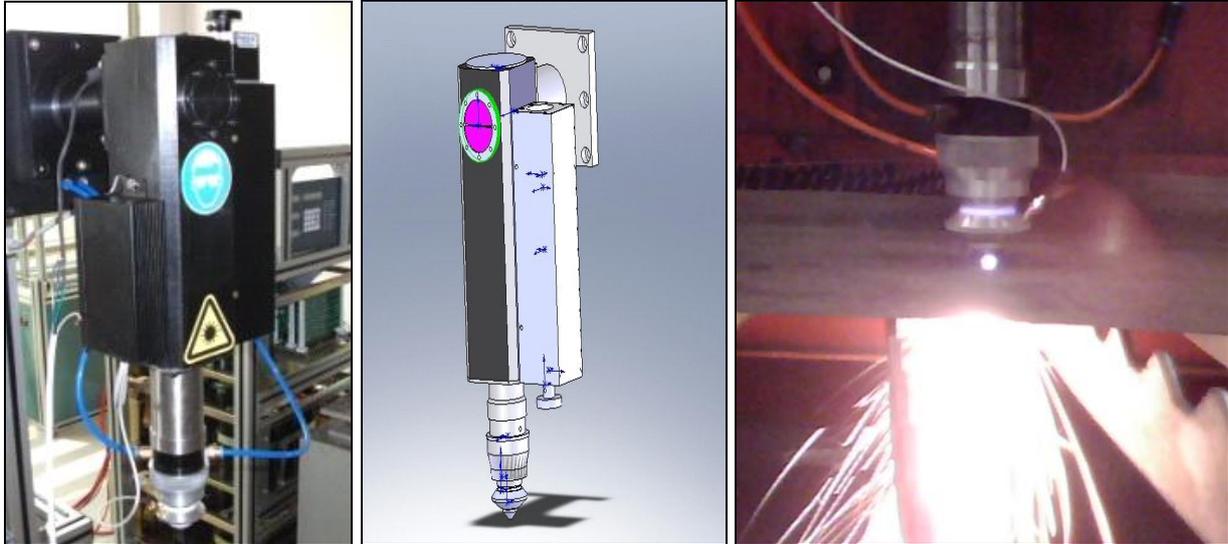




High-power Nd:YAG Self-floating Laser Cutting Head

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



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.

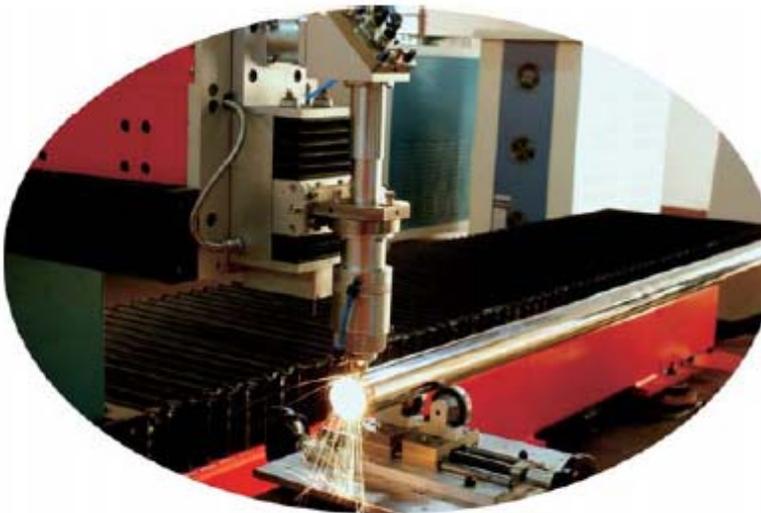
Structure Description

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:

- Power supply: AC220V \pm 10%, 50Hz/60Hz
- Motor: High-performance step motor
- Operation temperature: controller -10 - 60 °C, sensor: -10 - 250 °C
- Accuracy of height adjustment: \pm 0.1mm
- Maximum travel range: 120mm
- Water pipe diameter: 6mm
- Gas pipe diameter: 6mm
- Diameter: 45mm
- Focusing system: 2- or 3-lens system, focal length 75mm
- Maximum height from input beam axial to the workpiece: 480mm
- Minimum height from input beam axial to the workpiece: 360mm
- Connection: M8 mount holes
- Net weight: 7kg.





Sintec Optronics Pte Ltd

10 Bukit Batok Crescent #07-02 The Spire Singapore 658079

Tel: +65 63167112 Fax: +65 63167113

Beam Delivery System

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

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 available. Optical mirror replacement can be accomplished without affecting alignment.

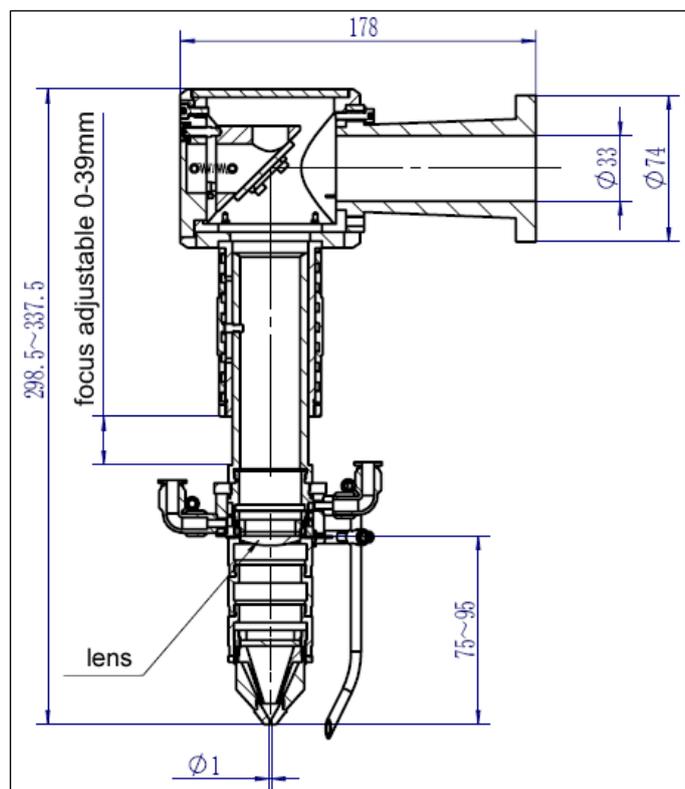
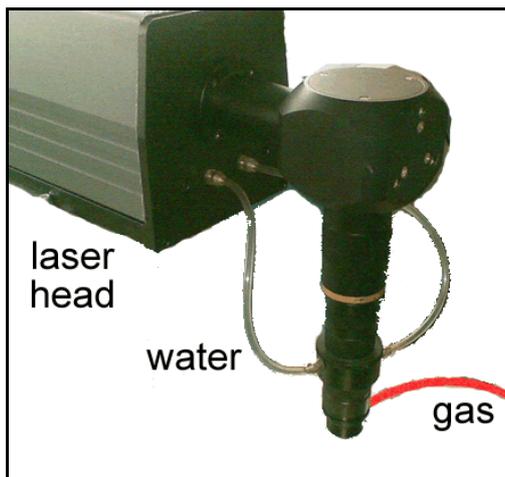
All the beam delivery devices come with Z-axis adjustable, gas inlet and nozzle. Custom-made devices available upon request. For high power laser, water cooling is provided.

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 CO2 laser beam delivery, focal length 80mm
 maximum allowed input beam diameter 20mm
 LBD-10.6-20-100: Air-cooled CO2 laser beam delivery, focal length 100mm
 maximum allowed input beam diameter 20mm
 LBD-10.6-15-60: Air-cooled CO2 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





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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.

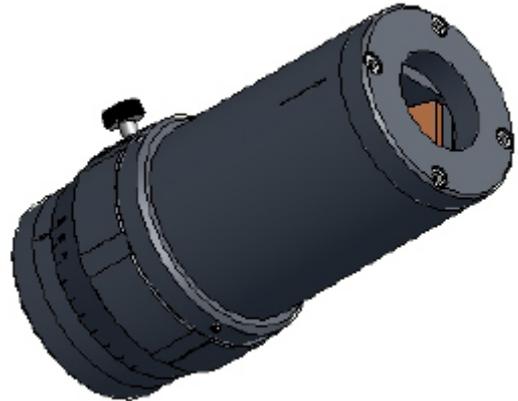
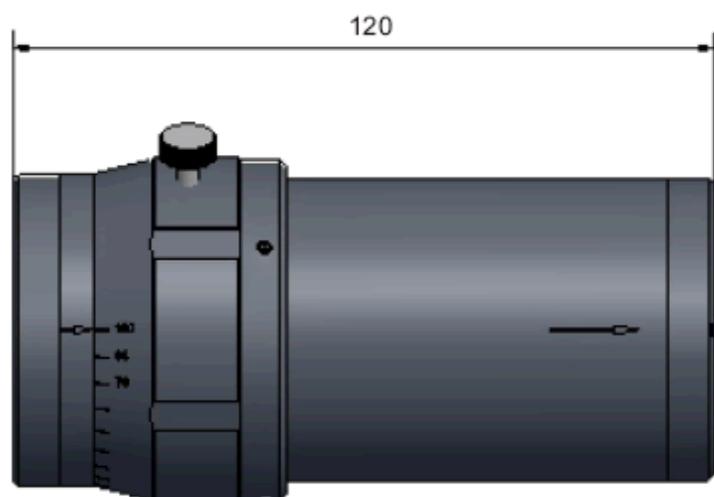
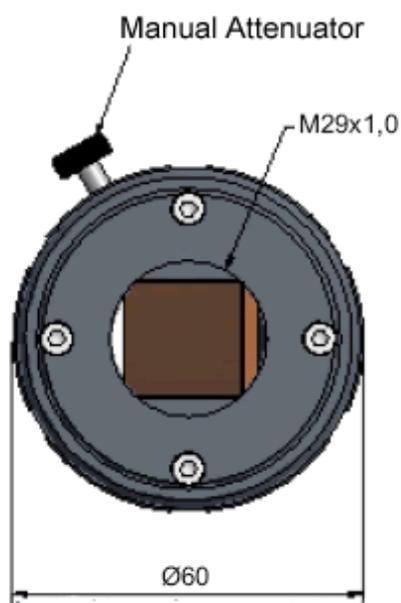


Table 1: Manual Attenuator specifications

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





Cutting and Welding with Micron Precision



Modules

The precision Modules of μ

Focusing



Laser light cable receiver
HIGHYAG



Laser light cable receiver for
collimated laser beams



Collimation module

Optical extensions



Process monitoring module for
CCTV-viewing and /or 90° beam
bending



CCTV-viewing with imaging
optics, CCD camera and
integrated illumination



Focusing module for high
resolution CCTV-viewing

Protection



Cover slide with holder



Cross Jet Module



Cutting Nozzle

Accessories



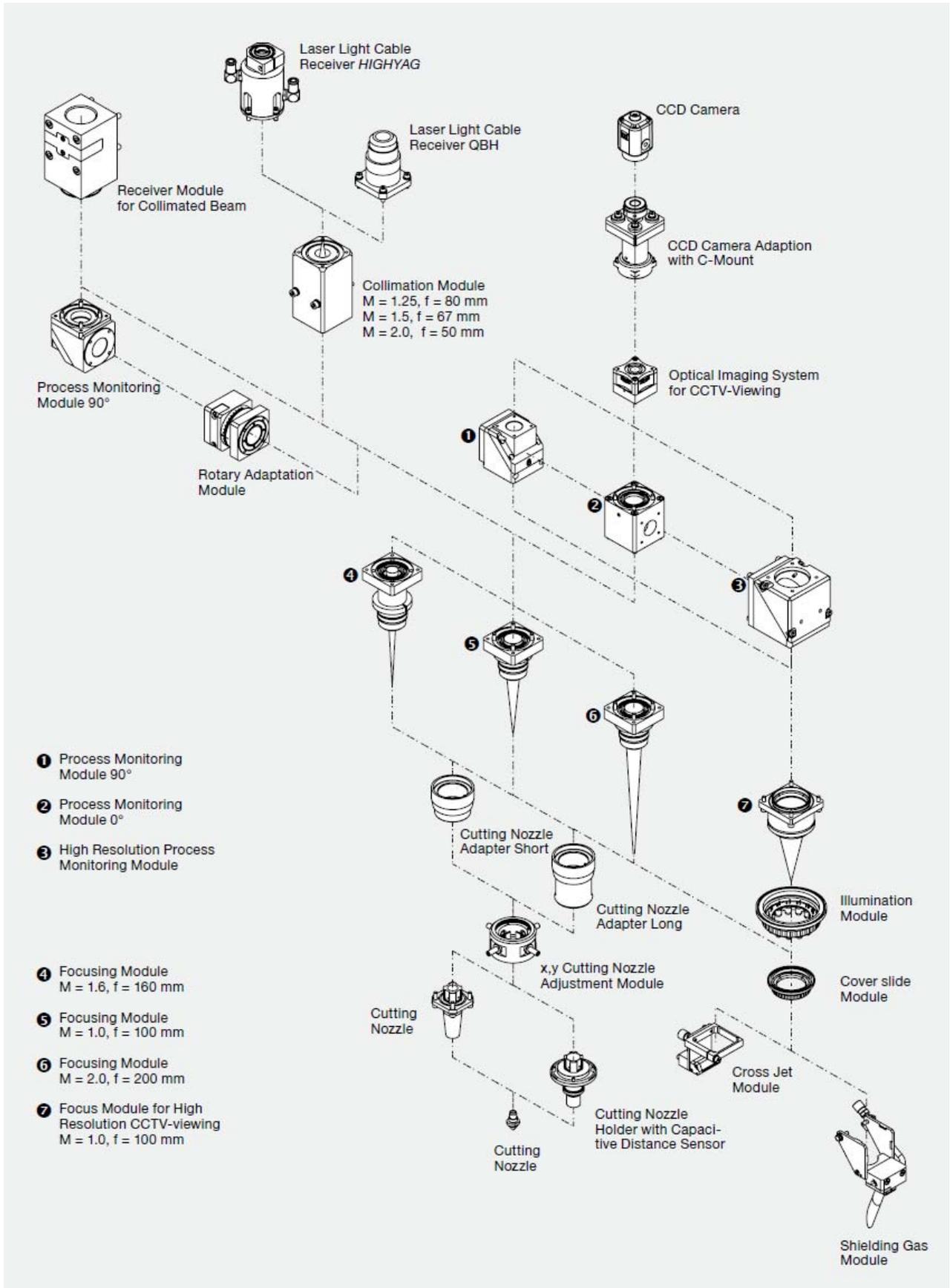
Cutting nozzle with capacitive
distance sensor



Rotary mount for focussing
module



Laser power meter module
(LPM)

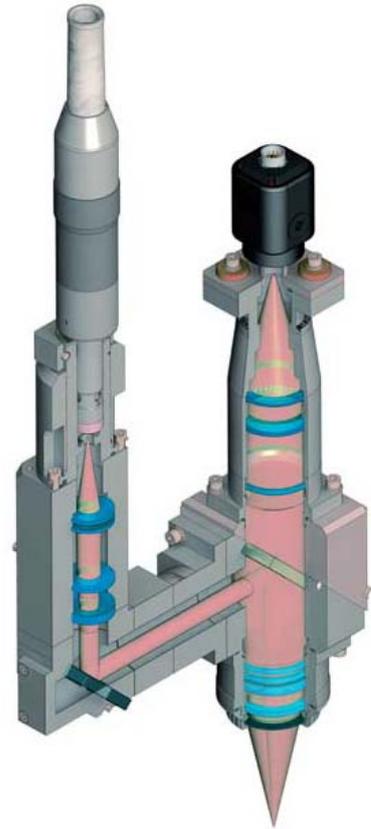


Optical System

The whole range with μ

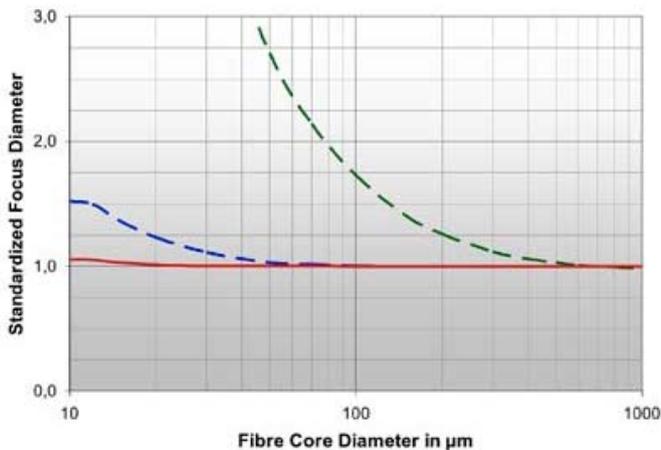
The optical system of the μ laser processing head is designed to meet the requirements of micro laser material processing, including the following options:

- adapting all common laser types for micro laser material processing, including fiber, solid-state and diode lasers from single mode to multi mode beam quality.
- connecting the laser directly from the collimated beam or via standard industrial LLK connectors.
- using modularity for focusing the laser beam according to custom laser application requirements. Including focus diameter with the precision of just a few μm for precision cutting tasks and larger focus diameters for plastic processing.
- Optionally, the μ laser processing head provides special modules for process monitoring: The optical system not only maps the laser beam in limited-diffraction imaging quality, but is also able to represent the processed spot itself with a resolution of just a few μm in the image processing system.

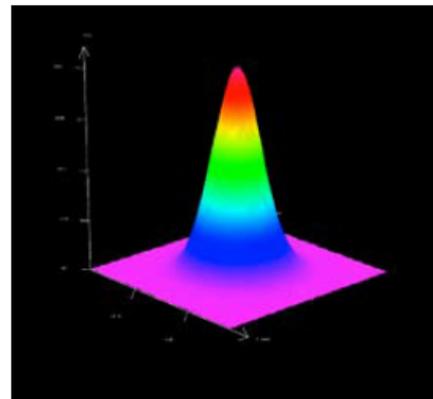


Performance of Different Focus Heads

Numerical Aperture = 0,11 (86% Power Content), Magnification = 2



Focus of a Single Mode Laser Beam (measured with PRIMES Micro Spot Monitor)



Laser Processing Head μ Micro Processing at its Best



Apart from cutting in the single mode in order to create kerfs with a cut width of a few μm , the processing head can also be deployed in alternative optical configurations for plastic welding with foci in the mm range. For custom applications, process-supporting modules are available, such as cutting and shielding gas nozzles for welding.

Process monitoring modules are designed for process monitoring and set-up. When it comes to the combination of systems for image recognition and seam detection, optical interfaces are available that permit the imaging of the processed spot with a local resolution in the μm range. The modular system permits a universal mechanical integration of the head in

laser processing facilities using the most diverse geometric parameters. In a word: The μ laser processing head will set you up for any job involving micro laser material processing. Micro laser material processing is playing an increasingly important role in flexible manufacturing. For innovative laser beam sources, including diode lasers as well as disc and fiber lasers, possible deployment scenarios are constantly expanding. The flexible modular μ laser processing head develops the full potential of laser systems in the various job scenarios in micro laser material processing

Technical Data

Optical System

Focusing system (magnification @ focal length)	1.0 @ 100 mm, 1.6 @ 160 mm *
Collimation system (magnification @ focal length)	1.25 @ 80 mm, 1.5 @ 67 mm, 2.0 @ 50 mm *
Max. laser power	Average power 500 W, peak power 50 kW
Max. beam parameter acceptance (half angle) of laser light exiting fiber	97 % power content within 125 or 210 mrad (depending on collimation system)
Wavelength	900 -1060 nm (e.g. for diode lasers); * 1025-1080 nm (e.g. for YAG, fibre and disc lasers)
Transmission	> 97 % @ 1064 nm
Core diameter laser light cable	10 -1000 μ m (typical)

Cutting nozzle

Diameter	<i>optional</i> 0.2 -0.8 mm *
x,y adjustment	+/-1.5 mm
Focus to nozzle position range	+/-5 mm, others optional
Pressure cutting gas	\leq 2.0 MPa

Height sensing

Range	<i>optional</i> 0 -20 mm
Output signal	0 -10 V for distance
Response time	< 1 msec

CCTV-Viewing

Magnification	Depending on configuration (Mcamera = Mcamera-objectiv/Mfoc)
Video system	CCIR
Interface CCTV-viewing	C-Mount *

Dimensions examples

WxDxH	Approx. 80 mm x 172 mm x 431 mm
Weight	Approx. 1.0 -2.5 kg (depending on configuration)

Supply

Electrical	DC 24 V, 2.5 A *
Pneumatics	1.0 MPa Cross jet: 1.0 MPa, approx. 500 l/min @ 0.6 MPa
Shielding gas	On request, approx. 5 -40 l/min, 0.6 MPa
Cooling	Optional
PLC / field bus system	Hard wired *

*Others on request