PRODUCT CATALOGUE

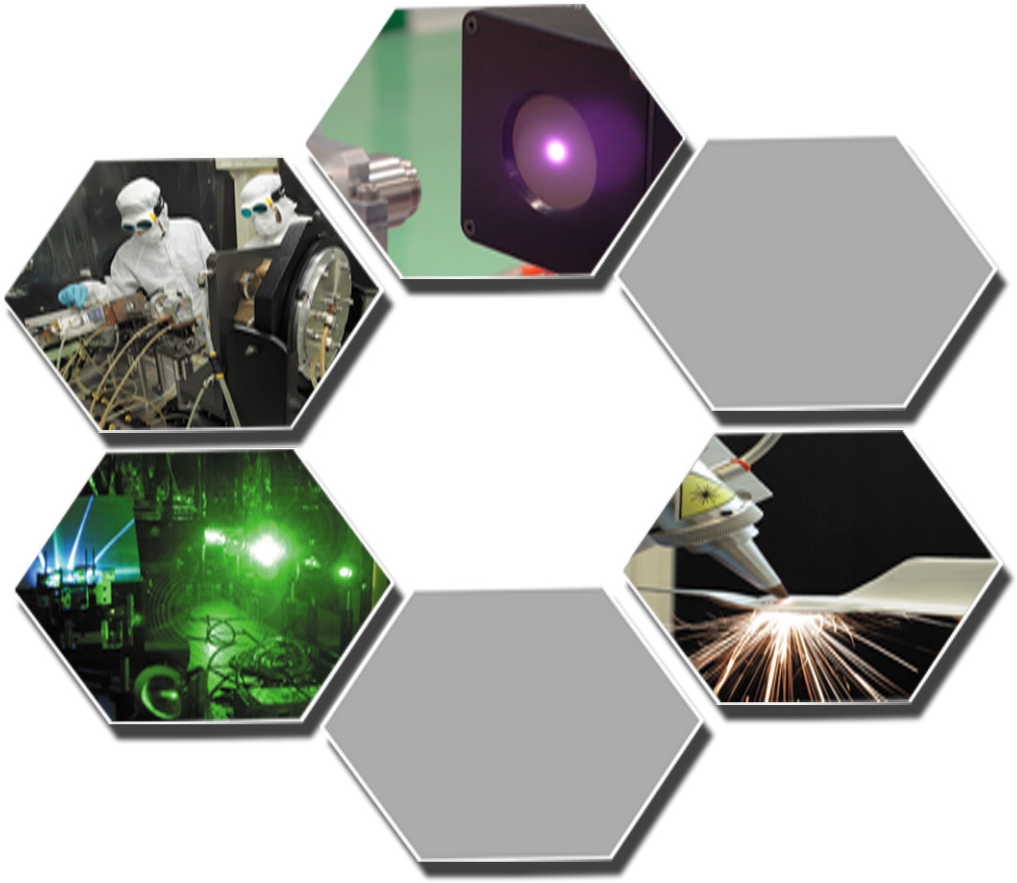
Iranian National Center for Laser Science & Technology

WWW.INLC.IR

V3

INLC

Welcome to Volume 3

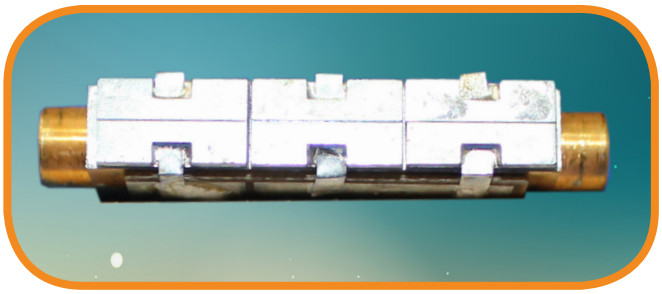


Laser Diode Thechnologies

Linear ArraySemiconductor LaserSingle Array Package
CW & QCW Mode

Description

The high power linear array semiconductor lasers operate at a typical wavelength of 808 nm. Standard product is up to 60 W and 180 W output power in linear package at CW and QCW mode, respectively. These lasers have input for water cooling with a recirculative water chiller to cool the diode.

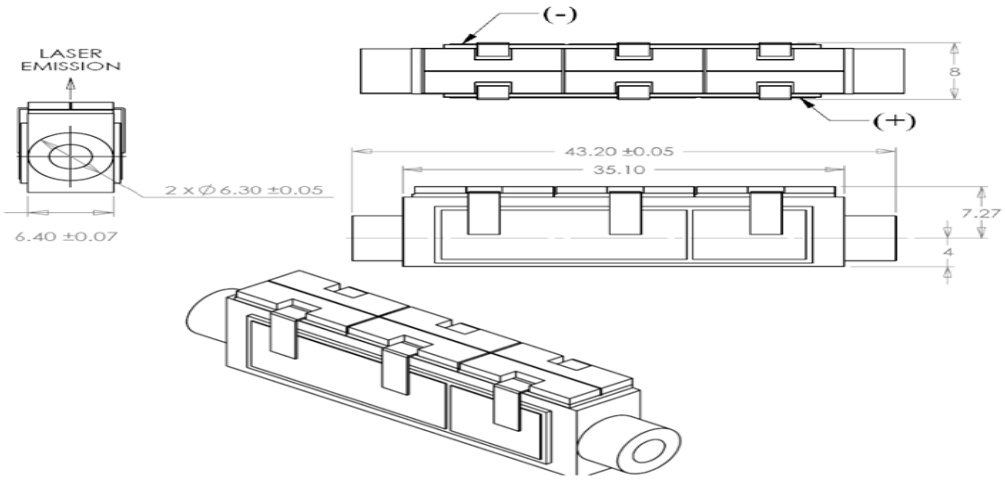


Applications

Pumping of solid state lasers and fiber lasers
Medical Equipment
Processing material
Cutting
Welding

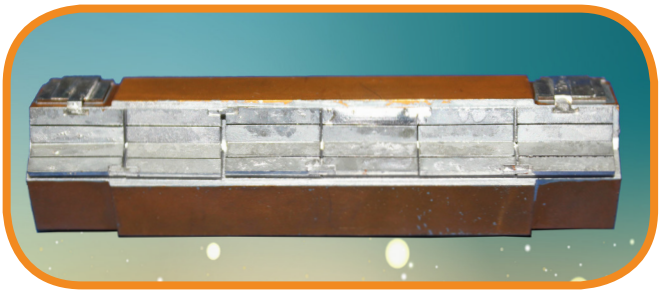
Typical Specifications			
Operation Mode	CW	QCW	
Optical Output Power	60	180	W
Center Wave Length Range		808	nm
Center Wave Length Tolerance		4±	nm
Slop Efficiency	2.8	3	W/A
Spectral Width (FWHM)		4	nm
Power Conversion Efficiency		40	%
Series Resistance		41	mΩ
Threshold Current	3.5	16	A
Operating Current	28	80	A
Operating Voltage	5.4	5.7	V

Package Dimensions (Unit: mm)



Laser Diode Thechnologies

Linear ArraySemiconductor LaserDouble Array Package
CW & QCW Mode



Description

The high power linear array semiconductor lasers operate at a typical wavelength of 808 nm. Standard product is up to 240 W and 720 W output power in double array package at CW and QCW mode, respectively.
These lasers have input for water cooling with a recirculative water chiller to cool the diode.

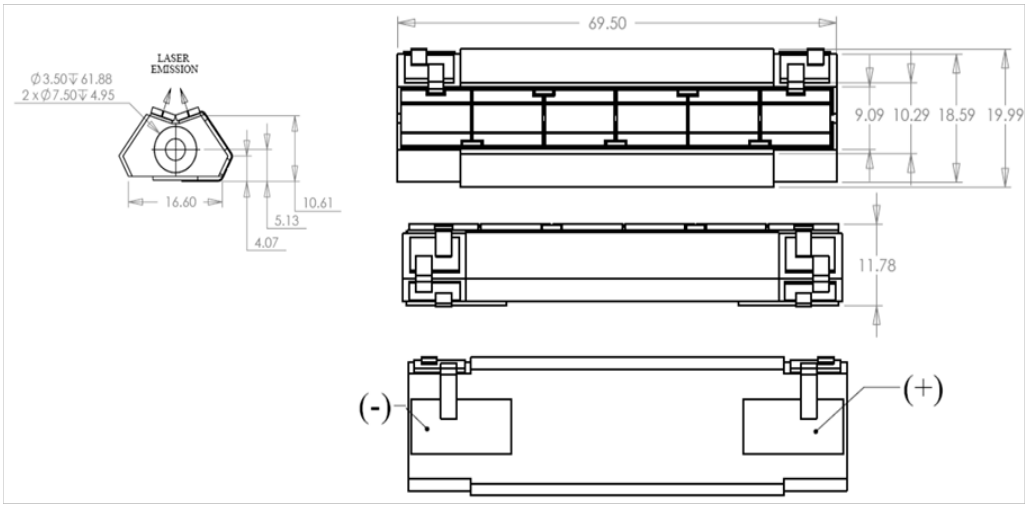
Applications

Pumping of solid state lasers and fiber lasers
Medical Equipment
Processing material
Cutting
Welding

Typical Specifications

Operation Mode	CW	QCW	
Optical Output Power	240	720	W
Center Wave Length Range		808	nm
Center Wave Length Tolerance		4±	nm
Slop Efficiency	10.8	12	W/A
Spectral Width (FWHM)		4	nm
Power Conversion Efficiency		40	%
Series Resistance		80	mΩ
Threshold Current	3.5	14	A
Operating Current	28	80	A
Operating Voltage	22.8	23	V

Package Dimensions (Unit: mm)

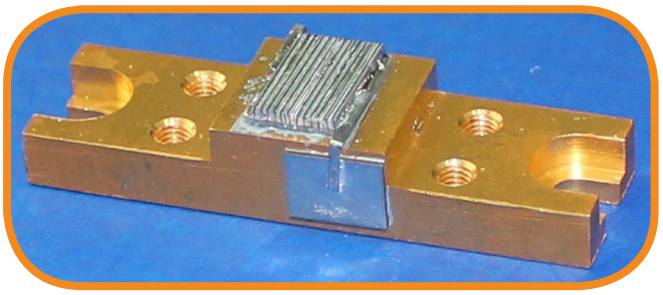


Laser Diode Thechnologies

Stacked ArraySemiconductor LaserHorizontal Array Package QCW Mode

Description

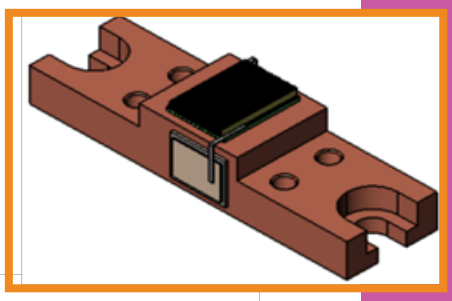
The high power stacked array semiconductor lasers operate at a typical wavelength of 808 nm. Standard product is up to 600 W and 1200 W output power in horizontal array package at QCW mode.
These lasers require an external heatsink like as TEC or water cooled.



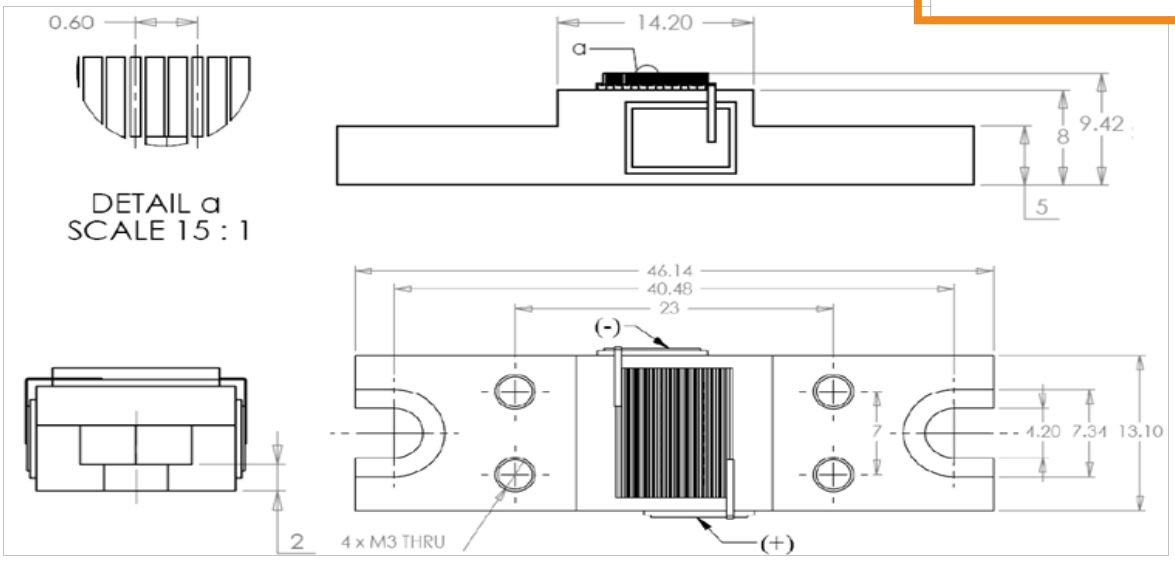
Applications

Industrial Pumping Applications
Medical systems
Aerospace & Defense Applications

Typical Specifications			
Optical Output Power	600	1200	W
Number of Bar	10	15	#
Center Wave Length Range		808	nm
Center Wave Length Tolerance		4±	nm
Slop Efficiency	11	12	W/A
Spectral Width (FWHM)		3	nm
Power Conversion Efficiency	45		%
Series Resistance	44	55	mΩ
Threshold Current	16	11	A
Operating Current	80	100	A

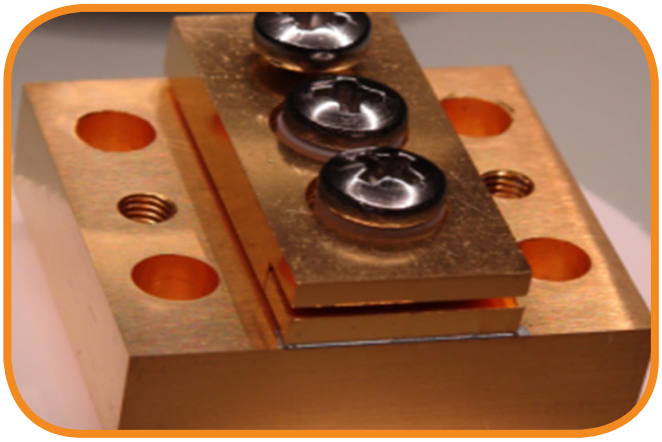


Package Dimensions (Unit: mm)



Laser Diode Thechnologies

Single BarSemiconductor LaserCS Package
CW & QCW Mode



Description

The single bar semiconductor lasers operate at a typical wavelength of 808 nm. Standard product in the single bar laser is up to 20 W and 60 W output power in CS package at CW and QCW mode, respectively.
These lasersrequire an external heatsinklike as TEC cooled.

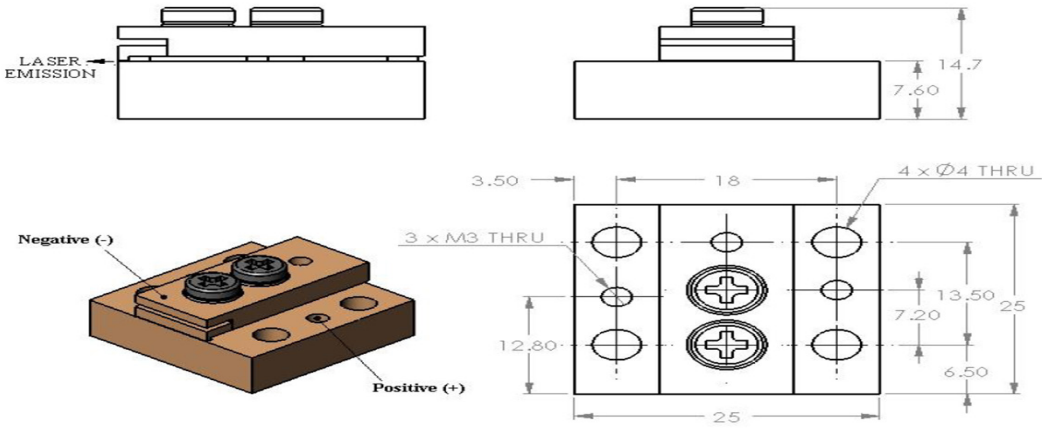
Applications

Medical Equipment
Laser Therapy
Research Activities
Plastic Welding
Dental

Typical Specifications

Operation Mode	CW	QCW	
Optical Output Power	20	60	W
Center Wave Length Range		808	nm
Center Wave Length Tolerance		4±	nm
Slop Efficiency	0.93	1	W/A
Spectral Width (FWHM)		3	nm
Power Conversion Efficiency		45	%
Series Resistance		7	mΩ
Threshold Current	3.5	11.5	A
Operating Current	28	80	A
Operating Voltage	1.6	1.7	V

Package Dimensions (Unit: mm)



Laser Diode Thechnologies

Single BarSemiconductor LaserCSR Package
CW mode

Description

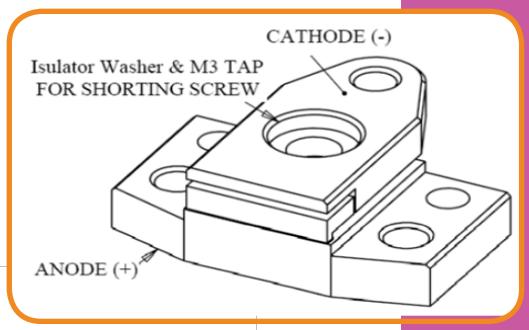
The single bar semiconductor laser
nm. 808 operates at a typical wavelength of
Standard product in the single bar laseris
10W output powerin CSR package at up to
.CW mode
This laser requires an external heatsinklike
.as TEC cooled

Typical Specifications

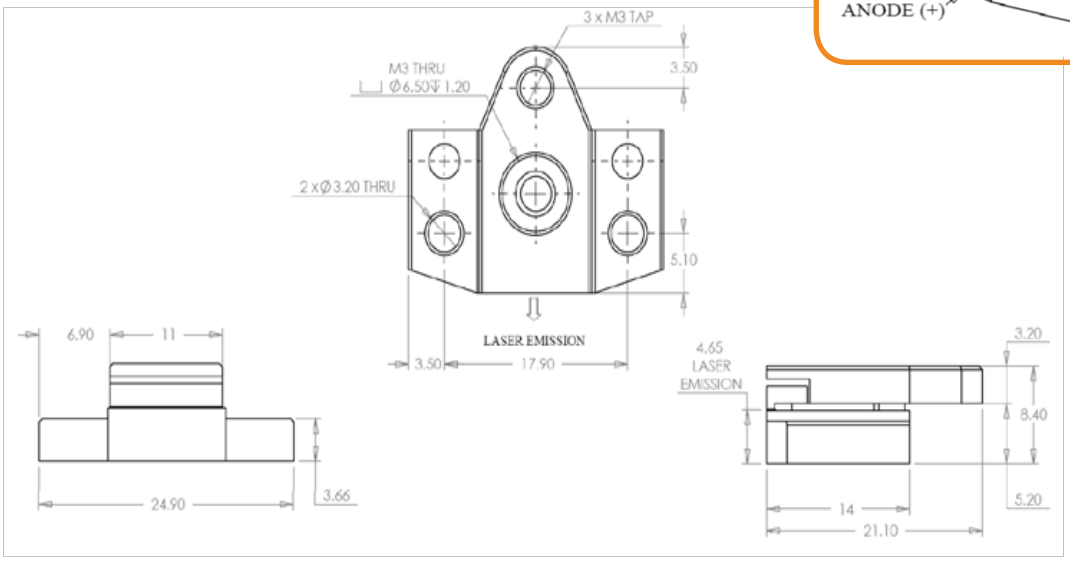
Output Power	10	W
Center Wave Length Range	808	nm
Center Wave Length Tolerance	4±	nm
Slop Efficiency	0.95	W/A
Spectral Width (FWHM)	2.5	nm
Power Conversion Efficiency	50	%
Series Resistance	8	mΩ
Threshold Current	3.5	A
Operating Current	15	A
Operating Voltage	1.9	V

Applications

Medical Equipment
Laser Therapy
ResearchActivities
Dental



Package Dimensions (Unit: mm)



Laser Diode Thechnologies

Single EmitterSemiconductorLaser To3 Package
CW Mode

Description

The single emitter semiconductor laser operates at a typical wavelength of 808 nm. Standard product in the single emitter laser is up to 1000 mWoutput powerin TO3 package.
This laser requires an external heatsink to cool the semiconductor laser.

Applications

Spectroscopy
Laser Ranging
Research Activities
Industrial Use

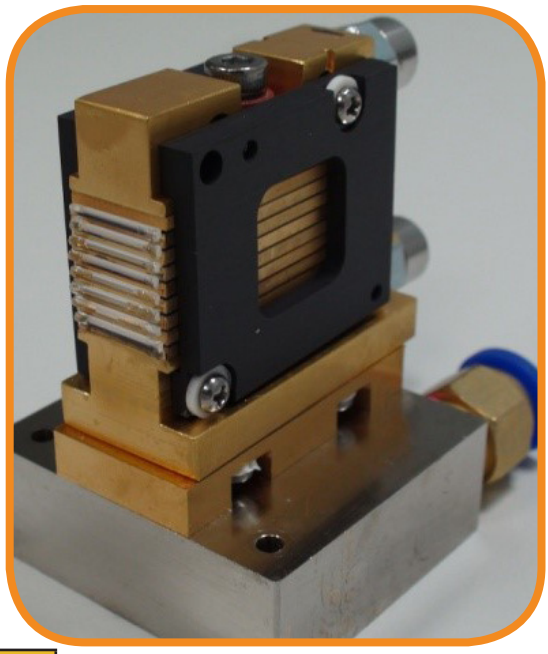
Typical Specifications		
Output Power	1000	mW
Center Wave Length Range	808	nm
Center Wave Length Tolerance	4±	nm
Slop Efficiency	1	W/A
Spectral Width (FWHM)	1.8	nm
Power Conversion Efficiency	45	%
Series Resistance	500	mΩ
Threshold Current	200	mA
Operating Current	1200	mA
Operating Voltage	2	V

Laser Diode Thechnologies

Stacked Array Semiconductor Laser Vertical Array Package
CW Mode

Description

The high power stacked array semiconductor lasers 976 and 940 ,808 operate at a typical wavelength of nm with fast axis collimation available. Standard W output power per 120 W and 60 product is up to .bar at CW mode
The laser diode bars are mounted on a water cooled microchannel package providing very high reliability in CW applications

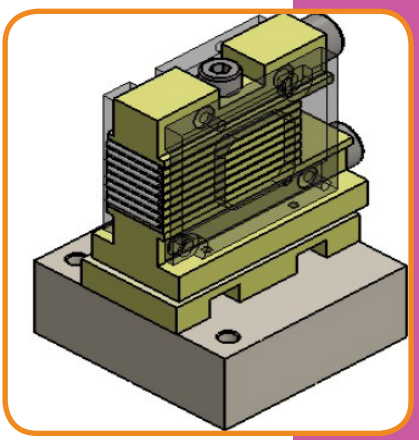


Typical Specifications

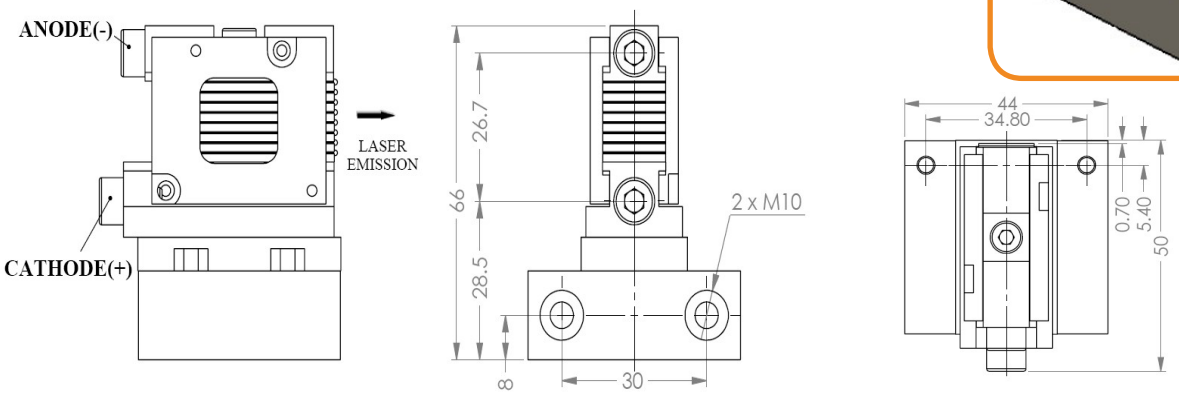
Optical Output Power	60-120	480-800	900-1500	W
Number of Bar	1	8	15	#
Center Wave Length Range	808/ 940/ 976			nm
Center Wave Length Tolerance	±4			nm
Spectral Width (FWHM)	3			nm
Bar to Bar Spacing	-	1.8		mm
Power Conversion Efficiency	50			%
Operating Current	75-120			A
Operating Voltage	1.9	12.5	25	V
Coolant (Deionized water)	2-6			µs/cm

Applications

Material Processing
DPSSL Pumping
Fiber Laser Pumping



Package Dimensions (Unit: mm)



Laser Diode Thechnologies

CW Fiber Coupled Diode Laser

Description

This system is a compact and high reliability CW fiber coupled diode laser that has output power up to 1 W. A thermoelectric cooler stabilities output power.

These systems are ideal solutions for a broad range of industrial, medical and scientific applications.

Typical Specifications

Output Power	1	W
Laser wavelength	808	nm
Fiber Core Diameter	400	µm
Operation Current	2	A
Output Current Step	10	mA
Input Power	220; 50/60	V; HZ
Package Dimensions (W×H×D)	207×150×75	mm
Weight	1.4	Kg
Cooling system	TEC, Air Cooled	
Operating temperature	0-30	℃

Fiber Laser

Industrial 10W - YFL-10- CW

Description

Inlc YFL-10-CW series represent new generation of diodepumped single-mode CW Ytterbium fiber laser systems of near infrared spectral range (1090-1060 nm) with unique compact design and high quality laser beam. The YFL-10-CW features are ultra-low amplitude noise, high stability and ultra-long pump diode lifetime. Users can customize the YFL-10-CW Series to meet their requirements by selecting output power, wavelength, linewidth and computer interface

Applications

Fine Cutting
Sintering
Welding
Engraving
Drilling
Scientific Experiments

Standard Specifications	
Wavelength	*1080 nm*
Mode of Operation	*CW*
Polarization State	*Random*
Output Fiber Type	*Single Mode*
Highly Efficient:	*>%65*
Line-width (FWHM-nm)	0.2

Typical Specifications	
Output Power W	*10*
Beam Quality M^2	*a <1.3*
Output Power Stability,	*(%) 0.5±*
Ambient Temperature (°C)	*45 - 5*
Weight, (kg)	*10*
Cooling System	*Air & Water Cooled*
Dimensions, W x D x H (mm)	*300 x 220 x 71*
Operating Voltage, (V DC)	*5*
Max, Current, (A)	*45*
Warranty	*One year*

Fiber Laser

Q-Switched 40W YFL-40- QS

Description

INLC's YFL-40-QS series is an active acousto-optic Q-Switched fiber laser which provides high peak power with average power up 40 W. The all fiber configuration of YFL-40-QS series allows for short pulse duration < 10 ns at repetition rate range 200-40 kHz and very high beam quality at the full range operation. The compact design and air-cooling system of YFL-40-QS series make it easy to be utilized in industrial systems.

Applications

Materials Processing
Ablation
Micromachining
Scribing
Solar/Photovoltaic
Scientific Research
Marking

Standard Specifications	
Wavelength	*1064 nm*
Mode of Operation	*Pulsed*
Polarization State	*Random*
Output Fiber Type	*Single Mode*
Highly Efficient:	*>%60*
Line-width (FWHM-nm)	2

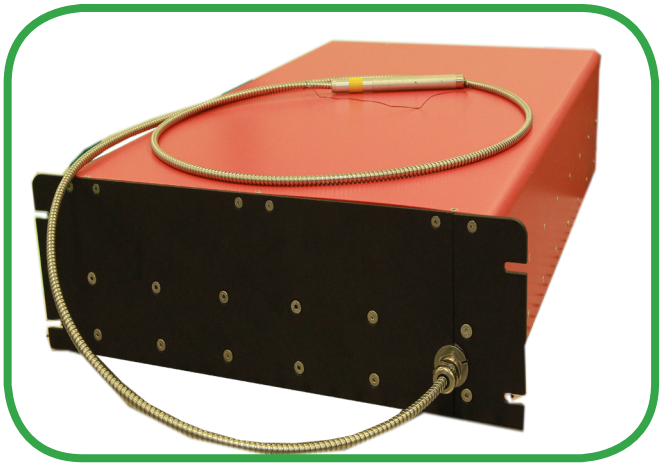
Typical Specifications	
Output Power KW	*100*
Average Power, (W)	*40*
Beam Quality M^2	*a <1.3*
Output Power Stability,	*(%) 0.5±*
Ambient Temperature (°C)	*5 - 45*
Weight, (kg)	*18*
Cooling System	*Air Cooled*
Dimensions, W x D x H (mm)	*450 x 200 x 170*
Operating Voltage, (V DC)	*220*
Max, Current, (A)	*5*
Warranty	*One year*

Fiber Laser

Narrow Band 200W CW YFL-200- SM

Description

Inlc YFL-200-SM series represent new generation of
diode-pumped single-mode CW Ytterbium fiber laser
systems of near infrared spectral range (1090-1060 nm)
with unique narrow band and high quality laser beam.. The
YFL-200-SM features are ultra-low amplitude noise, high
stability and ultra-long pump diode lifetime. Users can customize the YFL-200-SM Series to meet their
requirements by selecting output power, wavelength, linewidth and computer interface



Applications

Fine Cutting
Sintering
Welding
Engraving
Drilling
Scientific Experiments

Standard Specifications	
Wavelength	*1080 nm*
Mode of Operation	*CW*
Polarization State	*Random*
Output Fiber Type	*Single Mode*
Highly Efficient:	*>%65*
Line-width (FWHM-nm)	0.3

Typical Specifications	
Output Power W	*200*
Beam Quality M^2	*a <1.3*
Output Power Stability,	*(%) 0.5±*
Ambient Temperature (°C)	*4-45*
Weight, (kg)	*45*
Cooling System	*Water Cooled*
Dimensions, W x D x H (mm)	*815 x 480 x 186*
Operating Voltage, (V DC)	*40*
Max, Current, (A)	*43*
Warranty	*One year*

Fiber Laser

Industrial 600W YFL-600- CW

Description

600w continuous fiber laser provides high quality beam $M^2$1.3 at wavelength 1082nm. It is a water cooled laser and the optical efficiency of laser is %78. This allows optimal performance for critical welding, cutting and drilling applications. Spectral width of laser is 2nm. The laser system has no sensitivity to shocking and aerosols. There is no requirement to optical aliment. These compact units are substantially more cost-effective than conventional YAG lasers due to > %30wall-plug efficiency

Applications

Cutting of steel sheet
Drilling
Welding

Standard Specifications	
Wavelength	*1064 nm*
Mode of Operation	*CW*
Polarization State	*Random*
Output Fiber Type	*Single Mode*
Highly Efficient:	*>%78*
Line-width (FWHM-nm)	2.3

Typical Specifications	
Output Power W	*600*
Beam Quality M^2	*a <1.3*
Output Power Stability,	*(%) 0.5±*
Ambient Temperature (°C)	*5 - 45*
Weight, (kg)	*230*
Cooling System	*Water Cooled*
Dimensions, W x D x H (mm)	*600 x 950 x 1000*
Operating Voltage, (V DC)	*38*
Max, Current, (A)	*55*
Warranty	*One year*

Fiber Laser

Industrial 3kW CW

Description

The INLC produces 3000W CW fiber laser at wavelength 1080nm. It is a water cooled laser and the optical efficiency of laser is %78. This allows optimal performance for critical welding, cutting and drilling applications. Spectral width of laser is 4nm. The laser system has no sensitivity to shocking and aerosols. There is no requirement to optical aliment.

Standard Specifications

Wavelength	*1080 nm*
Mode of Operation	*CW*
Polarization State	*Random*
Output Fiber Type	*400 & 200 Micron*
Line-width (FWHM-nm)	<5

Typical Specifications

Power, (W)	3000
Beam Parameter Product (mm*m rad)	<6 200 micron <12 400 micron
Output Power Stability, (%)	1
Ambient Temperature (°C)	5 - 45
Weight, (kg)	1000
Cooling System	Water Cooled
Dimensions, W x D x H (mm)	130 x 1400 x 1900
Warranty	One year

Applications

Cutting of steel sheet
Drilling
Welding
Cladding

If you do not find suitable output power or other specifications do not meet you requirements please contact info@inlc.com and we guaranty to provide a solution for you

Fiber Laser

Fiber Bragg gratings

FBG-HR-1065-1.5-99.5-6/125
FBG-HR-1075-1.5-99.5-6/125
FBG-HR-1095-1.5-99.5-6/125

FBG-OC-1065-0.20-10.0-6/125
FBG-OC-1075-0.20-10.0-6/125
FBG-OC-1095-0.20-10.0-6/125

Description

Fiber Bragg gratings are the main components of fiber lasers that are used as laser mirrors. These mirrors are used as pairs of fiber Bragg grating, high reflection and output coupler, with the same center wavelength. Fiber lasers operate at the fiber Bragg gratings wavelength

Applications

Fiber Laser mirrors
Sensors
Spectral Filter
Dispersion compensator

Standard Specifications	
Wavelength	*1095 - 1075 – 1065 nm*
Spectral bandwidth ranges (@3-dB, nm)	*0.1-1.47*
Reflectivity (%)	*3-99.5*
Output Fiber Type	*Single Mode*
FBG Type	*Chirped*

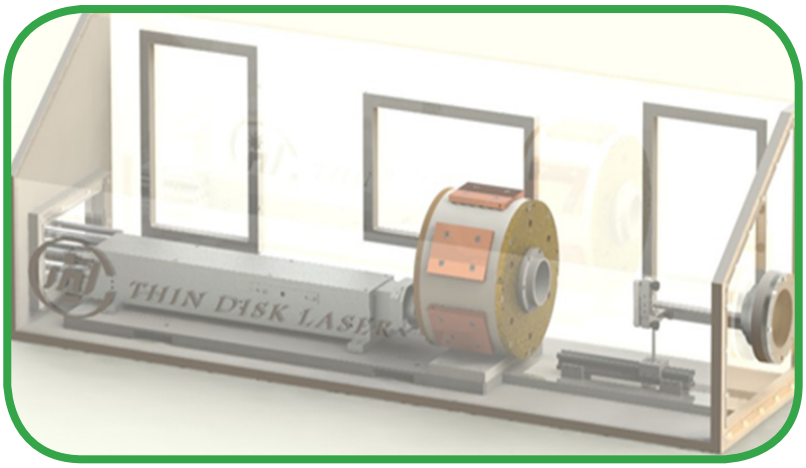
Typical Specifications			
Central wavelength ranges (nm)	*1095*	*1075*	*1065*
Spectral bandwidth ranges (@3-dB, nm)	*0.22*		*1.47*
Reflectivity (%)	*10*		*99.5*
FBG Type	*Chirped*		
Fiber Type	*Single mode*		

Disk Laser

200W Training Disk Laser

Description

The high power 200W thin disk laser is manufactured for training in academic and research centers. The principal of laser disk design and operation can be educated using this type of disk laser system.



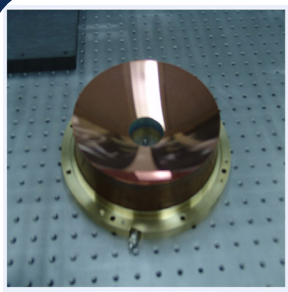
This product can be used for education in following topics:
- Fundamental of Laser
- Components of Laser
- Optical pump of solid state laser
- Resonator design
- Q-Switch

Applications

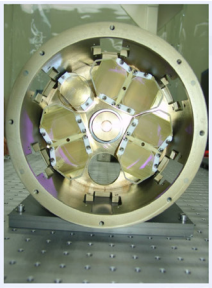
Training
Scientific Research

Standard Specifications	
Active medium	*Yb:YAG thin disk*
Wavelength	*1030 nm*
Operating mode	*CW*
Pump wavelength	*940 nm*
Beam diameter	*12mm*

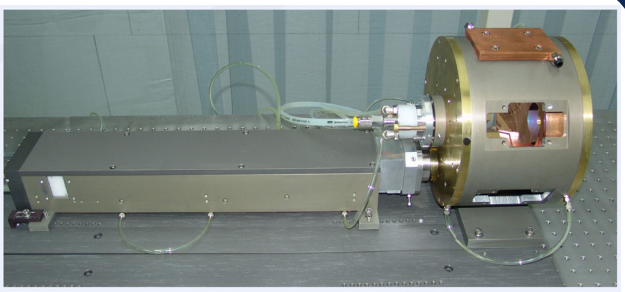
Typical Specifications		
Output Power	*W*	*200*
Average power (max)		*300W*
Average power (min)		*50W*
Beam Parameter Product (B.P.P)		*7 mm-mrad*
Weight		*100 Kg*



Parabolic Mirror



Pumping Multipass



Module of Thin Disk Laser

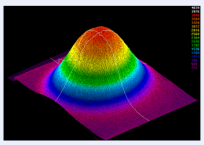
Disk Laser

1800W Disk Laser

Description

Based on thin disk technology, INLC offers an 1800W industrial thin disk laser which contains high power and good beam quality simultaneously. It is ideal for many purposes and also special purpose according to customers' specifications.

Standard Specifications	
Active Medium	*Yb:YAG thin disk*
Wavelength	*1030 nm*
Operating Mode	*CW*
Pump Wavelength	*940* nm
Output Beam Size	*10 mm*
Maximum Output Power	*1800 W*
Minimum Output Power	*100 W*
Beam Quality (B.P.P)	*12 mm-mrad (before fiber coupling)*
Spectral Bandwidth	*3 nm*
Fiber Coupling : Core Diameter 600 µm, Fiber Length 5 m	
Expected Lifetime	*10000 h*

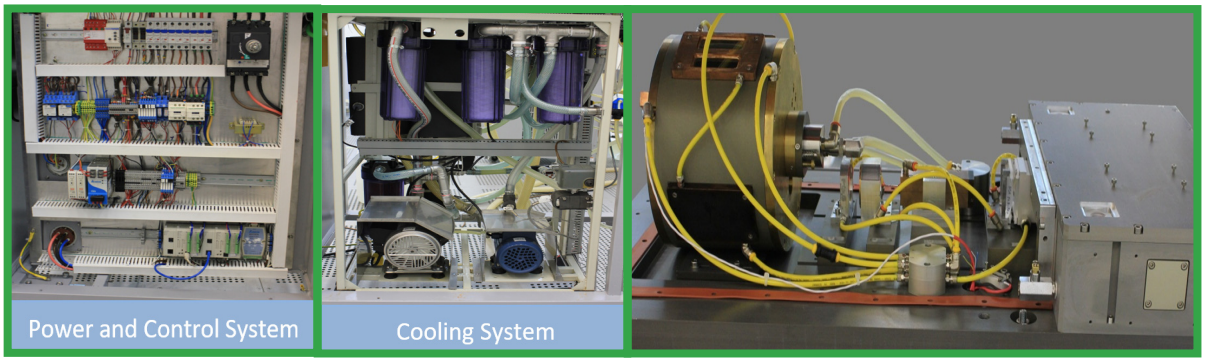


Output Beam Profile of 1800 W Industrial Thin Disk Laser

Typical Specifications	
Warm-up Time	*< 5 minutes*
Required Space	*12 m²*
Cooling System	*Closed Circuit DI Water*
Cooling Chiller Capacity	*5000 W*
Chiller Cooling System	*Water Cooled*
Cooling Chiller Dimension(Cm)	*77x63 x116*
Operating Temperature	*18°C- 32°C*
Storage Temperature	*0 °C – 50 °C (after draining the cooling water)*
System Dimensions,W x D x H (Cm)	*80 x 215 x 173*
Weight	*700 Kg*
Power Supply	*380 VAC, 3~/N/PE, 60/50 Hz,max. 100 A*
Power Consumption	*8 kW*

Applications

Material Processing
Welding
Cutting
Surface Treatment



Power and Control System

Cooling System

Disk Laser

Low Power Disk Laser

Description

The low power thin disk laser is the second version of training disk laser of INLC.The outstanding feature of this system is the operation in the more safe conditions.

Standard Specifications	
Active medium	*Yb:YAG thin disk*
Wavelength	*1030 nm*
Operating mode	*CW*

Applications

Training
Scientific Research

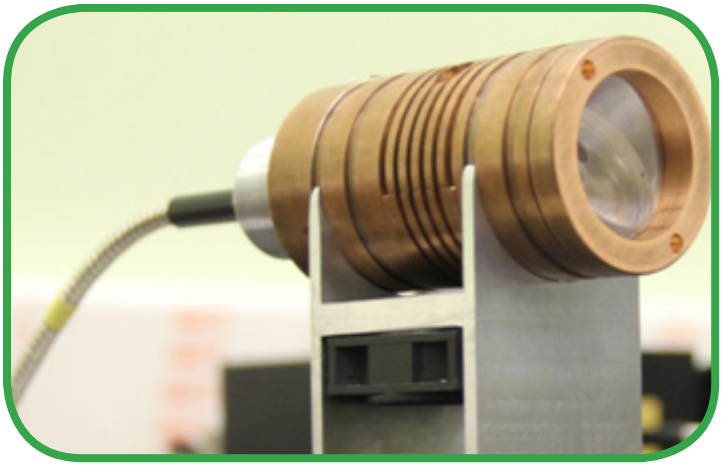
Typical Specifications		
Output Power	*W*	*10*
M^2		*<2*
Weight		*50 Kg*

Micro Laser

Passively Q-switched Microchip Laser

Description

Passively Q-switched microchip lasers have many attractive features and have found numerous applications for theirsubnanosecond pulses. They are also able to produce short pulses with high repetition-rate, high qualityTEM00 beam and if The output is amplified, they show much higher peak power than the ones which use modelockedtechnique. With these characteristics this laser has many Applications in nonlinear optics, micro-machining,Microsurgeryand other fields that need short pulses with high peak power and high repetition rates.



Applications

Non-linear optics
Sensing and scanning applications
Raman spectrometry
Ranging
Bio photonics

Standard Specifications	
Wavelength	*1064nm and 532nm*
Ultra-short pulses down to 660ps	
Excellent beam quality – TEM00	
Efficient, air-cooled	
Compact package	

Typical Specifications		
Product ID	*1064 PQM 800,0.15*	*532 PQM 660,0.058*
Wavelength	*1064nm*	*532nm*
Repetition Rate	*15KHz*	*15KHz*
Pulse Width(FWHM)	*800ps*	*660ps*
Output energy	*10μJ*	*3.8μJ*
Output power	*150mW*	*58mW*
Beam profile	*TEM00*	*TEM00*
Beam quality M^2	*1.2*	*1.2*
Peak Power	*12.5KW*	*5.8KW*
Power stability(60 min)	*%1.9*	*%1.9*

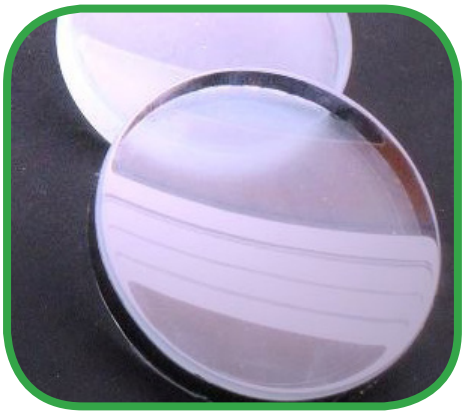
Aspherical Lenses

Description

The aspherical lens is designed to have a much shorter focal lenght than is possible with a spherical glass lens of equal diameter and equal spherical aberration.

A correctly formed aspheric lens surface exactly cancels the spherical aberration that would otherwise be present in an optical system, or reduce both spherical aberration and coma to insignificance, in which case the system is said to be aplanatic.

Aspheric lenses are ideally suited for low f-number and high throughput applications, such as elements adjacent to the source in condensing, projection, and illumination system. Other application include optical communication equipment, pollution monitors. They should be considered.



Standard Specifications	
Design Wavelength DWL (nm)	*550*
Diameter Tolerance (mm)	*+0.0/-0.1*
Focal Length Tolerance (%)	*1±*
Center Thickness Tolerance (mm)	*0.2±*
Surface Quality	*60-40*
Clear Aperture (CA)	*>%90*
Centering (arc minutes)	*<3*
Substrate	*BK7*
Coating	*Uncoated*
Flatness	*λ/4*

Typical Specifications

Diameter(mm)	*Radius(mm)*	*Conic*	*Ai*
200	*-1353*	*-1*	*0*
200	*-1353*	*-1*	*0*
127	*-240*	*-1*	*0*
127	*-240*	*-1*	*0*
150	*-800*	*-1*	*0*
150	*-800*	*-1*	*0*
90	*-240*	*-1*	*0*
90	*-240*	*-1*	*0*

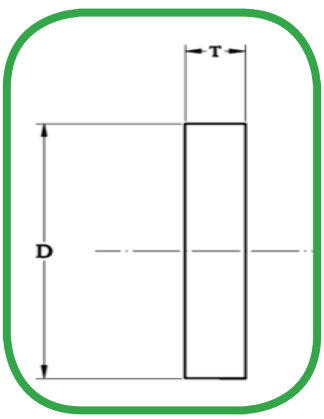
Custom design production is also available.

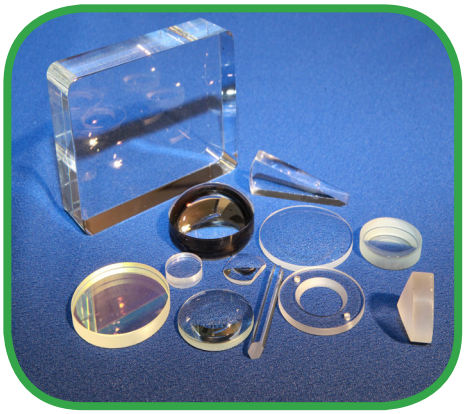
Custom diameter available up to *300* mm.

Optical substrate

Description

Standard substrates are laser grade polished on surface. These substrates are ideal for beam splitters, windows, high & partial reflecting mirrors etc. Laser components require highly polished substrates as well as high performance coatings. Scattering, damage of laser light can occur if the substrate is made of inferior material or if it is inadequately polished





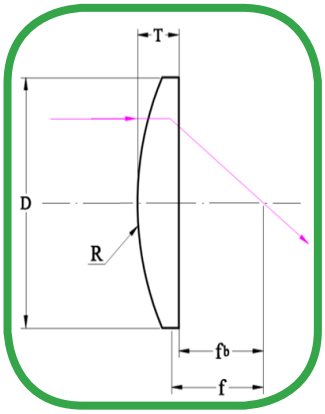
Standard Specifications	
Diameter Tolerance (mm)	*+0.0/-0.1*
Thickness Tolerance (mm)	0.1 ±
Parallelism (arc minutes)	3
Surface Accuracy (λ)	$\lambda/4$
Surface Quality	5-10
Substrate	BK7 or Fu
Coating	Uncoated

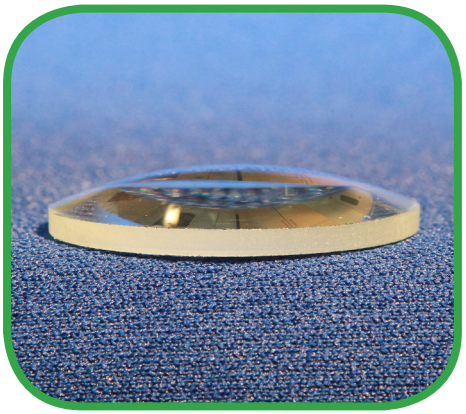
Typical Specifications	
D(mm)	*T (mm)*
12.7mm	*3.5*
12.7mm	*4.5*
12.7mm	*6.35*
25.4mm	*4*
25.4mm	*5*
25.4mm	*6.35*
50.8mm	*3.2*
50.8mm	*6.35*
50.8mm	*10*
76.2mm	*6*
76.2mm	*12.7*

Spherical Lenses Plano-Convex

Description

These lenses have positive focal length; lenses have flat surface on one side and spherical surface on the other. They are used for focusing beams in telescopes, collimators or condenser systems, Optical transceivers or other applications.





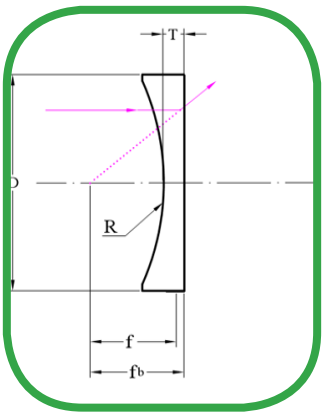
Standard Specifications	
Design Wavelength DWL (nm)	632.8
Diameter Tolerance (mm)	+0.0/-0.1
Focal Length Tolerance (%)	1±
Center Thickness Tolerance (mm)	0.2±
Surface Quality	5-10
Clear Aperture (CA)	>%90
Centering (arc minutes)	<3
Substrate	BK7 or Fu
Coating	Uncoated
Flatness	λ/4

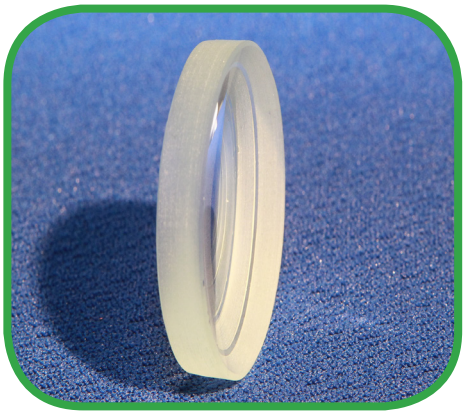
Typical Specifications				
f(mm)	D(mm)	T (mm)	f_b(mm)	Radius(mm)
10	5	4	11.3	5.2
20	10	4	21.3	10.4
15	12.7	4.5	11	7.8
50	12.7	3.5	47.8	25.9
38.1	25.4	5	34.8	19.77
50	25.4	5.7	45.8	25.9
250	25.4	4.0	246.4	129.7
75	50.8	10.5	67.3	38.9
500	50.8	3.2	497.5	259.4

Spherical Lenses Plano-Concave

Description

These negative focal length lenses have flat surface on one side And spherical surface on the other lenses have they are used in optical systems in combination with other lenses. These lenses also work as beam expanders, optical character readers viewers and projection system.

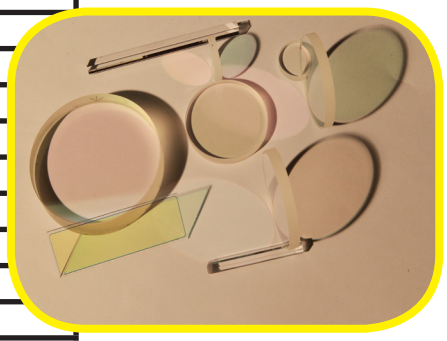




Standard Specifications	
Design Wavelength DWL (nm)	632.8
Diameter Tolerance (mm)	+0.0/-0.1
Focal Length Tolerance (%)	1±
Center Thickness Tolerance (mm)	0.2±
Surface Quality	5-10
Clear Aperture (CA)	>%90
Centering (arc minutes)	<3
Substrate	BK7 or Fu
Coating	Uncoated
Flatness	λ/4

Typical Specifications				
f(mm)	D(mm)	T (mm)	f_b(mm)	Radius(mm)
-10	5	3	-11.9	-5.2
-15	8	3	-17	-7.8
-15	12.7	4	-16.3	-7.8
-50	12.7	5	-51.1	-25.9
-50	25.4	5	-51.7	-25.9
-125	25.4	5	-128.9	-64.85
- 250	25.4	6	-251.7	-129.7
-75	50.8	7	-67.3	-38.9
-500	50.8	7	-504	-259.4

Standard Coating Specifications	
Diameter Tolerance (mm)	+0.0/-0.1
Thickness Tolerance (mm)	0.2±
Surface Quality	40-60*
Clear Aperture	>90 %
Front Surface Accuracy	λ/2 @ 632.8 nm*
Back Surface Accuracy	λ/2 @ 632.8 nm*
Front Radius of Curvature (mm)	∞
Back Radius of Curvature (mm)	∞
Parallelism (arcminutes)	3*
Substrate	BK7
Type	Mirror
Coating Specification	Ravg >%97 @ 450 nm - 20µm
Angle of Incidence (°)	not sensitive
Damage Threshold Pulsed (J/cm @ ...ns)	---
*Substrate and Coating Specifications Can be changed (improved) upon customer request.	



Ø50.8 mm, Protected Silver Mirror	Part No: SMM B 50
Typical Specifications	
Diameter (mm)	50.8
Thickness (mm)	6
Coating	Protected silver
Design Wavelength DWL (nm)	633*

Ø25.4 mm, Protected Silver Mirror	Part No: SMM B 25
Typical Specifications	
Diameter (mm)	25.4
Thickness (mm)	5
Coating	Protected silver
Design Wavelength DWL (nm)	633*

Description

Protected silver mirror has the highest reflectance of any protected metal coating in the visible, near IR and mid IR regions (average reflectance upper than %97 in the spectral range of 450 nm - 20 µm). In order to protect silver mirrors from oxidation and tarnishing, these mirrors have a thin SiO2 layer overcoat with an approximate thickness of 50 nm. Protected Silver is not sensitive to wavelength, angle of incidence and polarization, so it is useful for a wide range of low to medium power monochromatic and polychromatic applications. This coating is suited for femtosecond pulse lasers.

Ø50.8 mm, Protected Gold Mirror	Part No: GMM B 50
Typical Specifications	
Diameter (mm)	50.8
Thickness (mm)	6
Coating	Protected gold
Design Wavelength DWL (nm)	800*

Ø25.4 mm, Protected Gold Mirror	Part No: GMM B 25
Typical Specifications	
Diameter (mm)	25.4
Thickness (mm)	5
Coating	Protected gold
Design Wavelength DWL (nm)	800*

Description

Protected Gold mirror offers excellent reflectance from 700 nm through mid IR (average reflectance about 96 % and upper from 800 nm to 20 µm). A protective dielectric overcoat is layered over the gold to help protect it from damage and make cleaning easier. Protected gold is not sensitive to wavelength, angle of incidence and polarization, so it is useful for a wide range of monochromatic and polychromatic applications.

*	Coating Specification	R_{avg} >96% @ 800nm - 20µm

Ø50.8 mm, Protected Aluminum Mirror *Part No: AMM B 50*	
Typical Specifications	
Diameter (mm)	*50.8*
Thickness (mm)	*6*
Coating	*Protected gold*
Design Wavelength DWL (nm)	*633**

Ø25.4 mm, Protected Aluminum Mirror *Part No: AMM B 25*	
Typical Specifications	
Diameter (mm)	*25.4*
Thickness (mm)	*5*
Coating	*Protected gold*
Design Wavelength DWL (nm)	*633**

Description

Protected Aluminum is the most commonly used metal coating for less demanding, general purpose applications. Aluminum mirrors provide average reflectance about 90 % and upper from 450 nm to 650 nm and upper than %95 in the spectral range from 2μm - 20 μm. A SiO2 thin layer is used to protect the aluminum coating. Protected aluminum is not sensitive to wavelength, angle of incidence and polarization, so it useful for a wide range of low power monochromatic and polychromatic applications.

* Coating Specification	R_{avg} >90 %@ 450 - 650 nm R_{avg} >95% @ 2µm - 20µm

Ø50.8 mm, Enhanced Aluminum Mirror *Part No: EAMM B 50*	
Typical Specifications	
Diameter (mm)	*50.8*
Thickness (mm)	*6*
Coating	*Protected silver*
Design Wavelength DWL (nm)	*350**

Ø25.4 mm, Enhanced Aluminum Mirror *Part No: EAMM B 25*	
Typical Specifications	
Diameter (mm)	*25.4*
Thickness (mm)	*5*
Coating	*Protected silver*
Design Wavelength DWL (nm)	*350**

Description

Enhanced Aluminum is comprised of aluminum overcoated with a multilayer dielectric film that is designed to optimize reflectance at a specific wavelength. Enhanced Aluminum is used to enhance the reflectivity of bare Aluminum, most commonly in the ultraviolet region. For example, at 350nm, Bare Aluminum will deliver about %90 reflectivity. Using Enhanced Aluminum at the same wavelength will deliver greater than %95 reflectivity. This coating is more sensitive to wavelength, angle of incidence and polarization than protective metal coatings.

* Coating Specification	R >95 %@ 350 nm

Ø50.8 mm, Dielectric Nd:YAG Mirror *Part No:1064 DNM B 50*	
Typical Specifications	
Diameter (mm)	*50.8*
Thickness (mm)	*6*
Coating	*Protected silver*
Design Wavelength DWL (nm)	*1064**

Ø25.4 mm, Dielectric Nd:YAG Mirror *Part No: 1064 DNM B 25*	
Typical Specifications	
Diameter (mm)	*25.4*
Thickness (mm)	*5*
Coating	*Protected silver*
Design Wavelength DWL (nm)	*1064**

Description

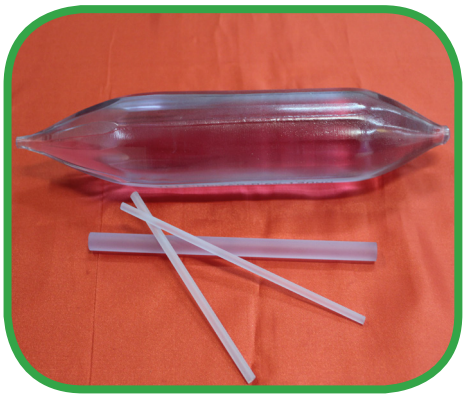
Nd:YAG High Reflection coatings provide high reflectance at 1064 nm wavelength. By use of Nd:YAG High Reflection coatings at the 1064 nm wavelength will deliver greater than %99 reflectivity. These coatings are specified for °0 and °45 angle of incidence. These all dielectric coatings are sensitive to polarization, wavelength and angle of incidence. They are durable and highly resistant to Nd:YAG laser damage.

* Coating Specification	R > 99.8 %@ 1064 nm

Laser Crystal

Nd:YAG Laser Crystal

Nd:YAG single crystal which is one of the most important active medium materials, is widely used in solid-state lasers with output wave length of 1064nm. The benefits of using Nd:YAG in laser applications are high laser efficiency, low laser threshold, good thermal and mechanical properties. High power cw lasers, high power pulse lasers besides Q-switch lasers are the main areas for using this crystal.



Standard Specifications

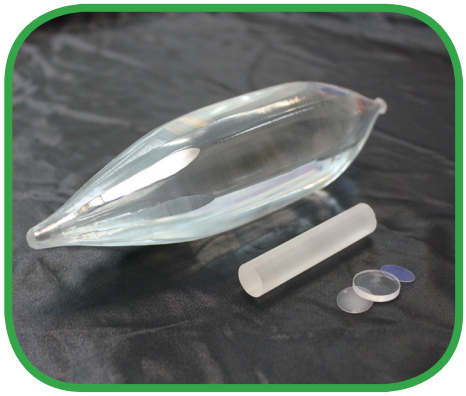
Formula	*Nd: $Y_3Al_5O_{12}$*
Crystal Structure	*Cubic Garnet*
Dopant Level	*1.1 ~ 0.6 at%*
Laser Transition	*$^4F_{2/3}$ to $^4I_{2/11}$*
Orientation	*<111> crystalline direction*
Laser Wavelength	*1064nm*
Diameter : 10 ~ 4 mm	
Length : 160 ~ 1 mm	

Typical Specifications

Dimension Tolerance	Diameter: +0.0 , -0.02mm Length: :-0.0 , + 0.5mm
Orientation Tolerance	≤0.5°
Surface quality	10-5
Flatness	λ/10
Parallelism	≤10arc second
Perpendicularity	≤5 arc minutes
Wavefront Distortion	≤λ/8 per inch
Extinction Ratio	Rods with diameter less than 5mm and with length up to 120mm: >25dB Rods with diameter from 5 to 10mm and with length up to 120mm: >20dB
Clear Aperture	≥95%

Yb:YAG Laser Crystal

Yb:YAG single crystal has superior properties such as optical transparency, high thermal and mechanical stability and to facility of growth with high dopant concentration (%20 atYb). This properties make the crystal capable to be used as standard gain media in industrial high power lasers. The laser wave length of Yb:YAG crystal is 1030nm. In this wave length, Yb:YAG has the least quantum defect (8.6 %) and low absorption in UV region that results in low thermal loading (smaller than %11).



Standard Specifications

Formula	Yb: $Y_3Al_5O_{12}$
Crystal Structure	Cubic Garnet
Dopant Level	5 – 12 at %
Orientation	<111> crystalline direction
Laser Transition	$^2F_{5/2}$to $^2F_{7/2}$
Laser Wavelength	1030nm
Size of Disk	Diameter : 4 ~20 mm Thickness : ≥0.15

Typical Specifications

Dimension Tolerance	Diameter: +0.0 , -0.02mm Thickness: ≤5micron
Orientation Tolerance	≤0.5°
Surface quality	10-5 scratch/dig
Flatness	≤λ/2
Parallelism	≤15 Arc Second
Clear Aperture	≥95%

Laser Crystal

Er:YAG Laser Crystal

Er:YAG single crystal is one of the most important crystals that is used as laser gain media in the wavelengths of 1645nm and 2940nm. Superior properties of Er:YAG single crystals, such as long life time radiation, broad absorption band, high thermal conductivity coefficient, high laser efficiency have been caused numerous application of these crystal in industry and medicine such as dentistry and surgery because the wave length 2940 nm is the most readily absorbed into water.

Standard Specifications

Formula	Er: $Y_3Al_5O_{12}$
Crystal Structure	Cubic Garnet
Dopant Level	0.5 - 50 at%
Orientation	<111> crystalline direction
Laser Transition	$^4I_{11/2}$ to $^4I_{13/2}$
Laser Wavelength	2940nm
Size of Rod	Diameter : 4~10 mm
	Length : 1 ~120 mm

Typical Specifications

Dimension Tolerance	Diameter: +0.0 , -0.02mm
	Length: :-0.0 , + 0.5mm
Orientation Tolerance	≤0.5°
Surface quality	10-5
Flatness	λ/10
Wavefront Distortion	≤λ/8 per inch
Parallelism	≤10 Arc Second
Perpendicularity	<5 arc minutes
Clear Aperture	≥95%

Ce:YAG Laser Crystal

Ce+3:YAG is of the most applicable crystals used as white luminescent phosphor diodes and scintillators in detectors. The Ce+3 ion has strong absorption peaks in UV-visible and also strong fluorescence peaks in yellow region. There will be a huge increase in gain at 1064nm laser output wavelength if it has Nd as co-dopant in YAG crystal structure. This crystal has high thermal radiation conduction and good mechanical and thermal properties.

Standard Specifications

Formula	Ce: $Y_3Al_5O_{12}$
Crystal Structure	Cubic Garnet
Dopant Level	0.05 - 0.2 at%
Orientation	<111> crystalline direction
Size of Disk	Diameter : 5~20mm
	Length : ≥0.15mm

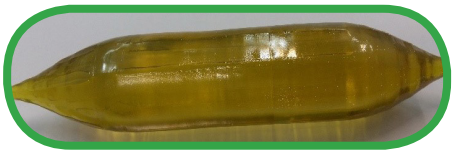
Typical Specifications

Dimension Tolerance	Diameter: +0.0 , -0.02mm
	Length: ≤5micron
Orientation Tolerance	≤0.5°
Surface quality	10-5 scratch/dig
Flatness	λ/10
Parallelism	≤15 arc second
Wavefront Distortion	≤λ/8 per inch
Clear Aperture	≥95%

Laser Crystal

Ce:Nd:YAG Laser Crystal

Ce+3:Nd:YAG is of the unique crystals to produce the air-cooled and miniature lasers with 1064nm wavelength. It should be noted that this crystal has about %50-30 more laser efficiency compared with Nd:YAG laser crystal in flash lamp pumped lasers. Other significant laser properties of Ce:Nd:YAG crystal are low threshold, anti-violet radiation and high repetition frequency for lasers operation. This crystal has high thermal radiation conduction and good mechanical and thermal specifications.



Standard Specifications

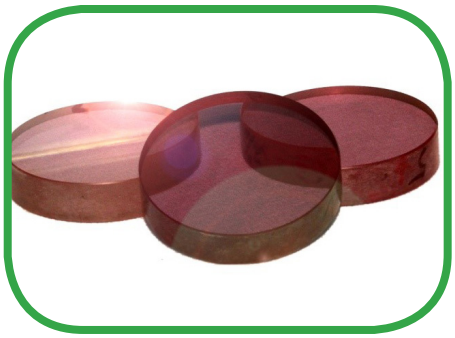
Formula	Ce:Nd: $Y_3Al_5O_{12}$
Crystal Structure	Cubic Garnet
Dopant Level	0.05 - 0.2 at%Ce & 0.1-1.1 at%Nd
Laser Transition	$^4F_{3/2}$ to $^4I_{11/2}$
Orientation	<111> crystalline direction
Laser Wavelength	1064nm
Size of Rod	Diameter : 4 ~ 10mm Length : 1 ~ 110 mm

Typical Specifications

Dimension Tolerance	Diameter: +0.0 , -0.02mm Length: :-0.0 , + 0.5mm
Orientation Tolerance	≤0.5°
Surface quality	10-5 scratch/dig
Flatness	λ/10
Parallelism	≤10arc second
Perpendicularity	<5 arc minutes
Wavefront Distortion	≤λ/8 per inch
Extinction Ratio	Rods with diameter less than 5mm and with length up to 120mm: >25dB Rods with diameter from 5 to 10mm and with length up to 120mm: >20dB
Clear Aperture	≥95%

Nd:GGG Laser

Nd:GGG single crystals are known as a prominent active medium in diode-pumped solid-state lasers. Nowadays, they are commonly used in applications of high power lasers. Possibility of growing with flat solid/melt interface and eliminating of many crystal defects are some of the advantages of this crystal. Furthermore, high concentration of doping ion, high absorption coefficient at pumped-wave length of 808nm, large excited-emission cross section as well as high laser efficiency and low laser threshold are other excellent characteristics of this crystal.



Standard Specifications

Formula	Nd:$Gd_3Ga_5O_{12}$
Crystal Structure	Cubic Garnet
Dopant Level	0.8 -3 at%
Orientation	<111> crystalline direction
Laser Transition	$^4F_{3/2}$ to $^4F_{11/2}$
Laser Wavelength	1064nm
Size of Disk	Diameter : 5~75 mm Thickness : 1 ~15 mm

Typical Specifications

Dimension Tolerance	Diameter: +0.0 , -0.02mm Length:-0.0 , + 0.5mm
Orientation Tolerance	≤0.55°
Surface quality	20-10
Flatness	λ/2
Parallelism	≤15 arc second
Clear Aperture	≥95%

Automation Industrial Series laser

RoboLasers

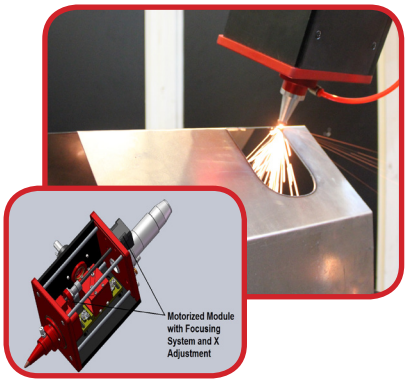
Description

The power and accuracy of laser meets the speed and flexibility of -8axis robotics machine via RoboLasers. Multi-task machine has been created with the integration of a robot and INLC resonator by a powerful automaton module made in INLC to laser processing (cutting, welding) of complexity geometry in 3D world of parts.
These machines could be equipped with the various types of cutting or welding heads.

Standard Specifications

Machine Data:			***Automation module:***		***Laser:***	
Industrial Robot	*KUKA*		*Processing -IPC*	*2core2-MHz*	*Resonators*	*INLC fiber or Disk laser*
Repeatability	*0.05± mm*		*I/O fast*	*32DO/DI8-AI/AO-BUS Coupler*	*Power*	*Up to 2 Kw*
Point Positioner	*0.03± mm*		*Net*	*PCI Ethernet/Ether CAT/Profibus*	*Wave length*	*1080-1064-1030 nm*
Pass Tracking	*0.1± mm*				*Pulse modulation*	*Up to 2K Hz*
Max. of Reach	*1611 mm*					
Max. Rotational Velocity		*156°/s*				
Rotary Table Axis	*2*					
Max. Weight of Workpiece		*400 kg*				
Protection	*Ip64*					

3D laser cutting head-model: INLC-VFD12



Description

In 3D laser cutting process, one of the most commonly drawback is the finding and keeping the vertical position of nozzle related to workpice surface during the path tracking of cutting head.
This novel product is developing to overcome the above mentioned challenge. It is imitating the scattering rolls in the world of optics.
Thanks to motorized focusing adjustment system, for increasing the ability of this product to detecting and linear moving of focus area.

Standard Specifications

Connector type	*QBH*	***Laser Data:***		***Dimensions and Weight***	
Focal Length	*100,125,150*	*Max. Power*	*Up to 2KW*	*Length*	*300 mm*
Lead motion	*0.6096 mm*	*Wavelength*	*1080-1030*	*Width*	*180 mm*
Max pressure of cutting Gas	*12 bar*			*Height*	*160 mm*
Vertical adjustment	*10±mm*			*Weight*	*≈ 5.5 kg*
Clear aperture	*12 mm*				

Laser Tracker, Model: INLC-LTS5-562

Description

Laser Trackers are used extensively in large scale metrology. They determine three dimensional coordinates of a point by measuring two orthogonal angles (nominally horizontal and vertical) and a distance to a corner cube reflector; typically, a spherically mountedretro-reflector (SMR).
Laser Tracker scans a fast moving object. They often use an interferometer so the distance is measured quasi-instantaneously. An interferometer counts fringes. It only can measure relative distancesbetween a zero point and some other point.

PRODUCT CATALOGUE