

1. Technical data and description of Laser LightWare™

Specification Nd:YAG laser FLS 542CL-307/611

• Wavelength	1064 nm
• Fiber core diameter, min. / numerical aperture	600 µm / 0.11
• Pulse length ^{*)}	0.3 - 100 ms
• Pulse frequency ^{*)}	0.1 - 500 Hz
• Peak power min. ^{*)}	0.2 kW
• Peak power at 3 ms, max. ^{*)}	8 kW
• Pulse energy, max. ^{*)}	60 J
• Average power, max. ^{*)}	400 W

^{*)} measured without beam-delivery and with new flash lamp and standard resonator plane-plane mirrors

Integrated laser control NLS with following functions

- Storage of up to 15 sets of laser parameters
- Multiple interfaces COM1, COM2, USER 1, SYSTEM (other options are available)
- Remote access via modem, but modem is not part of delivery
- Fast Peak power cruise-control through RTPS (Real Time Power Supply)
- Integrated online energy monitor
- Ramping up and down
- Pulse counter with various functions

Installation instructions

• Line power configuration	3 phase + ground, ± 10 %
multitap transformer for	3 x 380/400/480 V
• Line frequency	50 Hz
• Power consumption, max.	19 kVA
• Required fuse protection for 400 V	32 A
Attention: The mains connection has to be protected with a line safety switch (characteristic D) as part of the civil works scope of supply, in such a manner, that in case of overcurrent or short-circuit all three phases are disconnected at the same time.	
• Cabinet protection	IP54
• Water consumption, load-dependent	1 - 30 l/min.
• Water inlet, max.	20° C / 8 bar
• Pressure drop to outlet	4 bar
• Cooling power, max.	15 kW
• Dimensions cabinet, 2-door, L x W x H	1760 x 780 x 1410 mm
• Dimensions optical system, L x W x H	1100 x 200 x 115 mm
• Weight power supply	560 kg
• Weight optical system	35 kg
• Ambient temperature	10 - 35° C
• Relative humidity, max.	80 %
• Noise at 1 m, idle	65 dBA

Standard delivery volume includes

- 1 set Fiber output LLEK1, but without fiber
- 1 set Beam expander, 2x
- 1 set Laser rod, **quality B**
- 1 set Alignment / pilot laser
- 2 sets Flash lamps (1 set new lamp and 1 set test lamp for acceptance)
- 1 set Hand terminal HT2 with 3 m cable
- 1 set CD with PC terminal software PCT2 for WIN 2000 / XP
- 1 set 0-Modem-cable (cross wires) 6 m, 9 pin, F/F
- 1 set Laser protection goggles 1064 nm, extra charge for wear glasses
- 1 set Tool kit
- 1 set Operating manual (language German, English, French, Italian or Spanish)
- 1 set Service and integrator manual (language German or English)
- 1 day Acceptance at LASAG Thun, Switzerland

2. Regulations and safety of laser

The LASAG lasers correspond to the following important regulations and industrial standards

- EN 60825-1 of 2003 Safety of laser equipment; classification of installations, requirements and user guidelines (IEC 825 and FDA-CDRH, U.S. 21 CFR 1040.10)
- EN 60204-1 of 1997 Safety of machines, Electrical equipment of machines (IEC 204-1)
- EN 207 of 1998 Personal eye protection; filter and eye protection against laser radiation (laser protection goggles)
- EN 61000-6-4 of 2002 Electromagnetic compatibility, Generic emission standard, Industrial environment
- EN 61000-6-2 of 1999 Electromagnetic compatibility, Generic immunity standard, Industrial environment

and the EU regulations: 98/37/EG; 89/336/EWG; 73/23/EWG.

Operating the laser source without a safety enclosure makes it a product of the **laser class 4**. Therefore, it is the duty of the customer to cover the working place in accordance to the regulations. The user must integrate the laser source into the safety circle of the working place in order to reach the **laser class 1**.

All LASAG laser sources conform to the CE sign.

LASAG was the first laser manufacturer which acquired the QS certification **ISO 9001 / EN 29001** on February 10, 1990. Since February 10, 2002 we are certified according to ISO 9001:2000 standards.

3. Laser LightWare™ Scope of supply

Laser FLS 542CL-307/611; 400 Watt (Solar)

Pos.	Item	Qty.	Product
1.1	85.1050	1	Nd:YAG-Laser FLS 542CL-307/611, 400 Watt, 1 fiber output (0.6 mm, NA 0.11)
1.2	34.0720	1	Without Beam expander 2-times fix, without mount
1.3	34.0896	1	Beam expander 1-3 times manual, without mount
1.4	85.4002	1	Without Fiber coupling module LLEK2-1 with end plate, 1 fiber
1.5	85.4003	1	Fiber coupling module LLEK2-2 with end plate, 2 fibers, energy-shared
1.6	31.1468	1	LLEK2E-2 dust protection, for 2 fiber output
1.7	85.4007	2	to LLEK2 / LLEK4: add. price for Time-Sharing per switching mirror

Package Fiber optics welding

Pos.	Item	Qty.	Product
2.1	34.1092	1	Fiber optic cable LL97-611/5, pre-adjusted and plug-in, fiber diameter 0.6 mm, NA 0.22, length 5 m
2.2	85.4022	1	Processing head LLBK60 180:180, 90°; viewing possible with protection glass, c-mount incl. dust protection
2.3	41.7302	1	to LLBK60: Camera adapter 0° with C-mount
2.4	85.5014	1	CCD camera 1/2" b/w, model WAT902-A, with 12 V DC power supply
2.5	31.1328	1	End-plug to fiber

Option Package Fiber optics cutting

Pos.	Item	Qty.	Product
3.1	34.0920	1	Fiber optic cable LL97-422/10, pre-adjusted and plug-in, fiber diameter 0.4 mm, NA 0.11, length 10 m
3.2	85.4012	1	Processing head LLBK45, 100:50, 90°, NA 0.22, viewing possible
3.3	34.0436	1	to LLBK45: C-mount for TV-camera CCD with adjustable lens
3.4	85.5014	1	CCD camera 1/2" b/w, model WAT902-A, with 12 V DC power supply
3.5	34.0816	1	Nozzle holder, cutting, f=50 mm, with protection glass and graphit nozzle
3.6	31.1464	1	to LLBK45: dust protection
3.7	31.1328	1	End-plug to fiber