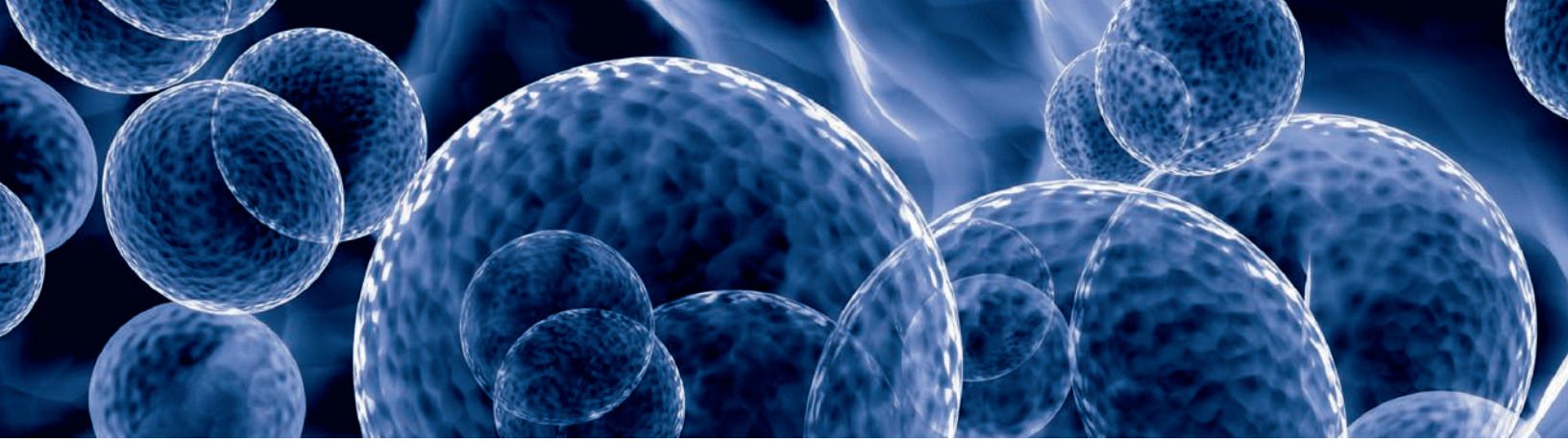


StingRay and BioRay

With a compact modular design measuring only 19 mm in diameter and using the industries' premier laser diodes, the StingRay delivers best-in-class performance. High-quality glass optics and sophisticated drive electronics deliver the power and control to your application to improve signal-to-noise and measurement speed.

StingRay is the highest-performing top-hat-profile laser available that comes in a variety of fan angles to create the line you need for measurement and profiling applications. Offering the same focus adjustment as the BioRay, the StingRay allows the user to optimize the focus location for the best measurement resolution.

BioRay is a Stingray with an included Heat Sink and Mounting Plate for Life Science applications with an elliptical beam output and a user-adjustable beam divergence (adjustable focus).

With optional RS-232 control the laser power is adjustable as well as onboard diagnostics for operating hours, diode current, output power, temperature, and more.

Select StingRay and BioRay models also include the µFocus and Fiber-Ready (FR) versions.

FEATURES & BENEFITS

- High Signal-to-Noise with superior Contained Power in the line
- 405 nm to 830 nm
- Power up to 200 mW
- User adjustable focus
- Pointing stability <10 µrad/°C
- Analog or digital modulation
- Microprocessor controlled
- Onboard diagnostics monitor
- RS-232 control option
- Power supply range: 5 to 24 VDC
- ESD protection, over-temperature protection, and reverse polarity protection
- Optional fiber-ready version

APPLICATIONS

- Microscopy
- Cytometry
- Medical Imaging and Instrumentation
- Genetics
- High Throughput Screening
- Machine Vision
- 3D Profiling
- Industrial

COHERENT®
Superior Reliability & Performance

LASER OUTPUT SPECIFICATIONS		
Spatial Mode		TEM_{00} (Single Transverse Electric Mode)
Beam Quality, M^2 (ModeMaster with 90/10 Clip Level)		<1.5
Pointing Stability over Temperature (µrad/°C)		<10
Beam Angle (boresight) (mrad)		<3
RMS Noise (%) (20 Hz to 20 MHz)		<0.5
Peak-to-Peak Noise (%) (20 Hz to 20 MHz)		<1
Long Term Power Stability (%) (over 8 hours and ±3°C)		<2
Warm-up Time (minutes)		<5
LASER ELECTRICAL SPECIFICATIONS		
Operating Voltage (V DC)		+5 to +24 (recommend 12 VDC for best efficiency)[1]
Operating Current (mA) (maximum at 25°C)		200
Power-on Delay (seconds) (if enabled)		5
Power Consumption (W)		<5
ESD Protection		EN61326-1 (8 kV Air Discharge, 4 kV Contact Discharge)
LASER MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS		
Operating Temperature		-10 to 50°C (except 450 nm, 520 nm, and 525 nm with 10°C to 40°C)
Non-Operating (storage) Temperature		-20 to 60°C
Weight (grams) (standard model)		<70
Diameter (mm)		19.05
Material		Aluminum 6061 T1
LASER WIRING		
V_{in}	Red	Power Supply input for +5 to +24 Volts DC, Recommend 12 VDC[1]
V_{in} Ground	Black	Power Supply Ground
Output Signal for Over-Temperature or Over-Current	Green	Open Collector Output, 30 Volts DC maximum, 100 ma current load maximum[2]
V_{mod}	Blue	Modulation Input, 5 kOhm input impedance, 5 Volts maximum
V_{mod} Ground	Red/Black	Modulation Ground
RS-232 Transmit	Orange	RS-232 Transmit for models with RS-232 option installed
RS-232 Receive	White	RS-232 Receive for models with RS-232 option installed
RS-232 Ground	White/Black	RS-232 signal ground

1 Minimum operating voltage for lasers between 400 nm to 525 nm is 6V DC.
2 Not available on Fast Digital Modulation (FT or RFT models).

CHOOSE YOUR LASER

The StingRay and BioRay products come in a variety of wavelength, output power, and configuration options.

Use the following simple ten-step selection guide to choose the ideal laser and features for your application. Refer to the last page for our most popular versions, their part numbers, and pricing available for immediate delivery.

Configure your laser with these ten steps:

STEP 1: Package

STEP 2: Wavelength

STEP 3: Output Power Control

STEP 4: Control Mode

STEP 5: Beam Shape

STEP 6: Focus Distance

STEP 7: Communication Option (RS-232)

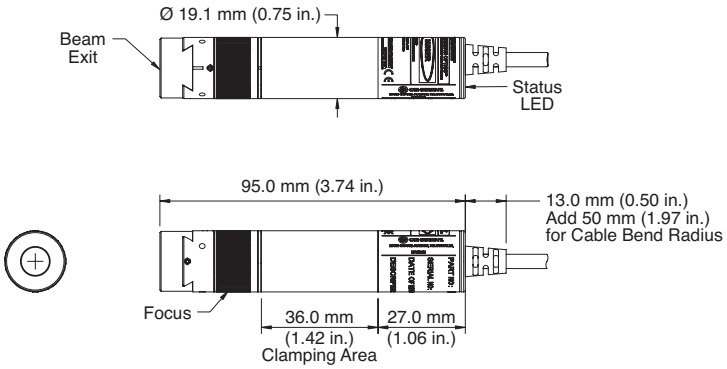
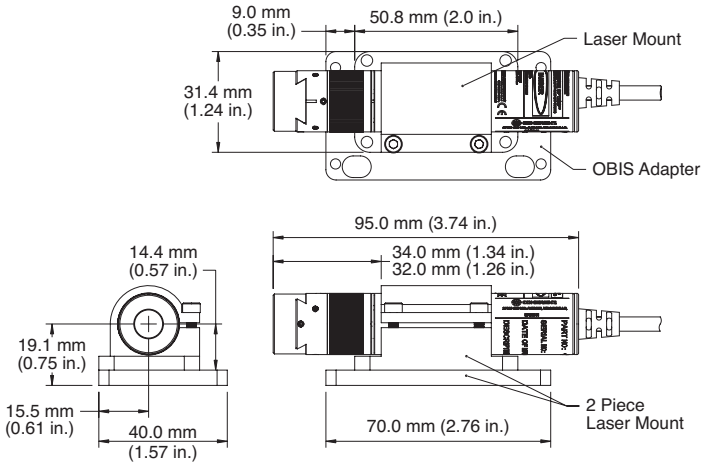
STEP 8: Cable Length/Connector

STEP 9: Data Report

STEP 10: Power-On Delay

STEP 1:

Choose your package with optional separated electronics, mounts, and/or fiber attachment.
Choose only one option from the following selections.

Standard StingRay	Mechanical Specifications[1]
☐ 	
StingRay in Mount, BioRay	**Mechanical Specifications[1]**
☐ 	

1 For more dimension details and CAD drawings, please visit www.coherent.com

STEP 1 (continued):

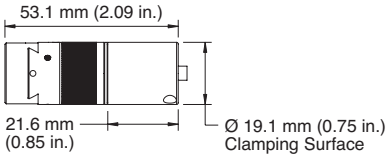
Separate Driver, Compact Laser Head

(select cable length between laser head and driver)

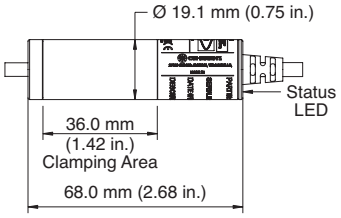
☐ 75 mm ☐ 150 mm ☐ 250 mm ☐ 500 mm

Mechanical Specifications[1]

Laser Head



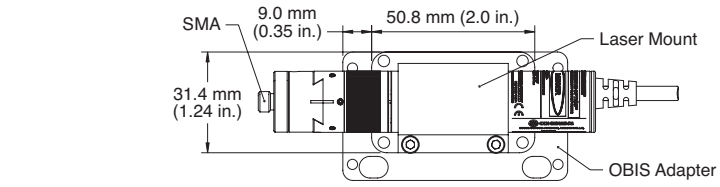
Driver

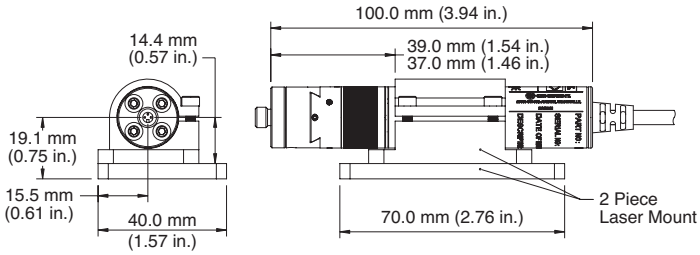


BioRay FR (Fiber-Ready with SMA)

☐

Mechanical Specifications[1]





1 For more dimension details and CAD drawings, please visit www.coherent.com

STEP 2:

Choose your wavelength.
Choose only one of the following selections.

Wavelength Choices[1] (nm)	405	450	488	520	525	639	640	655	660	685	785	830
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

1 BioRay FR available in 405 nm, 450 nm, 488 nm and 640 nm. Laser-to-laser wavelength tolerance of 405 nm is ±5 nm, 450 nm ±10 nm, 488 nm ±10 nm, 520 nm is 510 nm to 530 nm, 525 nm is 520 nm to 530 nm, 639 nm is 635 nm to 648 nm, 640 nm is ±6 nm, 647 nm is ±5 nm, 655 nm is 650 nm to 665 nm, 660 nm is ±5 nm, 685 ±15 nm, 785 nm is ±19 nm, 830 nm is 815 nm to 840 nm.

STEP 3:

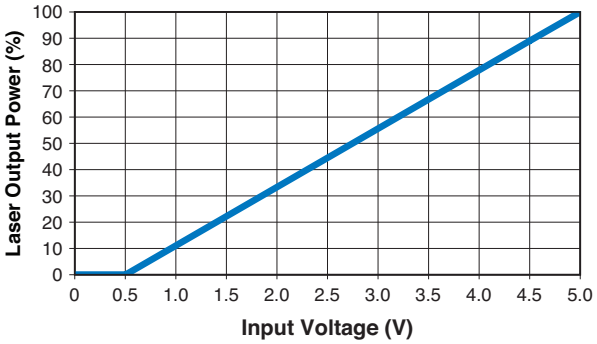
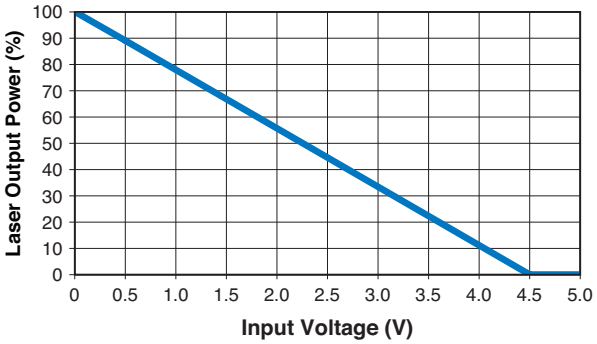
Choose your power.
Choose only one of the following selections.

Wavelength Choices[1] (nm)	405	450	488	520	525	639	640	655	660	685	785	830
Output Power Available (mW)												
1						☐		☐				
5				☐	☐	☐		☐				
10		☐		☐	☐	☐			☐			
20		☐	☐	☐	☐		☐		☐	☐	☐	
25					☐							
35		☐		☐			☐		☐	☐	☐	
50	☐	☐	☐	☐	☐				☐	☐	☐	
75					☐						☐	☐
90											☐	
100									☐			☐
150												☐
200												☐

1 405 nm 50 mW BioRay only. BioRay FR (Fiber-Ready) only available in 405 nm 50 mW, 450 nm 50 mW, 488 nm 20 mW and 640 nm 40 mW. BioRay FR offers >70% coupling efficiency with NA=0.22 into a customer-provided 50 µm or 100 µm fiber.

STEP 4:

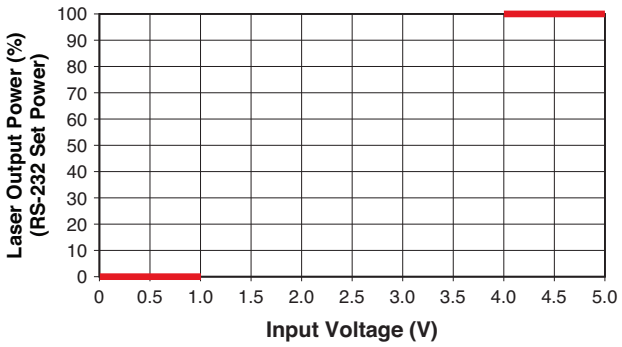
Choose your output power control: CW, analog modulation (variable output power), or digital modulation. Choose only one of the following selections.

CW Mode	Function
☐ Continuous Wave (CW)	Constant power mode Laser on at full power User can adjust laser output power and monitor power through RS-232 option (if enabled) No modulation input required
Analog Modulation	**Function**
☐ Analog[1] (A)	Input <0.5V = output power is off, Input = 5V is 100% output power, 0.5V to 5V is linear power control from external voltage source Maximum bandwidth of 500 KHz Rise time (10% to 90%) <1 msec Fall time (90% to 10%) <1 msec Also can be used with a DC voltage input to simply vary the output power  No adjustable output power through RS-232
☐ Reverse Analog (RA)	Input >4.5V = output power is off, Input = 0V is 100% output power, 4.5V to 0V is linear power control from external voltage source Maximum bandwidth of 500 KHz Rise time (10% to 90%) <1 msec Fall time (90% to 10%) <1 msec Also can be used with a DC voltage input to simply vary the output power	 No adjustable output power through RS-232

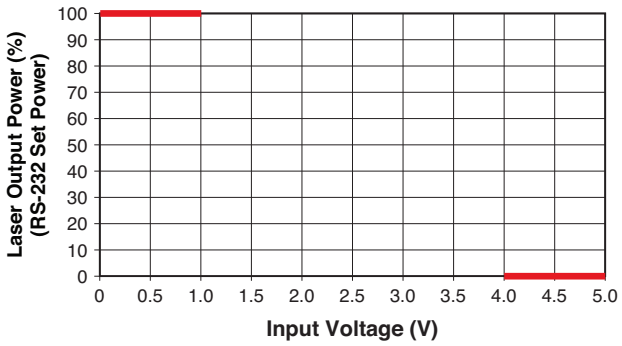
1 BioRay is standard with Analog Modulation, and will require a 5V input signal to operate CW.

STEP 4 (continued):

Digital Modulation	Function
☐ Digital TTL (T) ☐ Fast Digital TTL (FT)	Input 0V to 1V is output power off, Input 4V to 5V is 100% output power Maximum bandwidth of 100 KHz Rise time (10% to 90%) <1 msec Fall time (90% to 10%) <1 msec Maximum bandwidth of 2 MHz Rise time (10% to 90%) <150 nsec Fall time (90% to 10%) <150 nsec
☐ Reverse Digital TTL (RT) ☐ Reverse Fast Digital TTL (RFT)	Input 0V to 1V is 100% output power, Input 4V to 5V is 0% output power Maximum bandwidth of 100 KHz Rise time (10% to 90%) <1 msec Fall time (90% to 10%) <1 msec Maximum bandwidth of 2 MHz Rise time (10% to 90%) <150 nsec Fall time (90% to 10%) <150 nsec



User can adjust output power setting through RS-232 option (if enabled)



User can adjust output power setting through RS-232 option (if enabled)

STEP 5:

Choose your beam shape.
Choose only one of the following selections.

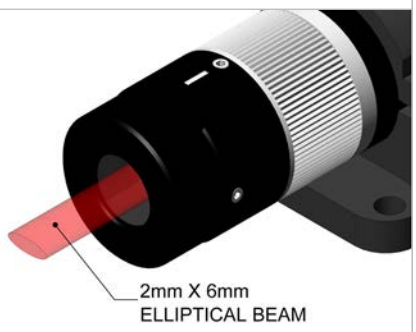
Elliptical Dot Beam

D01 – Coherent's high-quality elliptical collimated beam with user adjustable focus to change the beam divergence.

☐ D01-XX, Standard ~1 mm by ~3 mm beam diameter

MicoFocus µFL D01 – Coherent's high-quality elliptical collimated beam with user adjustable focus to change the beam divergence. Large diameter beam allows for tighter focus spots.

☐ µFL D01-XX, Large beam diameter 2X with less divergence



Line Beam Generator

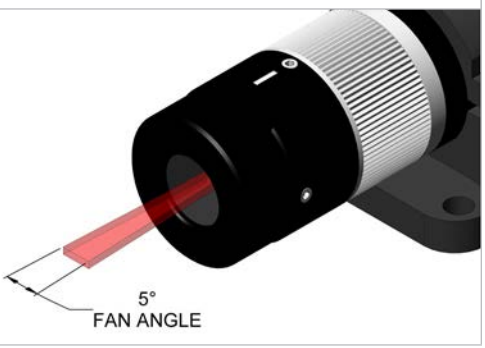
L01 – Coherent's Premier Flat-Top Line Technology, with nine choices for the fan angle at which the line expands out from the laser.

☐ L01-1 Line with 1 degree fan angle
Fan angle 1º with tolerance ±10%
Relative intensity floor >75%
Contained Power ≥90%

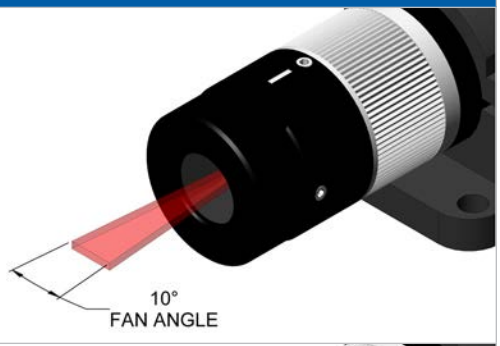
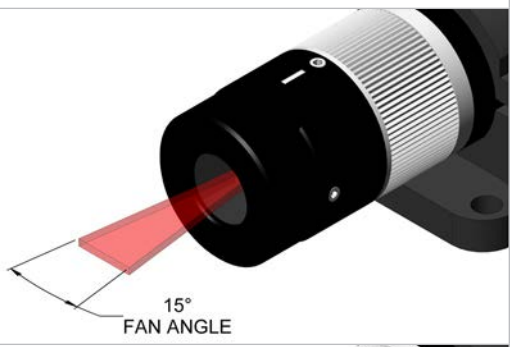
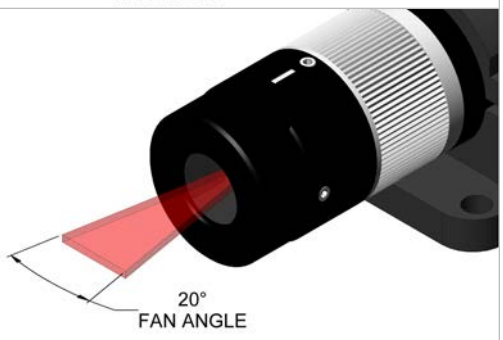
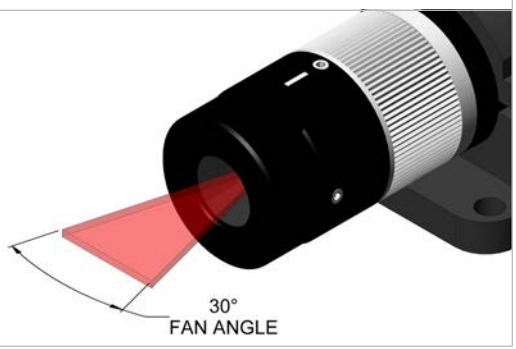
Note: Not available in 488 nm

☐ L01-5 Line with 5 degree fan angle
Fan angle 5º with tolerance ±10%
Straightness <0.1%
Relative intensity floor >75%
Contained Power ≥95%

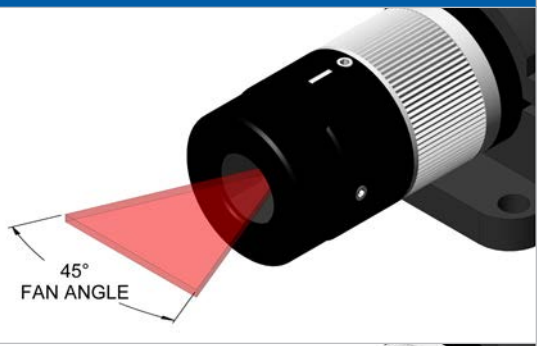
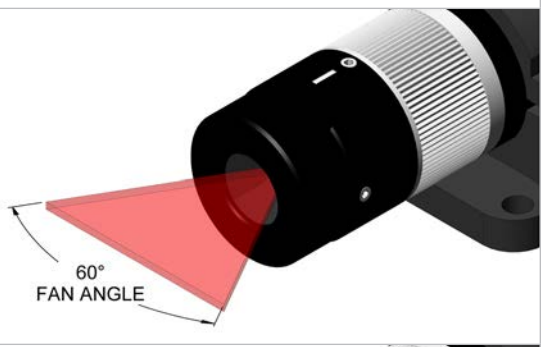
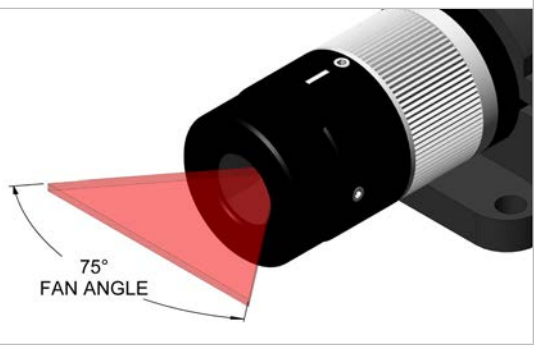
Note: Not available in 488 nm



STEP 5 (continued):

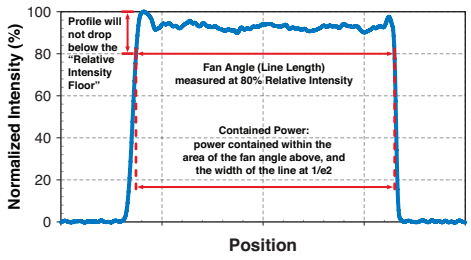
Line Beam Generator (cont.)	
☐ L01-10 Line with 10 degree fan angle Fan angle 10º with tolerance ±5% Straightness <0.1% Relative intensity floor >75% Contained Power ≥95% Note: Not available in 488 nm	
☐ L01-15 Line with 15 degree fan angle Fan angle 15º with tolerance ±5% Straightness <0.1% Relative intensity floor >75% Contained Power ≥95% Note: Not available in 488 nm	
☐ L01-20 Line with 20 degree fan angle Fan angle 20º with tolerance ±5% Straightness <0.1% Relative intensity floor >75% Contained Power ≥95% Note: Only available for wavelengths 520 nm to 785 nm	
☐ L01-30 Line with 30 degree fan angle ☐ L01-30 Line with 30 degree fan angle, micro-focus (µFL) Fan angle 30º with tolerance ±5% Straightness <0.1% Relative intensity floor >75% Contained Power ≥95% Note: Not available in 488 nm. Micro-focus (µFL) only available in 520 nm to 785 nm.	

STEP 5 (continued):

Line Beam Generator (cont.)	
☐ L01-45 Line with 45 degree fan angle ☐ L01-45 Line with 45 degree fan angle, micro-focus (µFL) Fan angle 45º with tolerance ±5% Straightness <0.1% Relative intensity floor >60% Contained Power ≥95% Note: Not available in 488 nm. Micro-focus (µFL) only available in 520 nm to 785 nm.	
☐ L01-60 Line with 60 degree fan angle ☐ L01-60 Line with 60 degree fan angle, micro-focus (µFL) Fan angle 60º with tolerance ±5% Straightness <0.1% Relative intensity floor >60% Contained Power ≥95% Note: Not available in 488 nm. Micro-focus (µFL) only available in 520 nm to 785 nm.	
☐ L01-75 Line with 75 degree fan angle Fan angle 75º with tolerance ±5% Straightness <0.1% Relative intensity floor >50% Contained Power ≥95% Note: Not available in 488 nm	

GLOSSARY OF TERMS:

Definition	Description
Fan Angle or Line Length	Length of flat top profile, measured at 80% intensity clip levels. Reported in degrees for the fan angle.
Straightness	Maximum deviation from the best fit line. Measured as the delta from the best fit line divided by the line length. Reported as a percentage.
Relative Intensity Floor	Minimum relative intensity at any point along the line length. Reported as a relative intensity.
Contained Power	Power contained within the defined Flat Top.



Note: Line is optimized in the factory at 500 mm working distance from laser

STEP 6:

Choose your focus distance (Coherent can preset the adjustable focus).
Choose only one of the following selections.

Focus	Description
☐ Standard, Default, 500 mm	Adjustable focus feature factory set for best focus at 500 mm distance from laser. You can readjust and lock as needed.
☐ Custom, _____ mm	Choose from a 50 mm up to a 2000 mm focus distance. Adjustable focus feature factory set to your specified distance from laser. You can readjust and lock as needed. Choosing 2000 mm is “collimated”.

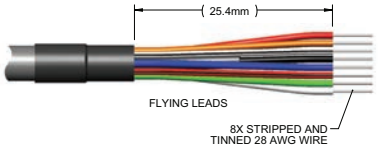
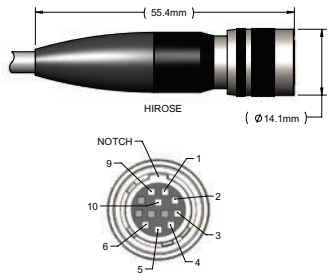
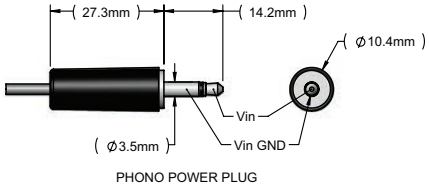
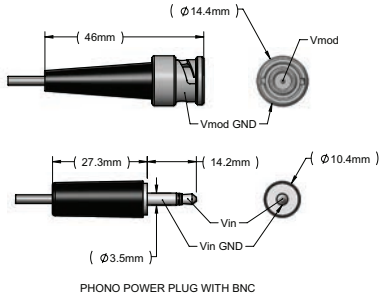
STEP 7:

Choose your communication option (RS-232).
Choose only one option of following selections.

Focus	Description
☐ None	No communications. RS-232 disabled.
☐ RS-232	RS-232 enabled for laser control and status. Can monitor hours, power and temperature. Can adjust laser output power for CW and digital modulation modes.

STEP 8:

Choose your cable length and connector/pinout.
Choose only one of the following selections.

Code	Description	Image	Connection	
FL	**Flying Leads** Choose Length (mm) ☐ 250 ☐ 500 ☐ 1000 ☐ 1500 ☐ 2000 ☐ 2500		V_{in} V_{in} Ground Fault V_{mod} V_{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	Red Black Green Blue Red/Black Orange White White/Black
HR	**Hirose R10A-10P-12SC(73)** ☐ 1000 mm		V_{in} V_{in} Ground Fault V_{mod} V_{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	9 1 10 2 3 6 4 5
P	**Power Plug, Phono 3.5 mm** ☐ 500 mm Note: Only for CW mode		V_{in} V_{in} Ground, Shield Fault V_{mod} V_{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	Tip Base No Connection No Connection No Connection No Connection No Connection No Connection
B	**Power Plug, Phono 3.5 mm and BNC for Modulation** ☐ 500 mm Note: Do not order with CW mode		V_{in} V_{in} Ground, Shield Fault V_{mod} V_{mod} Ground RS-232 Transmit RS-232 Receive RS-232 Ground	Phono Plug Tip Phono Plug Base No Connection BNC Tip BNC Base No Connection No Connection No Connection

STEP 9:

Choose data report.

Data Reports	Description
☑ Basic	Every laser includes a final quality test report
☐ Line Data	Add uniformity and straightness data for lines (L01)

STEP 10:

Choose five-second start-up power-on delay.
Choose only one of the following selections.

Power-on Delay	Description
☐ None	Laser will start emission at power-on
☐ Yes, default	Laser will have an approximate five-second delay for laser emission after power-on

CONGRATULATIONS:

You have completed the laser configuration steps! Please email this to your local Coherent Sales representative to get a quote on price and delivery. You can also view our most popular models in-stock for immediate delivery on the next two pages.

MOST POPULAR CONFIGURATIONS READY FOR IMMEDIATE DELIVERY:

Part Number	Description
1264213	**BioRay 405 nm 50 mW Elliptical Dot Laser** Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1264214	**BioRay 450 nm 50 mW Elliptical Dot Laser** Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1270002	**BioRay 488 nm 20 mW Elliptical Dot Laser** Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1264216	**BioRay 520 nm 50 mW Elliptical Dot Laser** Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1264218	**BioRay 640 nm 40 mW Elliptical Dot Laser** Analog Modulation enabled, Includes mount, 1 meter cable and Hirose connector, typical 1x3 mm collimated beam
1286584	**STR-520-20-CW-FL-L01-75-S-XX-3, CDRH Class II** StingRay, 520 nm, 20 mW, Single Line, 75º Fan Angle, Pre-focused to 500 mm distance, 5-second Power-on Delay, 500 mm cable with Flying Leads
1253606	**STR-520-35-CW-FL-D01-XX-S-TX** StingRay, 520 nm, 35 mW, Elliptical Dot Beam, Pre-focused to 500 mm distance, 5-second Power-on Delay, 500 mm cable with Flying Leads, Includes RS-232 communications
1285005	**STR-639-5-CW-FL-L01-20-S-XX-8** StingRay, 639 nm, 5 mW, Single Line, 20º Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads. NOTE: Does not have 5-second power-on delay for laser emission.
1276557	**STR-639-5-CW-FL-L01-45-S-XX-8** StingRay, 639 nm, 5 mW, Single Line, 45º Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads. NOTE: Does not have 5-second power-on delay for laser emission.
1277105	**STR-639-10-CW-P-L01-75-E-XX** StingRay, 639 nm, 10 mW, Single Line, 75º Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, 500 mm cable with Flying Leads
1262766	**STR-660-10-CW-FL-L01-10-S-XX-8** StingRay, 660 nm, 10 mW, Single Line, 10º Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads. NOTE: Does not have 5-second power-on delay for laser emission.
1255565	**STR-660-10-A-FL-L01-20-E-XX** StingRay, 660 nm, 10 mW, Single Line, 20º Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, 500 mm cable with Flying Leads, Analog Modulation enabled
1258287	**STR-660-10-CW-FL-L01-60-S-TX** StingRay, 660 nm, 10 mW, Single Line, 60º Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads, Includes RS-232 communications
1289028	**STR-660-35-CW-HR-L01-1-S-XX-8** StingRay, 660 nm, 10 mW, Single Line, 1º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector. NOTE: Does not have 5-second power-on delay for laser emission.

MOST POPULAR CONFIGURATIONS READY FOR IMMEDIATE DELIVERY (continued):

Part Number	Description
1288507	**STR-660-35-CW-HR-L01-20-S-XX-8** StingRay, 660 nm, 35 mW, Single Line, 20º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector. NOTE: Does not have 5-second power-on delay for laser emission.
1280731	**STR-660-100-T-FL-L01-10-S-TX** StingRay, 660 nm, 100 mW, Single Line, 10º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector, Digital Modulation enabled, Includes RS-232 communications
1280028	**STR-660-100-T-HR-L01-15-E-TX-5** Stingray, Separate Driver (Enclosed) with 150 mm between laser and driver, 660 nm, 100 mW, Single Line, 15º Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, ~1 Meter cable with Hirose Connector, Digital Modulation enabled, Includes RS-232 communications
1280027	**STR-660-100-T-HR-L01-30-E-TX-5** Stingray, Separate Driver (Enclosed) with 150 mm between laser and driver, 660 nm, 100 mW, Single Line, 30º Fan Angle, Pre-focused to 500 mm distance, Extended Depth of Focus, ~1 Meter cable with Hirose Connector, Digital Modulation enabled, Includes RS-232 communications
1285314	**STR-660-100-CW-HR-L01-45-S-XX-8** StingRay, 660 nm, 100 mW, Single Line, 45º Fan Angle, Pre-focused to 500 mm distance, ~1 Meter cable with Hirose Connector. NOTE: Does not have 5-second power-on delay for laser emission.
1262526	**STR-660-100-CW-FL-L01-60-S-XX** StingRay, 660 nm, 100 mW, Single Line, 60º Fan Angle, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads
1286514	**STR-785-90-T-FL-D01-XX-S-XX** StingRay, 785 nm, 90 mW, Elliptical Dot Beam, Pre-focused to 500 mm distance, 500 mm cable with Flying Leads
1231404	**StingRay Controller with Keyswitch and Interlock** Accessory for enhanced integration. Includes control software and power supply. Use with lasers that include a Hirose connector. For more details, refer to the StingRay Accessory datasheet.

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Coherent offers a limited warranty for all StingRay and BioRay Lasers. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative. MC-010-17-0M0119Rev.C Copyright ©2019 Coherent, Inc.