
ROFIN-SINAR

Diode pumped Nd:YAG Laser

Diode-pumped Nd:YAG laser

DY Series



ROFIN DY x55 - 022
(550 W - 2200 W)



ROFIN DY 027 - 044
(2700 W - 4400 W)

Diode-pumped Nd:YAG laser

ROFIN DY 022



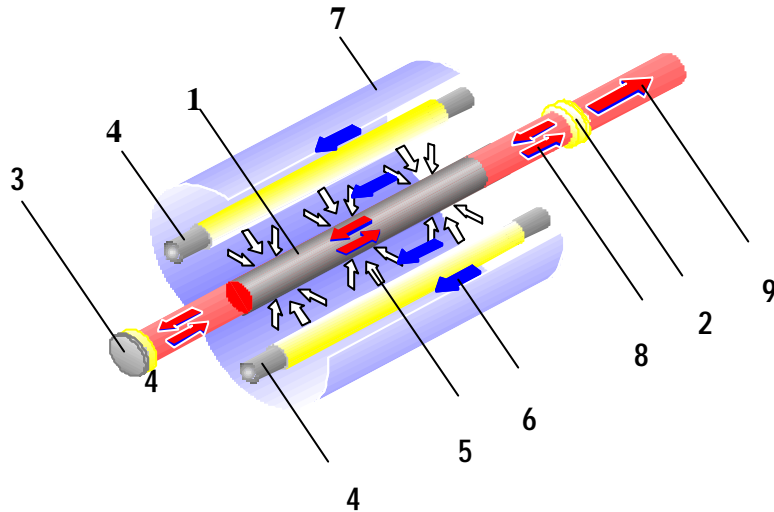
Advantages:

- high beam quality
- high efficiency
- virtually maintenance free
(typ. diode lifetime > 10,000 h)

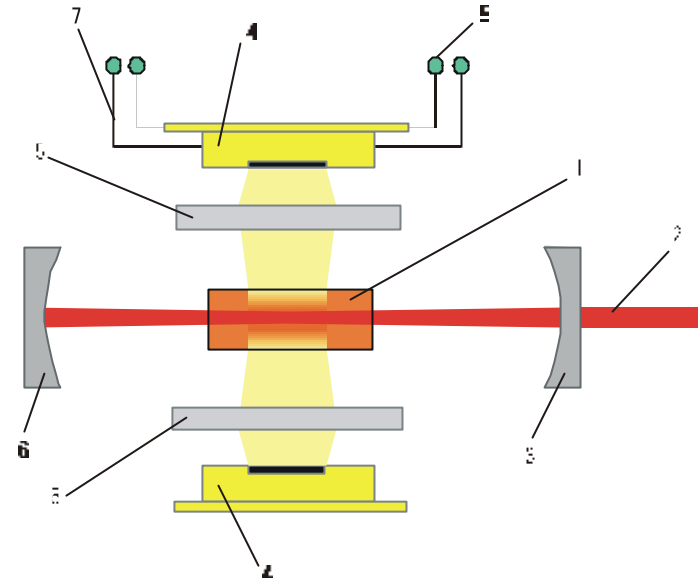
The principle of a Nd:YAG laser

Lamp pumped

Diode pumped



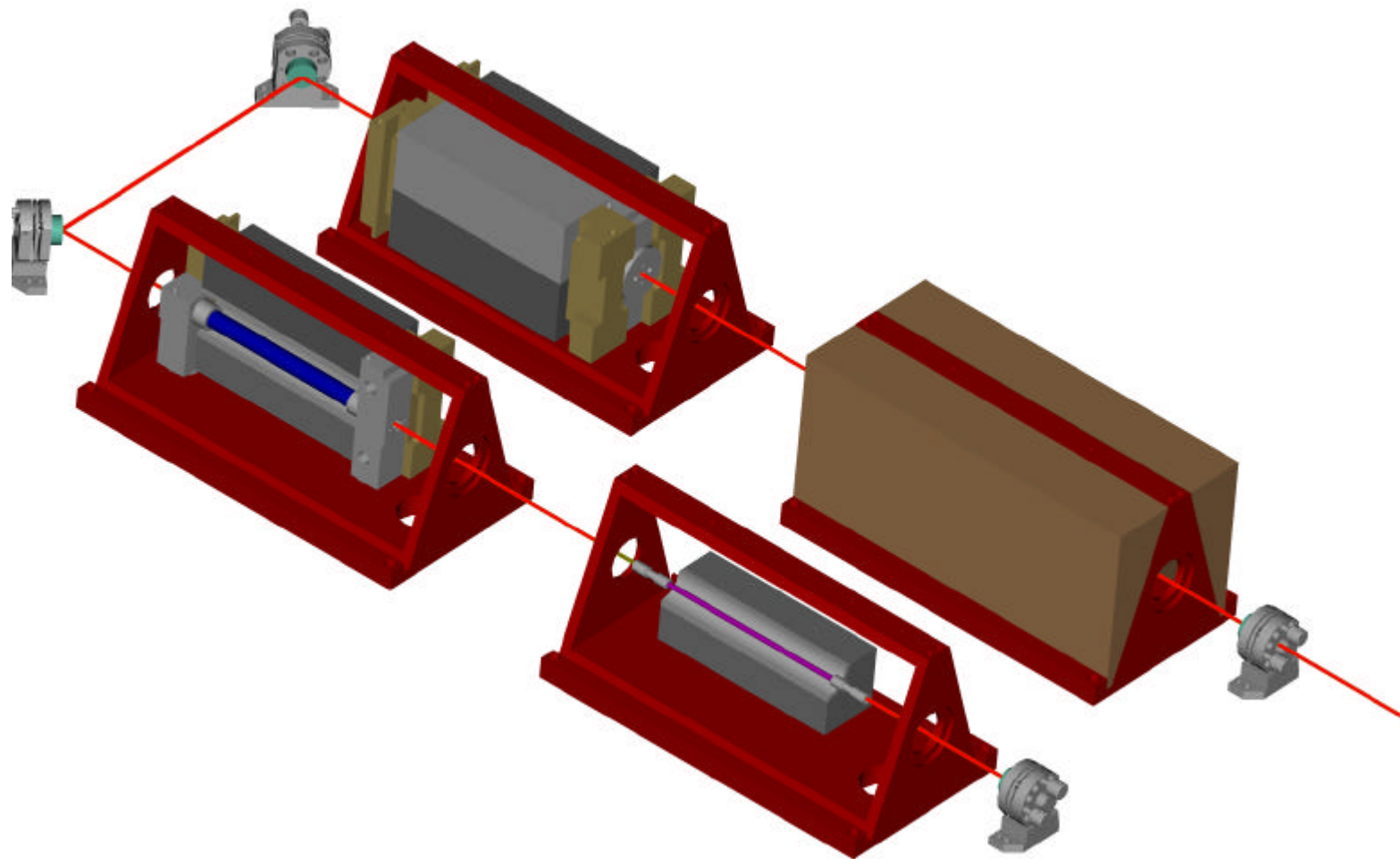
1. Active Medium (Nd:YAG crystal)
2. Output mirror
3. Rear mirror
4. Excitation (Pump lamps)
5. Pump light
6. Cooling water
7. Reflector
8. Stimulated emission
9. Laserbeam



1. Nd:YAG crystal
2. Laser beam
3. Outcoupling mirror
4. Diode arrays
5. Collimating optic
6. Rear mirror
7. Cooling
8. Electrical supply

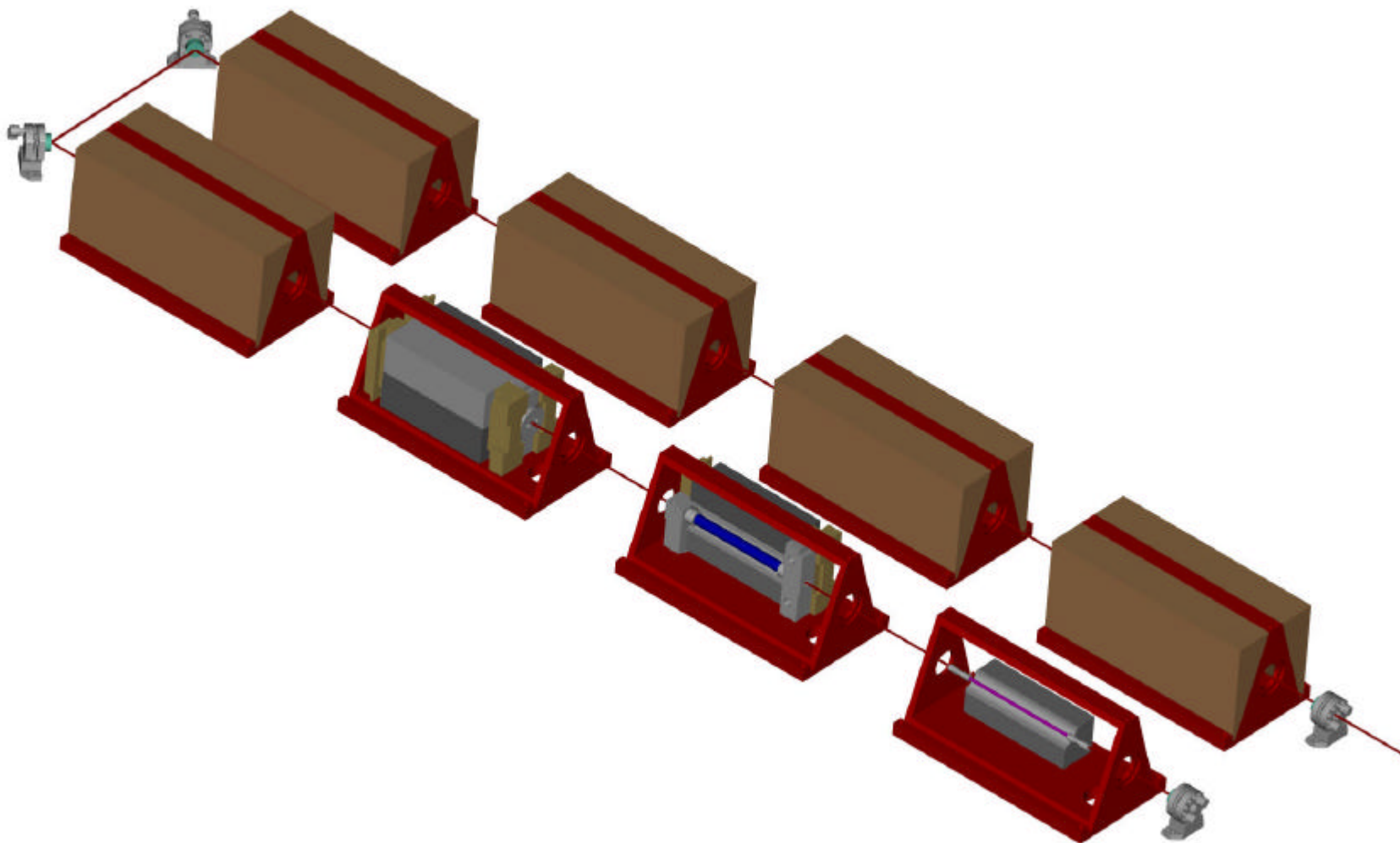
Diode-pumped Nd:YAG laser

ROFIN DY 022



Diode pumped Nd:YAG laser

ROFIN DY 044



ROFIN DY Series

Model	DY x55	DY 011	DY 016	DY 022	DY 033	DY 044
Max. Output Power	550 W	1100 W	1650 W	2200 W	3300 W	4400 W
Number of Cavities	1	2	3	4	6	8
Beam Quality	12 mm x mrad					
Effective power (at nominal power)	10 kW	19 kW	27 kW	37 kW	64 kW	73 kW
PC Control	Touch Screen PC, Windows NT					

Technological disadvantages of lamp pumped CW Nd:YAG lasers

Consequences of the low efficiency $< 3\%$ * :

- High investment cost for laser and chiller
- Cost intensive power supply installation because of high connected loads for laser and chiller
- High running cost because of high energy consumption

Consequences of high lamp wearing:

- Short maintenance intervals (300 - 1000 h)
- Unpredictable down times because of statistical lamp failures
- Cost intensive redundant laser system concepts for high production availabilities
- High running cost because of high lamp consumption

* Highest process efficiency, reliability and flexibility for cutting and welding is so far industrially approved (CO₂ lasers) with laser focal spot sizes of 0,15 - 0,3 mm at a focal length between 100 and 200 mm. Related beam qualities in the range of 10 mm x mrad can be realised with lamp pumped Nd:YAG lasers only with electrical efficiencies of less than 2%.

Some main differences between CW Nd-YAG laser lamp and diode pumped

Description	Lamp pumping			Diode pumping	Lamp pumping		Diode pumping
Nominal power W	350	500	700	550	1.000	1.000	1.100
Beam Quality mm*mrad	12	25	12	12	25	12	12
Fiber Optic Diameter μm	300	600	300	300	600	300	300
Mains Power kW (without chiller)	20	23	40	11	45	60	16
Lamp lifetime (hours)	500-1.000			--	500-1.000		
Guaranted diode lifetime (hours)	--			10.000	--		10.000

Savings of diode pumped versus lamp pumped Nd:YAG-lasers*

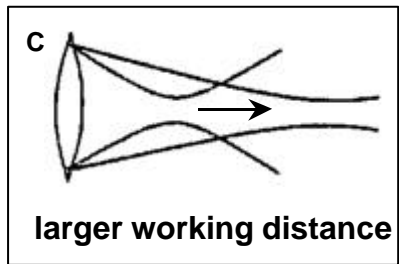
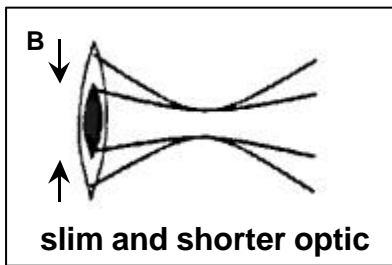
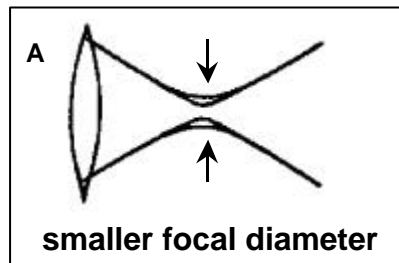
Laser				Savings*		
diode pumped		lamp pumped		at 0,14 DM/kWh	at 0,21 DM/kWh	at 0,21 DM/kWh***
Power** [W]	BQ [mmxmrاد]	Power** [W]	BQ [mmxmrاد]	[DM]	[DM]	[DM]
500	12	700	12	> 110.000	> 160.000	> 130.000
1000	12	1000	12	> 105.000	> 160.000	> 130.000
1500	12	2000	25	> 155.000	> 240.000	> 200.000
2000	12	3000	25	> 290.000	> 415.000	> 360.000
2500	12	3000	25	> 130.000	> 250.000	> 200.000
3000	12	4000	25	> 265.000	> 430.000	> 365.000
4000	12	5000	25	> 260.000	> 465.000	> 390.000

* in terms of investment and running costs for an operation time of 20.000 h respectively 4 years in 3 shift operation at 50% on time of the laser

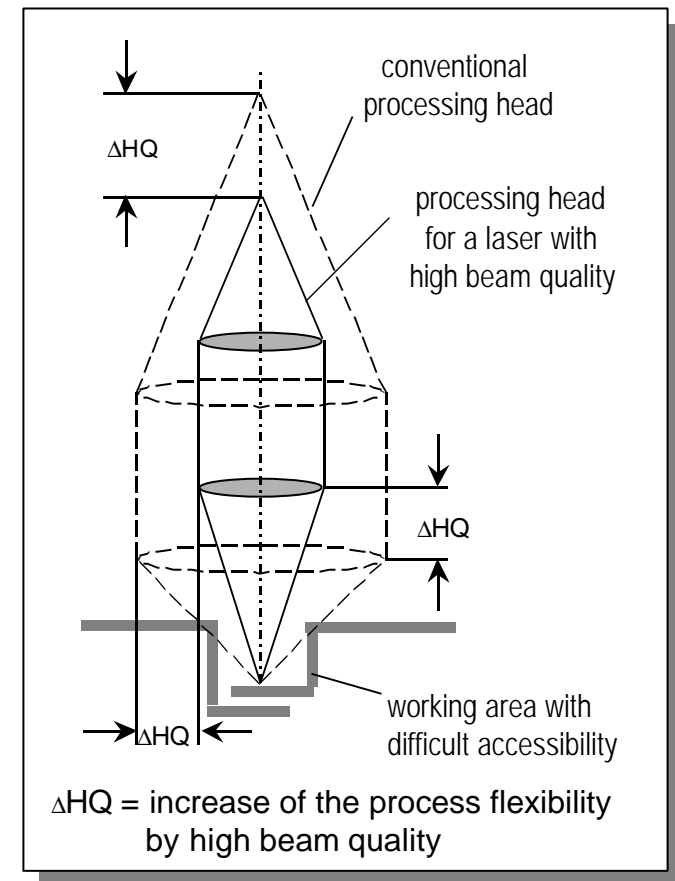
** power at the work-piece, controlled for a lamp life time of 2.000 h respectively a diode life time of 20.000 h
diode pumped Nd:YAG laser ROFIN DY 0XX with a beam quality (BQ) of 12 mmxmrاد
(0,3 mm focal diameter at 200 mm focal length) are saving related to the application 20 - 30 % beam power in comparison to lamp pumped lasers for similar cutting and welding speeds

*** related to investment and running costs for an operation time of 10.000 h respectively 2 years in 3 -shift operation at 100 % on time of the laser

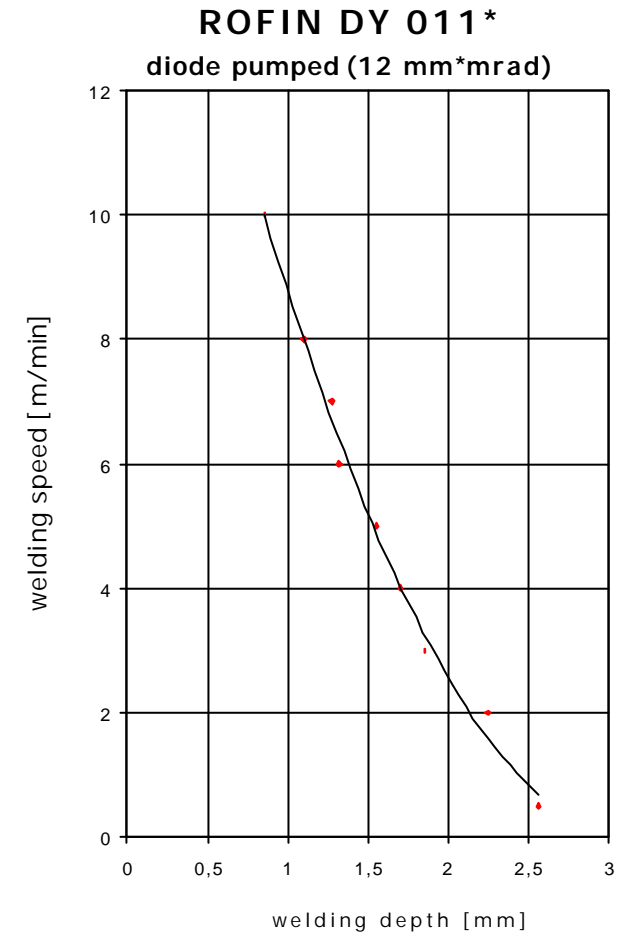
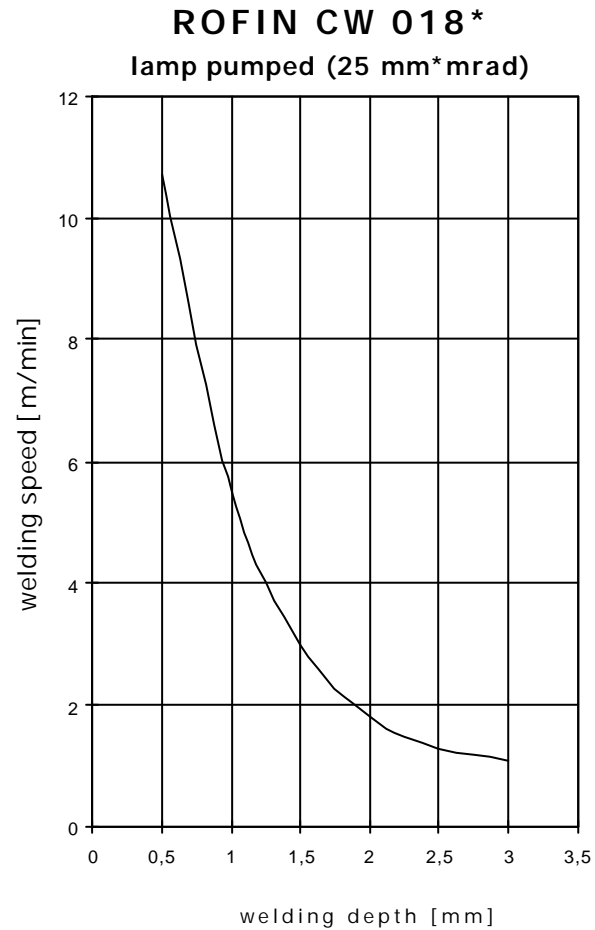
Advantages of the high beam quality for cutting and welding applications



- **higher process efficiency**
(higher speed or less power requirement)
- **low heat input**
- **higher process flexibility**



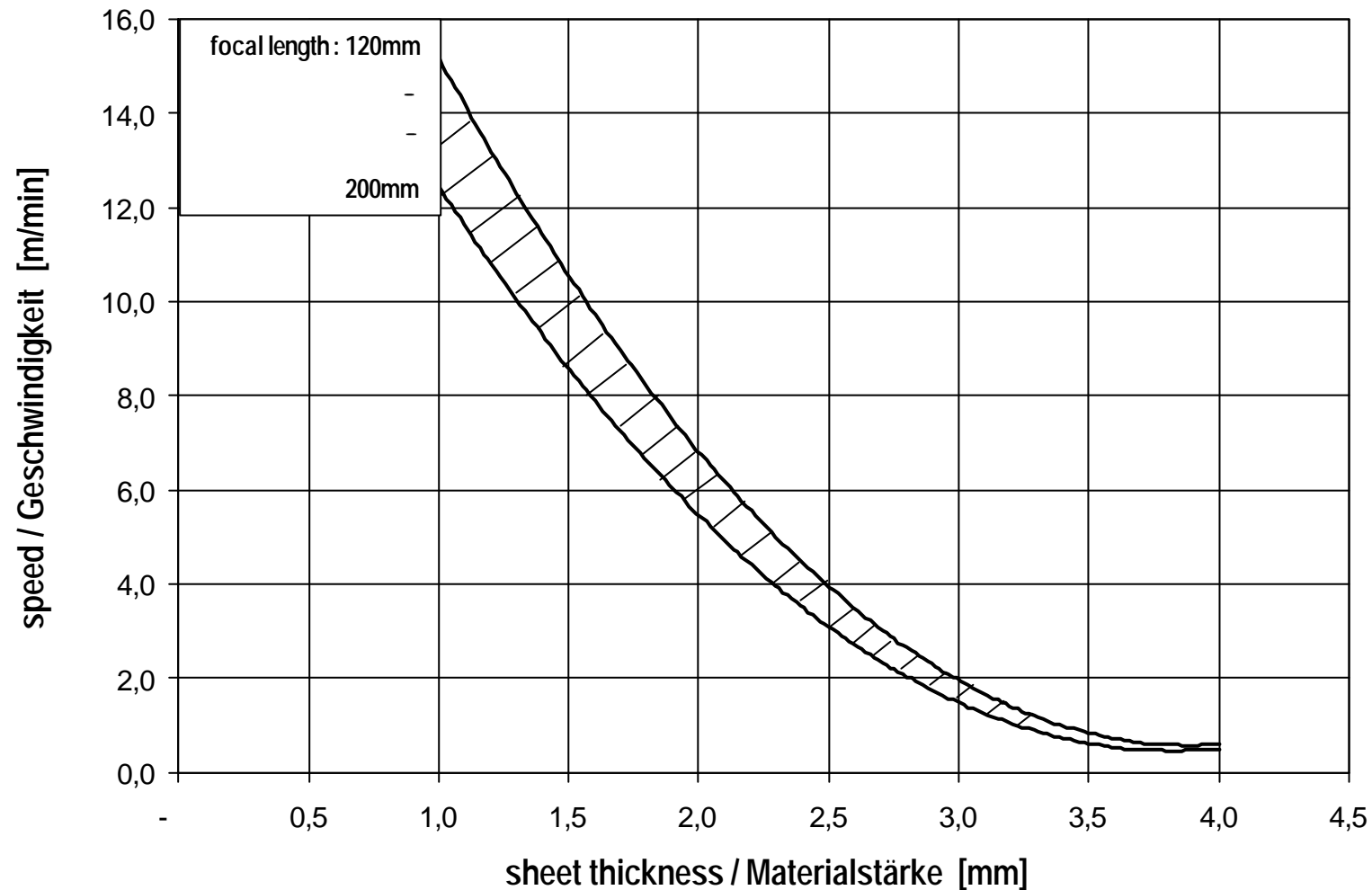
Comparison of welding speeds with ROFIN CW 018 and ROFIN DY 011



* Beam power: 1 kW on the workpiece at a focal length of 120 mm

Aluminium welding by ROFIN DY022* at focal length between 120 and 200mm

(Schweißen von Aluminium mit DY022 bei Brennweiten zwischen 120 und 200mm)

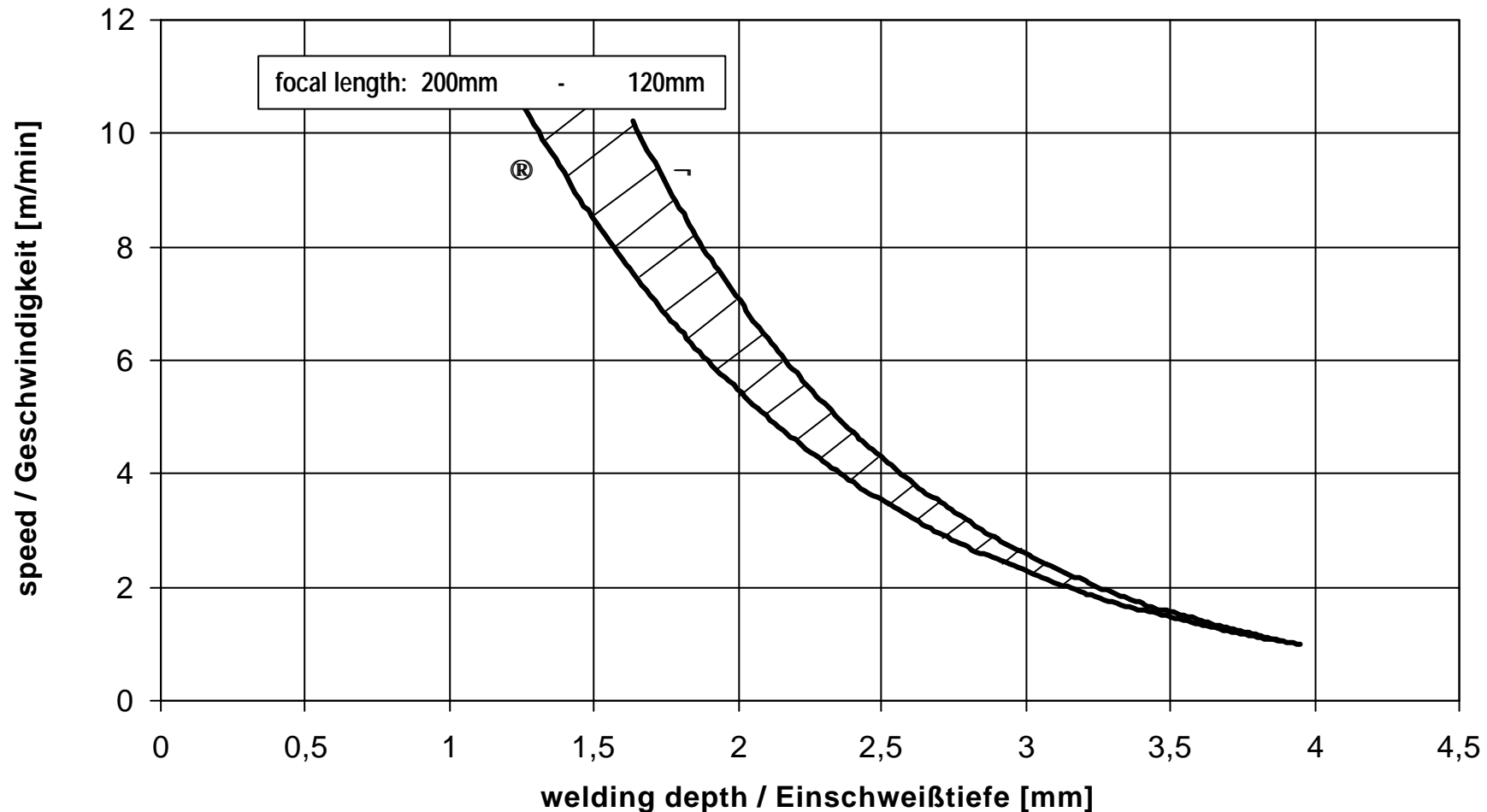


* welding in full material penetration / Schweißen in voller Materialstärke



Stainless steel welding by ROFIN DY022* at focal length between 120 and 200 mm

(Schweißen von Edelstahl mit DY022 bei Brennweiten zwischen 120 und 200 mm)

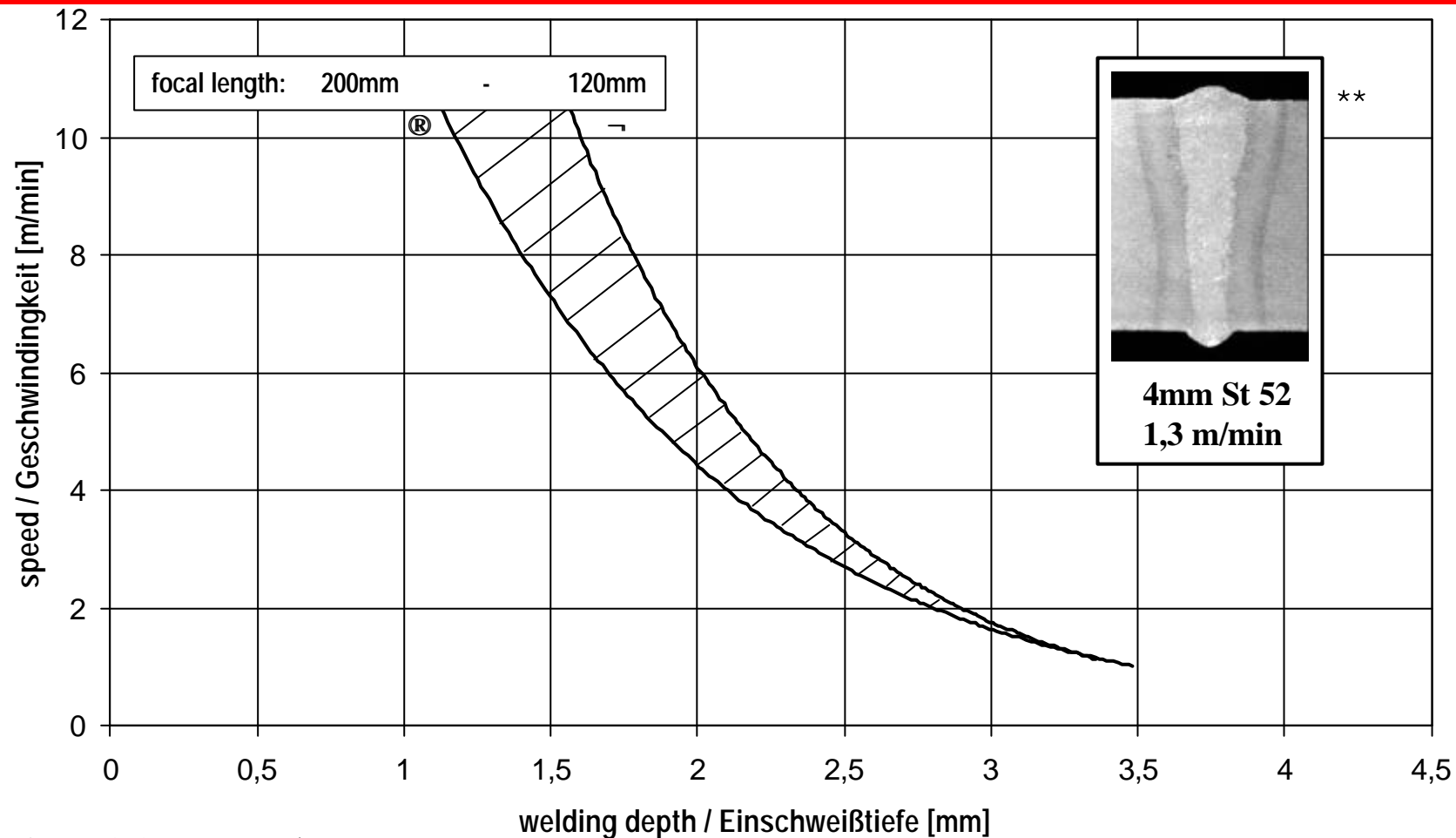


* 8 mm thick test coupon, welding in full material penetration allows higher speeds /

8 mm dicke Schweißproben, das Schweißen in vollständiger Materialstärke erlaubt höhere Schweißgeschwindigkeiten

Mild steel welding by ROFIN DY022* at focal length between 120 and 200 mm

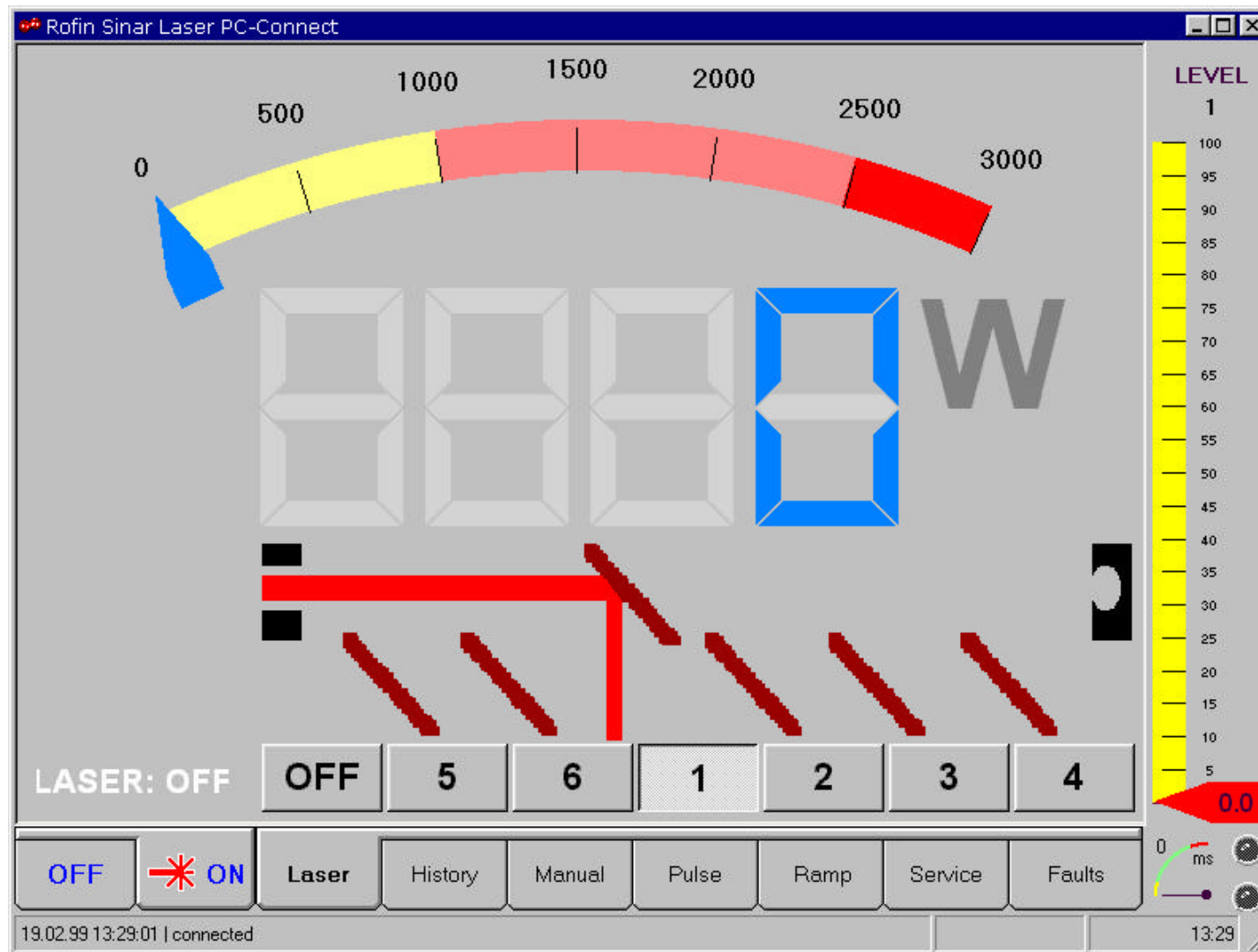
(Schweißen von Baustahl mit DY022 bei Brennweiten zwischen 120 und 200mm)



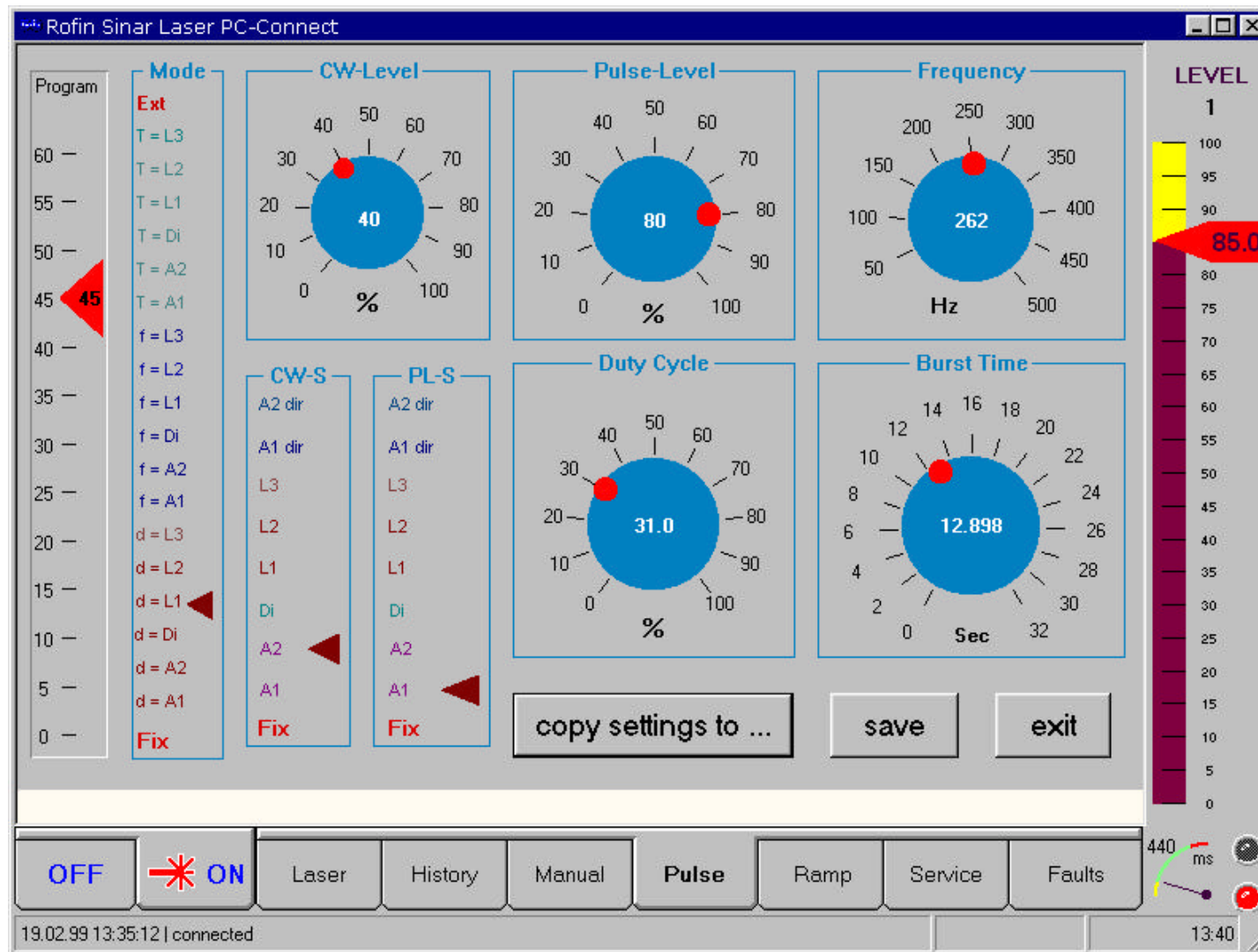
* 8 mm thick test coupons / 8 mm dicke Schweißmuster

** welding in full material penetration allows higher welding speeds / Das Schweißen in vollständiger Materialstärke erlaubt höhere Schweißgeschwindigkeiten.

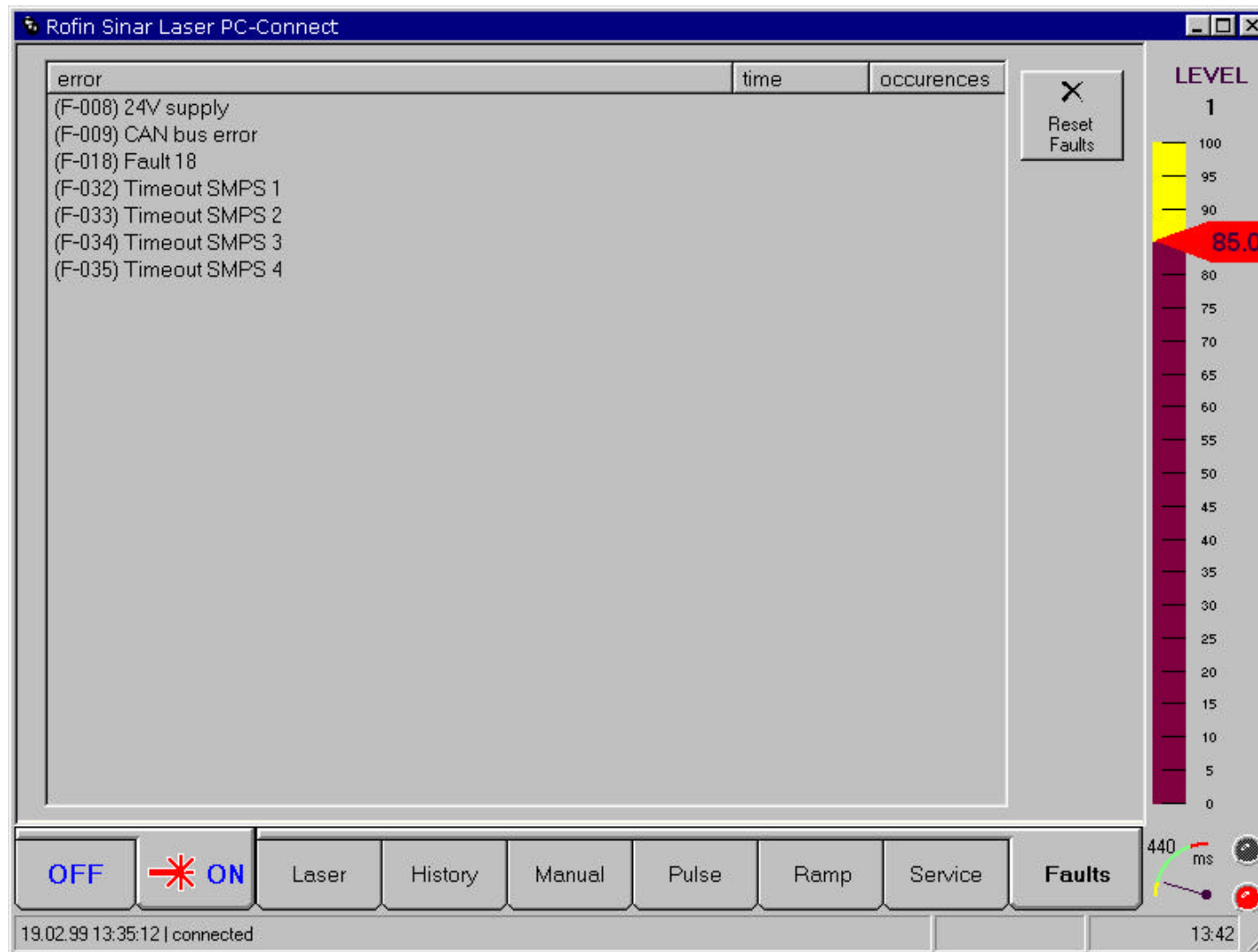
Laser Screen



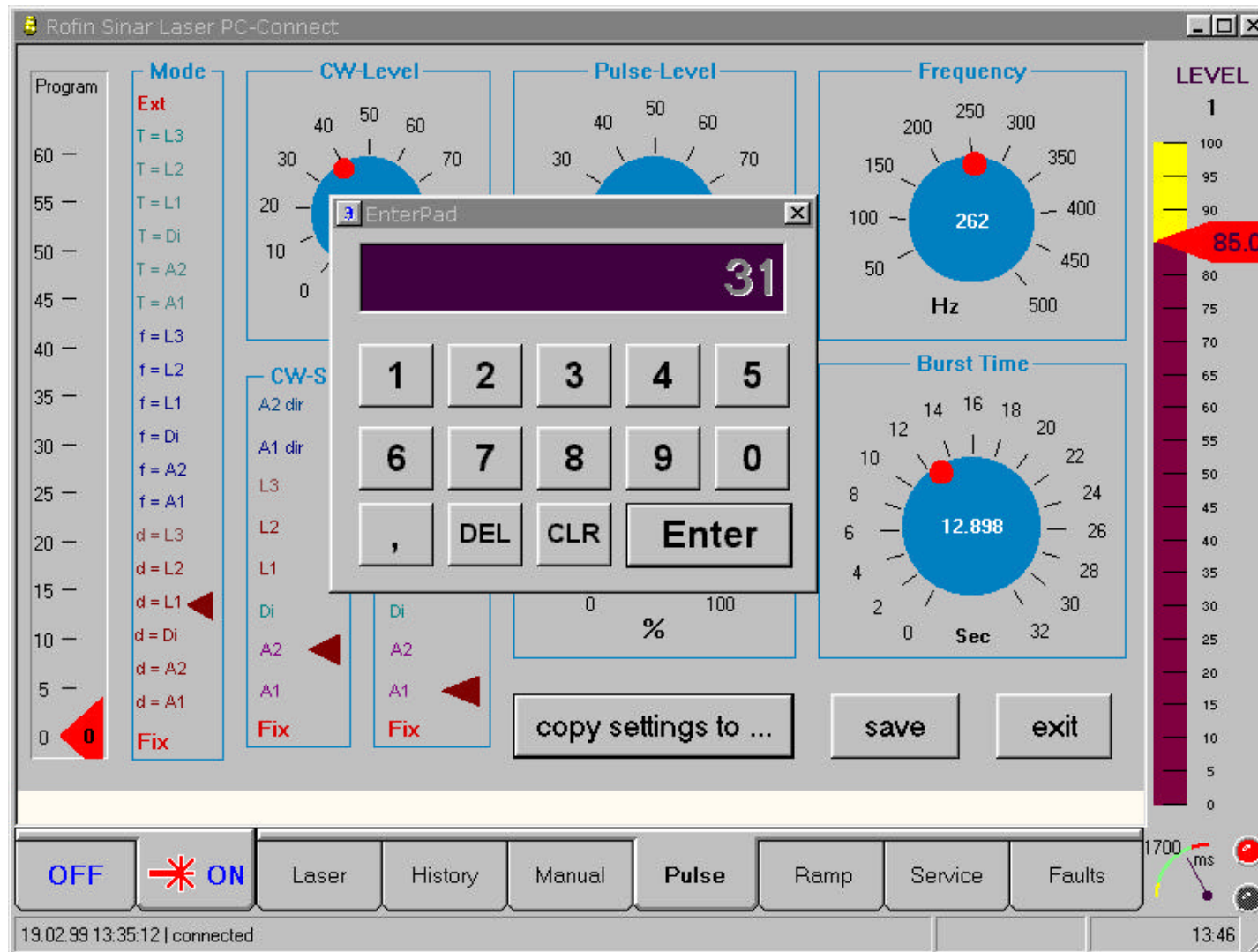
Edit Pulse



Fault Screen



Numeric Entry



Help Manual

