



tt532 & tt577

Pattern scanning laser devices

Engineered for optimal retinal
photocoagulation procedures

your laser specialist

MA - Brochure TT 532 - TT 577 (TT) M00471 Ver.2.0 | Copyright © Meridian Medical

LASER EXCELLENCE

Meridian Medical has been at the forefront of ophthalmic laser technology for decades.

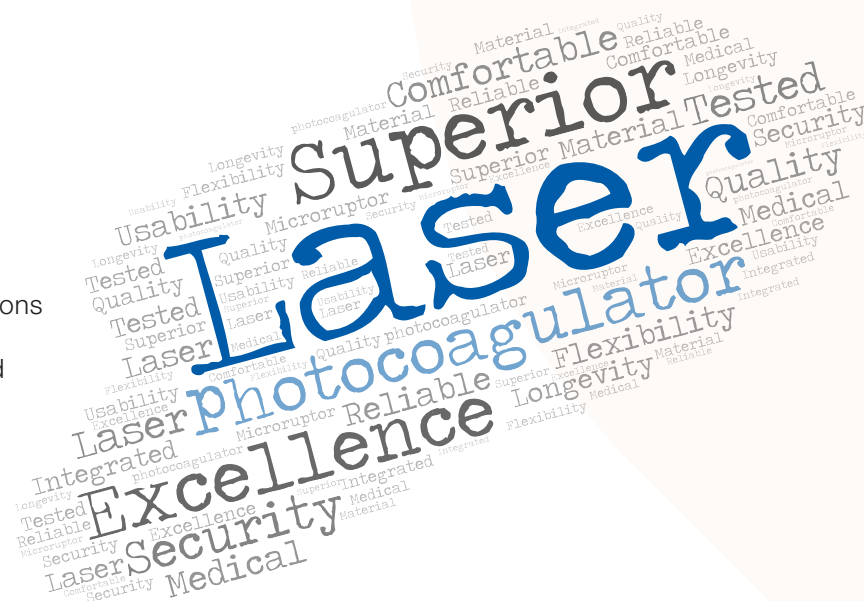
Our pioneering Microruptor II, developed by Meridian Medical engineers in collaboration with Dr Fankhauser, revolutionised ophthalmic treatments and set new industry standards with its Industry-first Nd:YAG laser technology in 1982.

From our Swiss headquarters, we continue to drive innovation and precision through the development of advanced ophthalmic laser systems supported by a strong portfolio of patents. Each system is engineered using high-quality Swiss and European components to ensure consistent performance, reliability, and full compliance with international standards.

Every Meridian Medical system is built following proven engineering practices and undergoes rigorous testing to meet the highest benchmarks of precision, safety, and durability. Our highly skilled and experienced team is dedicated to supporting superior clinical outcomes through reliable technology, responsive service, and the excellence that ophthalmologists worldwide associate with the Meridian Medical name.

PROTECT YOUR INVESTMENT: ESSENTIAL TIPS

- **Schedule Annual Maintenance:** Regular yearly servicing helps maintain consistent performance and supports the long-term reliability of your laser
- **Adhere to Safety Guidelines:** Always follow the manufacturer's safety recommendations and local regulatory requirements to maintain compliance and ensure safe operation
- **Use as Intended:** Refer to the Instructions for Use (IFU) to ensure proper handling and maximise efficiency and durability



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NEXT GENERATION PATTERN SCANNER

At Meridian Medical, we continue to raise the bar in quality, usability, and functional design – meeting the high expectations of today’s ophthalmic professionals. Discover our newly developed TT pattern scanning laser device, where proven Swiss precision meets the latest in med-tech refinement.

USABILITY

- User-friendly graphical user interface
- Auto-advance pattern, at-a-glance parameter visualisation via retinal projection
- User interface includes a safe shutdown
- Laser Indirect Ophthalmoscope (LIO) connection port
- New table design, easy in-room manoeuvrability
- Medical-grade all in one PC
- 14 mm slit-lamp adapter
- Control unit made of tempered glass
- Table depth (patient side to doctor side): 390 mm
- Ability to save individual settings by user name
- Meridian Medical’s online remote support empowers on-site service technicians with seamless maintenance assistance
- Service-friendly product design



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ADVANCED SAFETY AND HYGIENIC MATERIALS

Meridian Medical's new TT lasers are designed with the highest biocompatibility standards in mind, utilising premium materials in contact with the patient. For the tabletop we have selected Corian Glacier White (PK/A) by DuPont solid surface material, and tempered glass in the control unit to ensure both hygiene and durability. These materials offer a smooth, non-porous surface that is easy to clean and disinfect, providing optimal hygiene and patient safety.

HIGH-TECH TABLETOP MATERIAL

- Non-porous surface making it hygienic and easy to clean
- Chemical-resistant
- Inherent bacteriostatic properties
- Durable and resistant to scratches and cracks
- Environmentally friendly and recyclable design

MEDICAL-GRADE MONITOR

- 16" Medical-grade monitor
- IP65 water and dust-resistant display
- Sharp resolution and quick touch sensitivity
- Noiseless and dust-free due to fanless design
- Long-lasting durability



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WAVELENGTH THAT FITS YOUR CLINICAL NEEDS

Meridian Medical offers the green (532 nm) wavelength, which has been the gold standard for decades in retinal laser treatment, as well as the popular yellow (577 nm) wavelength.

CLINICAL INDICATION

Meridian Medical laser devices are expertly crafted for retinal photocoagulation procedures. Our lasers ensure top-notch performance and industry-leading optical quality.

The TT devices are intended for use in the treatment of ocular pathologies in both the posterior and anterior segments of the eye. The following indications have been defined:

for retinal photocoagulation:

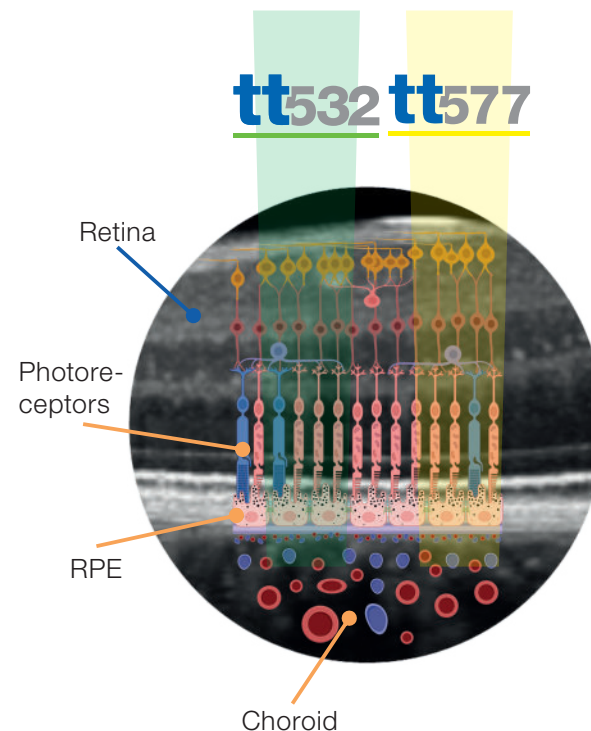
- diabetic retinopathy (proliferative and non-proliferative) and diabetic macular oedema
- retinal vein occlusion (branch and central)
- retinopathy of prematurity
- retinal breaks/tears/holes/degeneration

for iridotomy:

- primary angle closure

PRECISION ENGINEERING AT ITS FINEST

- **Swiss-made:** The new TT device is manufactured at Meridian Medical's headquarters in Thun, Switzerland, proudly reflecting the country's renowned tradition of precision engineering
- **Swiss-Made Components:** most of the components are sourced from Swiss manufacturers, ensuring continuously stable quality and trustworthiness
- **Unmatched Quality:** the device has been thoroughly tested for excellent performance and durability, meeting the requirements of healthcare professionals globally
- **Invest wisely:** Meridian Medical's TT device represents more than advanced technology, it's a long-term investment in reliability, performance, and engineering excellence



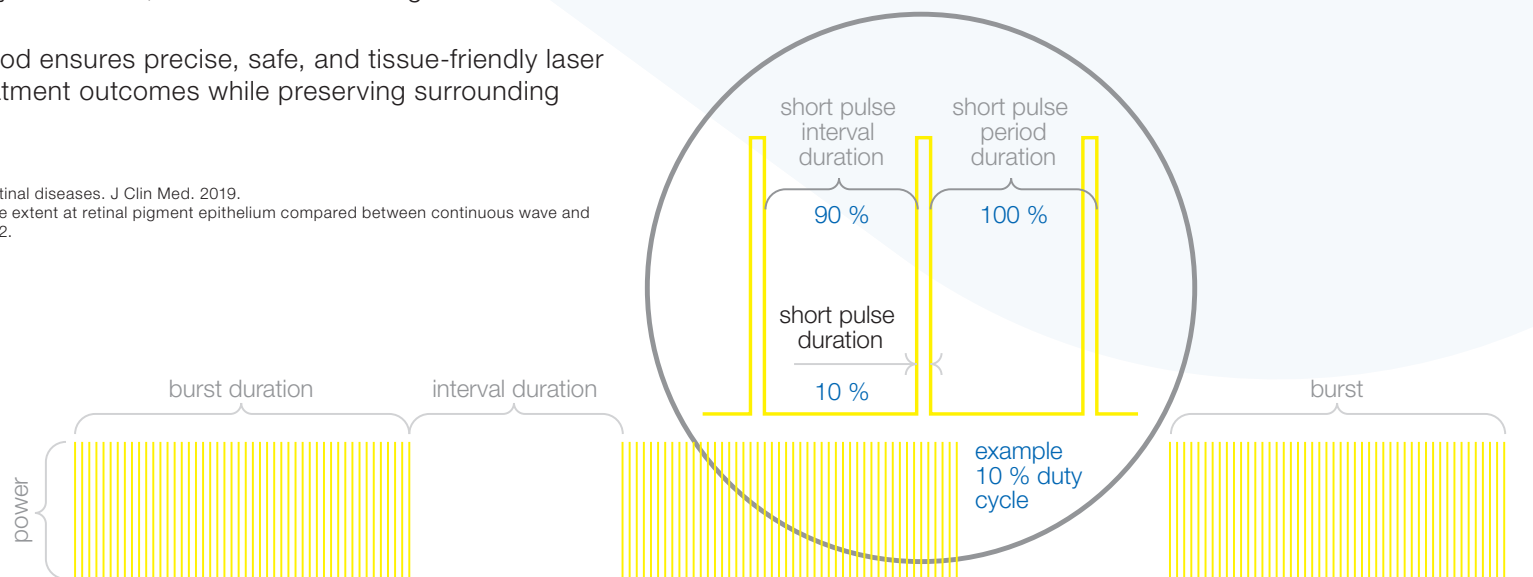
THE PRINCIPLE OF SHORTPULSE™

Meridian Medical 577SP offers microsecond pulse technology. Shortpulse™ delivers precisely controlled microsecond pulses of energy, where each pulse consists of multiple short bursts followed by resting intervals.

- **Gentle Tissue Treatment:** Shortpulse™ limits the duration of thermal stress rather than the magnitude of heating, resulting in gentler tissue interaction
- **Optimised Energy Delivery:** The alternating bursts and pauses enable controlled energy absorption, making it a practical yet gentler approach for delicate ophthalmic procedures.
- **Studies** (*) show similar average temperature rise than CW; however shortpulse™ offers a gentler profile generated from the interrupted temporal heating pattern and reduced time above injury thresholds, not from lower heat generation.

This advanced pulsing method ensures precise, safe, and tissue-friendly laser applications, enhancing treatment outcomes while preserving surrounding structures.

(*)Gawęcki M. Micropulse laser treatment of retinal diseases. J Clin Med. 2019.
Miura et al. Temperature increase and damage extent at retinal pigment epithelium compared between continuous wave and micropulse laser application. Life (Basel). 2022.



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WAVELENGTH BENEFITS

532 nm – The green laser is widely regarded as the gold standard for retinal photocoagulation.

It offers **superior absorption by melanin**, enhancing treatment precision and efficacy.

Its wavelength is ideal for **targeting the pigmented retinal epithelium (RPE)**.

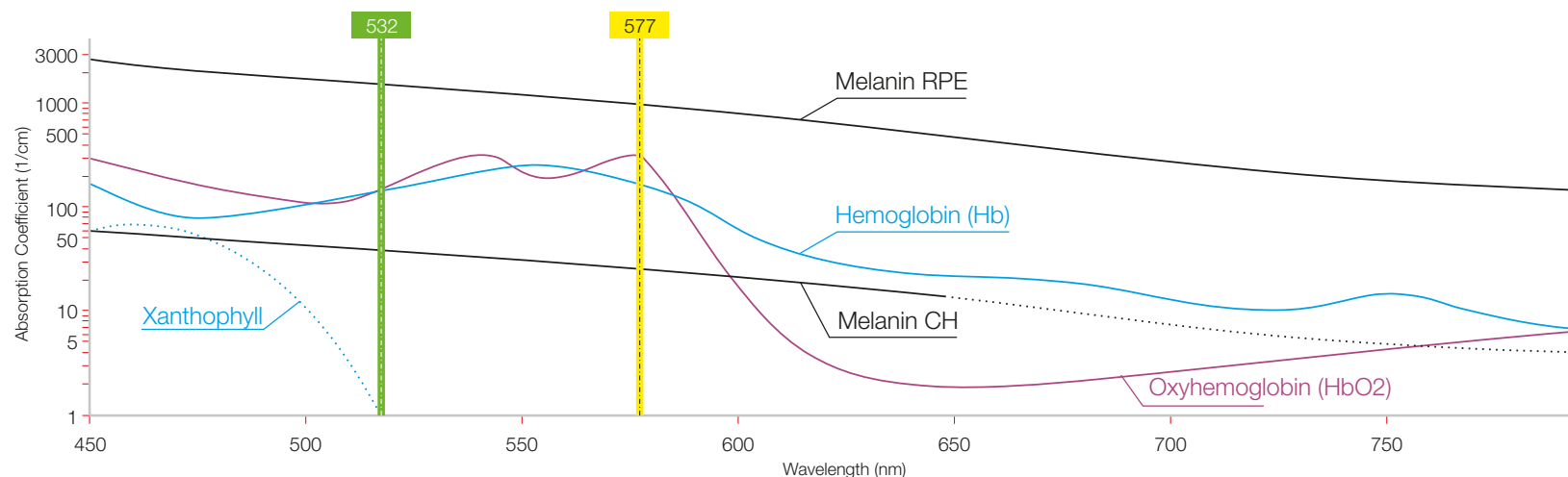
Clinically proven for a broad range of retinal conditions, particularly where pigmentation enhances therapeutic outcomes.

577 nm – The yellow (577 nm) light is **not absorbed by xanthophyll**, making it ideal for macular treatments.

The yellow wavelength demonstrates **reduced ocular scatter**, allowing for deeper tissue penetration and enhanced therapeutic control⁽¹⁾.

It is often better tolerated by patients compared to green wavelengths⁽²⁾.

Clinical reports indicate **lower levels of treatment-related pain** when using yellow lasers⁽²⁾.



⁽¹⁾ Sramek et al. Therapeutic window of retinal photocoagulation with green (532-nm) and yellow (577-nm) lasers. Ophthalmic Surg Lasers Imaging. 2012.

⁽²⁾ González-Saldivar et al. Single-spot yellow laser versus conventional green laser on panretinal photocoagulation: patient pain scores and preferences. Ophthalmic Surg Lasers Imaging Retina. 2017.

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SMART AND INTUITIVE USER INTERFACE

Designed by laser specialists, TT offers a high level of practical features:

- **Retinal projection:** Laser settings, laser power, pattern selection, size, and rotation are observed through the oculars eliminating the need of removing the eyes from the binoculars. Thus, maximising the efficiency of the surgeon when performing the treatment
- **Intuitive and easy to operate graphical user interface (GUI):** All laser parameters but the spot size can be modified through the touch screen (e.g., power, pattern, pulse duration)
- **Smart Wheel:** The 3D mouse interface enables fast, easy, and intuitive laser operation. Power and pattern parameters such as type, size, and position can be swiftly adjusted using the 3D mouse
- **Control Unit:** Made of tempered glass, this illuminated unit ensures easy and intuitive grasp of the key switch, the laser stop button as well as the table up/down switches. Including an illuminated laser status indicator
- **Extremely fast scanning and treatment procedure:** The new technical design of the adapter and its operating software, enables the TT to deliver extremely fast treatment
- **Meridian Medical integrates high-quality slit lamps:** Built on decades of partnership with Haag-Streit and CSO, our integrated adapters ensure accurate fit and consistent alignment with the best optics in the industry
- **Auto-Advance:** TT automatically repositions four consecutive treatment patterns in a square configuration, minimising user interaction and enabling efficient multi-pattern delivery.
- **Save and recall:** Up to 10 personalised treatment parameter presets to streamline setup and accelerate treatment.

These advanced features help to speed up the treatment time and reduce patient chair time.

TREATMENT PATTERNS



square



sector



circle



arc



line



single spot



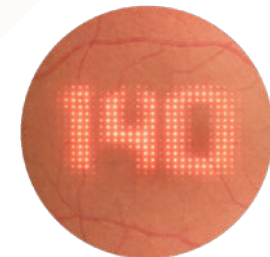
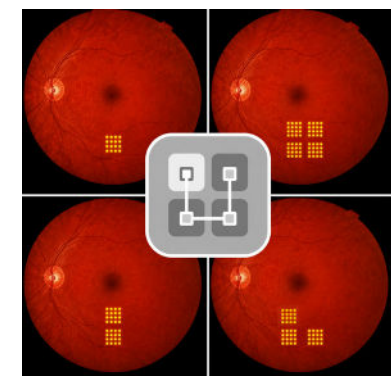
triple arc



rectangle



triangle



PHOTOCOAGULATION – TREATMENT GUIDELINES FOR CW LASERS

These guidelines have been prepared following industry standards for retinal treatments, the use of the laser and its parameters is responsibility of the treating ophthalmologist(*)).

Procedure	Spot size(**)	Pulse duration	Power	Visible effect
PRP (Central)	100 – 200 µm	100 ms	100 mW	Moderate burning
PRP (Periphery)	200 – 500 µm	200 – 300 ms	400 mW	Blanching
DME (Focal)	50 – 100 µm	100 – 200 ms	100 mW	Light blanching within 500 µm of fovea
DME (Grid)	50 – 200 µm	100 ms	100 mW	Blanching
RVO	100 – 500 µm	50 – 500 ms	100 – 500 mW	Intense burn
CNV	50 – 200 µm	100 – 500 ms	100 – 500 mW	Moderate burn
Tears & Breaks	50 – 1'000 µm	300 ms	400 – 600 mW	Linear with no spacing

(*) Some parameters are not fully compatible with TT spot size and power. TT maximum spot size is 400 µm

(**) Spot size on macula including the lens magnification factor

Suggested parameters extracted from the following sources: Royle P, Mistry H, Auguste P, et al. Pan-retinal photocoagulation and other forms of laser treatment and drug therapies for non-proliferative diabetic retinopathy: systematic review and economic evaluation. Southampton, UK: NIHR Journals Library; 2015. (Health Technology Assessment, No. 19.51.) Chapter 2, The landmark trials: Diabetic Retinopathy Study and Early Treatment Diabetic Retinopathy Study. [cited] Available from: <https://www.ncbi.nlm.nih.gov/books/NBK305100/>

International Council of Ophthalmology. Guidelines for Diabetic Eye Care. 2017. Available from: <https://www.icoph.org/resources/177/International-Council-of-Ophthalmology-Guidelines-for-Diabetic-Eye-Care.html>

Takamura Y, Arimura S, Miyake S, Matsumura T, Gozawa M, Iwasaki K, Inatani M. Panretinal photocoagulation using short-pulse laser induces less inflammation and macular thickening in patients with diabetic retinopathy. J Ophthalmol. 2017;2017:8530261. doi:10.1155/2017/8530261

Early Treatment Diabetic Retinopathy Study Research Group. Photocoagulation for diabetic macular oedema: ETDRS report number 1. Arch Ophthalmol. 1985;103(12):1796-1806.

Early Treatment Diabetic Retinopathy Study Research Group. Early photocoagulation for diabetic retinopathy: ETDRS report number 9. Ophthalmology. 1991;98(5 Suppl):766-785.

Silva R, Blumenkranz M. Prophylaxis for retinal detachments. AAO ONE Network. 2013. Available from: <https://www.aao.org/one>

Lois N, et al. Diabetic macular oedema and diode subthreshold micropulse laser. Ophthalmology. 2023;130(1):14-27.

DISCLAIMER

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PHOTOCOAGULATION – TREATMENT GUIDELINES FOR SHORTPULSE™ LASERS

These guidelines have been prepared following industry standards for retinal treatments, the use of the laser and its parameters is responsibility of the treating ophthalmologist.

Procedure	Spot size(*)	Pulse duration	Peripheral burn	Duty cycle
PRP (Periphery)	300 – 400 µm	200 ms	3x	5%
DME	100 – 200 µm	200 ms	2 – 4x	5%
DME+RVO	100 – 200 µm	200 ms	2 – 7x	5%

(*) Spot size on macula including the lens magnification factor

Suggested parameters extracted from the following sources: (1) Royle P, Mistry H, Auguste P, et al. Pan-retinal photocoagulation and other forms of laser treatment and drug therapies for non-proliferative diabetic retinopathy: systematic review and economic evaluation. Southampton (UK): NIHR Journals Library; 2015 Jul. (Health Technology Assessment, No. 19.51.) Chapter 2, The landmark trials: Diabetic Retinopathy Study and Early Treatment Diabetic Retinopathy Study. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK305100/> (2) International Council of Ophthalmology Guidelines for Diabetic Eye Care, 2017. (3) Takamura, Y., Arimura, S., Miyake, S., Matsumura, T., Gozawa, M., Iwasaki, K., & Inatani, M. (2016). Panretinal Photocoagulation Using Short-Pulse Laser Induces Less Inflammation and Macular Thickening in Patients with Diabetic Retinopathy. Journal of Ophthalmology, 2017(1), 8530261. <https://doi.org/10.1155/2017/8530261> (4) Photocoagulation for diabetic macular oedema. Early Treatment Diabetic Retinopathy Study report number 1. Early Treatment Diabetic Retinopathy Study research group. Arch Ophthalmol. 1985;103(12):1796-1806. Early photocoagulation for diabetic retinopathy. ETDRS report number 9. Early Treatment Diabetic Retinopathy Study Research Group. Ophthalmology. 1991;98(5 Suppl):766-785. (5) Silva, R. Blumenkranz, M. (2013) Prophylaxis for Retinal Detachments. AAO, One Network. (6) Lois, Noemi et al.(2022) Diabetic Macular oedema and Diode Subthreshold Micropulse Laser, Ophthalmology, Volume 130, Issue 1, 14 - 27.

PERIPHERAL BURN FACTOR

When using shortpulse™ it is necessary to perform a laser test shot in the periphery to assess the melanin response. Apply a burn shot away from the fovea, and titrate the power until achieving blanching. Start with a spot size of 100 – 200 µm, a power of 60 – 100 mW, and an exposure of 200 ms, then slowly increase the energy until a barely visible burn is produced.

The power is multiplied to offset the effect of the shortpulse™ duration.

Miura et al. Temperature increase and damage extent at retinal pigment epithelium compared between continuous wave and micropulse laser application. Life (Basel). 2022.
Gawęcki M. Micropulse laser treatment of retinal diseases. J Clin Med. 2019.

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ENERGY TITRATION

Before starting the treatment, users must titrate the energy to achieve the best therapeutic effect, to do this every user should:

- Start with the lowest recommended power and the shortest exposure time
- Perform a series of single spot laser pulses in the periphery to test the melanin response, For the test shot, aim for blanching or a light burn
- Always ensure perfect retinal focus before delivering the treatment

BINOCULARS IN FOCUS

Each user must have the oculars calibrated for their refraction, this way the laser will be in parfocality with the aiming beam and retina. A defocused slit lamp may result in unpredictable laser burns.

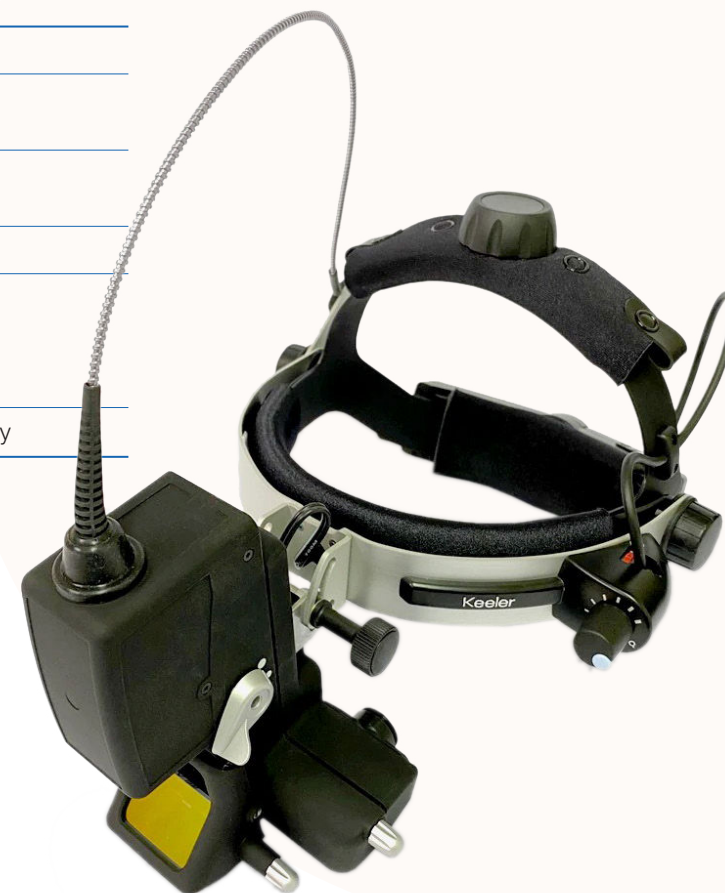
DELIVERY SYSTEMS – LIO – FEATURES

- Adjustable treatment laser's angle relative to the viewing axis
- Standard LED module
- Neutral LED cooler colour providing brighter illumination and longer battery life
- High-contrast optics
- Built-in filters: cobalt blue filter, clear filter, red-free filter, and diffuser
- High magnification lens with additional 1.6× magnification

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DELIVERY SYSTEMS – LIO – TECHNICAL SPECIFICATIONS

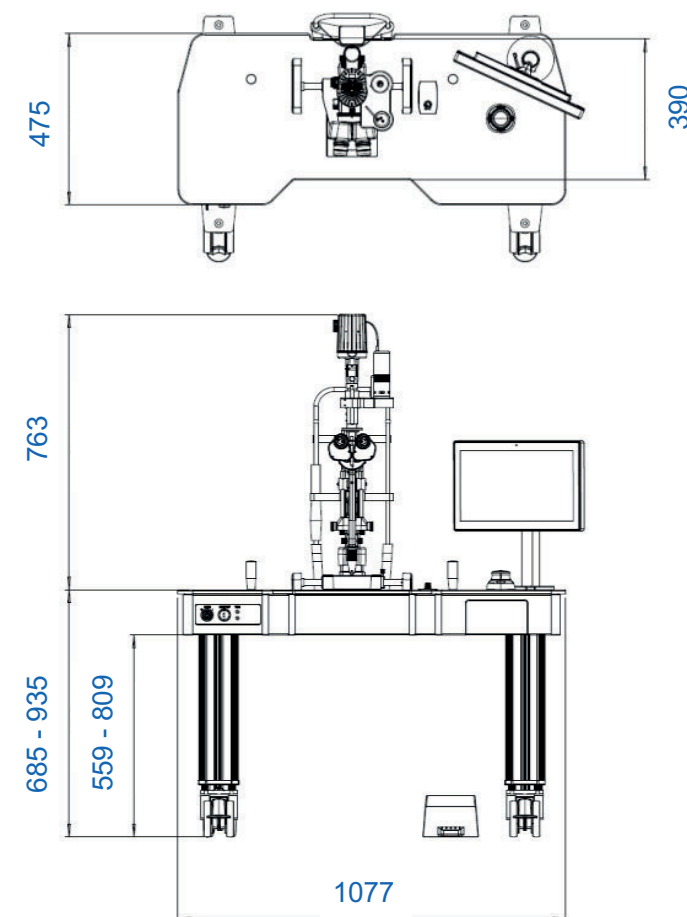
Description	Mode
Spot size	1100 μm $\pm$ 20%
Working distance (front of LIO to focused spot)	280 mm $\pm$ 20%
Operating wavelengths (Factory configured to one therapy wavelength)	Treatment laser: 532 nm, 577 nm, up to 1500 mW Aiming laser: 635 nm, 1 mW
Back-scatter protection	OD > 5.5 at treatment wavelength
Laser fibre	100 μm core, multimode with A/R coating 3 mm stainless steel protected 5 m length SMA905 fibre connector
Power Source	Wall-mounted wireless charger including spare lithium battery



TECHNICAL SPECIFICATIONS*

TT PATTERN SCANNING LASER

Device description	tt532	tt577
Laser wavelength	532 nm	577 nm
Laser Power	60 – 2'000 mW (± 20 %)	60 – 2'000 mW (± 20 %)
Laser type	Diode Pumped Solid State (DPSS)	Optically Pumped Semiconductor Laser (OPSL)
Single pulse duration	10 – 650 ms	10 – 650 ms
Pattern pulse duration	10 – 30 ms	10 – 30 ms
shortpulse™	N/A	Duty cycle: 5 – 50 % Short pulse period duration: 2 ms (fixed) Short pulse duration: 100 µs (5 %) up to 1'000 µs (50 %) Pattern: 100 ms/spot (burst of 50 short pulses)
Spot sizes	50 µm, 100 µm, 200 µm, 300 µm, and 400 µm	
Max. laser power	50 µm spot size = 1'500 mW 100 µm spot size = 1'500 mW 200 µm spot size = 2'000 mW 300 µm spot size = 2'000 mW 400 µm spot size = 2'000 mW Laser Indirect Ophthalmoscope (LIO) = 1'500 mW	
Min. laser power	60 mW	
Aiming beam	635 nm adjustable brightness pattern and energy projection	
Patterns	Square, sector, circle, arc, line, single spot, triple arc, rectangle, triangle	



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TECHNICAL SPECIFICATIONS*^{continuation}

Cooling	Laser: TEC / air cooling PC: fanless and passively cooled touchpanel PC
NOHD	SLA @ 50 µm spot 3.2 m (maximum power in regular operation: 1.5 W) SLA @ 400 µm spot 28.5 m (maximum power in regular operation: 2 W) LIO: 20.8 m (maximum power in regular operation: 1.5 W)
Beam divergence	SLA @ 50 µm spot 117 mrad SLA @ 400 µm spot 39.6 mrad LIO: 36.0 mrad
User interface	16" Medical-grade touchpanel PC Smart wheel (3D mouse)
Slit lamp	Haag-Streit BQ 900 or CSO SL 9900
Power supply	100 – 240 VAC; 50 – 60 Hz ; 450 VA
System weight	Net: 79.5 kg, Gross: 174.5 kg (HS variant) Net: 70.4 kg, Gross: 165.4 kg (CSO variant)

* All technical specifications are subject to change without notice. In accordance with the international general safety standards: IEC 60601-1:2005 + A1:2013 + A2:2021, IEC 60601-1-2:2014 + A1:2020, MDR Regulation (EU) 2017/745. The laser safety is in accordance with the international standards: IEC 60825-1:2014 and IEC 60601-2-22:2019.

**CE marked and certified in accordance with Regulation (EU) 2017/745 (MDR)





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