

STN Series High Power 450nm Blue Lasers

1. STN Series Fiber Coupled Blue Lasers



The STN Series Fiber Coupled Blue Lasers are high brightness blue lasers that process metals better and more efficiently than IR or green lasers and integrate with standard scanning systems. This enables them to service a wide range of welding, additive manufacturing, and other materials processing applications in batteries, e-mobility and consumer electronics. This series combined with scan head delivery, offers an ideal laser for metal processing due to the high absorption of blue light by metals: including 13x for copper and 3x for aluminium. Reducing the excess heat input compared to infrared lasers enable spatter-free and defect free welds with the highest possible mechanical and electrical performance. With available output powers from 125W to 1kW, these blue lasers can power mass production solutions for <1mm copper and aluminium welds which require a large process window and demand extremely high yields.

Key Benefits

- High quality low to spatter-free welding
- Dramatically improves process performance and process window
- Enables welding processes not possible or with low yields with IR

Application

- Batteries and energy storage
- E-mobility
- Consumer electronics
- Interconnects
- Electronics packaging
- 3D metal printing (powder bed fusion and wire feed)



Optical	Units	STN-125-F	STN-250-F	STN-500-F	STN-1000-F
Wavelength	nm	~444	~444	~444	~444
Bandwidth	nm	±15	±15	±15	±15
Output Power	W	125	250	500	1000
Power Adjustment	%	20-100	20-100	20-100	20-100
Power Stability (8 hours)	%	±1.5 at full power			
Fiber Diameter (Core)	micron	100	100	200	200
Fiber Numerical Aperture	N/A	0.22	0.22	0.22	0.22
Beam Parameter Product (10-90% enclosed power)	mm.mrad	5	5	15	15
Standard Fiber Length (Connector Type)	m	5 (QBH). Options for 10 and (QD)			
Electrical					
Operating Current	A	<18	<18	<8 per phase	<8 per phase
Operating Voltage	V	180/264 (47-63Hz) 1ph 3 wires		208-240 (50/16Hz, 3ph 4 wires)	
External Control Inputs					
Laser Enable (High on)	V	+5/+24	+5/+24	+5/+24	+5/+24
CW Analog Control	V	0-10	0-10	0-10	0-10
Modulation	V	5	5	5	5
Communications	kHz	Ethernet	Ethernet	Ethernet	Ethernet
Safety Interlocks					
Interlock Voltage (Laser Enable)	V	24	24	24	24
Open Circuit (Laser Shut-down)	V	0	0	0	0
Mechanical		Driver (19" Rack)		Driver (Stand Alone)	
Height, Width, Depth	mm	178 × 443 × 635		641 × 671 × 1183	
Weight	kg	21	21	~160	~180
IP Rating		IP20/NEMA 1		IP52/NEMA 12	
Operating Conditions					
Temperature	Deg C	15-25	15-25	15-25	15-25
Relative Humidity (non-condensing)	%	0-90	0-90	0-90	0-90
Storage and Transport					
Temperature	Deg C	0-40	0-40	0-40	0-40
Cooling					
Heat Load	kW/Rton	3/0.85	3/0.85	4/1.2	8/2.3
Min Flow Rate	Lpm/gpm	6/1.5	6/1.5	16.5/4.3	33/8.6
Supply Temperature	Deg C	15-25	15-25	20-24	20-24
Max Pressure	bar/psi	5.5/80	5.5/80	5.5/80	5.5/80

2. STN Series Free Space Blue Lasers

High brightness, free space output blue lasers for metals processing



The STN Series Free Space Blue Lasers are high brightness, blue lasers that process metals better and more efficiently than IR or green lasers and integrate with standard scanning systems. This enables them to service a wide range of welding, additive manufacturing, and other materials processing applications in batteries, e-mobility and consumer electronics. The high brightness of this series, combined with scan head delivery, offers an ideal laser for metal processing due to the high absorption of blue light by metals: including 13x for copper and 3x for aluminum. Reducing the excess heat input compared to infrared lasers enables spatter-free and defect free welds with the highest possible mechanical and electrical performance. With available output powers from 125W to 250W, these blue lasers can power mass production solutions for <500micron copper and aluminum welds which require a large process window and demand extremely high yields.

Key Benefits

- Compact footprint to simplify integration
- Capable of direct interface to standard scanners
- All semiconductor laser reliability and lifetime
- Lower cost of ownership than fiber and solid-state lasers
- Spatter and defect free conduction mode welds
- Higher weld joint densification

Application

- Batteries for consumer electronics
- Consumer electronics
- Interconnects
- Electronics packaging
- Powder bed fusion 3D metal printing



Optical	Units	STN-125	STN-250
Wavelength	nm	~444	~444
Bandwidth	nm	±15	±15
Output Power	W	125	250
Power Adjustment	%	20-100	20-100
Power Stability (8 hours)	%	±1.5 at full power	
Collimator Aperture Diameter	micron	20 or 30	20 or 30
Beam Parameter Product (10-90% enclosed power)	mm.mrad	<5	<5
Electrical			
Operating Current	A	<18	<18
Operating Voltage	V	180/264 (47-63Hz) 1ph-3 wires	
External Control Inputs Laser Enable (High on) CW Analog Control Modulation Communications	V V kHz	+5/+24 0-10 5 Ethernet	+5/+24 0-10 5 Ethernet
Safety Interlocks Interlock Voltage (Laser Enable) Open Circuit (Laser Shut-down)	V V	24 0	24 0
Mechanical		Driver/Head with telescope	
Height, Width, Depth	mm	H: 178/170 - W:443/100 - D: 635/410	
Weight	kg	21	11.4
Power Supply		19" Rack	
IP Rating		IP20/NEMA 1	
Operating Conditions			
Temperature	Deg C	15-25	15-25
Relative Humidity (non-condensing)	%	0-90	0-90
Storage and Transport			
Temperature	Deg C	0-40	0-40
Cooling			
Heat Load	kW/Rton	3/0.85	3/0.85
Min Flow Rate	Lpm/gpm	6/1.5	6/1.5
Supply Temperature	Deg C	15-25	15-25
Max Pressure	bar/psi	5.5/80	5.5/80

STK Series Blue Diode Lasers

1. 500W-2000W Blue Diode Lasers

Compared with traditional laser products, our blue diode laser has a higher absorption rate for materials such as copper and aluminum, and can process non-ferrous metals with lower power. Our blue laser is more compact and easier to use. With flexible laser output mode, it can be integrated into the processing system conveniently.

Our blue lasers can be used in wide applications like welding, cladding, surface treatment, lithium-ion battery manufacturing, etc. Our professional laser application team, with good knowledge and experience, provides the best laser system solution for our customers all around the world.

Features:

- Good beam quality
- High electro-optical conversion efficiency
- Excellent power stability
- Two operation modes: CW and modulation
- Excellent system reliability
- Max modulation frequency up to 5kHz
- Easy-to-use control interface
- Cost effective and maintenance free

Application:

- Welding
- Additive manufacturing
- Surface treatment
- Lithium-ion battery manufacturing



Part number	STK-450-500-330	STK-450-1000-400	STK-450-1500-400	STK-450-2000-600
Power	500W	1000W	1500W	2000W
Wavelength	450±5 nm	450±10 nm	450±5 nm	450±5 nm
Output Fiber Core Diameter	330µm	330/400µm	400µm	600µm
Output Cable Length	10m or Customized	10m or Customized	10m or Customized	5m or Customized
Output Cable Connector	QBH	QBH or Customized	QBH	QBH
Aiming Beam	Red	Red	Red	Red

Operation Mode	CW or modulation	CW or modulation	CW or modulation	CW or modulation
Polarization	Random	Random	Random	Random
Power Stability (25°C)	< ±3% (2h)	< ±3% (2h)	< ±3% (2h)	< ±3% (2h)
Power Adjustment Scope	10%-100%	10%-100%	10%-100%	10%-100%
Max Modulation Frequency	5kHz	5kHz	5kHz	5kHz
Physical Size (H×W×D)	798×420×900mm	798×420×900mm	798×420×900mm	800×750×1200mm
Weight	< 130 kg	< 80 kg	< 140 kg	< 140 kg
Power Supply	Three Phase, 380±20V, AC, PE, 50/60 Hz	Three Phase, 380±20V, AC, PE, 50/60 Hz	Three Phase, 380±20V, AC, PE, 50/60 Hz	Three Phase, 380±20V, AC, PE, 50/60 Hz
Power Consumption	3.5kW	5.0kW	9.0kW	10.0 kW
Control Interface	RS232/AD	RS232	RS232/AD	RS232/AD
Minimum Water-Cooling Capacity	3.0kW	4.0kW	8.0kW	8.0 kW
Temperature Settings	25°C (Laser Module), 30°C (QBH)	25°C (Laser Module), 30°C (QBH)	25°C (Laser Module), 30°C (QBH)	25°C (Laser Module), 30°C (QBH)
Cooling Tubes Size	I.D. Φ25mm	I.D. Φ19mm	I.D. Φ25mm	I.D. Φ32mm
Cooling Water Flow Rate (Laser Module)	>20L/min	>25L/min	>25L/min	>50L/min
Cooling Water Flow Rate (QBH)	1.5~2.0L/min	2.0L/min	2.0L/min	1.5~2.0L/min

Note: The back reflection will affect the performance and life of the direct diode laser. It is necessary to use the output laser when it is 8-10° away from the vertical direction of the surface.

2. 100W~200W Blue Diode Lasers



2.1 200W Blue Diode Lasers

Features:

- 445nm wavelength
- 100W/150W/200W output power
- 105µm fiber core diameter

10 Bukit Batock Crescent #07-02 The Spire Singapore 658079 Tel: 6316 7112 Fax: 63167113
<http://www.SintecOptronics.com> <http://www.sintec.sg> sales@sintec.sg sales@SintecOptronics.com

- 0.22NA
- Cooling mode: water cooling

Applications:

- Material Processing
- 3D Printing

Specification (20°C)	Symbol	STK- 445-200-105		
		Minimum	Typical	Maximum
Optical Data (1)				
Total CW Output Power (W)	Pbol (4)	200	-	-
Number of submodules	pcs	-	4	-
Submodule CW Output Power (W)	Po	-	50	-
Center Wavelength (nm)	λ_c	445±20	445±20	445±20
Spectral Width (FWHM), (nm)	$\Delta\lambda$	-	6	-
Wavelength Shift with Temperature, (nm/°C)	$\Delta\lambda/\Delta T$	-	0.1	-
Wavelength Shift with Current, (nm/A)	$\Delta\lambda/\Delta A$	-	1	-
Electrical Data				
Electrical-to-Optical Efficiency, %	PE	-	30	-
Operating Current, (A)	Ibol (4)	-	3	3.5
Threshold Current, (A)	Ith	-	0.35	-
Operating Voltage (single module), V	Vop	-	52	60
Slope Efficiency (single module), (W/A)	η	-	18.5	-
Power Supply Mode	-	-	4 modules	-
Fiber Data				
Core Diameter, (μm)	Dcore	-	105	-
Numerical Aperture	NA	-	0.22	-
Minimum Bending Radius, (mm)	-	50	-	-
Fiber Length, (m)	-	-	5.5	-
Fiber Termination	-	-	HP-SMA905	-
Thermistor, (KΩ)/β(25°C°C)	Rt	-	10±3%/3450	-
ESD (V)	Vesd	-	-	500
Storage Temperature (2), (°C)	Tst	-20	-	70
Lead Soldering Temp, (°C)	Tls	-	-	260
Lead Soldering Time, sec	t	-	-	10
Operating Temperature (3), (°C)	Top	15	-	30
Relative Humidity, %	RH	15	-	75

Remark:

- (1) Data measured under operation output at 200W@20°C.
- (2) A non-condensing environment is required for operation and storage.
- (3) Operating temperature defined by the thermistor. Acceptable operating range is 15°C~30°C, but performance may vary.

(4) Product delivery qualification standards: $I_{\text{beginning of life}} \leq 3.5A$ $P_{\text{beginning of life}} \geq 200W$.

(5) Within the warranty period, the product is considered qualified with $I_{\text{end of life}} = 3.5A$ $P_{\text{end of life}} = 160W$.

2.2. 150W Blue Diode Lasers

Specification (20°C)	Symbol	STK- 445-150-105		
		Minimum	Typical	Maximum
Optical Data (1)				
Total CW Output Power (W)	P_{bol} (4)	150	-	-
Number of submodules	pcs	-	3	-
Submodule CW Output Power (W)	P_o	-	50	-
Center Wavelength (nm)	λ_c	445±20	445±20	445±20
Spectral Width (FWHM), (nm)	$\Delta\lambda$	-	6	-
Wavelength Shift with Temperature, (nm/°C)	$\Delta\lambda/\Delta T$	-	0.1	-
Wavelength Shift with Current, (nm/A)	$\Delta\lambda/\Delta A$	-	1	-
Electrical Data				
Electrical-to-Optical Efficiency, %	PE	-	30	-
Operating Current, (A)	I_{bol} (4)	-	3	3.5
Threshold Current, (A)	I_{th}	-	0.35	-
Operating Voltage (single module), V	V_{op}	-	52	60
Slope Efficiency (single module), (W/A)	η	-	18.5	-
Power Supply Mode	-	-	3 modules	-
Fiber Data				
Core Diameter, (μm)	D_{core}	-	105	-
Numerical Aperture	NA	-	0.22	-
Minimum Bending Radius, (mm)	-	50	-	-
Fiber Length, (m)	-	-	5.5	-
Fiber Termination	-	-	HP-SMA905	-
Thermistor, (KΩ)/β (25°C)	R_t	-	10±3%/3450	-
ESD (V)	V_{esd}	-	-	500
Storage Temperature (2), (°C)	T_{st}	-20	-	70
Lead Soldering Temp, (°C)	T_{ls}	-	-	260
Lead Soldering Time, sec	t	-	-	10
Operating Temperature (3), (°C)	T_{op}	15	-	30
Relative Humidity, %	RH	15	-	75

Remark:

(1) Data measured under operation output at 150W@20°C.

(2) A non-condensing environment is required for operation and storage.

(3) Operating temperature defined by the thermistor. Acceptable operating range is 15°C~30°C, but performance may vary.

(4) Product delivery qualification standards: $I_{\text{beginning of life}} \leq 3.5A$ $P_{\text{beginning of life}} \geq 150W$;

(5) Within the warranty period, the product is considered qualified with $I_{\text{end of life}} = 3.5A$ $P_{\text{end of life}} = 120W$.

2.3 100W Blue Diode Lasers

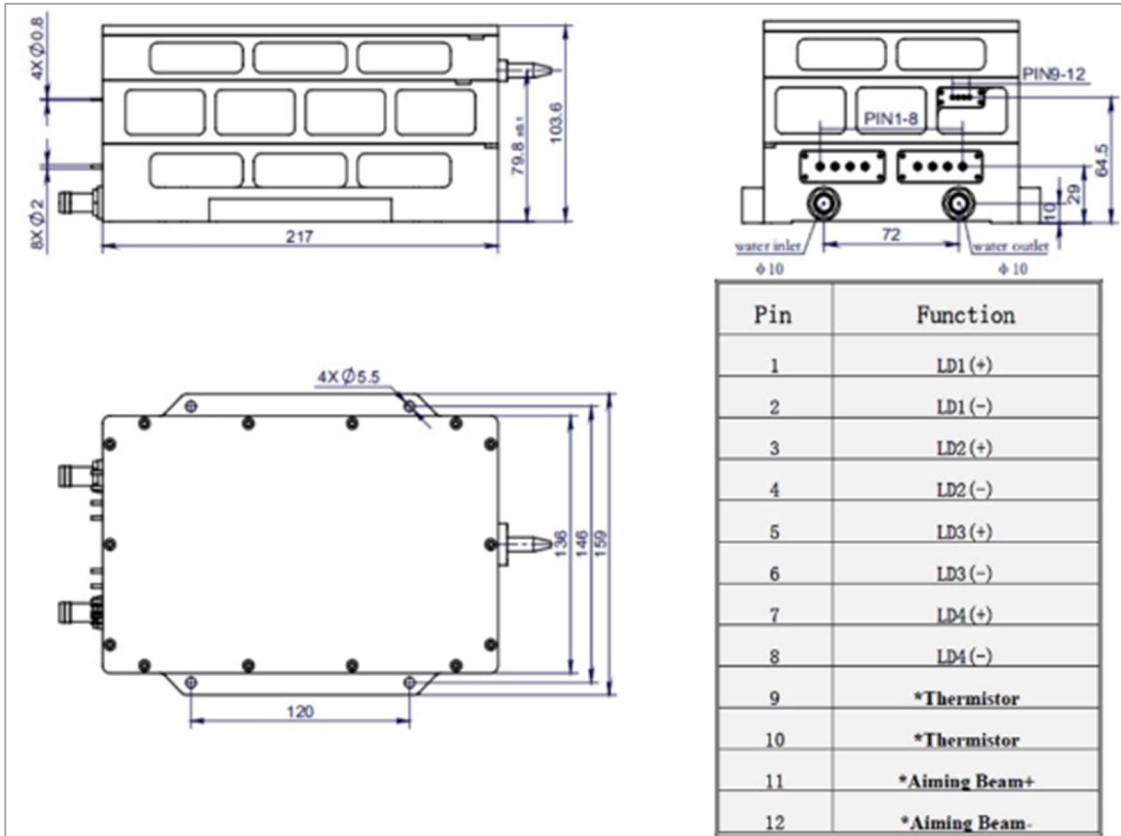
Specification (20°C)	Symbol	STK- 445-100-105		
		Minimum	Typical	Maximum
Optical Data (1)				

Total CW Output Power (W)	Pbol (4)	100	-	-
Number of submodules	pcs	-	2	-
Submodule CW Output Power (W)	Po	-	50	-
Center Wavelength (nm)	λ_c	445±20	445±20	445±20
Spectral Width (FWHM), (nm)	$\Delta\lambda$	-	6	-
Wavelength Shift with Temperature, (nm/°C)	$\Delta\lambda/\Delta T$	-	0.1	-
Wavelength Shift with Current, (nm/A)	$\Delta\lambda/\Delta A$	-	1	-
Electrical Data				
Electrical-to-Optical Efficiency, %	PE	-	30	-
Operating Current, (A)	Ibol (4)	-	3	3.5
Threshold Current, (A)	Ith	-	0.35	-
Operating Voltage (single module), V	Vop	-	52	60
Slope Efficiency (single module), (W/A)	η	-	18.5	-
Power Supply Mode	-	-	2 modules	-
Fiber Data				
Core Diameter, (μm)	Dcore	-	105	-
Numerical Aperture	NA	-	0.22	-
Minimum Bending Radius, (mm)	-	50	-	-
Fiber Length, (m)	-	-	5.5	-
Fiber Termination	-	-	HP-SMA905	-
Thermistor, (K Ω)/ β (25°C)	Rt	-	10±3%/3450	-
ESD (V)	Vesd	-	-	500
Storage Temperature (2), (°C)	Tst	-20	-	70
Lead Soldering Temp, (°C)	Tls	-	-	260
Lead Soldering Time, sec	t	-	-	10
Operating Temperature (3), (°C)	Top	15	-	30
Relative Humidity, %	RH	15	-	75

Remark:

- (1) Data measured under operation output at 100W@20°C.
- (2) A non-condensing environment is required for operation and storage.
- (3) Operating temperature defined by the thermistor. Acceptable operating range is 15°C~30°C, but performance may vary.
- (4) Product delivery qualification standards: Ibeginning of life \leq 3.5A Pbeginning of life \geq 100W;
- (5) Within the warranty period, the product is considered qualified with Iend of life =3.5A P end of life 80W.

Packaging Dimension:



1. STK Series blue laser consists of up to 4 submodules (50W per module). Power can be supplied separately or in series.

2. STK Series blue laser cooling water inlet and outlet size: Outer 10mm* Inner 6.5mm. The water flow should be at least 5L/min.

3. *: Optional functions.

Operating Notes

Applications:

- Avoid eye and skin exposure to direct radiation during operation.
- ESD precautions must be taken during storage, transportation and operation.
- Short circuit is required between pins during storage and transportation.
- Please connect pins to wires by solder instead of using socket when operation current is higher than 6A. Soldering point should be close to the root of the pins. Soldering temperature should be lower than 260 and time shorter than 10 second.
- Make sure the fiber output end is properly cleaned before operation of laser. Follow safety protocols to avoid injury when handling and cutting the fiber.
- Use constant current power supply to avoid surge current during operation.
- Laser diode must be used according to the specifications.
- Laser diode must work with good cooling.
- Operation temperature ranges from 15 to 30°C
- Storage temperature ranges from -20 to +70°C

3. <100W Fiber-coupled Blue Lasers

The STK series fiber-coupled blue lasers are manufactured by adopting specialized fiber-coupling techniques, resulting in high efficiency, stability and superior beam quality. The asymmetric radiation from the laser diode chips are coupled into an output fiber with small core diameter by using special micro optics. Their prices are reasonable and cheaper in the market.



Part Number		STK450FFBFN-0.8W	STK445F03N-3W	STK445FTRFN-20W	STK445FTRFN-50W
Optical Parameter	Laser power(W)	0.8	3	20	50
	Wavelength(nm)	450	445	445	445
	Tolerance(nm)	±10	±10	±10	±10
	Spectral width(nm)	<6	<6	<6	<6
	Temperature drift (nm/K)	0.3	0.1	0.1	0.1
Fiber Data	Core dia.(um)	105	105	105	200
	NA	0.22	0.22	0.22	0.22
	Fiber Length (m)	1.0	1.0	3.5	3.5
	Connector	NIL	SMA905	SMA905	SMA905
Thermistor	K Ohm		option	10	10
Electrical Parameter	Operation(A)	1.0	3.0	2.5	2.8
	Threshold current(A)	0.25	0.3	0.3	0.3
	Operation voltage(V)	4.8	5.2	41	81
Others	Operation temp.(oC)	15-35	15-35	15-35	15-35
	Store temp.(oC)	-20+70	-20+70	-20+70	-20+70
	Dimension(mm)	30x12.7x14.8	20x13.6x16	143x68x37	143x68x37
Pilot			option		