TruLaser 1000 Basic Edition (L99)

Economic reliable machine

Easy to use and program
Control and programming are developed by TRUMPF and ensure a fast start for your production, even without a lot of know-how, thanks to numerous cutting parameters for the entire sheet thickness range.

Reliable machine and safe cutting
The machine is built at the same production line as all the other TRUMPF 2D-Laser machines. As with all our machines, it is safe during operation, thanks to enclosed protective housing and high-class laser safety window.

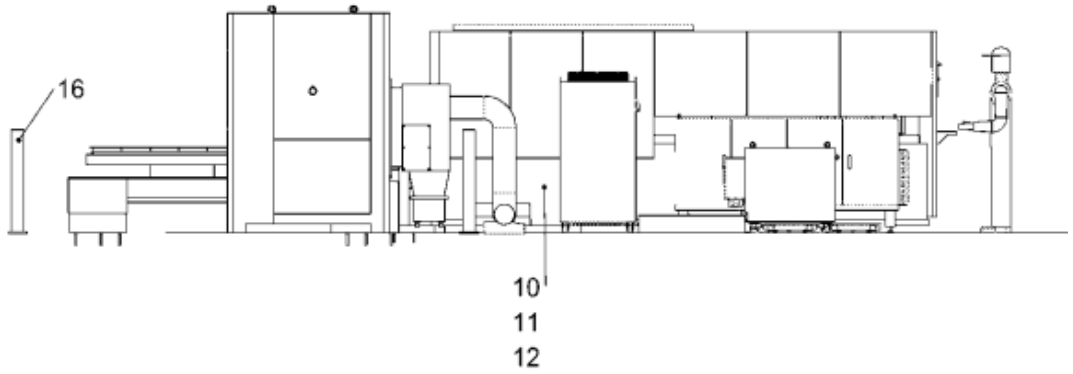
High cutting performance
High accuracy due to our precise movement is guaranteed. A welded machine bed with a TRUMPF cutting bridge design ensures a good performance.

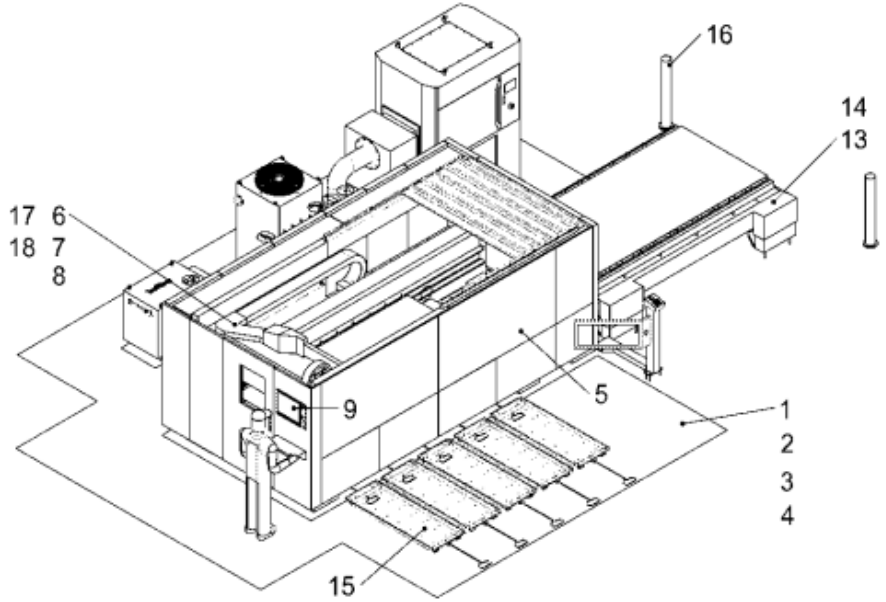
Strong service network
The mGuard makes a remote service easy and safe. We can respond fast in every area thanks to our strong local service network and specialized technicians.

Machine Layout

Simple Ergonomic Layout

- **Clean and simple layout**
- **Easily accessible service areas**
- **Easy accessories layout**



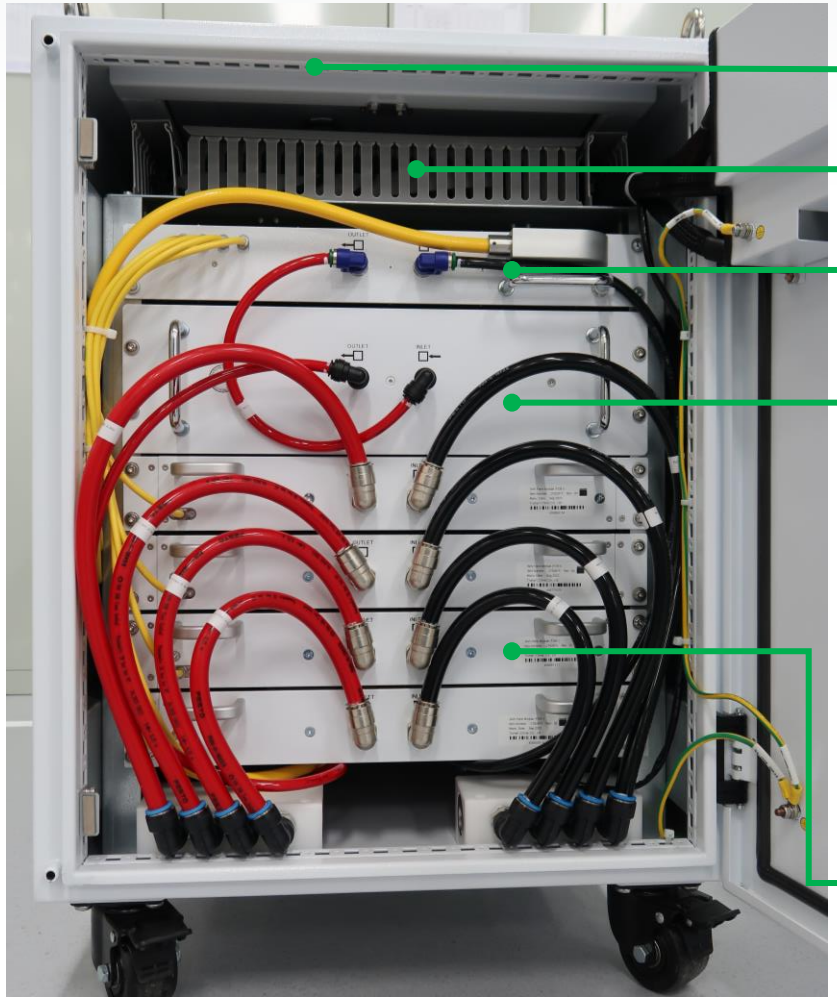


System Overview

Laser Source:

The TruFiber G series offers multimode fiber lasers with high beam quality of up to 12 kW of laser power and Bright Line mode laser variants up to 6 kW. Thanks to their broad power spectrum and special functions, they are an extremely cost-effective solution for precise cutting and welding applications

TruFiber G modular architecture

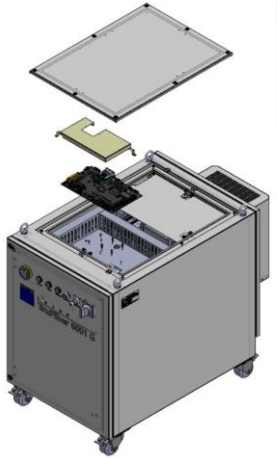


Cabinet

- Designed with front/ rear/ top doors → service friendly for technicians
- IP54 rating → increased reliability

Control system (not TruControl!)

- Flexible configuration
- Multi-interfaces, EtherCAT fieldbus configurable



Top view of control system

High Power Combiner (HPC) & Beam Delivery Optic (BDO)

- Fixed BDO, through splicing process replaceable in the field by TRUMPF service
- Integrated sensors and electronics for unique PierceLine and VariMode features

Power supply

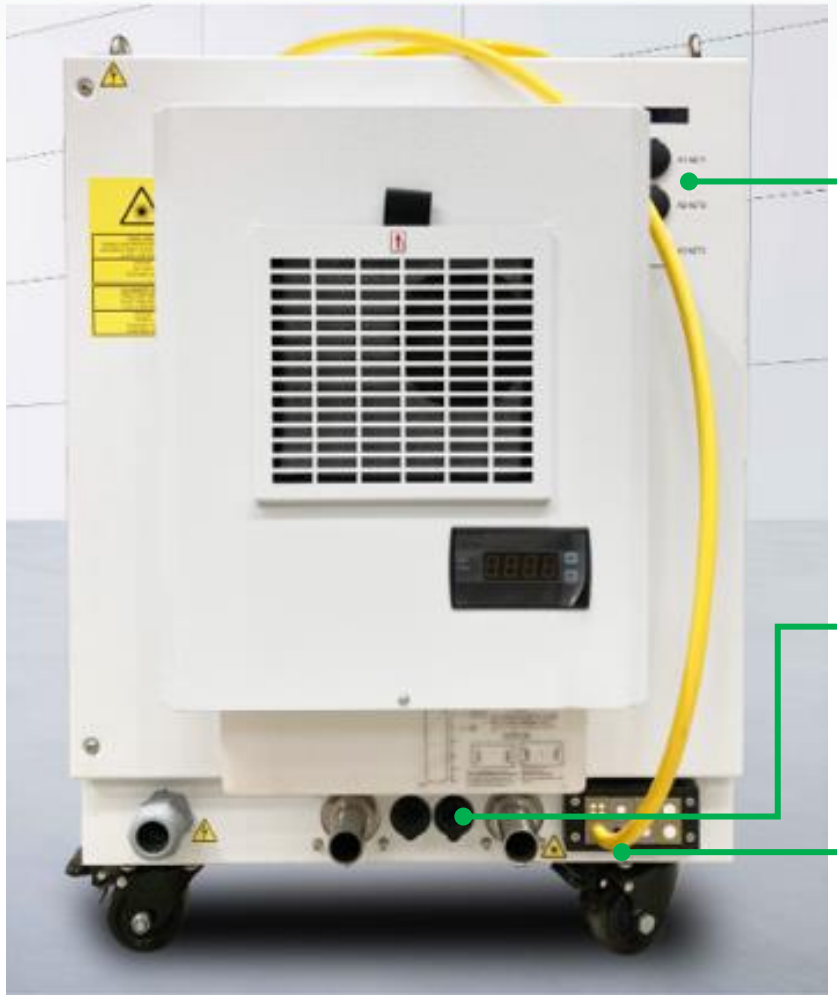
- Modular design
- Power range from 2% - 100% nominal power

Up to 4 * 3 kW laser modules

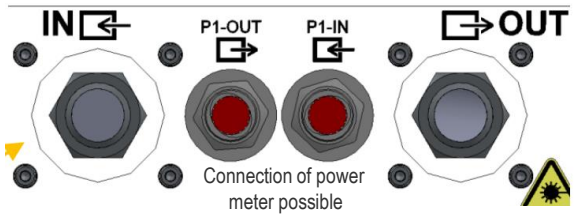
- Modular basis of new generation TruFiber
- Higher efficiency (optical to optical efficiency ≥78%,

Field repair by trained TRUMPF service

TruFiber G: Interfaces



Control interface:
- Ethernet
- EtherCAT
- LCD display with info



Cooling interface:
- IN & OUT: connections for cooling of the laser
- P1-IN & P1-OUT: connections for cooling of power meter

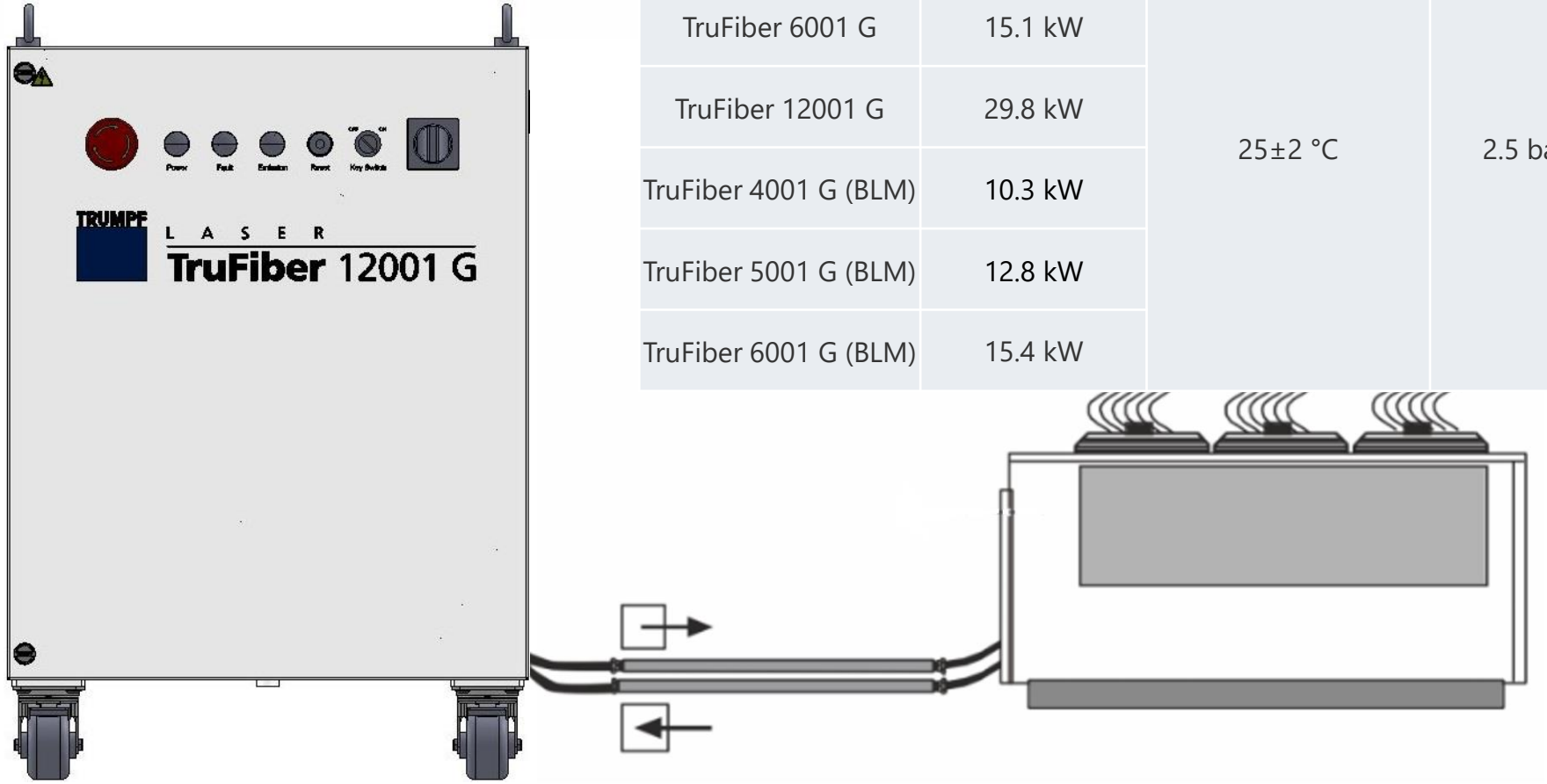
Not pluggable LLK - QBH/QD
- Permanently connected to HPC
- Fiber exchange by splicing a new fiber to HPC or exchange the complete HPC+LLK module

Cooling concept for TruFiber G

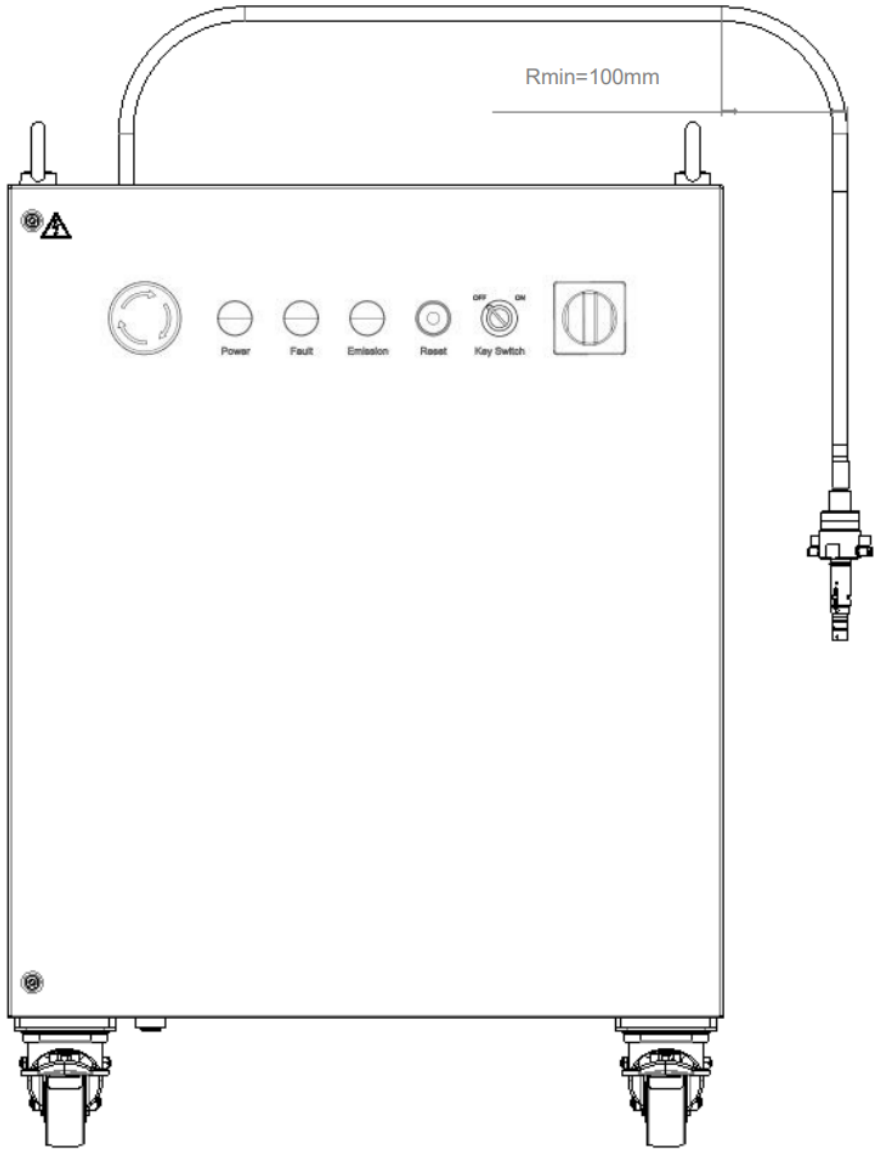
Requirements for chiller

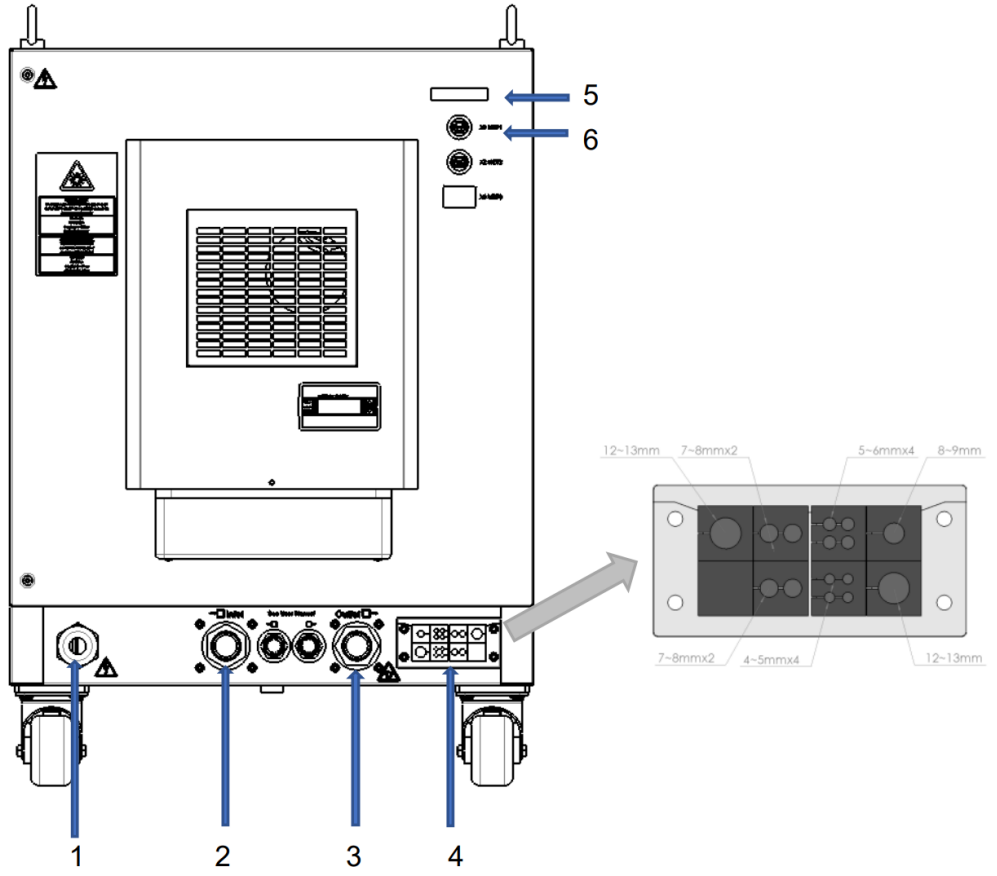
Laser type	Cooling capacity	Coolant temperature	Pressure drop	Coolant
TruFiber 3001 G	7.7 kW	25±2 °C	2.5 bar	**DI-Water to be used.** **Copper** material is **not allowed** in cooling system
TruFiber 6001 G	15.1 kW			
TruFiber 12001 G	29.8 kW			
TruFiber 4001 G (BLM)	10.3 kW			
TruFiber 5001 G (BLM)	12.8 kW			
TruFiber 6001 G (BLM)	15.4 kW			

External cooling



TruFiber G- Ergonomic layout

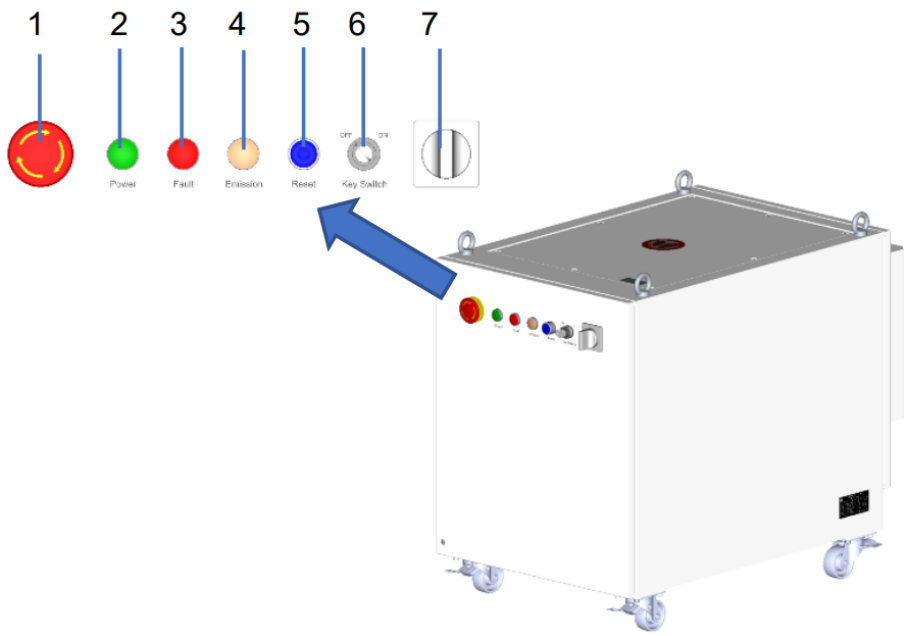




1. Mains cable
2. Cooling water return
3. Cooling water supply
4. Control cable for external interfaces
5. LCD display
6. EtherNET

TruFiber G

Part Identifier



1. EMERGENCY STOP push button
2. Signal lamp “Power On”
3. Indicator light “Fault”
4. Laser warning lamp
5. Reset push button
6. Key switch
7. Main switch

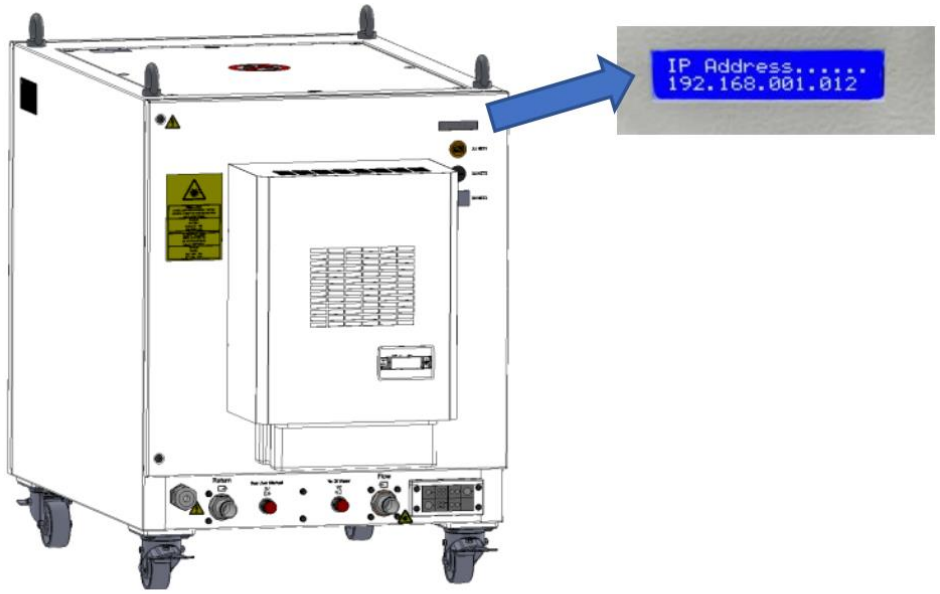


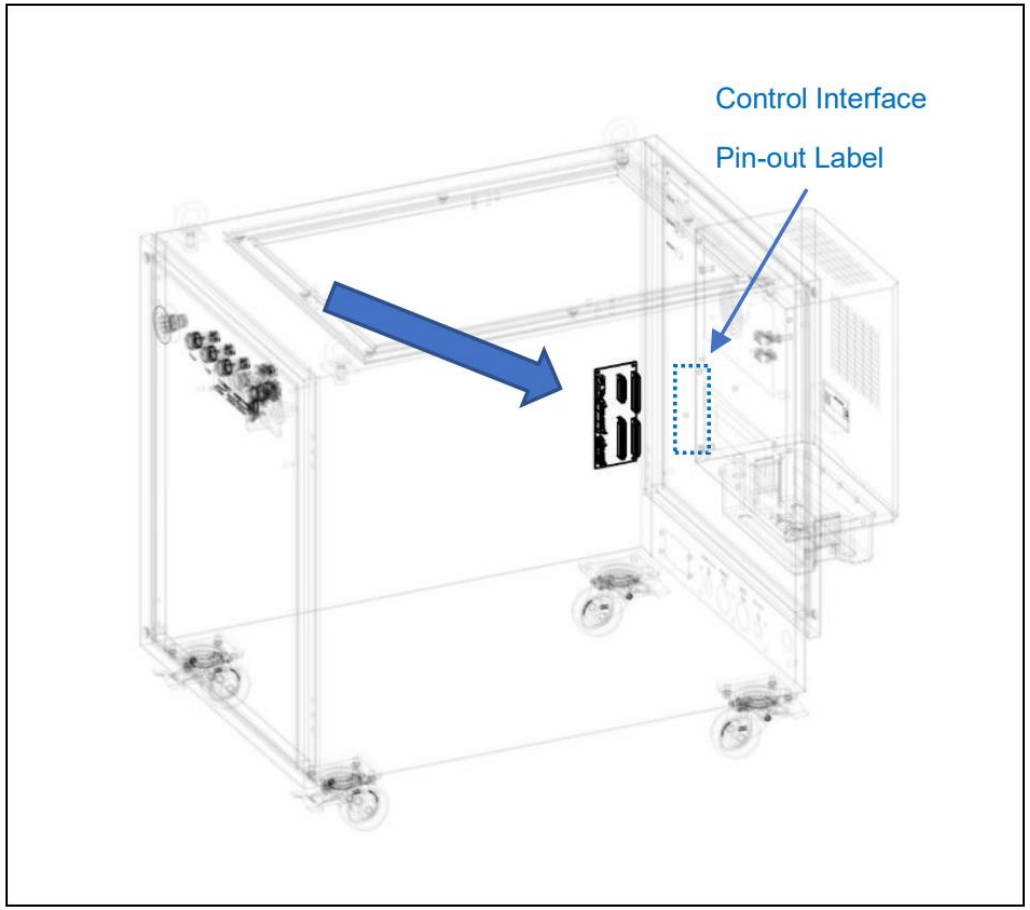
Fig. 4-3

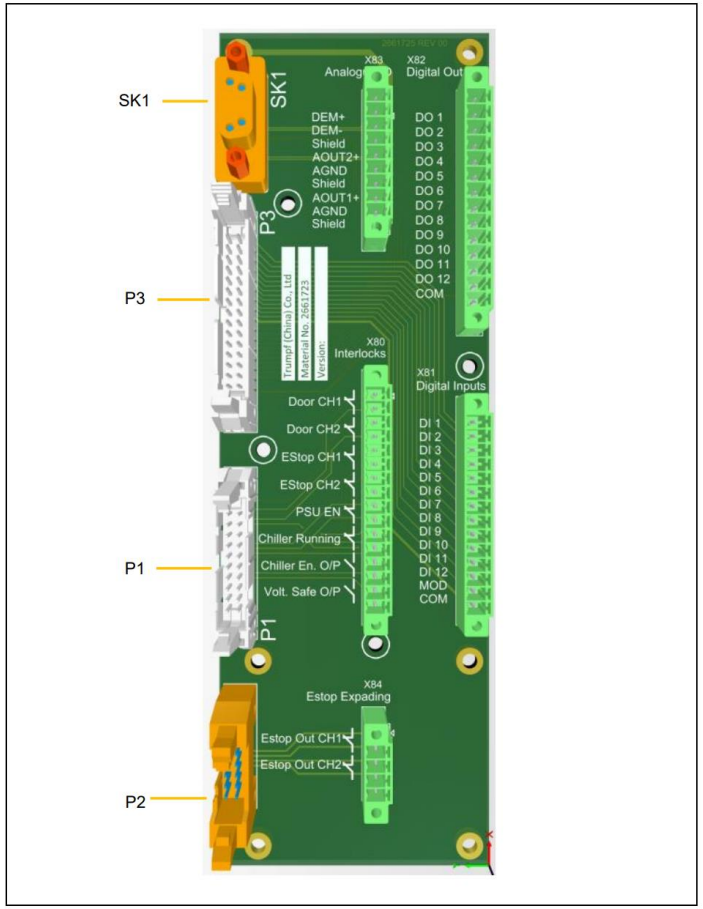
The LCD display offers the following information:

- Product Name
- Serial Number
- MAC Address
- IP Address

With the IP address, the operator has the access to GUI.

Electrical control interfaces





P1/P3/SK1	For internal use
X80	Interlock Interface
X81	Digital Inputs
X82	Digital Outputs
X83	Analogue I/O
X84	E-Stop Expanding

The inputs and outputs of interlock connections are voltage-free contacts on port X80.

The digital input circuit is designed to work with PLC signals on port X81, circuit type is sink input.

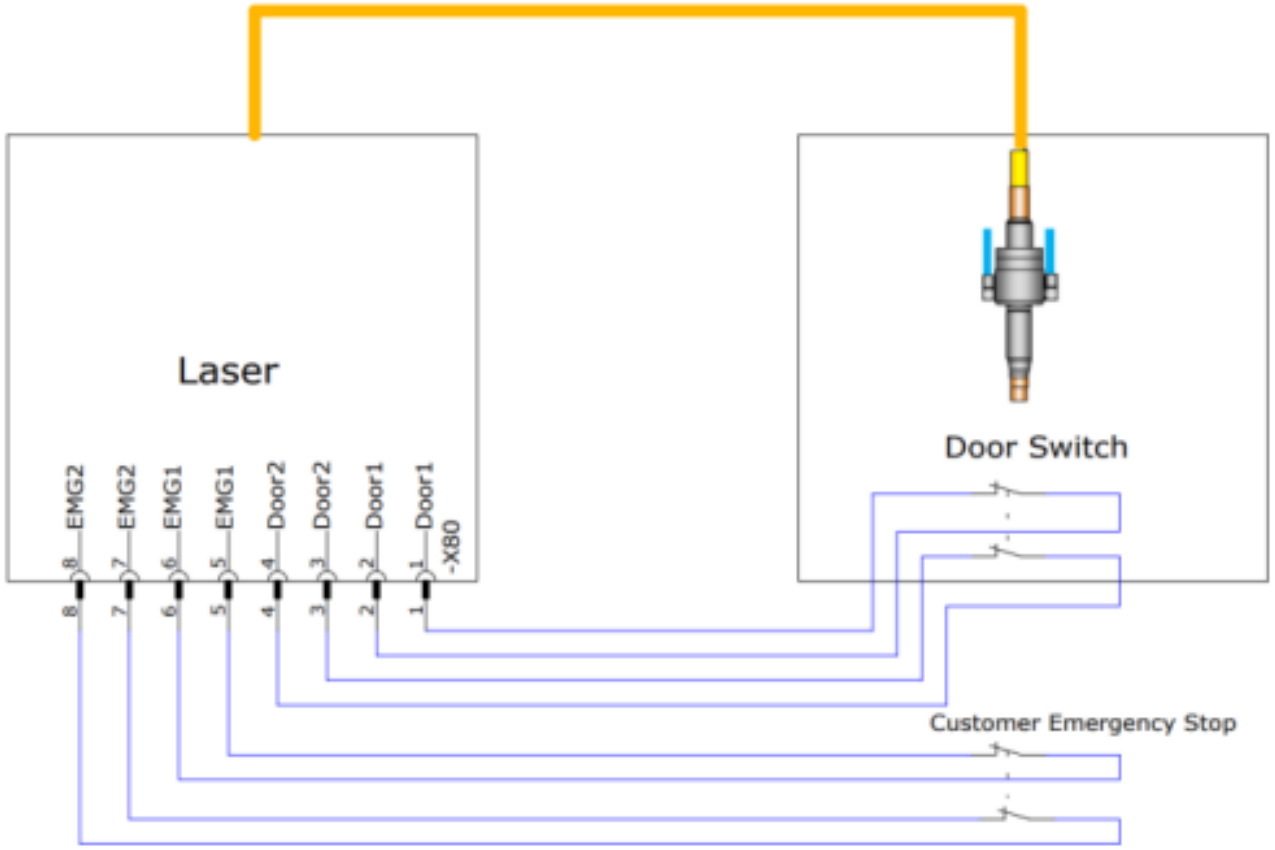
The digital outputs are PLC signals and supplied with 24 VDC from the laser on port X82, circuit type is source output.

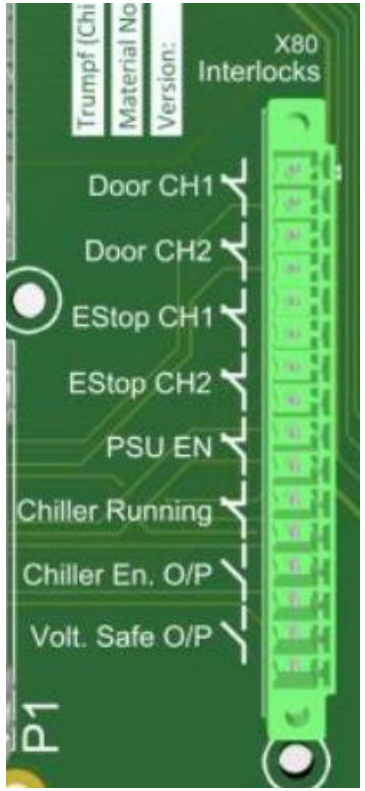
Please make sure the voltage applied to X80, X81 and X82 will not exceed 30V DC.

Control Interface Layout Fig. 2-6

TruFiber G - Safety circuit principle

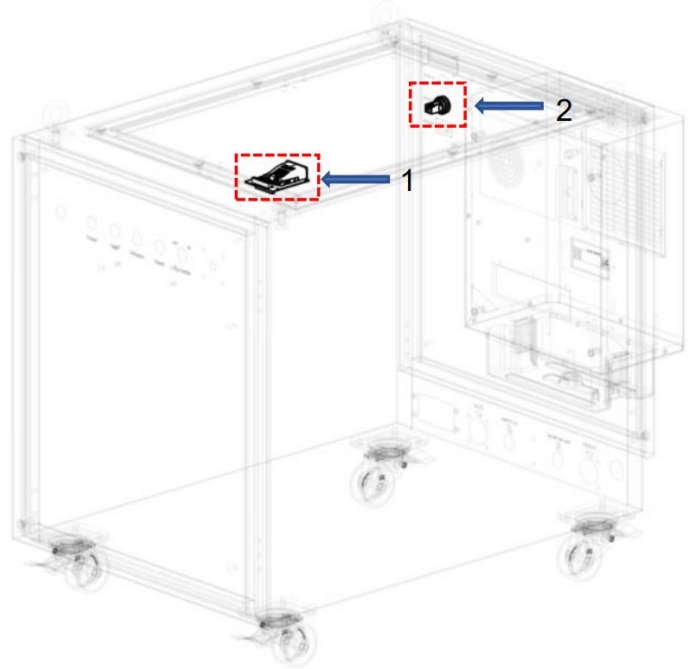
The control unit of the laser device contains interfaces for safety circuits.



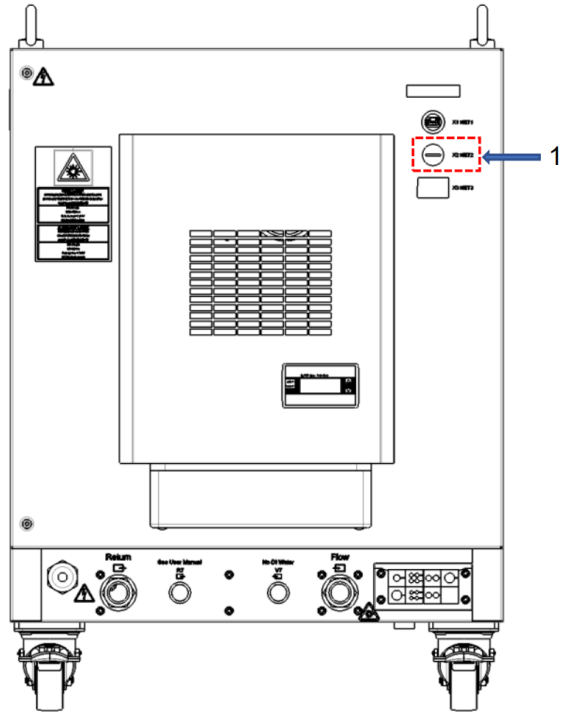


TruFiber G - Operation with fieldbus

Apart from EtherNET, the laser device can also be controlled online via Fieldbus. The Fieldbus is an optional function. The module is located under top cover, on the laser control board. External connection is X2 port on rear door.



1. Fieldbus module 2. Fieldbus connection port



1. Fieldbus connection port on rear door

Fig. 3-11

Current available type of Fieldbus:

- EtherCAT

For detailed information please see interface description:
90-17-00-000000-AS FieldBus Instruction

TruFiber G - Cooling requirements

Parameter	Value			Notes
Output Power (kW)	3	6	12	
Maximum Cooling Capacity (kW) (Heat load to be removed from laser cabinet)	7.7	15.1	29.8	At end of life for nominal output power
Coolant Temperature (°C)	25 ± 2			Non condensing
Input pressure (bar)	6			Maximum for safe operation
Pressure Drop (bar)	2.5			Between inlet and outlet

Coolant Connection Diameter (mm)	25.4 (1”)		32 (1.25”)	Relative ID (inner diameter) hoses to be used
Minimum flow rate (l/min)	28	55	107	At 25°C water temperature.
Coolant Materials Compatibility	Aluminium, stainless steel or plastic			• DI-Water to be used. • **Copper material is not allowed in cooling system.**
External Water Specification	**Min**		**Max**	
Appearance	Clear and without sediment			
Particle size (µm)	-		100	100 mesh
Electrical conductivity (µScm^{-1})			45	At 25°C
pH	5.5		8.0	
Fiber Terminator Cooling Requirements				
Coolant Temperature (°C)	10 - 45			Non condensing
Max. Water Pressure (bar)	8			Maximum for safe operation
Coolant Connection Diameter (mm)	ID 4 OD 6			ID: Inner Diameter OD: Outer Diameter
Flow rate (l/min)	1.5 – 3.0			

Accessory Overview- Chiller

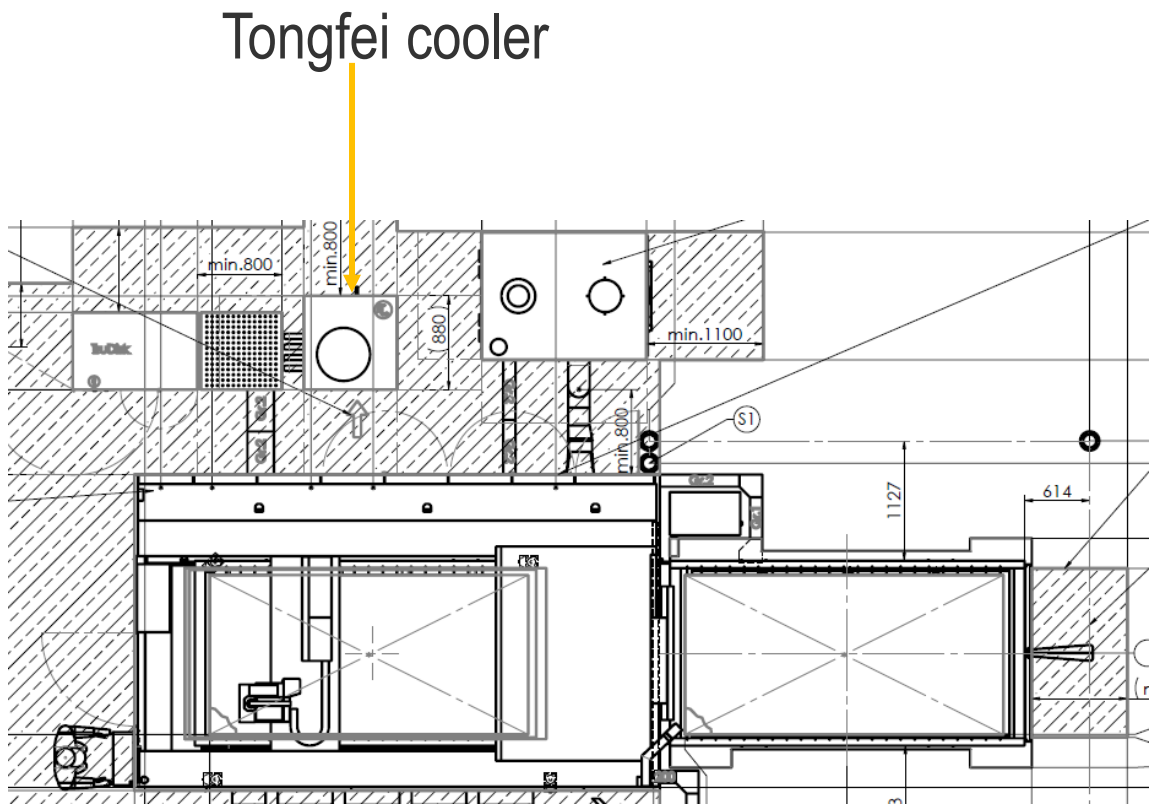
Water Cooler (Chiller):

Laser Cutting Machine uses water chiller, Called the Eco cooler, to cool the components and ensure efficient operation.

The Eco Cooler circulates pure water through heat-generating components like the laser diodes, optics, drives, and control cabinets. The cooled components then return to the Eco Cooler, where they are cooled again by a heat exchanger.

Tongfei coolers for TruLaser

Layout (example 3-6kW)



System Overview

Laser Suction:

A suction system consisting of several suction chambers is present within the working range of the laser cutting machine. Each suction chamber is opened and closed using a pneumatically-operated flap and is connected to the central suction channel.

During the cutting operation, only the flap of the suction chamber below the cutting unit is opened.

The suction power is concentrated on only one chamber at a time, which ensures optimum suction of the fumes and airborne particles.