

Continuous wave lasers

# Make your vision come true



# Smart solutions for an outstanding performance

From hairpin welding to shipbuilding – our broad portfolio of CW lasers will equip you for all your CW laser applications. TRUMPF lasers have proven their strengths across a wide range of industrial applications, showing themselves to be effective, innovative and eco-friendly. At TRUMPF, we supply you with everything from a single source: lasers, sensors, optics and services. Whatever your project or process – we will do everything to find the right solution for your needs.



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# TruFiber P



## Versatile fiber lasers

The fiber lasers of the TruFiber P Series cover a power range from 500W to 6 kW. With freely choosable beam quality – including single mode to 2 kW – plus a choice of fiber diameters, they are ideal for a host of different applications. Equipped with the optional BrightLine Mode, they also offer extremely variable beam shaping. The combination of different beam qualities in the core and ring ensures an exceptionally high-quality weld seam with minimal spatter.

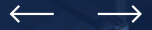
## For diverse applications

- Single mode laser platform for laser power up to 2 kW, multi mode from 500W to 6 kW
- One laser output with spliced LLK
- Beam shaping with VariMode and BrightLine Mode
- Maximum power stability with Active Power Control



For more information:  
[trumpf.com/en\\_GB/products/lasers/fibre-lasers/trufiber-p/](http://trumpf.com/en_GB/products/lasers/fibre-lasers/trufiber-p/)





# TruFiber S



## High-end fiber lasers for flexible use

The multi mode fiber lasers of the TruFiber S Series are our all-rounders in the medium power range from 3 to 6 kW. A variable beam guidance system is integrated in the compact laser housing. Incorporation of multiple laser outputs ensures optimal laser utilization. Our proven BrightLine Weld technology, in combination with a wide selection of pluggable LLKs, ensures high-quality results at maximum welding speeds.

### For diverse applications

- Multi mode fiber laser with laser powers of 3 to 6 kW
- Variable beam shaping with two laser outputs
- BrightLine Weld for high-quality weld seams and virtually spatter-free laser welding
- Maximum power stability with Active Power Control



For more information:  
[www.trumpf.com/en\\_GB/products/lasers/fibre-lasers/trufiber-s/](http://www.trumpf.com/en_GB/products/lasers/fibre-lasers/trufiber-s/)



# TruDisk with infrared wavelength



## Laser power plus high performance

This disk laser delivers impressive productivity at a laser power of up to 24 kW. With its outstanding beam quality, this disk laser produces greater welding depths with low thermal input. Its exceptional power stability guarantees highly reproducible results. Thanks to our BrightLine Weld technology, the production of spatter, pores and cracks is minimized, because the beam is shaped at full laser power.

## For diverse applications

- Highly resistant to back-reflection
- Easy integration with two laser outputs and pluggable LLKs of up to 100 meters in length
- Exceptional power stability with Active Power Control



For more information:  
[www.trumpf.com/en\\_GB/products/lasers/disk-lasers/trudisk/](http://www.trumpf.com/en_GB/products/lasers/disk-lasers/trudisk/)



# TruDisk with green wavelength



## Laser precision for highly reflective materials

Using a green wavelength, you can achieve efficiency and very high productivity, making high-quality welds to join copper and other highly reflective materials, regardless of the material surface attributes. Spatters are reduced to a minimum. At the same time, you benefit from maximum reproducibility. Whether spot or linear welding – green laser light reliably ensures a constant welding depth with both heat-conduction and deep-penetration welding.

### For diverse applications

- Two laser outputs and pluggable LLKs
- High productivity with up to 3 kW output power at the workpiece
- Maximum reproducibility with first-rate power stability



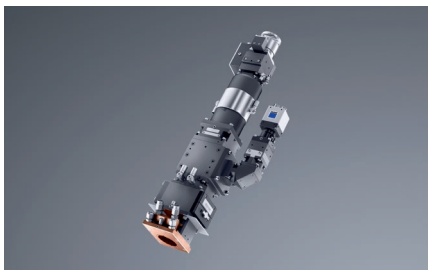
For more information:  
[www.trumpf.com/en\\_GB/products/lasers/disk-lasers/trudisk-with-green-wavelength/](http://www.trumpf.com/en_GB/products/lasers/disk-lasers/trudisk-with-green-wavelength/)



# Processing optics

With TRUMPF processing optics, you can tailor the properties of the laser beam precisely to your task at hand. Thanks to their modular system and optional components, the processing optics can be adapted to different spatial conditions and applications, and as such enable a great number of different structural designs. Numerous additional functions also broaden the range of industrial applications.

## Focusing optics



### BEO D70

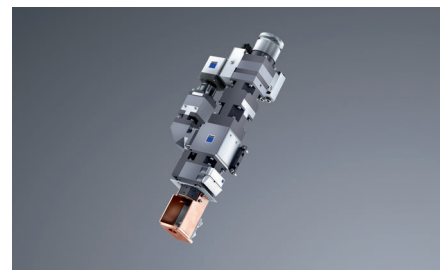
The BEO D70 was specially developed for laser welding at greater working distances and with a small focal diameter. With the optional Multifocus element, gas-tight weld seams can also be produced. Smart monitoring functions deliver enhanced reliability and process stability.

- **Laser power: max. 24 kW**
- **Laser: TruDisk, TruFiber multi mode**

### BEO D50

Robust and compact, the BEO D50 features an enhanced crossjet function. It also boasts additional options such as shielding gas supply through a variety of nozzles and a protective glass monitoring unit, making it the ideal processing optics solution for challenging manufacturing jobs.

- **Laser power: max. 8 kW**
- **Laser: TruDisk, TruFiber**



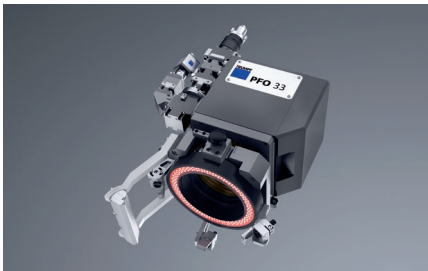
### BEO D35

Thanks to its robust design, this focusing optics is suitable for a wide range of applications.

- **Laser power: max. 4 kW**
- **Laser: TruDisk, TruFiber**



## Programmable focusing optics (PFO)



### PFO 33

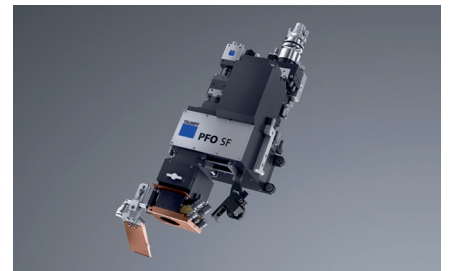
Thanks to lightweight mirrors and an innovative drive architecture, the PFO33 offers maximum productivity and an extremely dynamic performance. Perfect integration of all the various mechanical and optical assemblies has resulted in a highly robust optics. Options such as the monitoring for contamination of the protective glass and Real-time Contour Check make it an extremely reliable manufacturing tool.

- **Laser power: max. 12 kW**
- **Laser: TruDisk, TruFiber**

### PFO SF 20/33

This compact and versatile small-field scanner requires only a small work area for rapid beam oscillation. The PFO SF can be adapted to a wide range of applications.

- **Laser power: max. 12 kW**
- **Laser: TruDisk, TruFiber**



### PFO 20

With up to 6kW of laser power at a 100 % duty cycle, the PFO 20 sets the benchmark in the 20mm aperture class. The scanner optics uses the same digital drive architecture as all the third-generation PFOs and therefore converts the full laser power into productivity, whether for surface processing or difficult welding jobs.

- **Laser power: max. 6 kW**
- **Laser: TruDisk, TruFiber**

### PFO 3D-2

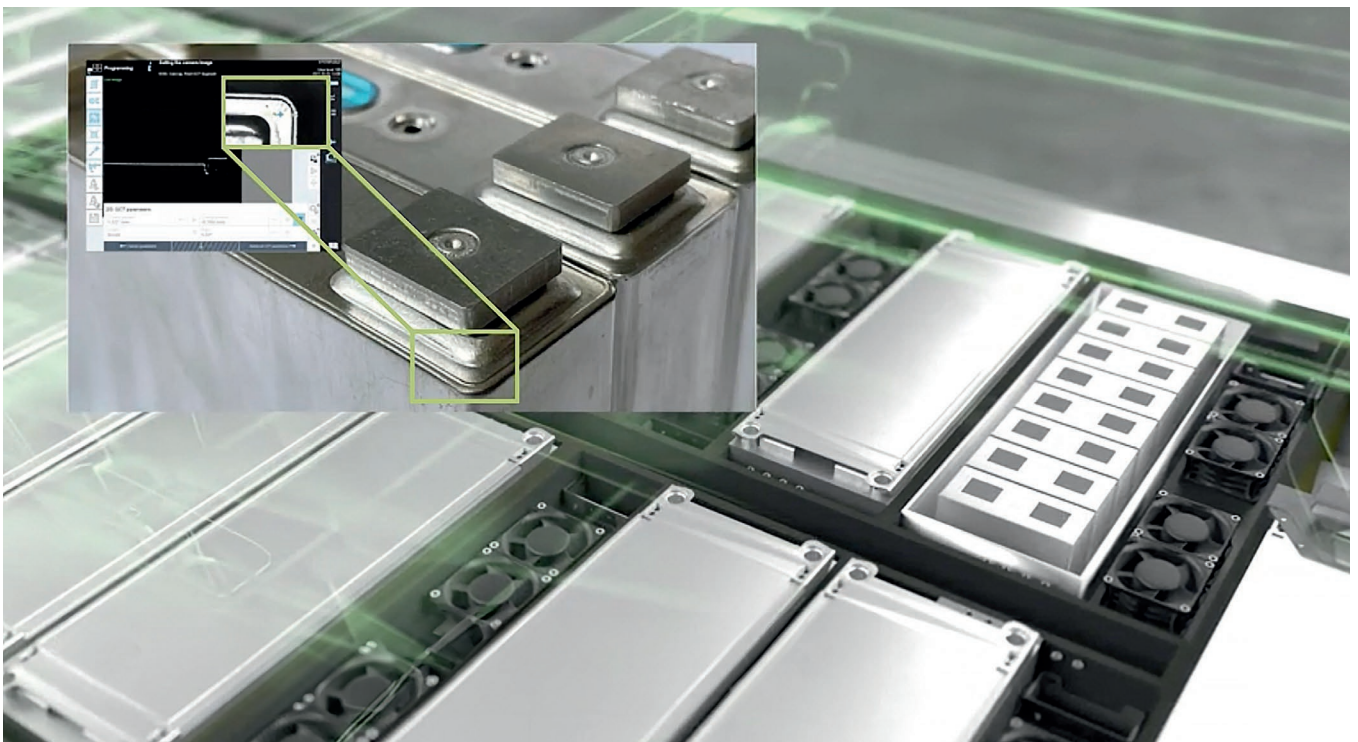
This 3D scanner is based on the pre-objective scanning principle. This means that all points within the scanner area are dynamically scanned with constant beam quality at a varying distances. All the processing programs can be uploaded to the PFO itself, meaning that it can also be operated without a PC or Internet connection.

- **Laser power: max. 8 kW**
- **Laser: TruDisk, TruFiber**



# Smart sensor systems

Smart process sensor systems from TRUMPF monitor the quality of your operation, providing you continuously with data and controlling the process according to your specifications. Easily integrable in your optics, lasers or systems, our sensors help save you money by stabilizing production processes, preventing rejects and avoiding the unnecessary use of excess laser power.



## VisionLine OCT Detect

VisionLine OCT Detect from TRUMPF is a camera-based image-processing system for use with cutting and welding applications. It combines a camera and optical coherence tomography (OCT) within a single unit. This generates 3D data that can be used for positioning and for checking the features of your component, irrespective of how it is illuminated or clamped. Using this data, the working distance to the component or to the clamping fixture can be measured, as well as any height differences in the component – to determine, for example, whether hairpins in an electric motor are of a different height. Suitable distinguishing features can be selected from a template library for use in a great variety of applications. This enables you to get the best out of your process and thereby the best for your component.





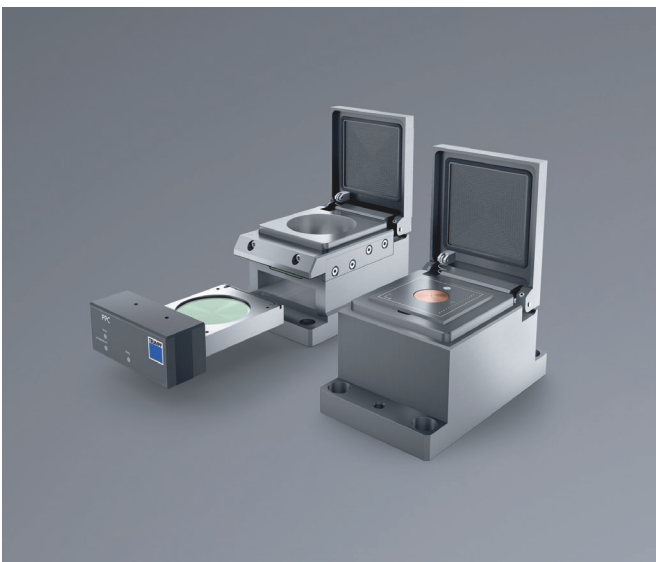
## VisionLine Detect with AI Filter

By combining VisionLine Detect and the EasyModel AI training tool, you can optimize your production with AI. This improves feature detection and makes your process less susceptible to external influences such as dirt on the fixture, reflections from the component, difficult lighting conditions or fluctuations in upstream processes.

EasyModel AI is a cloud-based AI training platform that enables you to label data easily and without programming skills. Just a small amount of training data is enough for powerful AI models and can be used with the AI Filter option for VisionLine Detect.

## VisionLine OCT Check

VisionLine OCT Check ensures the precise and reliable monitoring of welding depth. The use of optical coherence tomography (OCT) enables you to perform process synchronous quality assurance – e.g., the measurement of vapor capillary depth during deep-penetration welding. On the basis of this real-time data, you can then make informed decisions regarding process control. The geometry of the solidified weld seam is measured using an additional OCT scan.



## CalibrationLine Power / Focus

CalibrationLine checks at regular, individually definable intervals whether the laser power and the focus position on the work-piece correspond to the actual laser control settings. If required, CalibrationLine realigns the program, using the TruControl software to correct the laser power and the focus position in the X, Y and Z axes. This ensures highly reproducible results.



# Laser Application Centers

In our Laser Application Centers worldwide, we advise you on all the issues relating to processes, materials, fixtures and design. Thanks to our extensive laser portfolio, we can test your applications directly on a wide range of laser processing systems and find the best solution for your needs.

Visit our Laser Application Centers to discover the latest lasers, laser machines and innovations from TRUMPF Laser Technology. Draw inspiration from our product demonstrations – either live

in the Laser Application Center or in a digital presentation. Our application experts are on hand to provide detailed advice and develop solutions tailored to your needs.

Our Laser Application Centers offer much more besides: as powerful R&D centers, they will work together with you and your ideas to develop new products and technologies.

# TruServices.

## Your partner in performance

To ensure you continue to benefit from your lasers over the long term, we also offer a comprehensive range of services. We can help you create the optimal setup for your manufacturing process, get the very best out of your TRUMPF laser, and adapt it in line with changing requirements. Whatever the process – together, we will find ways to maximize your added value on a lasting basis.

### › OPC UA Interface

The bidirectional OPC UA interface gives you the option of connecting your own software to your laser. Using this standardized interface, you can access process and device data in real time and also control the laser.

### › Smart View

Easy-to-read dashboards give you an overview of the current status of your laser. This enables you to independently monitor system status and any occurrences, and in so doing generate greater process transparency.

### › Condition Monitoring

Let TRUMPF experts and algorithms monitor your laser. At the first sign of anything abnormal, we contact you proactively. This helps avoid unscheduled downtimes in your production operation.

### › Quality Data Storage

You have synchronous data storage and visualization of the individually selectable data generated by your lasers, connected optics and process sensor. This data remains exclusively in your possession.



# Technical data

## TruFiber P

		TruFiber 50X P	TruFiber 100X P	TruFiber 150X P	TruFiber 200X P	TruFiber 300X P	TruFiber 400X P	TruFiber 600X P	
Laser power	W	500	1000	1500	2000	3000	4000	6000	
Typical power stability	%	±0.5 over 8 hrs (with APC)							
Adjustable power range	%	2–100							
Typical beam quality	mm·mrad	Single mode: x=0: 25 µm --> M <sup>2</sup> <1.3 Multi mode: x=0: 50 µm: 2.1 Multi mode: x=0: 100 µm: 3.3				x=0: 50 µm: 2.1 x=1: 100 µm: 3.3 oder 4.0 x=2: 200 µm: 8 BLM: 25/100 µm: Core: M <sup>2</sup> < 1.5   ring: 4			
Min. diameter of LLK	µm	25				50			
Wavelength	nm	1071 ± 2							
LLK diameter	m	Single mode: 10 Multi mode: 20				10–30 (depending on laser power and beam quality)			
Dimensions (W x H x D) (excl. AC unit, incl. cooling water inlets)	mm	600x1300x1200				600x985x1200			
Cooling water temperature	°C	25 or 29 (configurable)				18–30			
Ambient temperature during operation	°C	5–45							

## TruFiber S

		TruFiber 3000S	TruFiber 4000S	TruFiber 5000S	TruFiber 6000S
Laser power	W	3000	4000	5000	6000
Typical power stability	%	±0.5 over 8 hrs (with APC)			
Adjustable power range	%	2–100			
Typical beam quality	mm·mrad	2			
Min. diameter of LLK	µm	50			
Wavelength	nm	1071 ± 2			
LLK diameter	m	10–40 (depending on laser power and beam quality)			
Dimensions (W x H x D) (excl. AC unit, incl. cooling water inlets)	mm	600x1300x1200			
Cooling water temperature	°C	25 or 29 (configurable)			
Ambient temperature during operation	°C	5–45			



## TruDisk with infrared wavelength

		TruDisk	TruDisk P
Laser power	W	1000–24000	3000–6000
Typical power stability	%	± 0.5 over 8 hrs (with APC)	± 1 over 8 hrs
Adjustable power range	%	2–100	
Typical beam quality	mm·mrad	2 to 8 kW 4 to 24 kW	4
Min. diameter of LLK	µm	50 to 8 kW 100 to 24 kW	100
Wavelength	nm	1030	
LLK diameter	m	10–100 (depending on laser power and beam quality)	10–40
Number of couplings		max. 4 (to 6 kW) max. 2 (6–24 kW)	1
Cooling water temperature	°C	5–28	29
Ambient temperature during operation	°C	10–50	10–45

## TruDisk with green wavelength

		TruDisk 1020/1021	TruDisk 2021	TruDisk 3022
Laser power	W	1000	2000	3000
Typical power stability	%	± 1 over 8 hrs (with APC)		
Adjustable power range	%	2–100		
Typical beam quality	mm·mrad	2 4	4	6
Min. diameter of LLK	µm	50 100	100	105
Wavelength	nm	515		
LLK diameter	m	10 oder 20	20	20
Dimensions (W x H x D)	mm	1340x1430x725		
Cooling water temperature	°C	5–28		
Ambient temperature during operation	°C	10–50		