

New generation TruFiber

Fiber laser with TRUMPF DNA

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Comprehensive solution from a single source

for easy integration

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100% constant process results

for most demanding quality expectations

03

Intelligence included

in operation and control

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Highest laser safety

included in basic configuration

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Optimized for Industry 4.0

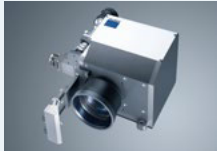
as future-ready platform



Comprehensive solution from a single source

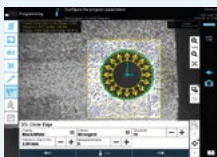
for easy integration

With TRUMPF, the laser, control, beam delivery, processing optics, and sensor system are optimized to one another. The TruFiber offers you technically mature solutions, for example in conjunction with the scanner optics PFO and additional modules.



Scanner optics PFO

- Easily set up and optimally synchronized
- Intuitive programming offline and online
- Integrated wobble geometries
- Configuration optimized for the specific task



Process sensor system

- VisionLine image processing system for workpiece observation, teach-in and for features recognition at the workpiece
- Calibration of laser power and focal position with CalibrationLine



Intelligent cooling concepts

- Cooling of laser light cable plug and optics via the laser
- Cooling over a broad temperature range enables integration into domestic water circuit
- Water-air compressor chiller can be integrated in laser unit up to 1 kW

100% constant process results

for most demanding quality expectations

Thanks to its particularly robust concept, the TruFiber withstands disturbances and external stress factors.



Integrated laser power control

- Measures and regulates the laser power in real time with an accuracy of $\pm 1\%$
- Regulates power continuously and independently from the ambient conditions



Protective mechanisms

- Dehumidification unit available for operation in tropical environments
- Comprehensive measures for protecting the laser against back reflections

Intelligence included

in operation and control

The TruFiber offers a high degree of integrability and the intelligent control software TruControl.



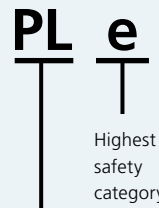
Maximum control flexibility

- Frequency generator
- Pulse forming and modulation
- Compatible with all commonly used fieldbus systems
- OPC UA data interface
- Real-time interface as signal trigger
- Control over analog signals
- Operation via panel PC or customer PC
- Power saving standby modes
- Various software features

Highest laser safety

included in basic configuration

Machine and system integrators are responsible for operator safety in laser systems. The TruFiber meets the highest laser safety standards.



The Performance level denotes the reliability of safety functions according to EN 13849

Performance level e

- Functional switch-off/on time of the emergency safety circuit is 25 or 90 ms
- Fast switch-on and switch-off time reduces the systems cycle time, if safety circuit needs to be opened for parts transfer

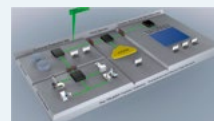
Comprehensive 2-channel technology

- Laser light cable breakage monitoring
- Laser light cable plug monitoring

Optimized for Industry 4.0

as future-ready platform

Analyze and control your production processes.



The TruFiber fulfills optimally the requirements for:

- Remote laser connection via safe IT technology
- Condition monitoring
- Predictive maintenance
- Quality data assurance
- Cockpits for data visualization
- Consistency of all measured values and data by internal synchronization of all control units in the laser with the same time stamp using Precision Time Protocol



Optimized process by choosing the right beam quality

What does beam quality mean?

Beam quality describes how well a laser beam can be focused, and defines the intensity distribution through the beam. Higher beam quality translates into smaller spot sizes and higher power density on the workpiece. High power CW lasers are distinguished between single-mode laser, that have the highest beam quality described by an M^2 value lower than 1.3, and multi-mode lasers, with less beam quality and an M^2 value larger than 2.

Single-mode beam quality

When really small spot sizes e.g. 30 to 50 μm are needed, a single-mode laser is inevitable and enables extremely high power density. Process advantages thereby are:

- Highest process speed
- High penetration depth with relatively low average power
- Stable input coupling of laser power into highly reflective metals
- Excellent seam quality with wobble welding e.g. in copper and aluminum



Which beam quality do I need for my welding application?

Depending on the process requirements, a sweet spot between performance, seam quality and size of the process window must be found. In laser welding, better beam quality directly correlates to increased weld depth and feed rate. However, the welding process stability and gap and position tolerance accommodation favor less beam quality

Multi-mode beam quality

Many applications require spot sizes in the range of 50 to 300 μm . Multi-mode lasers serve perfectly the purpose. Process advantages thereby are:

- Position tolerance accommodation
- Gap-bridging capability in linear welding
- Higher tolerance against optics contamination
- Excellent seam quality in linear and wobble welding e.g. in steel and aluminum



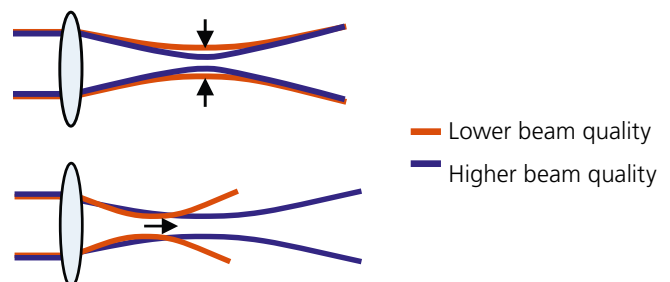
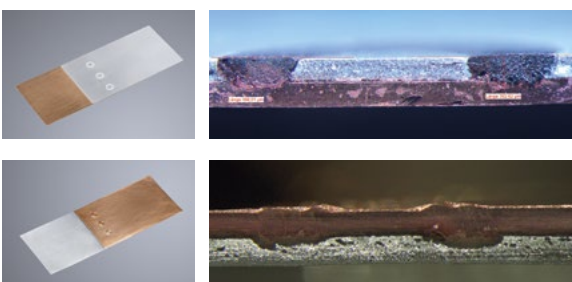
Welding dissimilar materials

- Joining dissimilar materials like copper and aluminum
- By means of beam-scanning strategies like wobble and hatching* welding it is possible to create connections with:
 - High mechanical stability and electrical conductance
 - Minor pores and cracks as well as low contaminations which can be created through blow-outs and spatters



Tuning process parameters

- Depending on the required process parameters with respect to spot size and working distance the appropriate beam quality can be chosen.
- Scaling the working distance results in greater depth of focus, which translates into greater tolerances for workpiece positioning.





TruFiber 1000 – compact design,
simple 19" integration solution



TruFiber 1000 – compact design,
cabinet on casters



TruFiber 1000 – stand alone design with
integrated water-air compressor chiller

Technical data								
		TruFiber 500	TruFiber 1000	TruFiber 1500	TruFiber 2000	TruFiber 1000	TruFiber 2000	TruFiber 2001
Single-mode				Multi-mode				
Laser parameters								
Laser power at the workpiece	W	500	1000	1500	2000	1000	2000	
Typical power constancy at rated power	%	± 1 with laser power control						
Continuously adjustable power range	%	3 to 100						
Beam parameter	mm-mrad	0.38			2.1		3.3	
Wavelength	nm	1075 ± 7						
Laser light cable type		LLK-D, ± 150° rotatable plug				LLK-D, standard plug		
Laser light cable diameter	µm	26				50	100	
Laser light cable length	m	15	10		20			
Structural design								
Dimensions, compact version (W x H x D)	mm	482 x 490 x 705		482 x 490 x 896		482 x 490 x 705	482 x 490 x 896	
Dimensions, stand alone version (W x H x D)	mm	600 x 1600 x 850		–		600 x 1600 x 850	–	
Maximum number of laser light cables		1						
Installation/options								
Ambient temperature	°C	5 to 45						
Laser safety/Performance level		PL e						
Selection of options		Laser power control, interface scanner optics PFO, extended ambient conditions, VisionLine, CalibrationLine, diverse field bus interfaces, interface OPC UA, Remote Support, QDS						

Subject to alteration. Only specifications in our offer and order confirmation are binding.