



ILLUMINATION

Lasiris™ MFL Micro-Focus Laser

FEATURES

- Two year warranty
- Extremely thin lines down to 5.0 μm at $1/e^2$
- Wide range of wavelengths
- Uniform intensity distribution with line generator
- Superior mechanical stability
- ESD, over-temperature, over-voltage, and reverse-polarity protection
- Rugged stainless-steel housing



StockerYale's Lasiris™ MFL Micro-Focus lasers produce lines as thin as 5.0 μm at a specified working distance and are designed for applications where utmost accuracy and precision are required.

Our OEM customer base is constantly creating new applications that benefit from this technology, including medical and semiconductor applications such as inspection of microelectronics, biometrics, optical fiber alignment and inspection, high resolution 3-D contour mapping, and other machine vision applications.

Lasiris™ MFL lasers use patented uniform line generator optics. Our wide range of standard and custom models have exceptional mechanical stability, ESD protection, and feature a fully protected integrated laser diode driver.

A dot generator projecting an elliptical spot at a 1:3 ratio is also available.

APPLICATIONS

The MFL series was designed for applications that require the utmost accuracy and precision. Specific examples include:

- Precision inspection of small parts such as chips, wafers, small pins, resistors, semiconductor components
- Optical fiber alignment and inspection
- High precision surface analysis
- Machine vision
- 3-D contour mapping
- Industrial inspection
- Biometrics

OPTIONS AND CUSTOM UNITS

The laser is available with options allowing you to strobe or control its output electronically (refer to the Pulsing and Power Adjustment section). Please contact our application engineers for specific requests, since custom units can be built for specialized applications.

AVAILABLE PATTERNS

Single Line Single Dot

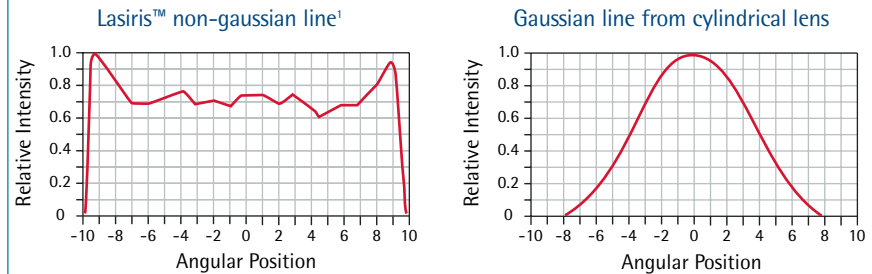


For multiple line or other patterns, please call us for details.

UNIFORM INTENSITY

Laser line patterns are often generated by cylindrical optics that produce a gaussian line profile with a bright center and fading ends. Lasiris™ patented optics spread the light into an evenly illuminated line. The result is crisp, uniform lines with sharp ends.

LINE INTENSITY PROFILE ALONG LINE LENGTH



Relative intensity vs. angular position along line length

1) Typical profile

LINE THICKNESS AND DEPTH-OF-FIELD

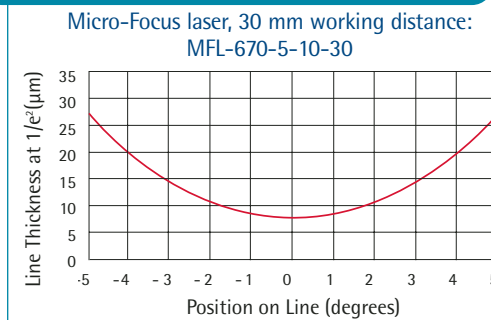
MFL lasers feature factory-set focusing for specific working distances. The table below shows the typical centerline thickness (at $1/e^2$) and depth-of-field performance of a 670 nm wavelength MFL. The depth-of-field is defined as twice the distance over which the thickness of the line has increased by a factor of $\sqrt{2}$.

NOMINAL WORKING DISTANCE	LINE THICKNESS** (± 1 MICRON)	DEPTH-OF-FIELD	MAXIMUM FAN ANGLE SUGGESTED*	LINE THICKNESS AT BOTH ENDS OF MAXIMUM FAN ANGLE
20 mm	5.0 μm	55 μm	5°	7 μm
30 mm	9 μm	140 μm	7.1°	12 μm
65 mm	13 μm	320 μm	7.1°	18 μm
90 mm	16 μm	510 μm	7.1°	22 μm
120 mm	19 μm	720 μm	7.1°	26 μm
185 mm	30 μm	1.7 mm	10°	42 μm

*If the requested fan angle is equal to the maximum fan angle suggested above, the thickness at both ends of the line will be a factor $\sqrt{2}$ thicker than at the center of the line. For example, a 13 μm line thickness at center will become: $13 \mu\text{m} \times \sqrt{2} = 18 \mu\text{m}$ at both ends of the 7.1° line.

**Line thickness is a function of angle divergence and wavelength. The larger the divergence and shorter the wavelength, the thinner the achievable line thickness. Please contact our sales engineers to receive a calculation for the laser and working distance of your choice.

THICKNESS VERSUS POSITION



LINE THICKNESS VERSUS POSITION ON LINE

The 'Thickness versus position' graph shows how the line thickness of the MFL laser increases farther away from the center of the line. Because of this unavoidable behavior we do not recommend the use of fan angles greater than those specified in the Line Thickness and Depth-of-Field section.

LASERS AND EYE SAFETY

Our lasers can comply with CDRH and IEC certification and fall in different safety classes depending on output power, wavelength and fan angle. According to CDRH 21CFR1040.10 regulations, they can be classified Class II, Class IIIa, or Class IIIb.

According to IEC 60825-1 regulations, they can be classified Class 1, 1M, 2, 2M, 3R, or 3B. For Class 1M and 2M lasers, viewing the laser output with certain optical instruments (magnifiers, binoculars, etc.) may pose an eye hazard.

Call us or visit our website for further details.



CAUTION: It is important to follow laser safety rules and wear appropriate protective eyewear when working around lasers. Use of controls, adjustments or performance of procedures other than those specified in the instruction manual may result in hazardous radiation exposure.

SPECIFICATIONS

MECHANICAL SPECIFICATIONS

Weight	175 g ±15 g
Dimensions	See dimensional diagrams
Housing material	Stainless steel

OPTICAL SPECIFICATIONS

Diode power	1 to 150 mW, varies with model
Wavelength	375 to 1550 nm, varies with model
Intensity distribution	Uniform (non-gaussian) for line, Gaussian for dot
Fan angles	1°, 5°, 7.1°, 10°, 15°, custom
Line thickness	Varies with model
Bore sighting	<3 mrad

ENVIRONMENTAL SPECIFICATIONS

Operating temperature	-10°C to +48°C
Wavelength drift	0.25 nm/°C typical
Thermal stability	Less than 5% change in focus over multiple temperature cycling from 10°C to 30°C
Over-temperature protection	Built-in: 48°C

ELECTRICAL SPECIFICATIONS: POWER SUPPLY

Input voltage	5 - 6 Vdc Optional 9,12,24 Vdc, 115/220 VAc
Connector type	Male phono-jack 3.5 mm Ø, or custom
Slow start time delay	10 µsec
Reverse-polarity protection, Over-voltage protection	

OPTIONS

POWER OPTIONS

Power Adjustment Potentiometer

The laser power can be easily changed by adjusting an optional built-in potentiometer with a small screwdriver. Indicate Code "P".

Pulsing & Power Adjustment

The power can be modulated or pulsed using an external signal. Input voltage of 0 Vdc: "on", 5 Vdc: "off" (or can be reversed). See figure below.

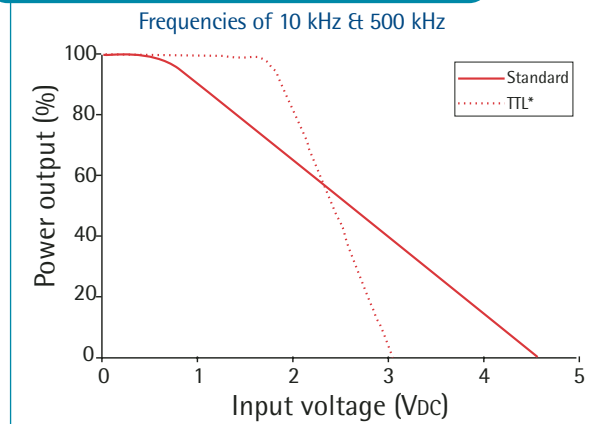
Coding:

- Standard S: 10 kHz FS*: 500 kHz
- TTL T*: 10 kHz FT*: 500 kHz

2 MHz available.

Impedance	> 1 kΩ
Rise/Fall time	10 µsec for 10 kHz, 0.23 µsec for 500 kHz

POWER ADJUSTMENT CURVES



*Not available on all models.

The standard slope can be modified.

SEPARATE ELECTRONICS OPTION

The electronics of the laser can be separated. See diagram 'MFL laser with separate electronics option' on next page for details. Indicate Code "SD".

ORDERING INFORMATION

Micro-Focus lasers 635 to 1550 nm are covered under a 2-year warranty (parts & labor). To order, select from the specifications below. Code: MFL (or MFD for dot) - Wavelength & Power Option (if applicable) - Diode Power - Fan Angle (for line) - Working Distance - Separate Electronics option (if applicable; it is a standard for certain wavelength and diode power combinations). E.g., MFL-635S-35-1-20-SD, MFD-635-35-30, etc. Call us or visit our website for updates and other specifications.

STANDARD WAVELENGTHS AND DIODE POWERS

635 nm	1, 5, 10, 15, 35 mW
660 nm	1, 5, 10, 20, 35, 50, 80, 100 ^(a) mW
690 nm	20, 35 mW
785 nm	20, 35, 75 mW
830 nm	30, 100, 150 mW
Custom	

(a) Please call us for details.

WORKING DISTANCE (660 NM)

20 mm ± 1 mm (5.0 μm focus)
30 mm ± 2 mm (9 μm focus)
65 mm ± 3 mm (13 μm focus)
90 mm ± 3 mm (16 μm focus)
120 mm ± 3 mm (19 μm focus)
185 mm ± 5 mm (30 μm focus)

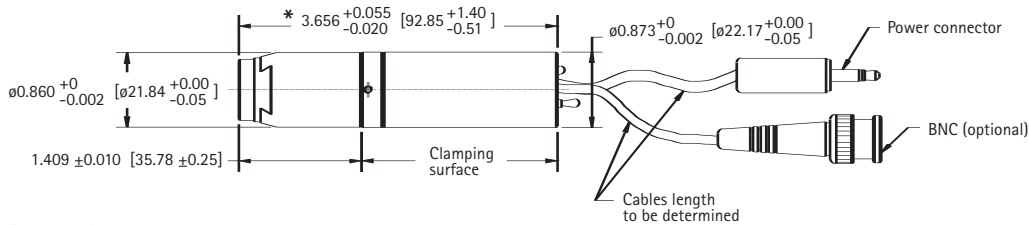
FAN ANGLE

1°
5°
7.1°
10°
15°
Custom

Please read section on line thickness and depth-of-field. For other wavelengths, the best focus is proportional to the wavelength.

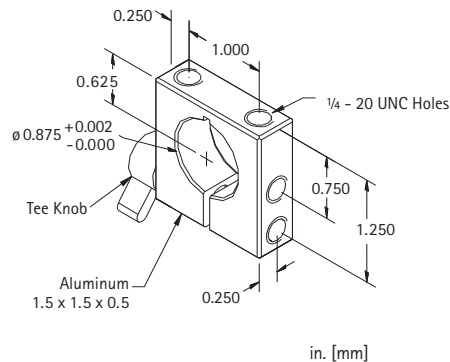
Other wavelengths and diode powers are available. Please call us for more details.

DIMENSIONAL DIAGRAMS



* For 5 μm focus lasers, the overall length is 0.207 [5.25] shorter

M-875 MOUNTING BRACKET



Patents: US #4,826,299 / CAN #1,276,827 / Other patents pending

Information and specifications contained herein are deemed to be reliable and accurate. StockerYale reserves the right to change these specifications at any time without notice.