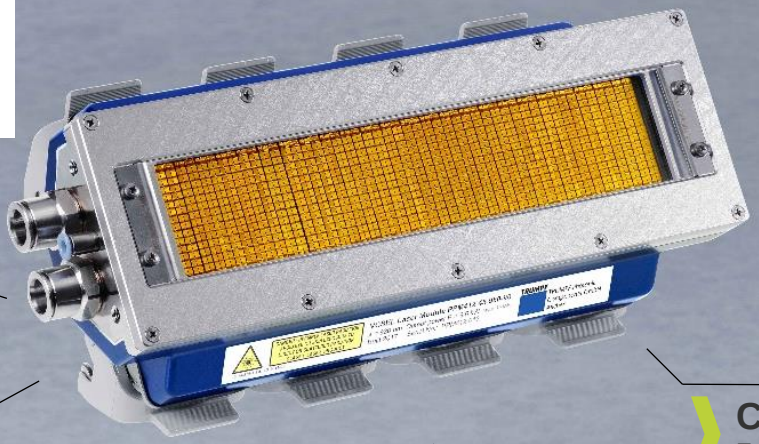
Industrial Heating

TruHeat VCSEL systems



Scalable
Application specific IR-output

Fast processing
Thanks to high power density

Compact
Easy to integrate

Precise control
Local control by individually addressable emission zones

Low cost
For cost sensitive applications

TruHeat VCSEL sources: Your compact infrared laser solution for scalable and flexible industrial laser heat treatment

Laser sources based on VCSEL micro laser arrays are delivering directed large-area beams of near infrared power that can be applied in many industrial heating applications and production processes.

Considerable cost advantages compared to conventional lasers can be realized by direct illumination of the target area, without expensive optics or scanner systems.

As a unique feature, the spatial heating profile can be arbitrarily programmed by independent control of small segments of the laser modules. Heating patterns can even change dynamically during operation, enabling an unprecedented level of process flexibility.

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TruHeat VCSEL sources offer excellent and reliable performance over a wide range of conditions

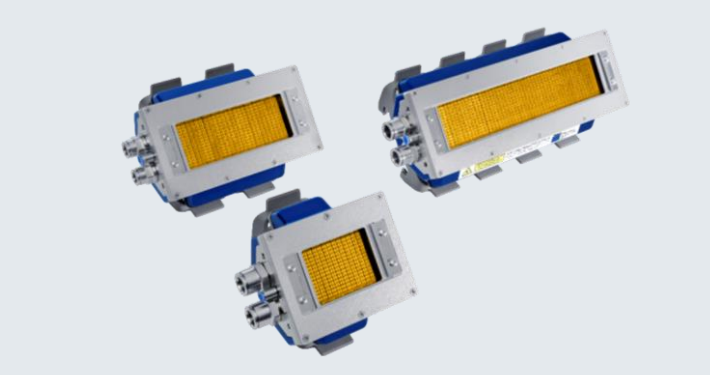
High power infrared sources for industrial laser heat treatment serve a wide range of application fields, such as:

- Automotive
  - Softening of high strength steel
- E-Mobility
  - Drying of battery foils | Pouch cell sealing | Perforating foils
- Electronics / Semiconductor
  - Laser Assisted Soldering (LAS) | Laser Assisted Bonding (LAB) | Wafer heating
- Additive Manufacturing
  - 3D printing of polymers | Pre-heating of metal 3D printing
- Photovoltaics
  - Manufacturing of solar cells | Ultrafast regeneration

Key features of industrial TruHeat VCSEL systems:

- High power infrared laser source based on VCSEL (Vertical Cavity Surface Emitting Laser) technology
- Scalable kW range output power
- High power density of 100 W/cm² enabling fast processing
- Precisely controllable by individually addressable emission zones (tailored intensity profiles, in time and spatially)
- Compact, robust and easy to integrate
- Lower cost than conventional laser systems

Flexible control of emitted IR-radiation



TruHeat VCSEL Series 3000: standard modules from 2.4 kW to 19.2 kW laser power

TruHeat VCSEL Series 3000: High power laser systems

TruHeat VCSEL Series 3000 can be scaled from small to large treatment width and up to several ten kilowatts infrared output power.

TruHeat VCSEL Series 3000				
Laser Module		**TruHeat VCSEL 3010 (2.4 kW)**	**TruHeat VCSEL 3010 (4.8 kW)**	**TruHeat VCSEL 3010 (9.6 kW)**
Optical power (max.)	kW (cw)	2.4	4.8	9.6
Emission area	mm²	40 x 52	40 x 104	40 x 208
Distinct emission zones		12	24	48
Power density	W/cm²	min. 100/typ. 115 (at emission aperture)		
Wavelength	nm	980 ± 20		
Beam half angle		typ. 10° (enclosing 95% power)		
Front glass		double borosilicate, anti-reflex coated		
Options		air curtain protection, integrated lenses		
Laser module size	mm	W 87 x H 48 (without connector)		
		L 108	L 160	L 264
Driver Unit				
Number of driver racks		1	2	4
Laser control		typically 10 ms time constant; individual control of laser emission zones, integrated laser zone monitoring		
Machine communication		Ethernet-based (EtherCAT® protocol)		
Mains voltage		3 phase 400 V (±10%), 47-63 Hz		

For more information visit
www.trumpf.com/s/vcsel-heating-systems

Safety information:

The products contain laser arrays that can emit invisible high power laser radiation of class 4, which can cause serious injury.
The machine manufacturer is responsible to fulfill the relevant laser-related and other safety regulations.

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