

## STC5 Fiber Laser Cutting Head

STC5 series cutting head is a newly designed cutting device for fiber lasers. A fully closed-loop control method with high performance capacitive sensor enables STC5 to be a cost effective solution, which demonstrate an impressive auto-focusing features to enable the cutting machine to process any sheet surface waviness. Besides common communication port, STC5 is equipped with Ethernet port in order for real-time height detection, step piercing, leapfrog, pen-up height presetting, constant optical path compensation, extraordinary fast response time, and dual closed servo loop of speed and position feedback.



### Features:

- Fully closed speed and position loop
- Ethernet communication port
- Step piercing
- Leapfrog jumping
- Pen-up height presetting
- Constant optical path compensation
- Extraordinary response time
- Auto-focusing for surface waviness
- Crash protection
- No signal attenuation over long distance
- Thumb drive upgrading firmware

### Specifications:

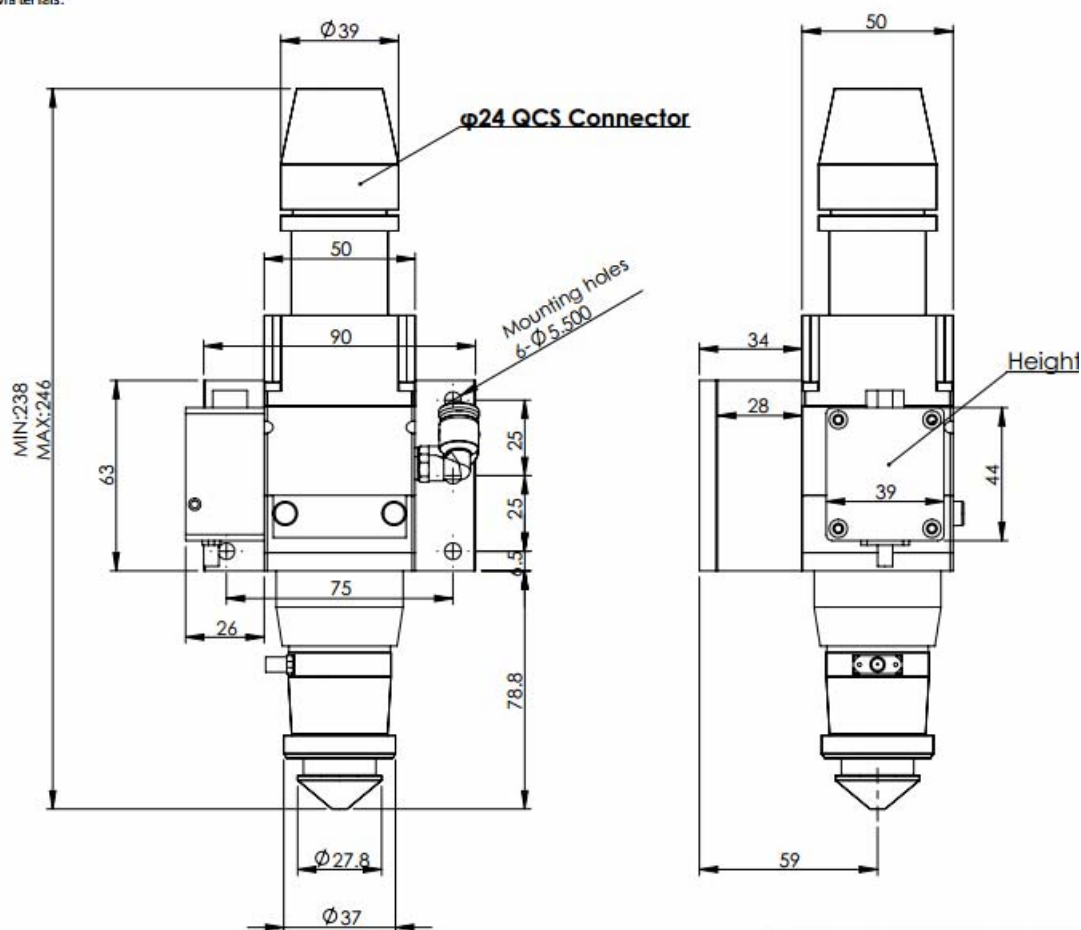
Part number	STC5-xxx (xxx: QCS or QBH related to fiber adaptor)
<b>Cutting Head</b>	
Max power input	1000W
Lens EFL	100/125/150mm
Nozzle diameter	1 to 2mm
Nozzle type	Single outlet
Adjustable focus range	-4 to +4mm
Fiber adapter	QBH(IPG), QCS(Raycus), Other available upon request
Maximum assistant gas	2.5MPa
Cooling water	>1.5l/min, 6mm in diameter
Maximum diameter	50x50mm
Length	241mm @ FL100
Weight	1.6kg @ FL100
<b>Capacitive Sensor &amp; Focus Tracking Controller</b>	
Sampling rate	1000Hz
Static accuracy	1um
Dynamic accuracy	50um

Height sensing range	0-10mm
Max travel speed	500mm/s(depends on the motor and ball screw pitch)
Max cable length	100m
Communication port	Ethernet
Firmware upgrade	Thumb drive
Capacitive sensor	Self-accommodating to other cutting head and nozzle
Alarm	Crash protection, edge detection
Calibration	Control panel access
Movement	Leapfrog, step piercing, pen-up height presetting
Capacitance monitor	Oscilloscope
Required DC power input	24VDC
Controllable motor	Servo motor such as Moon, Panasonic etc

Notes: Fiber core diameter of single mode IPG 500W laser is 50um, and the divergence angle from QBH is 160mrad. The reduced divergence angle after QBH-A-060 is 0.4-0.6mrad with 16-20mm diameter, which is less than the cutting head aperture 25mm.

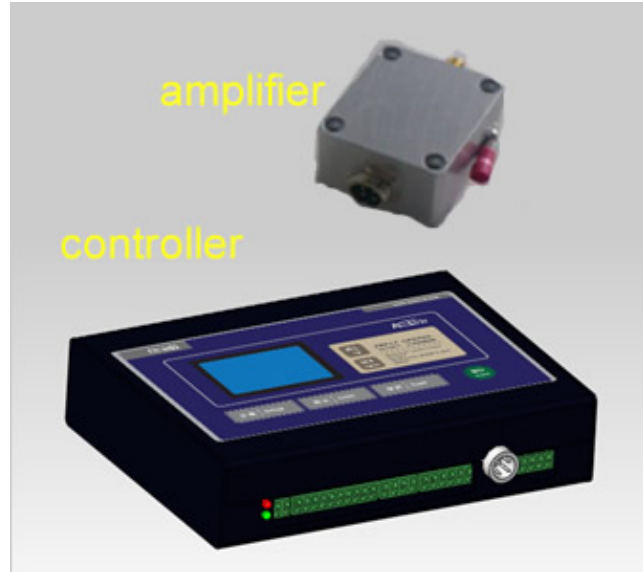
### Dimensions:

3. Materials:



## STC2 Nd:YAG Laser Cutting Head

We supply the laser cutting heads with auto-focusing function and you can easily cut uneven surface metals for Nd:YAG laser cutting applications.



Laser cutting head is one of most important parts of laser cutting machines. The traditional cutting head only includes focusing lens and nozzle and does not have auto-focus function. If there is no auto-focus, the spacing between the focus lens and workpiece will not be same, which results in different focused beam diameters and then different power densities at different positions. Thus the cutting quality may be different at the positions.

Based on the requirements from the market, we have developed self-floating laser cutting heads. By using capacitive sensor and auto motor moving system, the spacing between the focus lens and workpiece will be kept same at any position of the cutting field. The response time is millisecond range only and the system is stable and reliable.

There are following main features of our cutting heads:

- 1) Suitable to 1064nm wavelength YAG laser cutting system.
- 2) Suitable to laser power less than 1000W.
- 3) Spacing between the exit of the nozzle and workpiece is 1-20mm adjustable, response time is less than 5ms, and the control precision is 0.2mm.
- 4) Independent, complete Z-axis control and adjustable focus position. Also there are some functions such as automatic/manual mode, up/down jog control, auto tracking/auto reset function, multiple gap setting, zero shift compression etc
- 5) Numerical control port can easily be connected to most controllers. The cutting system automatically tracks the marking head open, close or back to zero.
- 6) Multiple focusing lenses with various focal lengths.
- 7) Cooled nozzle design used for high pressure cutting.
- 8) Over travel protection, collision protection and power-off protection etc.

### Structure Description

High power Nd:YAG self-floating laser cutting head consists of nozzle, focal lenses and auto-focusing system.

- Nozzle: nozzle is very important for laser cutter. Through in-depth research and tests, we have obtained a large of optimal data according to the different customers' requirements to recommend the best suitable nozzle.

- Focal lens: in general, the focal lens system consists of a few lenses or non-spherical lenses. The focal length is longer, the focused beam diameter is larger, the power density is lower, but the depth of focus is longer, which is beneficial to cutting thick material.
- Auto-focusing system: there is a capacitive sensor used to measure the distance between the nozzle and workpiece. The measured distance will be online fed backed and then the system will drive the step motor or servo motor to adjust the distance and always keep the distance same.


**Technical specifications:**

Part number	STC2
Max. allowed laser power	1000W
Focal length of focal lens	80mm/120mm
Max. input beam diameter	40mm
Adjustable focus range	-4mm~4mm
Length of cutting head	146mm @ FL=80mm
Max. diameter of cutting head	88mm
Required DC power input	24VDC
Weight	0.5kg @ FL=80mm


We also can supply High-power CO2 Self-floating Laser Cutting Head similar to YAG Self-floating Laser cutting Head after replacing all optics. However, CO2 laser cutting head only can be used to cut metals due to using capacitive sensor.

## STD80 Fiber-coupled Nd:YAG Laser Welding Head

STD80 series laser welding heads are suitable for the fiber-coupled Nd:YAG laser beam via the connector D80. The laser beam goes into the welding head via D80 and then the laser beam is focused onto the workpiece to be welded. The co-axial assistant gas can be input via gas connector. The fiber connector D80 and focusing lens inside the head will be water-cooled for high power laser.



Part number	STD80-H
Laser	Nd:YAG
Laser wavelength	1064nm
Input connector type	D80
Focal length of focal lens	100 or 120mm
Focusing adjustable range	15mm
Cooling	Water cooling for both input connector and focusing
Assistant gas	Co-axial gas inlet & outlet
Max. Allowed input laser power	Average 500W & <30Hz
Option	Co-axial CCD and monitor



Part number	STD80-V
Laser	Nd:YAG
Laser wavelength	1064nm
Input connector type	D80
Focal length of focal lens	100 or 120mm
Focusing adjustable range	15mm
Cooling	Water cooling for both input connector and focusing
Assistant gas	Co-axial gas inlet & outlet
Max. Allowed input laser power	Average 500W & <30Hz

## Beam Delivery System

These type laser beam delivery devices designed to meet industrial environment constrain providing safety and sealing against contamination for free space laser beam path. Static and adjustable laser beam manipulation options are available. Optical mirror replacement can be accomplished without affecting alignment.

All the beam delivery devices come with Z-axis adjustable, gas inlet and nozzle. Custom-made devices are available upon request. For high power laser, water cooling is provided.

- Sealed for industrial requirements
- Stable and accurate
- Easy mounting

### Classification: LBD-1064-20-80W

LBD: laser beam delivery

1064: laser wavelength, 1064nm, 10.6um, 532nm, 355nm or 355nm

20: clear aperture in mm.

80: focal length of the focusing lens in mm

W: W means water-cooling.

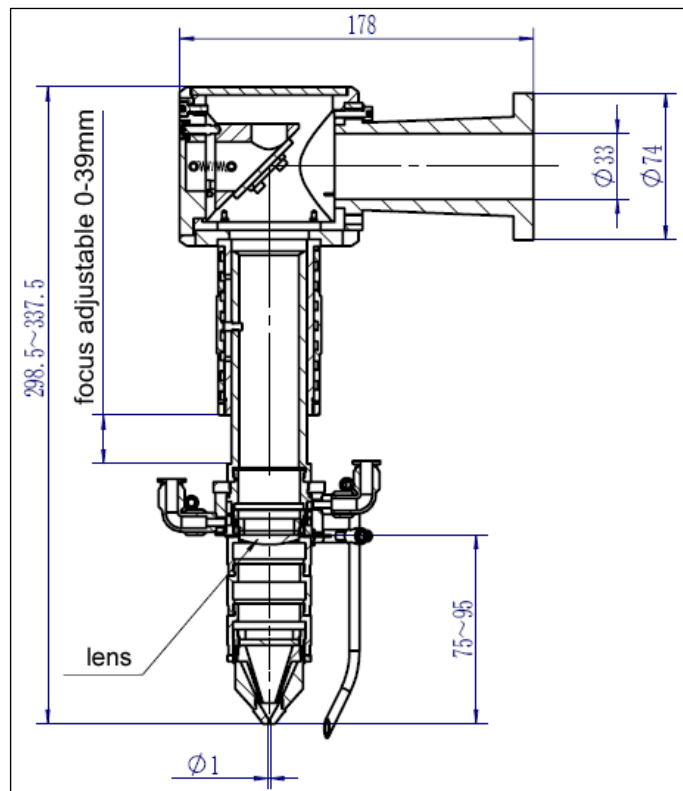
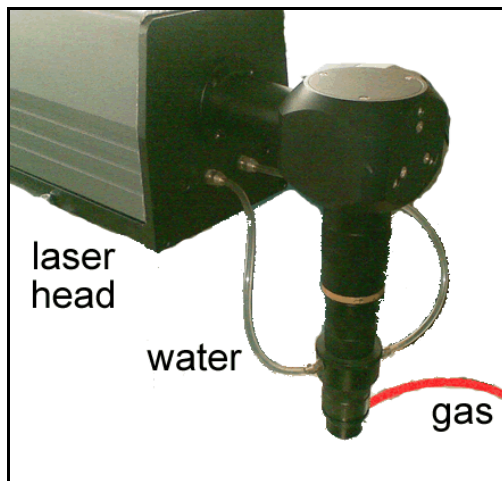
### Examples:

LBD-10.6-20-80: Air-cooled CO<sub>2</sub> laser beam delivery, focal length 80mm  
maximum allowed input beam diameter 20mm

LBD-10.6-20-100: Air-cooled CO<sub>2</sub> laser beam delivery, focal length 100mm  
maximum allowed input beam diameter 20mm

LBD-10.6-15-60: Air-cooled CO<sub>2</sub> laser beam delivery, focal length 60mm  
maximum allowed input beam diameter 15mm

LBD-1064-20-75: Air-cooled Nd:YAG laser beam delivery, focal length 75mm  
maximum allowed input beam diameter 20mm





## CO2 Compact Manual Attenuator

We supply CO2 compact Manual Attenuators that allow you to vary laser output power.

Our Manual Attenuators allow the user to externally vary the power delivered from the laser. Many lasers only vary their output power by pulsing full power on and off, and this does not always provide the fine levels of control needed for some materials. This device will give infinitely variable control of the transmitted beam from approximately 6% to 100%. Using 'enhanced' coated Brewster plates the transmittance range can be changed from 0.04% to 98%.

When used with a laser of up to 100W the CO2 compact Manual Attenuator can left be air-cooled. When used above 100W then the optional water-cooled jacket should also be fitted.

### Features:

- Vary power delivered from the laser
- Optional cooling jackets
- Provide fine levels of control

The attenuator is a cost-effective solution to low-power beam delivery that is easy to understand, easy to use and easy to order.

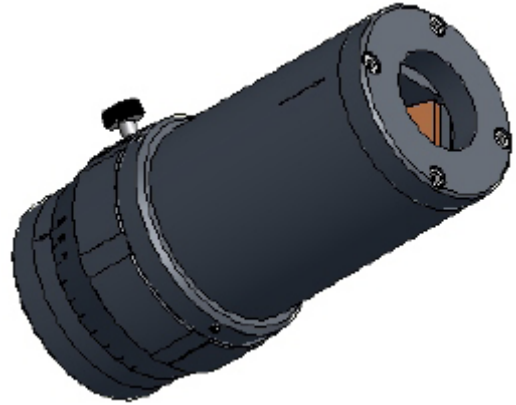
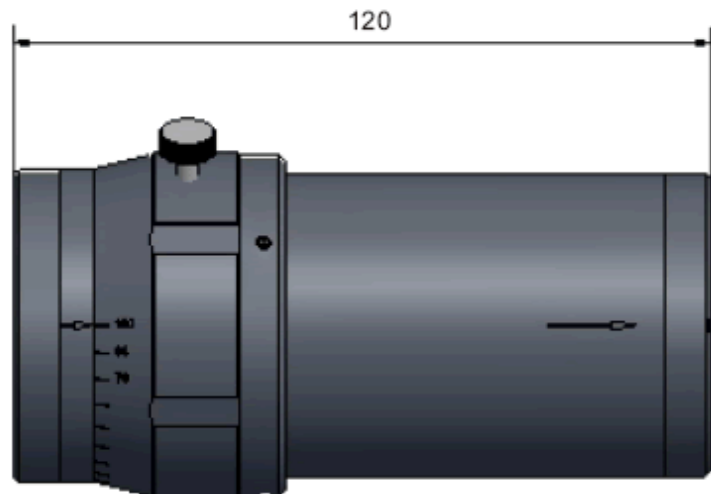
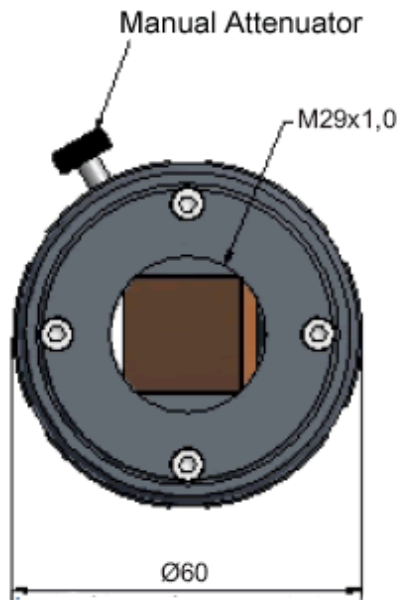


Table 1: Manual Attenuator specifications

Part Number	Height	Length	Clear Aperture
STC-MA	55mm	120mm	19mm

Table 2: specifications

Laser Power	Clear Aperture
Up to 500W	14.5mm to 22mm



## Laser Beam Splitter

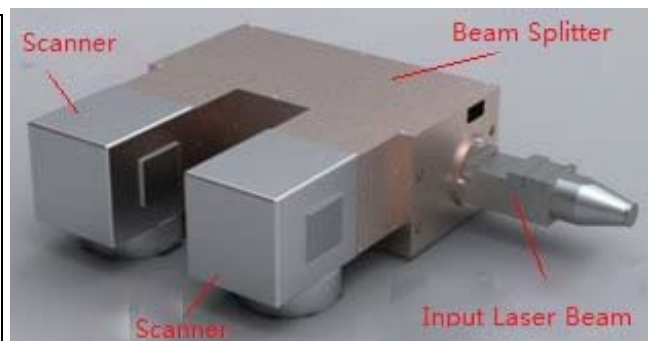
Beam splitter, which splits input laser beam into two or more beams (called sub-beam), is widely used in laser applications. Sub-beam can be delivered in wanted direction with optics, and all the sub-beams can be assigned different power percentage to cater versatile applications.



Typical beam splitter produced by Sintec is a 2-channel splitter which divides the input beam into two equal power with same optical properties. Multiple reflectors and transmissions are employed in the splitter system, and special optical design delivers sub-beams with same property, which enable the same spot size and equal power density at the focus of following convergent optics, so that same application performance can be achieved in different channels.

High efficiency can be obtained where a beam splitter is involved to output multiple laser beams. It is the most perfect solution for multiple beam processing production lines because of the beam splitter's high advantages: multiple channel, no power difference, sharing laser source and low cost.

The power difference measurement has been conducted in the 2-channel beam splitter of a fiber laser marking system, which shows only 0.37% power difference between 2 channels.



Input Laser Power	Sub-beam1	Sub-beam 2	Difference
8 W	3.61 W	3.65 W	0.55%
10 W	4.32 W	4.29 W	0.35%
12 W	5.82 W	5.77 W	0.43%
14 W	6.95 W	6.89 W	0.43%
16 W	7.74 W	7.68 W	0.39%
18 W	8.52 W	8.50 W	0.12%
20 W	9.65 W	9.59 W	0.31%

