

BY DEKA SURGICAL

SmartXide² ENT

The ENT laser platform. The accuracy of scanner-assisted CO₂ laser and the flexibility of diode lasers, driven from a single console.

- RF-excited CO₂ source with PSD® pulse shaping
- EasySpot Hybrid + HiScan Surgical scanning
- Optional 980 nm diode module, integrable at any time



10.6 μm
CO₂ WAVELENGTH

980 nm
DIODE WAVELENGTH

80 W
MAX U-PULSE POWER (C80)

< 50 μm
THERMAL DAMAGE MARGIN

01 PLATFORM OVERVIEW

Two laser sources. One console.

The SmartXide² ENT pairs an RF-excited CO₂ laser on a 7-mirror articulated arm with an optional 980 nm diode module on flexible fibre, both driven from the same 15.6" colour touchscreen.

The SmartXide² RF-excited CO₂ laser source offers high power and speed of action. PSD® (Pulse Shape Design) uses both, generating variable peak pulses with different structure, duration and power to adapt to the various clinical conditions.

On the arm sit the EasySpot Hybrid micromanipulator and the HiScan Surgical scanning system, giving control over cutting length, ablation area, treatment depth and coagulation — with minimal thermal damage to perilesional tissues and no carbonisation of the cutting edges.

2 wavelengths
10.6 MM · 980 NM

5 emission modes
CW · SP · DP · HP · UP

4 configurations
C60 · C60H · C80 · C80H



Fig. 1 The CO₂ articulated arm carrying the EasySpot Hybrid micromanipulator and the HiScan Surgical scanning system. EasySpot Hybrid can be used with all surgical microscopes.

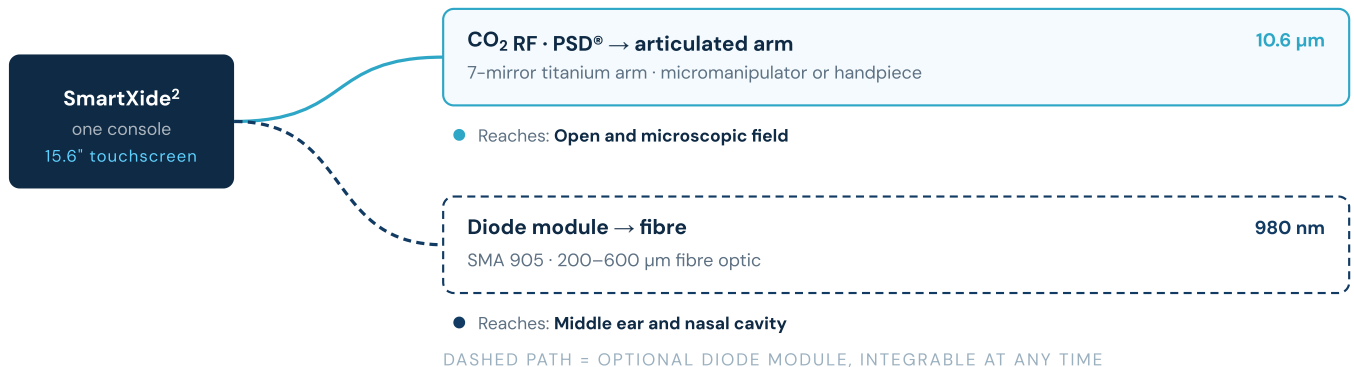


Fig. 2 Platform architecture. The RF-excited CO₂ source feeds the 7-mirror articulated arm; the optional diode module adds an independent 980 nm fibre path and can be integrated into the SmartXide² at any time.

Defining characteristics

RF-excited CO₂ + PSD®

Pulse Shape Design generates variable peak pulses of differing structure, duration and power, adapting the source to the clinical condition.

980 nm diode module

An additional wavelength on flexible fibre, expanding the range of available procedures. Integrable into the SmartXide² at any time.

EasySpot Hybrid

Holographic lenses and high-reflectance mirrors, single-ring focus with focal-point memory, four functions on one microswitch joystick.

HiScan Surgical

Beam movement in 100 millionths of a second with minimum dwell time, across scanning shapes up to 6.3 mm for cutting and ablation.

Handpiece range

Focusing lenses, spacers and mirrors from 1.5" to 8" EFL plus collimated, each with a dedicated air inlet and smoke extraction at the tip.

"ONE SHOT" stapedotomy

Retrieval database protocols set the energy needed to make the plate hole with a single pulse, by scanner-assisted CO₂ laser or by diode fibre.

02 LASER SOURCE & PSD®

The pulse is the instrument.

U-Pulse and “Real CW” are the modes most commonly used in ENT surgery. Power envelopes below are shown for the C80 chassis; SP, DP and HP are identical across all four configurations.

MODE		POWER	ROLE IN ENT SURGERY
CW	Continuous Wave	0.5–70 W	“Real CW”: no acoustic effect. Suitable for ONE SHOT stapedotomy.
SP	<i>not named in the ENT sheet</i>	0.1–15 W	PSD® pulsed mode.
DP	<i>not named in the ENT sheet</i>	0.2–15 W	PSD® pulsed mode.
HP	<i>not named in the ENT sheet</i>	0.1–15 W	PSD® pulsed mode.
UP	U-Pulse (Ultrapulse)	0.5–80 W	Massive energy in microseconds. Ablation without carbonisation.

Fig. 3 The five emission modes and their published power envelopes. DEKA's ENT technical sheet lists all five by code and names only CW and U-Pulse in prose; the remaining three are left unnamed here rather than captioned with a guess.

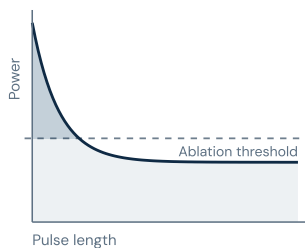


Fig. A — Superpulse
Continuous-supply excited

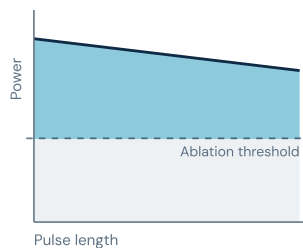


Fig. B — Ultrapulse (RF)
Radiofrequency excited

Fig. 4 Single-pulse comparison. Radiofrequency-excited CO₂ sources produce greater energy above the ablation threshold than continuous-supply excited sources, at comparable pulse length. Redrawn from the manufacturer's technical literature: the envelopes illustrate the emission behaviour described, and are not measured traces.

Why RF excitation

The SmartXide² RF-excited CO₂ laser source offers high power and speed of action. PSD® uses both, generating variable peak pulses with different structure, duration and power to adapt to the various clinical conditions.

- **U-Pulse** — a massive energy supplied in microseconds, ensuring a perfect ablation without tissue carbonisation. The perfect pulse for ENT microsurgery.
- **“Real CW”** — no acoustic effect, which is what makes it suitable for the “ONE SHOT” stapedotomy technique.

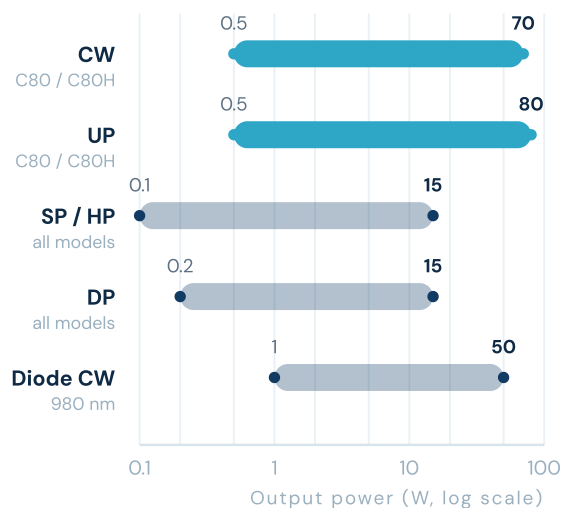


Fig. 5 Output-power envelopes on a common logarithmic axis. The diode bar shows the module's rated 50 W continuous-wave ceiling.

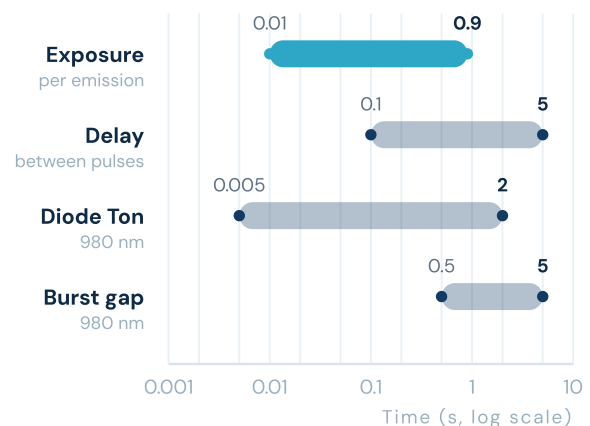


Fig. 6 Timing envelopes. Exposure and delay are independently selectable, giving direct control of duty cycle and accumulated thermal load.

03 DELIVERY

Reach every anatomy from one platform.

Each delivery path addresses a distinct set of surgical conditions. Both are driven from the same console and the same 15.6" touchscreen control panel.

01 CO₂ LASER · 10.6 MM

Articulated Arm

A 7-mirror titanium articulated arm with counterweight, optionally supplied in carbon fibre. SmartXide² offers a broad range of handpieces with different focusing lenses, spacers and mirrors for perfect operation in all applications.

- Electronic scanning systems, for extremely precise, safe and reproducible treatments
- High Precision micromanipulators
- Dedicated handpieces with various focal lengths and integrated smoke suction channel
- A dedicated air inlet keeps lenses safe from dust and debris particle accumulation
- A special 2" ("SLIM CUT") handpiece for free-hand precision cutting



02 DIODE LASER MODULE · 980 NM

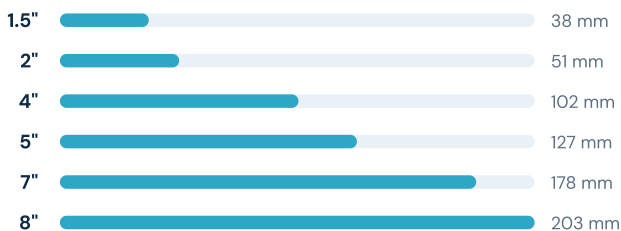
Fibre

An additional wavelength (980 nm) to expand the range of available procedures. The diode laser and fibre delivery system allows the surgeon to operate easily, even in the hardest conditions.

- The use of diode lasers is well known in ENT
- Fibre optics reach internal areas such as the middle ear and the nose (turbinates)
- Enables the "ONE SHOT" stapedotomy technique
- 200, 300, 400, 500 and 600 µm fibre optics with chips, SMA 905 connector
- Single-use, or resterilisable up to 10 times



EFFECTIVE FOCAL LENGTH



∞ Collimated handpiece — no focal convergence

Fig. 7 Handpiece effective focal lengths, bar length proportional to the figure. The integrated smoke channel extracts at the tip of every EFL handpiece and of the collimated handpiece.

FIBRE CORE DIAMETERS · TRUE RELATIVE SCALE

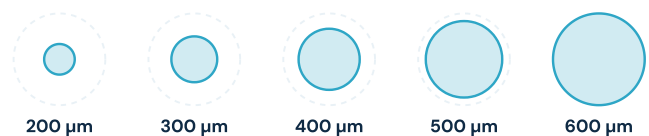


Fig. 8 Fibre core diameters for the diode module, drawn to true relative scale: 600 µm carries nine times the core area of 200 µm.

7 mirrors

ARTICULATED ARM

980 nm

DIODE WAVELENGTH

200–600 µm

DIODE FIBRE CORES

10 ×

RESTERILISABLE FIBRE OPTION

04 EASYSLOT HYBRID

Safety. Reproducibility. Ease of use.

The EasySpot Hybrid micromanipulator combines holographic lens technology with high-reflectance mirrors, giving the surgeon control over spot dimension, scanning shape and focal depth without moving their eyes from the microscope. It can be used with all surgical microscopes.

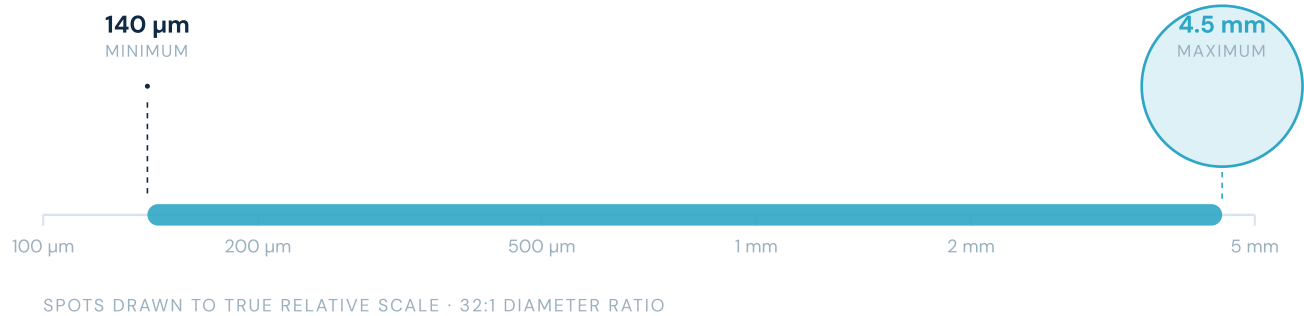


Fig. 9 Spot dimension range of the EasySpot Hybrid micromanipulator. The minimum and maximum spots above the axis are drawn to true relative scale — a 32:1 ratio between the finest incisional spot and the widest defocused spot.

DEKA scan-assisted ENT laser microsurgery

- Minimal thermal damage — Less than 50 microns to perilesional tissues.
- No carbonisation — Cleanliness of cutting edges.
- Control on cutting length — Ablation area, treatment depth and coagulation (%).
- 2 working modalities — “Depth” and “Power”.
- Software-guided procedure — For both focusing and laser beam centration.

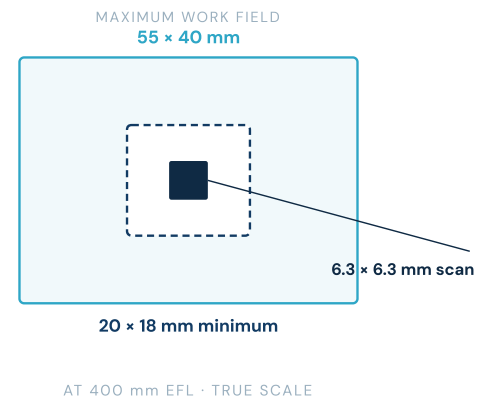


Fig. 10 Work-field envelope at 400 mm EFL, with the maximum HiScan scan area shown at the same scale.

The four controls

Easy Control

Operate without ever moving your eyes from the microscope. Four functions on the exclusive microswitch joystick: scanning shape rotation, ablation figure dimension, Scan-ON/Scan-OFF and laser beam centering.

Easy Field

Mechanical control of the working area. Precisely confines the laser beam within the operating field. Easy and safe.

Easy Focus

Hybrid technology focusing system. Holographic lens and high-reflectance mirrors, with a single-ring focus/defocus system and focal point memory. High depth focus, with exact correspondence between the guide light and the CO₂ laser.

Easy Plug

Fast connections and internal wiring.

140 µm
FINEST SPOT

4.5 mm
WIDEST SPOT

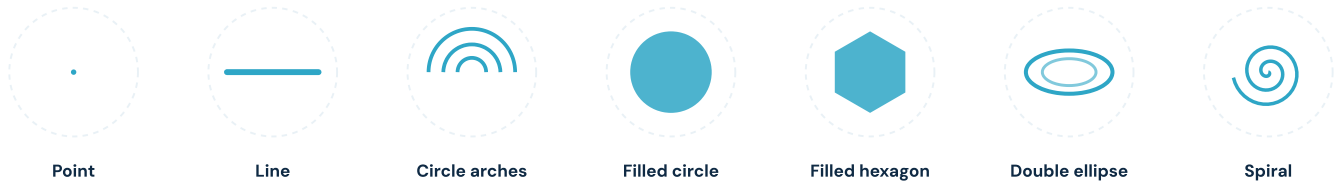
4 functions
JOYSTICK MICROSWITCH

55 x 40 mm
MAX WORK FIELD

05 HISCAN SURGICAL

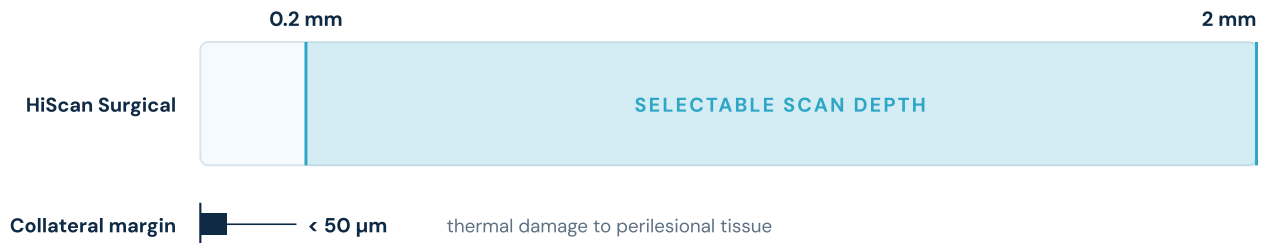
Ultra-fast, reproducible beam movement.

HiScan Surgical moves the laser beam in 100 millionths of a second with minimum dwell time, producing high-precision scanning shapes of up to 6.3 mm for tissue cutting and ablation.



DRAWN TO A COMMON SCALE INSIDE THE 6.3 mm SCAN ENVELOPE (DASHED). POINT IS THE 140 μ m MINIMUM SPOT.

Fig. 11 The scanning geometries available for surgery. Filled figures are laid down in either progressive or interlaced pass order. Spirals are the figure used for the "ONE SHOT" stapledotomy technique.



BOTH SCALES IDENTICAL · 1 mm = 197 pt

Fig. 12 Selectable scan depth against the collateral thermal margin, plotted on one common scale. The margin to perilesional tissue stays below 50 μ m across the whole depth range.

100 μ s

MINIMUM DWELL TIME

45 ms

MAXIMUM DWELL TIME

0.2 – 2 mm

SCAN DEPTH RANGE

7

SCANNING GEOMETRIES

Scan modalities and pass order

- **Power Mode and Depth Mode** — two working modalities: set the power the tissue sees, or set the depth the scan should reach.
- **Progressive and interlaced scan** — filled figures are laid down in either pass order.
- **Emission modes** — the scanner operates in CW and U-Pulse.
- **Easy Plug** — fast connections and internal wiring, alongside the EasySpot Hybrid.

3D ABLATION

Fast Ablation Turbo CUT Technology

06 CLINICAL APPLICATIONS

The technological solution for all ENT treatments.

Case series published by DEKA and documented by the operating surgeons, with follow-ups from three to twelve months.

Left vocal cord polyp

Left vocal cord polyp → 3 months follow-up

Courtesy of Stefano Dallari, M.D.

Squamous cell carcinoma (T3)

Squamous cell carcinoma (T3) → 6 months follow-up

Courtesy of Stefano Dallari, M.D.

Squamous cell carcinoma (T1a)

Squamous cell carcinoma (T1a) → 12 months follow-up

Courtesy of Stefano Dallari, M.D.

"ONE SHOT" stapedotomy

With CO₂ laser → With diode laser

Courtesy of Arturo Mario Poletti, M.D.

Recurrent respiratory papillomatosis

Recurrent respiratory papillomatosis → After removal of the papilloma (obvious glottic stenosis) → 11 months follow-up (after 4 procedures)

Courtesy of Guillermo Campos, M.D.

Bilateral paralysis of the vocal cords (after total thyroidectomy)

Bilateral paralysis of the vocal cords → Posterior cordotomy → 6 months follow-up

Courtesy of Guillermo Campos, M.D.

"ONE SHOT" stapedotomy with diode laser fibre

Up to a few years ago, "ONE SHOT" laser stapedotomy had to be performed only with micromanipulators and scanning systems. Today the same minimally-invasive technique can be performed with a fibre delivered diode laser with high power and low time of emission.

Dedicated retrievable database protocols set the laser energy necessary to make the plate hole with a single pulse, ensuring operative simplicity, safety and precision.

Single pulse
TO MAKE THE PLATE
HOLE

980 nm
FIBRE DELIVERED

2 routes
SCANNER OR FIBRE

BIBLIOGRAPHIC REFERENCES

A.M. Poletti et al.

The "One Shot" Diode Stapedotomy
Photomedicine and Laser Surgery, 2015

S. Dallari

Video Atlas of Middle Ear Surgery
Minerva Medica ed., 2018

S. Dallari et al.

"One Shot" Stapedioplasty with Scanner-Assisted CO₂ Laser and 980 nm Diode Laser
DEKA White Paper, October 2011

The experience of professionals

I've been using diode laser for stapedotomies since the end of the 1990s. It's very easy to use, safe and makes the surgical procedure faster. I started with 940 nm and switched to 980 nm, which I prefer. The main characteristic of 980 nm is that it's partially absorbed by water, therefore the...

Arturo Mario Poletti, M.D.
American Hospital Dubai, UAE

The DEKA CO₂ laser, with progressive scanning technology, makes surgery on delicate tissues, like vocal cords, easier and safer. This is a wonderful tool for selective reconstruction procedures of the airways, with a series of significant advantages that go from ablation depth control, to...

Guillermo Campos, M.D.
Fundación Santa Fé University Hospital, Bogotá DC, Colombia

Thanks to the precision and replicability that only scan-assisted CO₂ laser microsurgery can offer, the new HiScan Surgical scan system, along with the Easyspot Hybrid micromanipulator, has significantly simplified the performance of delicate and complex surgical procedures such as transoral...

Stefano Dallari, M.D.
Ospedale di Fermo (Hospital of Fermo), Italy

Clinical disclaimer. The DEKA SmartXide² is a Class 4 laser appliance intended for use by qualified physicians and surgeons. All clinical applications should be undertaken in accordance with applicable regulations, institutional protocols and applicable safety standards. Individual results may vary. Clinical cases referenced above are the documented experience of the named investigators and are not a representation of expected outcomes. Quotations are reproduced from the manufacturer's published ENT literature.

07 CONFIGURATIONS

Four models. One platform.

The chassis sets the CO₂ power envelope and the cabinet height. Everything else — PSD®, the articulated arm, the scanning and micromanipulator options — is common to all four.

MODEL	CABINET	CW POWER	U-PULSE POWER	HEIGHT	WEIGHT
C60	Standard cabinet	0.5 – 60 W	0.5 – 60 W	162 cm	95 kg
C60H	Tall cabinet	0.5 – 60 W	0.5 – 60 W	192 cm	100 kg
C80	Standard cabinet	0.5 – 70 W	0.5 – 80 W	162 cm	95 kg
C80H	Tall cabinet	0.5 – 70 W	0.5 – 80 W	192 cm	100 kg

Fig. 13 Suggested ENT configurations. Cabinet footprint is 59 cm wide by 56 cm deep on every model.

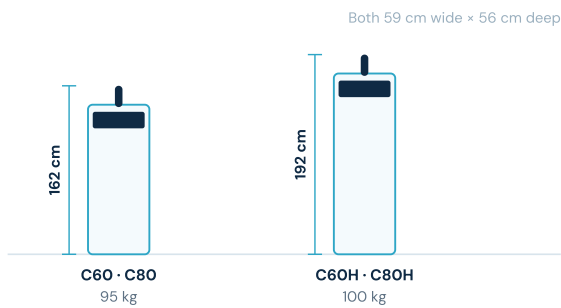


Fig. 14 Cabinet elevations, drawn to scale on both axes. The H variants stand 30 cm taller and weigh 5 kg more.

Common to every configuration

- CO₂ RF source with PSD® pulse shaping, 10.6 μm, TEM₀₀
- SP 0.1 – 15 W · DP 0.2 – 15 W · HP 0.1 – 15 W
- 7-mirror titanium articulated arm with counterweight, optionally carbon fibre
- 15.6" LCD colour touchscreen
- 635 nm guide light, 4 mW, regulated 2% to 100%, off during emission (DOWL)
- Power supply 100 to 120 Vac 50/60 Hz, or 220 to 230 Vac 50 Hz / 1600 VA

Optional across all models

- High Power Diode laser @ 980 nm, max. 50 W
- HiScan Surgical scan system
- EasySpot Hybrid micromanipulator
- Broad range of surgical handpieces

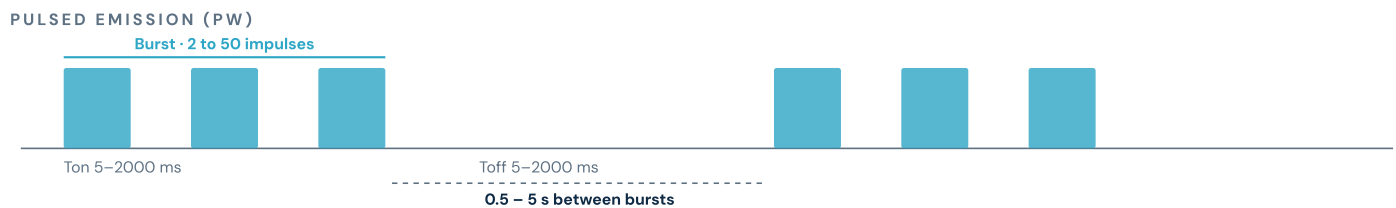


Fig. 15 Pulsed-emission timing for the optional diode module: bursts of 2 to 50 impulses, each with independently selectable on and off times, and a selectable delay between bursts.

08 SPECIFICATIONS

Technical data.

Reproduced from the manufacturer's published technical sheet for the ENT configurations.

CO₂ LASER — MAIN SOURCE

Models	C60 and C60H · C80 and C80H
Type of laser	CO ₂ RF · PSD®
Wavelength	10.6 µm
Laser emission mode	TEM ₀₀
Emission modes	CW · SP · DP · HP · UP
CW power	0.5 to 60 W (C60, C60H) · 0.5 to 70 W (C80, C80H)
SP power	0.1 to 15 W
DP power	0.2 to 15 W
HP power	0.1 to 15 W
UP power	0.5 to 60 W (C60, C60H) · 0.5 to 80 W (C80, C80H)
Exposure time	0.01 to 0.9 seconds
Delay time	0.1 to 5 seconds
Transmission system	7-mirror titanium articulated arm with counterweight, or flexible hollow fiber. Optionally supplied in carbon fiber.
Guide light	High Quality Diode @ 635 nm · 4 mW. Intensity regulated from 2% to 100%. Diode function OFF during emission (DOWL).
Control panel	15.6" LCD colour touchscreen
Accessories (optional)	High Power Diode laser @ 980 nm, max. 50 W · HiScan Surgical scan system · EasySpot Hybrid micromanipulator · broad range of surgical handpieces
Power supply	100 to 120 Vac, 50/60 Hz · 220 to 230 Vac, 50 Hz / 1600 VA
Size and weight	162 (H) × 59 (W) × 56 (D) cm, 95 kg for C60 and C80 · 192 (H) × 59 (W) × 56 (D) cm, 100 kg for C60H and C80H

HIGH-POWER 980 NM DIODE LASER (OPTIONAL)

Wavelength	980 nm
CW power	50 W
Emission modes	CW and PW
Exposure modes	Continuous, single impulse, burst or repeated burst
Emission time PW (Ton)	From 5 to 2000 ms
Emission delay time in PW (Toff)	From 5 to 2000 ms
Burst impulses in PW	From 2 to 50
Delay between bursts	From 0.5 to 5 seconds
Transmission system	200 µm, 300 µm, 400 µm, 500 µm and 600 µm fiber optics, single-use or resterilisable up to 10 times, with chips, SMA 905 connector

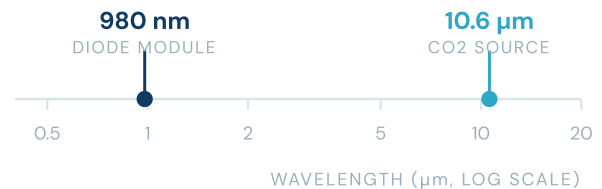


Fig. 16 The two wavelengths available on the platform, on a logarithmic wavelength axis. The optional diode module operates an order of magnitude below the CO₂ line.

HISCAN SURGICAL SCANNING SYSTEM

Max scanning area	6.3 mm × 6.3 mm @ 400 mm EFL
Dwell time	From 100 µs to 45 ms
Scan depth	From 0.2 to 2 mm
Scan modalities	Power Mode and Depth Mode
Scanning system	Point, lines, circle arches up to a complete circle, spiral, filled circle, hexagon (progressive and interlaced scan)
Emission modes	CW · UP

EASYSLOT HYBRID MICROMANIPULATOR

Optics technology	Holographic lenses and mirrors (Hybrid)
Spot dimension	Min 140 µm · Max 4.5 mm
Work field @ 400 mm EFL	Min 20 × 18 mm · Max 55 × 40 mm
Joystick-regulated functions	Rotation and size of scanning shapes, Scan On / Scan Off, fine centration
Microscope compatibility	Can be used with all surgical microscopes

At a glance

10.6 µm

CO₂ WAVELENGTH

980 nm

DIODE WAVELENGTH

80 W

MAX U-PULSE (C80)

50 W

DIODE CW POWER

< 50 µm

THERMAL DAMAGE MARGIN

100 µs

MINIMUM DWELL TIME

6.3 × 6.3 mm

MAX SCANNING AREA

140 µm – 4.5 mm

SPOT DIMENSION RANGE

ISO 9001 certified

ISO 13485 certified

Directive 93/42/EEC

Class 4 laser appliance

Manufacture. DEKA M.E.L.A. s.r.l., Via Baldanzese 17, 50041 Calenzano (FI), Italy. DEKA manufactures laser devices in compliance with the specifications of Directive 93/42/EEC and its quality assurance system is in accordance with the ISO 9001 and ISO 13485 standards. Reserved to health professionals.

Attention. Visible and invisible laser radiation. Avoid exposing eyes and skin to direct or diffuse radiation. Class 4 laser appliance, classified to IEC 60825-1 (2014-05).

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