

## THE POWER OF ONE

THE ONE FEMTO PLATFORM FOR CORNEA,  
PRESBYOPIA AND CATARACT



FEMTO LDV  
**Z Models**



# TIME TO LISTEN, PASSION TO DESIGN, POWER TO BUILD

## A partnership for the future

Technology is rapidly changing and it is important to carefully evaluate your options when it comes to femto-second lasers and extremely precise diagnostic devices. At Ziemer, our mission is simple: We embrace a strategy that grows with your practice, offering you the latest technology available today, on a platform that is ready for tomorrow.



Headquartered in Port, a town in the heart of Switzerland, in an area renowned for its traditional watch-making and state-of-the-art microtechnology industry.



Image from the production facilities of Ziemer's femtosecond laser – our flagship product. The Ziemer Group specializes in surgical and diagnostic instruments for ophthalmology. Precision is our drive.

## The house of technology

Our house of technology uniquely represents the package of the core competencies we have built and accomplished over the years. By structuring these attributes "under one roof", we have the opportunity to offer tested and studied cutting edge technology straight from our laboratory to your hands faster and more efficiently than ever before.

From our solid foundation we have created three distinct towers, each one specifically focused on detailed applications of our femtosecond lasers:

## CORNEA, PRESBYOPIA, CATARACT



Made in   
Switzerland

### Femto cornea tower

This tower represents gentle but ultra-precise treatments on the cornea. Every floor symbolizes its own application: from crystal clear Z-LASIK to advanced corneal surgery, with various indications highlighted:

- Z-LASIK – tapered and customized flaps
- Customizable tunnels for intracorneal ring segments
- Lamellar and penetrating keratoplasty
- Corneal blindness treatment option
- Arcuate incisions

### Femto cataract tower

Femtosecond laser assisted cataract surgery is supported by the third tower. A variety of applications assist you in performing the actual surgery. Our goal with this tower is to have no compromises in precision and the highest level of quality control is maintained on both the cornea and the lens.

- A new Z Model, fully equipped to assist you in performing femto-cataract surgery, is already under development.
- The FEMTO LDV Z6 is ready for upgrading to femto-cataract capability when it becomes available.

### Femto presbyopia tower

The middle tower is dedicated to the challenge of presbyopia. Designed to improve the daily life of your patients, several applications support the precise techniques and intricate surgery of inlays. Available treatments are:

- SIM LASIK™ – all-in-one combined Z-LASIK plus presbyopia correction
- Post-LASIK treatments – highly precise pocket resection below an existing flap
- Tailored pocket software for intrastromal inlays for presbyopia treatment

The application towers are constantly growing and being developed as we continue to learn.

Although some treatments might not be available in your country yet, be confident that your platform is already designed to accommodate these applications.

Versatility makes it happen!

**ZIEMER IS THE FEMTO-TECHNOLOGY COMPANY OF TODAY,  
TOMORROW AND THE FUTURE**

**Z Model**

# THE POWER OF ONE

## FEMTO LDV Z Models



### Presenting the unparalleled Ziemer FEMTO LDV Z Models

There are lasers. And then there are Ziemer femtosecond lasers. No laser is more precise, more powerful or more progressive when it comes to meeting all your procedure needs in a single platform.

Ziemer's FEMTO LDV systems, the first compact, mobile femtosecond surgical lasers, have been conceived to provide a versatile, powerful platform for a wide spectrum of applications in ocular surgery.

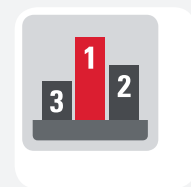
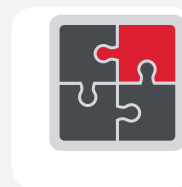
## THE ONE FEMTO PLATFORM FOR CORNEA, PRESBYOPIA AND CATARACT

Based on clinical experience of over 1.5 million successful procedures, the FEMTO LDV stands out as the femtosecond laser that is robust, easy to use and safe to operate, all with a remarkably low complication rate.

The new FEMTO LDV Z Models are designed to maximize these capabilities resulting in a revolutionary femtosecond laser platform:

- Unique femtosecond technology
- True mobility, true efficiency
- Modular platform solution
- Outstanding clinical results

Now, you can offer your patients a premium experience with the Ziemer FEMTO LDV Z Models and deliver the most advanced vision care available.



# FEMTO LDV Z Models

## Developing your business with Ziemer

With Ziemer's FEMTO LDV Z Models, you can operate with a modular femtosecond system that is designed to grow with your practice – cornea and presbyopia today, cataract tomorrow.

**DESIGNED  
FOR OCT**

**DESIGNED  
FOR CATARACT**



**TOGETHER WE CAN GROW**

# FEMTO LDV FEMTOSECOND SURGICAL LASERS

## Unique femtosecond technology

### A technical revolution in ocular surgery

With their unique operating concept, the FEMTO LDV systems have already become the technology leader among all femtosecond lasers.

Other femtosecond lasers currently in the market are based on the same basic technology that has been used in femtosecond lasers since they were introduced to ophthalmology several years ago. Laser sources operating at tens to hundreds of kilohertz are fed to amplifiers to achieve high pulse energies to create large cavitation bubbles to disrupt corneal tissue. This inevitably induces mechanical stresses in the eye.

Ziemer's proprietary FEMTO LDV systems are based on a radically different technology. Operating with very low pulse energy and very short pulse width but very high pulse frequencies in the megahertz range, the threshold for tissue disruption is reached without requiring an amplifier. This low energy delivery has turned out to be the most relevant factor for a gentle tissue resection.

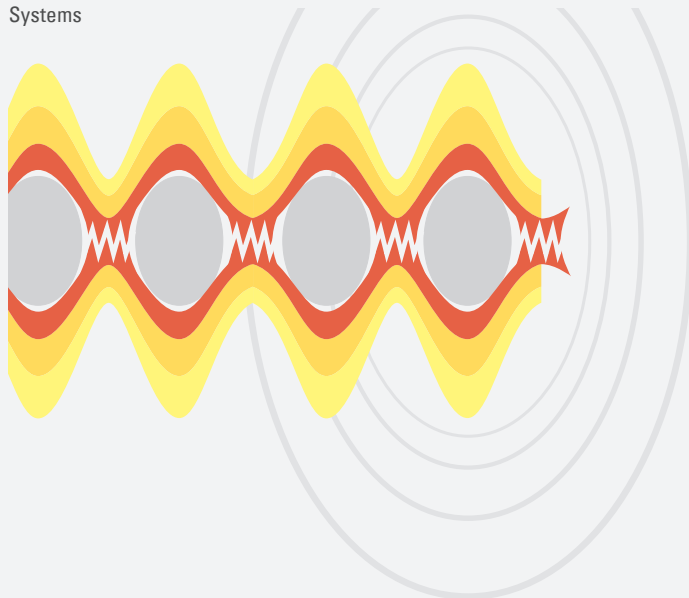
- Lowest pulse energy (nJ range)
- Highest pulse repetition rate (MHz)
- Shortest pulse width



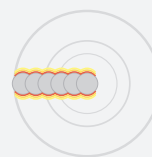
- Minimal side effects
- Minimal mechanical stress
- Cleavage-free tissue dissection

## ONLY CUSTOM-MADE COMPONENTS AND AN INTEGRAL SYSTEM DESIGN CAN BRING THIS PERFORMANCE

Conventional Laser Systems



Ziemer's FEMTO LDV Systems





nJ  
MHz

### Microscope lens quality optics

The unique design of the FEMTO LDV laser delivery system features a hand-piece with a highly sophisticated optical system: an optomechatronical masterpiece. These custom made microscope lenses with high numerical aperture assure a perfect focus and ensure high precision in cutting depth:

- Very high numerical aperture
- Extremely short focal depth
- Wave-front optimized optics



- Significantly fewer gas bubbles
- Tissue preservation
- Quiet eyes, free of edema



Laser energy is delivered to the eye through an articulated arm and a hand-held scanning device, which affords a direct view of the cornea.

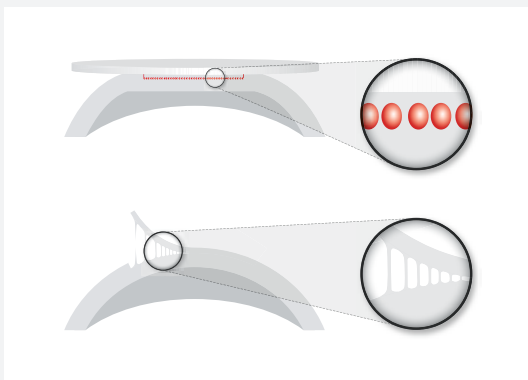
## FOCUSING POWER



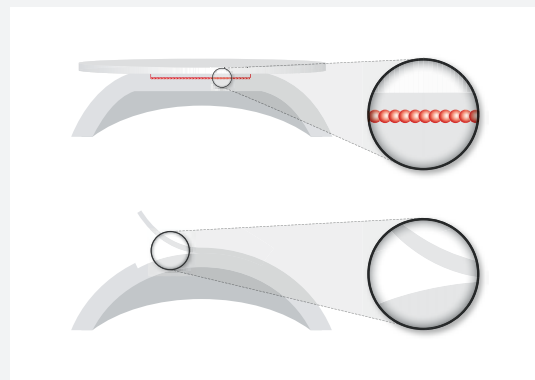
### High Density Pulse raster

The precision optics, the custom made laser sources and a proprietary high speed scanning system generate tightly focused low-energy laser pulses in an overlapped pulse raster. This results in a complete and smooth resection with no interstitial, un-dissected spaces and minimal complications.

- Flaps can be easily lifted (no "tissue bridges")
- Excellent stroma bed quality
- Minimal complications such as opaque bubble layer (OBL), transient light sensitivity (TLS), or laser-induced diffuse lamellar keratitis (DLK)



Laser pulse raster by conventional laser systems



High Density Pulse raster by Ziemer's FEMTO LDV systems

# FEMTO LDV Z MODELS

True mobility, true efficiency

## Efficient

The productivity tool that integrates into your surgical workflow.

- Universal workstation – fits with every excimer
- Simplified patient flow

Workflow integrated solution:

Due to its unique hand-held laser delivery system, which is attached to an easily maneuverable articulated arm, patients can be treated on the patient bed of the excimer laser. Neither the patient nor the surgeon needs to move, and the treatment is a single, uninterrupted process with no waiting time.

This makes Z-LASIK a more comfortable and less stressful for the patient.

- Single working position for the doctor
- No need to move the patient

**Superior comfort**

## Mobile

True mobility. The first truly mobile femtosecond surgical laser, designed to meet your needs.

- The FEMTO LDV Z Models are designed to be moved between different surgical rooms:  
9.00 AM – Z-LASIK, 11.00 AM – Presbyopia,  
2.00 PM – Keratoplasty, etc.
- Multi-site universal system: With the FEMTO LDV Z Models this is not just possible – it's easy

**Improved mobility  
= higher productivity**



**ALL YOU NEED FOR AN EFFICIENT**



## Compact

Experience our line of premium FEMTO LDV Z Models and see how the world's smallest femtosecond laser can deliver the biggest results.

- Its small size makes it ideal for almost every refractive and operating room.
- It's a workflow integrated solution.



## Unique system architecture

- No need to enlarge your practice
- Fits into a small van



## HD visual control

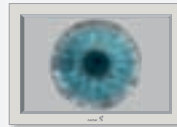
A large high definition (HD) flat monitor shows a real-time image of the eye. This gives the surgeon full tactile and visual control while observing the treatment field both through the microscope and the TopView camera built into the handpiece.

- Professional HDR (High Dynamic Range) imaging
- Multiple screen technology

- Easier centration
- More precise positioning
- Improved ergonomics, improved usability

## Remote monitor

Standard with Z6, optional accessory with Z2 or Z4



Even more convenience – position the display for optimal user viewing.

## Robust system

The ultra stable laser sources and optics minimize downtime. A plug and play laser technology, no calibration needed.

- Resistance to humidity
- Resistance to heat
- Resistance to movement

## Zero-sensitivity laser source

- No investment in infrastructure needed
- Minimal break-down time

# FEMTO LDV Z MODELS

## Modular platform solution

### Platform concept

Ziemer's FEMTO LDV Z Models offer you a powerful platform for performing a broad variety of ocular surgeries. Each of the systems – FEMTO LDV Z2, Z4 and Z6 – offers unique solutions, that provide unique results.

Keeping our eye on the future, development is ongoing on a range of applications. Have confidence that your platform is ready for tomorrow's technology today.

- Convenient on-site upgrades
- Standardized components and interfaces

**BE READY FOR THE FUTURE!**



## FEMTO LDV Z2

### LASIK one step ahead:

- Flap creation at its best
- Natural curvature flap edges
- Improved Swiss femto-technology for your premium refractive clinic

### Business-effective solution:

- Your ideal partner for your daily refractive business
- Platform growth potential
- Now is your time to adopt femto-technology – join the Z Models!

## FEMTO LDV Z4

### Z-LASIK full capability:

- Truly customizable flap creation
- Expanded LASIK capability

### Expand your possibilities:

- Keratoconus treatment with your femtosecond laser – be one of the first
- Choose your presbyopia-tailored treatment

# Which Femto are you?



## Modular architecture

With the FEMTO LDV Z Models you have access to a modular femtosecond laser. Strategic flexibility.

Tailored application packages Adapted to your individual requirements	Z2 Model	Z4 Model	Z6 Model	Z6 Model PowerPlus
Z-LASIK	•	•	•	•
Z-LASIK Z		•	•	•
Intracorneal Rings (ICR)		○	•	•
Intrastromal Pocket (ISP)		○	•	•
SIM-LASIK		○	•	•
Lamellar Keratoplasty (LKP)			○	○
Penetrating Keratoplasty (PKP)			○	○

• Standard software package  
○ To be purchased separately

Arcuate incisions, lamellar preparation for treatment of corneal blindness, biomechanically enhanced procedures ... The corneal applications are constantly being developed as we continue to learn – and your Z6 Model is already designed for these applications.

## FEMTO LDV Z6

## DESIGNED FOR FUTURE APPLICATIONS

### Ultimate femto-technology:

- For the whole Anterior Segment
- All femto corneal applications
- Advanced multi-dimensional scanner system

### The future in your hands:

- Prepared for future corneal applications
- Designed for OCT
- Designed for cataract



An even more powerful laser source allowing for higher and adjustable pulse energy.

PowerPlus is a real break-through in femtosecond laser technology. Your choice for therapeutic procedures. A must-have for the advanced corneal surgeon.

# FEMTO LDV Z MODELS

## Outstanding clinical results

### Excellent vision

Based on clinical experience from over 1.5 million successful Z-LASIK procedures, the FEMTO LDV systems stand out as the femtosecond lasers with a remarkably low complication rate.

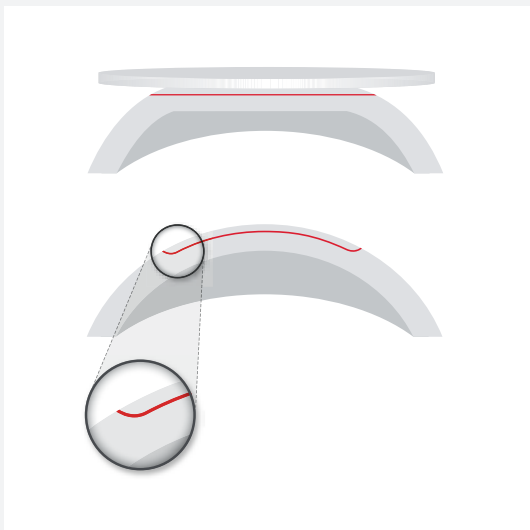
The FEMTO LDV Z Models provide the basis for excellent outcomes in laser vision correction.

- Large corneal flaps
- Uniform, reproducible flap thickness
- Capable of thin flaps (SBK)
- Full computer-controlled suction

### Z-LASIK – the gold standard

With this method, the flap resection is created in a planar mode (xy-plane), at the requested depth. Fully-adjustable hinge size and position.

- Natural curvature flap edges
- Smooth, self-sealing flap edges

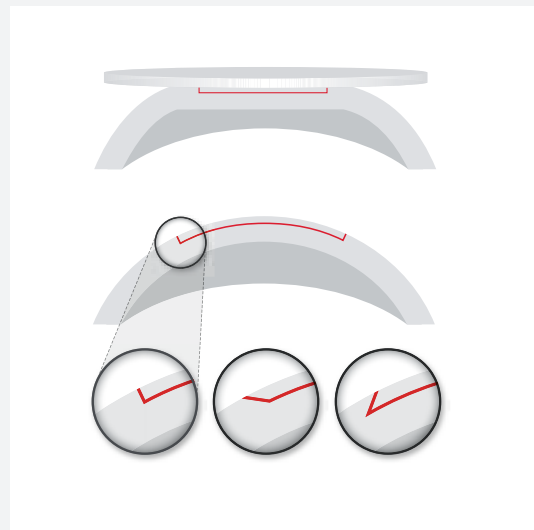


Z LASIK.

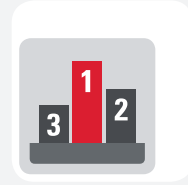
### Z-LASIK Z – NEW

This new Z-LASIK method performs the resection in a three-dimensional mode. Each flap can be customized to accommodate the desired geometry.

- Round and oval flaps
- Angled edge as desired by surgeon



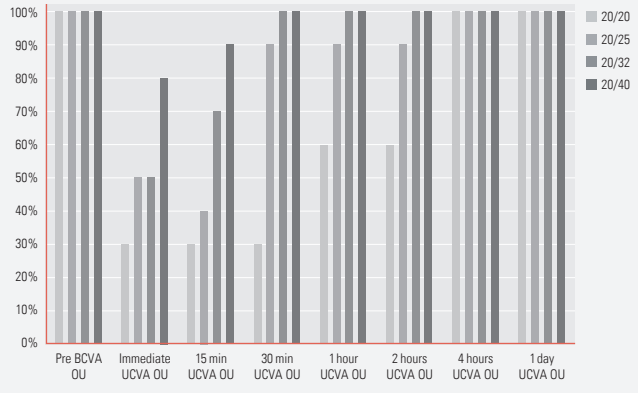
Z LASIK. Z



### Very fast visual recovery

In conjunction with state-of-the-art excimer lasers, the FEMTO LDV systems achieve superior short-term results as well as excellent long-term visual outcomes in femto-LASIK procedures.

The graphic compares binocular uncorrected distance visual acuities (UDCVA) immediately at the conclusion of surgery and at 15, 30 minutes, 1, 2, 4 hours and 1 day postoperatively. The results speak for themselves: right after surgery, uncorrected visual acuity of 20/40 for 80% of the patients. After only 4 hours, 100% had 20/20.



D. Durrie, MD; data presented at ASCRS 2011, San Diego

## TRULY SAFE FOR ULTRA THIN CORNEAL RESECTIONS

### Corneal surgery and therapeutic procedures

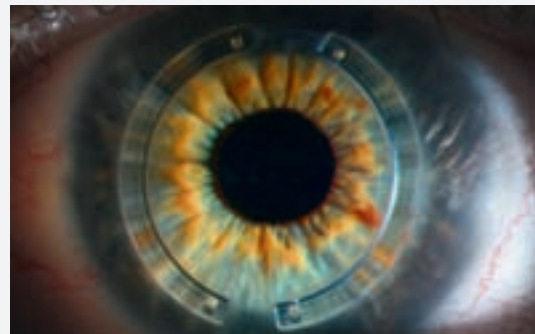
The FEMTO LDV Z Models address the demand of ophthalmologists for a versatile femto-platform that is highly efficient and extends the range of surgical modalities.

- Procedures customizable to patient's specific conditions
- Designed to enable corneal transplantations in a sterile environment (OR)

- Tunnel resections for Intracorneal ring segments
- Intrastromal pocket incisions for inlays for presbyopia treatment
- Lamellar Keratoplasty: (D)ALK and DSAEK
- Penetrating Keratoplasty



Microscope view of an implanted KAMRA™ inlay for presbyopia, Acufocus Inc. (Irvine, CA). Courtesy of D. Allamby, MD; Focus Clinics, London (UK)



Microscope view of two implanted Intacs® Corneal Implants, Addition Technology Inc. (Des Plaines, IL). Courtesy of Addition Technology Inc.

CAUTION: The KAMRA™ inlay is an investigational device, limited by federal (U.S.) law to investigational use and not available for sale in the United States.

“With Ziemer’s FEMTO LDV Z Models, my dream has now become true. Due to the very low energy, the treatment is very gentle to the eyes and therefore the visual recovery is very fast. We can also make customized oval flaps and set any side cut angle between 30° and 150°. Flap thickness accuracy and reproducibility are better than ever before. The Z Models are definitely the ideal partner for every LASIK surgeon.”

**Minoru Tomita, MD, PhD**

Shinagawa LASIK Center, Tokyo (Japan)

“This versatile new femtosecond laser offers a wide range of corneal incision techniques which can be modified according to the wishes of the surgeon. For corneal grafting, the standard mechanical resection procedure can be easily replaced with the new FEMTO LDV Z6, offering a wound geometry of unsurpassed quality.”

**Prof. Matthias Böhnke, MD**

Augenlinik & Laserzentrum Rothebaumchaussee, Hamburg (Germany)

“The Z-LASIK procedure results in 100% of patients treated for short-sight (< -9 D) achieving 20/20 vision or better. The results being achieved are simply amazing.”

**David Alamy, MD**

Focus Clinics, London (United Kingdom)

“The FEMTO LDV Z4 is an excellent femtosecond laser! Flap thickness is very precise and predictable: all flaps  $89.6 \pm 2.8 \mu\text{m}$ . The system is very easy to use and the results extremely good – even better than with the former FEMTO LDV which I have been using for 5 years.”

**Juhani Pietilä, MD, PhD**

Mehiläinen Eye Clinic (Finland)



# FEMTO LDV Z MODELS

## Specifications

### Technical specifications

Laser type	Mode-locked, diode-pumped oscillator
Mode	Fundamental (TEM00)
Pulse repetition rate	> 5 MHz
Central laser wavelength	1020 nm – 1060 nm
Laser pulse duration	200 – 350 fs
Laser class	4
Remote interlock	Yes


### System specifications

Base station footprint	101 cm (L) × 70 cm (W) × 76 cm (H)
System height	100 cm (floor to articulating arm) 139 cm (floor to top of screen)
System weight	215 kg
Input voltage	100/120/230 – 240 VAC, 50 – 60 Hz
Maximum current	700 VA
Interfaces	USB 2.0 / Ethernet / ext. interlock / foot pedal

### Ambient conditions

Ambient operating conditions	18 to 24 °C (65 to 75 °F), 20 to 70% rH
Recommended storage conditions	10 to 50 °C (50 to 122 °F), 20 to 70% rH
Recommended transport conditions	–20 to 60 °C (–4 to 140 °F), 10 to 90% rH, not condensed
Atmospheric pressure range	500 to 1060 hPa

### Application specifications

Time to create a flap	< 20 sec “suction on” to “suction off”	
Flap dissection time	7 to 15 sec (depending on size and parameters)	
Flap diameter	6.5 to 10.0 mm (0.1 mm steps)	
Border cut	Choice of different rim geometries	
Hinge position and width	Free programmable	
Resection depth	90 to 850 µm (1 µm steps)	
Intracorneal tunnels	Pre-programmed parameters for all existing ring segments, manual option	
Intrastromal pockets	Pre-programmed parameters for several inlays, highly flexible resection geometry	
Lamellar Keratoplasty	Free programmable depth and diameter of resection; for patient and also donor grafts (with artificial anterior chamber)	
Penetrating Keratoplasty		
Eye fixation	Suction ring and computer controlled vacuum system	



### Product Information

Manufacturer: SIE Surgical Instruments Engineering AG, CH-2562 Port, Switzerland (a Ziemer Group Company)

Sales & Service: Ziemer Ophthalmic Systems AG, CH-2562 Port, Switzerland (a Ziemer Group Company) and its network of established ophthalmic equipment distributors.

Availability: Europe: CE-marked. USA: Product launch and availability pending FDA clearance. For other countries, availability may be restricted due to local regulatory requirements; please contact Ziemer for details.

Configuration: Self-contained system on wheels, height-adjustable. With hand-held laser beam delivery module, mounted on a weight-compensated, articulated arm. Built-in computer system includes touch-screen color monitor and foot-switch. Integrated, automatic, computer-controlled suction system.

Consumables: For each patient treatment, a single-use Procedure Pack is required, each containing one set of sterile handpiece casings, one suction ring with InterShield spacer, vacuum tubing, and sterile drape. Each Procedure Pack is coded for the dimensions of suction ring and InterShield spacer and automatically detected by the system.

Service: Regular maintenance and repair service is available from the manufacturer and from local certified service centers (please contact your local distributor or consult the Ziemer website for address information). Automatic self-checks and self-adjustment routines are built into system. The Ziemer service hotline can provide instant online diagnostics and repair (Internet connection required). Convenient maintenance and service contracts are available.

Warranty: Ziemer's FEMTO LDV systems come with a 12-month limited warranty on parts and workmanship. Please consult Ziemer Ophthalmic Systems' warranty terms for details.

### Headquarters, International Sales & Support

#### Ziemer Ophthalmic Systems AG

a Ziemer Group Company  
Allmendstrasse 11  
CH-2562 Port, Switzerland  
Phone +41 32 332 70 50  
Fax +41 32 332 70 71  
innovation@ziemergroup.com

### Sales & Support USA

Ziemer USA, Inc.  
a Ziemer Group Company  
620 E. Third Street  
Alton, Illinois 62002, USA  
Phone +1 618 462 9301  
Fax +1 618 462 9302  
usa@ziemergroup.com

[www.ziemergroup.com](http://www.ziemergroup.com)

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## **Ziemer Ophthalmic Systems AG**

a Zeimer Group Company  
Allmendstrasse 11  
CH-2562 Port, Switzerland

[www.ziemergroup.com](http://www.ziemergroup.com)

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