
Fiber diameter: 200 μm
- **V19-150-500-F400-XB**
Fiber diameter: 400 μm
- ▲ **V19-150-500-F400-HB**
Fiber diameter: 400 μm

The V-Step modules are delivered with a FAC (quality grade of FAC corresponds to given specification). The XB module is delivered with an additional coupling asphere.



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INGENERIC GmbH develops and manufactures ultra-precision and micro-optical systems for high-end applications. Our products are renowned for their optimum operational features and their high numerical aperture in conjunction with excellent levels of reproducibility.

We have extensive experience and expertise in a wide range of technologies, extending from ultra-precision machining and micro-structuring to ultra-precision glass molding for mass production environments.

In addition to our established range of standard optics, we develop systems tailored to the needs of your applications.

We develop the optimum solution for you - starting from optics design extending through prototype manufacture to serial production. The range of our goods and services includes the manufacture of optics to your specifications and system development based on the parameters specified by our customers.

We take particular pride in our proven ability to guarantee a fully-comprehensive service and in our longstanding record of successful, confidential collaboration with our clients.



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