

DR. FRITSCH

SONDERMASCHINEN

Laser Welding Machine

LSM 300



Dr. Fritsch Sondermaschinen GmbH, 70736 Fellbach, Germany

Technical Specification

LSM 300

- for diamond saw blades of \varnothing 100 – 1,200 mm with manual feeding
of \varnothing 100 – 800 mm with automatic feeding
Other diameter ranges possible upon request
- Higher productivity due to optimized processes in the machine
(e.g. 54 saw blades per hour, with a diameter of 310 mm and 15 standard segments
and 3 drop segments)
- Exact positioning of the segments to ensure consistent quality of your saw blades
- Higher strength of the weld seam due to intelligent measuring methods
(e.g. drop segment land, concentricity of the steel center)
- Quick-change system for clamping of the steel centers and segment adjustment
facilitates changeovers and provides greater flexibility with batch sizes
- The automatic adjustment of the focus position avoids manual mistakes
- Focal distance of the welding head is 200 mm
- Longer service life by means of a Crossjet protecting the welding head
- Universal use \Rightarrow possibility to weld different types of drop segments (option)
- Beam switch to connect another welding machine to the laser source (option)
- Energy saving by using a fiber laser as a laser source (on request)

DESIGN

- Welded machine frame
- Linear table and built-on rotary table with a centering clamping device to place the steel centers
- Built-in welding station with pneumatic steel center clamping and pneumatic segment clamping
- Automatic segment feeding by means of a belt magazine or a bowl feeder, each equipped with a linear conveyor
- Laser head with two-axis continuous-path control
The optics is being moved by two CNC axes which can run both, all usual radii and straight paths
- Two touch screen panels

FURTHER OPTIONS

- Blade exchanger with each one magazine trolley for non-welded and welded blades (up to \varnothing 800 mm)
- Additional segment feeder (belt magazine, bowl feeder or combination)
- Additional belt magazines for special segments
- Camera detection for sorting of segments
- Software for the options twin segment, triple segment, tack welding
- Air treatment (air dryer Ultrapack 200 and activated carbon filter)

FUNCTIONING

The steel center is taken from the magazine either manually or by means of the blade exchanger, placed in the clamping fixture of the rotary table, measured and positioned. The linear table takes the rotary table with the steel center to the welding station where the steel center is clamped pneumatically. The segments are conveyed to the welding station by the individual segment feeders and clamped pneumatically.

The segment is welded on the steel center by means a path-controlled laser beam. The clamping fixtures of the steel center and the segments are released, the steel center moves on one welding position and a new segment is fed. The steel center and the segment are clamped and welded together. These sequences are repeated until all segments are welded on the steel center.

The rotary table with the welded saw blade moves to the blade changing position where the blade is taken out either manually or by means of the blade exchanger.

TECHNICAL DATA

Supply voltage: 3 x 400 V, 50/60 Hz
(other voltages possible on request)

Total connected load:
- machine part: 3 kVA
Nominal current: 3 x 4.3 A
Fuses (provided by the customer): 3 x 10 A

Total connected load:
- complete equipment with laser source
and cooling unit: max. 68 kVA (depending on design)
Nominal current: 3 x 98 A
Fuses (provided by the customer): 3 x 100 A

Cooling water machine part:
- pressure: 3 – 6 bar
differential pressure: min. 3 bar
- consumption: approx. 8 l/min.
- temperature: 20 °C (\pm 1 °C)
- water quality: demineralised water
purity: filtered with 100 μ m

Compressed air machine part incl.

Crossjet

- consumption: approx. 340 l/min., depending on process
- pressure: 4 – 6 bar

Compressed air cooling nozzles:

- consumption: approx. 1,000 – 1,500 l/min., depending on process
- pressure: 4 – 6 bar

Compressed air blade exchanger (option):

- consumption: approx. 30 l/min., depending on process
- pressure: 4 – 6 bar

Inert gas beamline:

- pressure: to be effected by the customer
3,8 – 5,3 bar
- consumption: ≥ 4 l/min., depending on process
- type: nitrogen or adsorption-dried air
(Please contact us for further information.)

Inert gas welding:

- pressure: to be effected by the customer
max. 5 bar
- consumption: approx. 5 – 50 l/min., depending on process
- type: argon or helium

Extraction system:

- connection: to be provided by the customer (air flow approx. 300 m³/h)

- connection: connecting piece \varnothing 30 mm

Clamping force segments/steel centers: 3900 N at 6 bar (pneumatical)

Saw blades (incl. segments):

- diameter:
 - min. 100 mm
 - max. 1,200 mm with manual loading
800 mm with automatic loading (option)

Segments:

- dimensions:
 - length: 20 – 51 mm
 - thickness: 1.8 – 8 mm
 - height: 6 – 25 mm

Dimensions of machine part:

- length: approx. 4,340 mm
- width: approx. 3,000 mm
- height: approx. 2,350 mm

Weight of machine part:

approx. 3,100 kg

OPTION: Laser Sources

A. CO₂ laser

- design:	CO ₂ laser, SLAB-construction
- output :	min. 2000 W, or 2500 W
- adjustable laser output:	10 – 100 % of the output
- wave length:	10,6 µm
- pulse frequency:	8 – 5000 Hz
- laser connected load:	approx. 24 kVA
- laser gas (in rental bottle)	Rofin Sinar special pre-mix (the rental bottle of laser gas is not part of the scope of supply and has to be provided by the customer. Available at your local Messer Griesheim branch, e.g.)

Cooling unit (option)

- water flow for cooling water circuit:	approx. 110 l/min.
- cooling capacity:	≥ 35 kW
- connected load cooling unit:	approx. 15 kVA
- tank capacity:	approx. 255 l + approx. 10 l for pipes
- temperature constancy:	≤ 1 K
- recommended temperature:	20 °C outlet temperature
- recommended ambient temperature:	5 – 43 °C

B. Fiber laser

- design:	Ytterbium fiber laser
- output :	2500 W
- adjustable laser output:	10 – 100 % of the output
- wave length:	1,070 nm
- laser connected load:	approx. 10 kVA

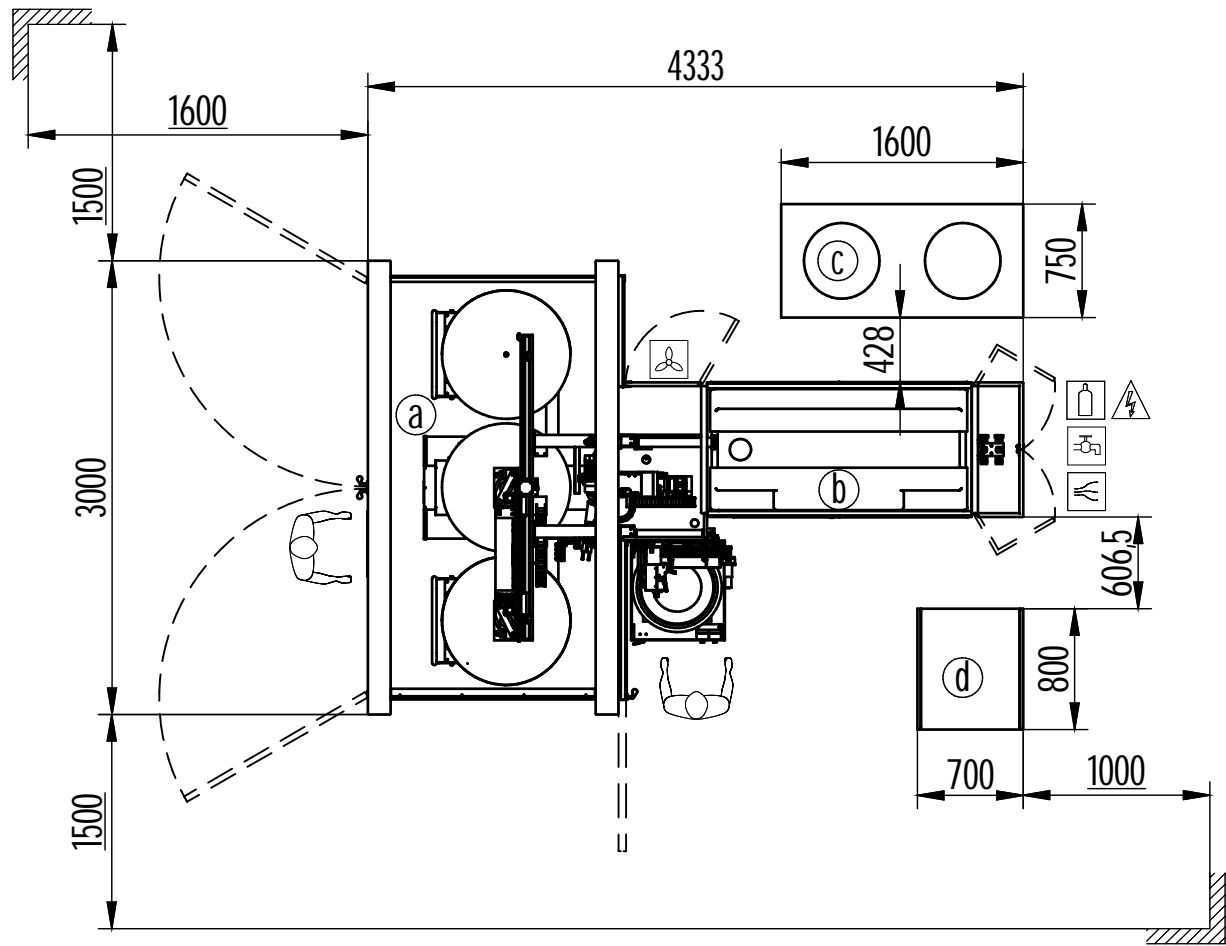
Cooling unit (option)

- water flow for cooling water circuit:	approx. 50 l/min.
- cooling capacity:	approx. 12 kW
- connected load cooling unit:	approx. 5 kVA
- tank capacity:	approx. 65 l + approx. 10 l for pipes
- temperature constancy:	± 0.5 K
- recommended temperature:	22 °C outlet temperature
- recommended ambient temperature:	10 – 40 °C

Please note:

- Further details on the recommended cooling unit are available in the operating instructions of the laser source supplier. Or contact us for more information.
- There must be no expansion joints in the floor between the laser resonator and the machine part.
- The control cabinet of the laser resonator as well as the cooling unit can be placed in a different way.
- Other beam alignments available on request.

- Technical data and design subject to modifications –



- (a) Maschinenteil (machine part)
- (b) Strahlerzeuger (laser)
- (c) Kühlaggregat (ciller unit)
- (d) Steuerschrank (control cabinet)

max. Maschinenhöhe: 2350 mm
 (max. machine height)
 erforderliche Raumhöhe: 2800 mm
 (clear height required)

Symbol	Bedeutung (meaning)	Symbol	Bedeutung (meaning)	50 cm — —	DFT019020.dft ASM014073.asm		Aufstellplan floor plan	
	Elektrik (electrics)		Gas (gas)			Datum		
	Pneumatik (pneumatics)		Wand (wall)		Bearb. 27.03.2009	m_feil	Zeichnungs Nr.: 15D 3	
	Kuehlwasser (cooling water)		Arbeiter (operator)		DR. FRITSCH Sondermaschinen GmbH D-70722 Fellbach			Bl. 3 / 6
	Absaugung (suction)							