Coherent Laser Training Catalog

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INTRODUCTION

Training leads to productivity!

Coherent offers training courses in our Laser Training Center or at your facility. Training can help to maintain optimum laser performance, increase the life of your laser, and improve your product quality. In addition, we offer custom courses tailored to your specific requirements – preventative maintenance, process optimization, application development, and much more.

We offer:

- Customer basic training to ensure the best operation of your system
- Customer advanced training to ensure the highest productivity of your system
- Customized training adapted to your needs

Participants who successfully complete a laser training course will gain a level of knowledge and skill that will allow them to effectively and efficiently operate, optimize, and maintain their laser system.

The customer must have purchased and received a Coherent laser system before attending a training course.

Instructors

Our instructors have extensive knowledge and experience in their areas of product specialty. They have gained their expertise through formal education and by working in various fields, such as manufacturing, customer service, and engineering. Each instructor creates a professional and comfortable environment that is ideal for learning.

Course Features

Our courses are unique and can be a powerful tool to increase your performance and effectiveness in the workplace. Key features and benefits of the Coherent laser training program include:

- Individually tailored courses designed to meet the specific needs of our trainees.
- Small course sizes, ensuring a generous amount of individualized attention and hands-on experience with the laser system.
• Emphasis on laser safety
• Professional, experienced instructors
• For factory training: dedicated training laboratories
• Emphasis on hands-on lab time and formal lectures during the theoretical portion of the courses.
• Course materials -- including manuals, books, videos and, in some cases, tools -- are included in the course tuition.
• Official certification upon successful course completion

**Prerequisites**

• The customer must have purchased and received a Coherent laser system before attending a training course.
• Trainees should be able to read and speak English or German. A good knowledge of how to read schematics and/or block diagrams is also very helpful.
• A pre-course questionnaire must be completed and returned to Coherent at least two weeks before the start of the course.
• Trainees must complete the on-line laser safety training provided by Coherent and must pass the quiz that follows, prior to attending a training course.
• For on-site training, a system and a proper training room needs to be made available for the duration of the training course.
• Training at Hamburg: trainees from Germany need EFK qualification and all others need an electrical qualification.

**Tuition**

• Customer’s site: is billed at a daily training fee plus a travel costs (zone charge). Courses are performed at the Customer’s site, using the customer’s equipment. The laser must be available during the entire training and not installed in any equipment.
• Factory: is billed at a daily training fee. Courses are performed at one of the Coherent Laser Training Centers factory sites, location will be listed. Trainees will be taught on a representative laser system.
**Schedule**

- All courses are scheduled upon a customer request.

**Training Locations**

- Santa Clara, California
- Plymouth, Michigan
- Hamburg, Germany
- Göttingen, Germany
- Munich, Germany
- Kaiserslautern, Germany
- Mainz, Germany
- Belp, Switzerland
- Shanghai, China
- Nanjing, China
- Tokyo, Japan

**Registration**

To register for a course, contact one of our Coherent Laser Training Centers. You can find the contact information here:

[www.coherent.com/support/main/training](http://www.coherent.com/support/main/training)

Or fill out our Training Course Inquiry Form here:

[www.surveymonkey.com/r/Training_Course_Inquiry_Form](http://www.surveymonkey.com/r/Training_Course_Inquiry_Form)

**Did you find the course you wanted?**

If you do not find a course you are looking for, there are some courses available that do not appear in the catalog. We can prepare special courses to meet specific laser training needs.

A minimum of 8 weeks prior notification is required to process requests for special courses. This includes requests to conduct standard laser training courses, courses listed in this catalog, and courses intended to take place away from a Coherent Laser Training Centers. All courses are scheduled at a customer request.
# TRAINING TERMS AND CONDITIONS

## Terms of Certification

**NOTE:** Certification for courses attended will apply only while you are under the employment of the company for which you trained. When/if you are no longer employed by that company, your certification will no longer be valid or recognized by Coherent.

## Terms of Payment

The invoiced amount, or purchase order number, is due at registration.

## Training Agreement Expiration

Paid training must be taken within 1 year of the purchase of the laser system and training. Discounted training must be taken within 6 months of the purchase of the laser system and training.

## Cancellations by Trainees

If you need to cancel your participation in a laser training course, the following fees will apply:

- **For cancellation notice received more than 20 business days before the scheduled course,** no fee is charged.
- **Between 10 and 20 business days before the scheduled course,** a 25% cancellation fee is charged.
- **Fewer than 10 business days before the scheduled course,** 100% of the fee is charged. We recommend you substitute another individual in your place. Participation substitution is acceptable anytime, without penalty.
- **Cancellation notice of a discounted course must be received 20 business days before the scheduled course,** or the discount will be forfeit and the standard training fee will be charged for the rescheduled course.

## Cancellations by Coherent

There is a minimum required number of trainees per course. Courses not meeting the attendance requirement are subject to cancellation. Coherent will notify trainees of a course cancellation no fewer than 15 days prior to course start date. At that time, alternative course dates or a priority position on
the laser training course waiting list will be provided to the trainee.

In general, Coherent cannot guarantee that a course will proceed as scheduled. We strongly advise that Trainees purchase trip insurance as Coherent accepts no financial responsibility in the event that a training course is canceled.
# Reading the Course Descriptions

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<tr>
<th>#</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
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<td>1</td>
<td>—</td>
<td>Title of laser training course.</td>
</tr>
<tr>
<td>2</td>
<td>Location</td>
<td>Indicates if the training is at the factory or at the customer’s site.</td>
</tr>
<tr>
<td>3</td>
<td>Vocabulary of the Factory Laser Training Center</td>
<td>Indicates the location of the factory Laser Training Center.</td>
</tr>
<tr>
<td>4</td>
<td>Audience</td>
<td>Who the course is intended for.</td>
</tr>
<tr>
<td>5</td>
<td>Course length</td>
<td>Number of full days for standard training course.</td>
</tr>
<tr>
<td>6</td>
<td>Day(s)</td>
<td>The courses are normally offered on business days. Trainees will be notified at time of registration of any changes.</td>
</tr>
<tr>
<td>7</td>
<td>Begin – End</td>
<td>The course start and end time, local time. Trainees will be notified at time of registration of any changes.</td>
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<tr>
<td>8</td>
<td>Number of Students</td>
<td>Minimum and maximum number of students per course.</td>
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<td>9</td>
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<td>Overview of educational objectives for the training course.</td>
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</tr>
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<td>Pre-training and knowledge requirement list for the selected training course. Contact the Coherent Laser Training Center if you have any questions or would like additional information.</td>
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Diamond CO₂ OEM Course

Location: Customer’s Site or Factory  Part #: 1391738 or 1391739  Course length: 1 day  Day(s): Upon availability

Santa Clara, CA, USA  Begin: 9:00 AM  End: 5:00 PM

Audience: OEMs and end customers  Number of Students: minimum-2 per system / maximum-4

Course Description: The Diamond CO₂ is designed for people that service, maintain, and/or integrate the CO₂ laser. Trainees will be taught on their specific model of CO₂ laser. The course covers theory of operation, installation and site requirements, and troubleshooting. Trainees will learn to identify correct operation and will be qualified to diagnose faults at the major-component level. Beam delivery optics and integration will be discussed.

Key Topics: Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

Optional Topics: Instruction about remote control (external triggering) of the laser, available upon advance request.

Prerequisites: Complete product knowledge requires a full understanding of different electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

Diamond CO₂ Cx-10, Cx-10 LDE, LDE+ and LQS Service Course

Location: Factory  Part #: 1391732  Course length: 2 days  Day(s): Upon availability

Santa Clara, CA, USA  Begin: 9:00 AM  End: 5:00 PM

Audience: Coherent FSEs, subs, and reps  Number of Students: minimum-2 / maximum-4

Course Description: The Cx-10 Service course prepares trainees to install, operate, optimize, troubleshoot to the board level, repair, and maintain the laser. Course content ranges from theory of operation to electronic troubleshooting. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

Key Topics: Laser, electrical, and lab safety; ESD awareness; thermal management; power supply layout; laser head overview; interfacing; RF module replacement; RFPA replacement; optical cleanliness and alignment; AOM theory of operation; principles of Q-switch laser operation; peak and average power measurements.

Prerequisites: Complete product knowledge requires a full understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and block diagrams, as well as relate them to the actual assembly of printed circuit boards and any other applied circuitry. An understanding of basic laser theory is also recommended.
## Diamond CO₂ E-1000 Service Course

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<th>Factory</th>
<th>Part #:</th>
<th>1391734</th>
<th>Course length:</th>
<th>3 days</th>
<th>Day(s):</th>
<th>Tuesday – Thursday</th>
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<tr>
<td>Santa Clara, CA, USA</td>
<td>Begin:</td>
<td>9:00 AM</td>
<td>End:</td>
<td>5:00 PM</td>
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**Audience:** Coherent FSEs, subs, and reps  
**Number of Students:** minimum-2 / maximum-4

**Course Description:** The Diamond CO₂ E1000 Service course prepares trainees to install, operate, troubleshoot, repair, and maintain the laser. Trainees will learn how to control and operate the laser. Course content ranges from basic theory of operation to extended diagnostic troubleshooting. Extensive hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of supporting the product in the field. After successful completion of this course, trainees will be able to replace the coolant flow switch, RF power module, laser head, optional shutter, and align the shutter aiming beam. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; major component diagnosis, replacement, and calibration; performing electrical measurements and calibrations; troubleshooting procedures; head-power supply swaps; HTTP/TCP operation; real-time controller operation.

**Prerequisites:** Complete product knowledge requires a full understanding of different electronic devices and their role in the circuit. Trainees should be able to read schematics and block diagrams and relate them to the actual assembly of printed circuit boards and any other applied circuitry. Successful completion of the Diamond Service course, or ownership of a K or G series OEM laser can be substituted.

*Laptop and Ethernet crossover cable required.

## Diamond CO₂ E and K-Series (Employee only) Refresher Service Course

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<tr>
<th>Location:</th>
<th>Factory</th>
<th>Part #:</th>
<th>1391733</th>
<th>Course length:</th>
<th>2 days</th>
<th>Day(s):</th>
<th>Upon availability</th>
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<tr>
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<td>Begin:</td>
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<td>End:</td>
<td>5:00 PM</td>
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</tbody>
</table>

**Audience:** Coherent FSEs, subs, and reps  
**Number of Students:** minimum-2 / maximum-4

**Course Description:** The Diamond E and K-Series Refresher Service course prepares the trainee to troubleshoot, repair and support lasers installed at user sites. The trainee will learn how to help users to determine the reason for laser faults and how to take steps to correct them and return lasers to production. Course content may be attendee driven by identifying needs for further in-depth training prior to executing a course. Trainers are all experts in their particular field and can take attendees to the next level of understanding for the products. Extensive hands-on laboratory time allows the trainee to test the trainees knowledge and develop skills to ensure that the trainees are capable of supporting the product in the field. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; log-file generation and interpretation from E-Series lasers; applications and beam delivery theory and practice; advanced details on laser interfacing; troubleshooting procedures; closed loop laser control advancements and RS422 operation; K-Series laser review and servicing.

**Prerequisites:** Successful completion of the Diamond E1000 Service course and the Diamond K-Series standard course. The trainee should be able to read schematics and block diagrams, have experience in Field Service or Product Support.
### Diamond CO₂ GEM CW Service Course

<table>
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<tbody>
<tr>
<td>Factory</td>
<td>1391735</td>
<td>2 days</td>
<td>Upon availability</td>
</tr>
</tbody>
</table>

Santa Clara, CA, USA  
Begin: 9:00 AM  
End: 5:00 PM  

**Audience:** Coherent FSEs, subs, and reps  
**Number of Students:** minimum-2 / maximum-4

**Course Description:** The GEM CW Service course covers the service and maintenance of the GEM CW laser models: air-cooled and liquid-cooled. The course covers the theory of operation, installation and site requirements, and troubleshooting. Trainees will learn to identify correct operation and will be qualified to diagnose faults at the major component level. Basic beam delivery optics and integration will be discussed. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; theory of operation; troubleshooting; laser mode evaluation; installation and site requirements; remote control (external triggering) of the lasers.

**Prerequisites:** Complete product knowledge requires a full understanding of different electronic devices and their role in the circuit. The trainee should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

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### Diamond CO₂ J-Series (J2, J3, J5, and J5V) Service Course

<table>
<thead>
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<tbody>
<tr>
<td>Factory</td>
<td>1391737</td>
<td>3 days</td>
<td>Tuesday – Thursday</td>
</tr>
</tbody>
</table>

Santa Clara, CA, USA  
Begin: 9:00 AM  
End: 5:00 PM  

**Audience:** Coherent FSEs, subs, and reps  
**Number of Students:** minimum-2 / maximum-4

**Course Description:** The Diamond CO₂ J-Series Laser Service course prepares trainees to install, operate, troubleshoot, repair, and maintain the laser. Trainees will learn how to control and operate the laser appropriately and in a safe manner. Course content ranges from basic theory of operation to extended diagnostic troubleshooting. Extensive hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of supporting the product in the field. After successful completion of this course, trainees will be able to replace the RF power module, laser head, optional shutter, and align the shutter aiming beam. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; major component diagnosis, replacement, and calibration; performing electrical measurements and calibrations; troubleshooting procedures; RF power supply replacement; HTTP/TCP operation; real-time controller operation.

**Prerequisites:** Complete product knowledge requires a full understanding of different electronic devices and their role in the circuit. Trainees should be able to read schematics and block diagrams and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

*Laptop and Ethernet crossover cable required.*
Coherent Laser Training Catalog

Diamond CO₂ J5V Gas Refill Cart Use and Operation Service Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391736</th>
<th>Course length: 1 day</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Clara, CA, USA</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Begin:** 9:00 AM  
**End:** 5:00 PM

**Audience:** Coherent FSEs, subs, and reps  
**Number of Students:** minimum-2 / maximum-4

**Course Description:** The J5V Gas Refill Cart Service course prepares trainees to operate and maintain the laser gas cart laser. Course content ranges from theory of operation to practical use. Upon successful completion of the course, trainees should be able to train others to control and operate the Gas Cart.

**Key Topics:** Laser, electrical, and lab safety; gas cart power supply layout; laser head overview; vacuum system considerations and leak prevention; connecting correctly to the laser; gas bottle precautions and care; measuring laser pulse fall time accurately using a fast detector and oscilloscope; filling lasers to the correct vacuum levels; precautions to avoid gas waste; purging laser with Nitrogen; returning laser to full operation; leak checking and verification.

**Prerequisites:** Complete product knowledge requires a full understanding of various electronic and vacuum devices and their role in the gas cart. Trainees should be able to read schematics and block diagrams, as well as relate them to the actual assembly of vacuum systems and any other applied circuitry. An understanding of basic laser theory is also recommended.

---

Slab Lascon

Slab Lascon – Basic Operation

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391907</th>
<th>Course length: 3 days</th>
<th>Day(s): Tuesday – Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Hamburg, Germany; Shanghai, China</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The Slab Lascon Basic Operation course is designed for people that operate the Slab Lascon laser system. The course covers principals of laser operation, safety regulations, operation and basic troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose minor faults at the major component level.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications, basic laser theory, basic troubleshooting and site requirements.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various components of the laser device. Technical knowledge would be helpful for completing the training course.
Slab Lascon – Advanced Maintenance

**Location:** Factory  
**Part #:** 1391906  
**Course length:** 5 days  
**Day(s):** Monday – Friday

Plymouth, MI, USA; Hamburg, Germany; Shanghai, China

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The Slab Lascon Advanced Maintenance course is designed for people that service, operate and maintain the Slab Lascon, laser system. The course covers principal of operation, safety regulations, operation and preventive inspection. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the advanced level.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications; basic laser theory, 2000/4000h maintenance resp. 3000h inspection works, advanced troubleshooting, site requirements and beam mode analysis. GUI/HMI software will be installed at the customer maintenance PC (bring with you to training). The PC needs a RS-232 interface to control the laser.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (3 days) to renew the certification.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various components of the laser device. Technical knowledge would be helpful for completing the training course.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.

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Slab Lascon – OEM Maintenance

**Location:** Factory  
**Part #:** 1391908  
**Course length:** 5 days  
**Day(s):** Monday – Friday

Plymouth, MI, USA; Hamburg, Germany; Shanghai, China

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** OEM Customers  
**Number of Students:** min-2 / max-5

**Course Description:** The Slab Lascon OEM Maintenance course is designed for people that service, maintain, and/or integrate the Slab Lascon laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation, installation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; installation; advanced troubleshooting, beam mode analysis and telescope beam alignment. GUI/HMI software will be installed at the customer maintenance PC (bring with you to training). The PC needs a RS-232 interface to control the laser.

**Optional Topics:** GUI interface basic training and 3000 hour maintenance inspection is available upon request.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (3 days) to renew the certification.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various components of the laser device. Technical knowledge would be helpful for completing the training course.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.
**Slab RCU (Slab 3)**

### Slab RCU – Basic Operation

<table>
<thead>
<tr>
<th><strong>Location:</strong> Factory</th>
<th><strong>Part #:</strong> 1391910</th>
<th><strong>Course length:</strong> 3 days</th>
<th><strong>Day(s):</strong> Tuesday – Thursday</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Begin: 8:30 AM</td>
<td>End: 4:00 PM</td>
</tr>
</tbody>
</table>

**Audience:** Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The Slab RCU Basic Operation course is designed for people that service the Slab RCU laser system. The course covers theory of operation and basic troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications, basic laser theory, basic troubleshooting and site requirements.

**Optional Topics:** GUI interface basic training is available upon request.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various components of the laser device. Technical knowledge would be helpful for completing the training course.

### Slab RCU – Advanced Maintenance

<table>
<thead>
<tr>
<th><strong>Location:</strong> Factory</th>
<th><strong>Part #:</strong> 1391909</th>
<th><strong>Course length:</strong> 5 days</th>
<th><strong>Day(s):</strong> Monday – Friday</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Begin: 8:30 AM</td>
<td>End: 4:00 PM</td>
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</tbody>
</table>

**Audience:** Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The Slab RCU Advanced Maintenance course is designed for people that service, maintain the Slab RCU laser system. The course covers theory of operation, safety regulations, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at a basic level.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications, basic laser theory, 3000h inspection works, advanced troubleshooting, site requirements and beam mode analysis. GUI/HMI software will be installed at the customer maintenance PC (bring with you to training). The PC needs a LAN port to control the laser.

**Optional Topics:** GUI interface basic training and 3,000 hour maintenance inspection is available upon request.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (3 days) to renew the certification.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.
Slab RCU – OEM Maintenance

Location: Factory  Part #: 1391911  Course length: 5 days  Day(s): Monday – Friday
Plymouth, MI, USA; Hamburg, Germany; Shanghai, China

Audience: OEM Customers  Number of Students: min-2 / max-4

Course Description: The Slab RCU OEM Maintenance course is designed for people that service, maintain and install the Slab laser system. The course covers theory of operation, safety regulations, Operation, preventive maintenance and installation. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

Key Topics: Laser, electrical, and lab safety; basic operation, specifications, site requirements, basic theory of operation, site requirement, installation, 3000h inspection works, advanced troubleshooting, beam mode analysis. GUI/HMI software will be installed at the maintenance PC (bring with you to training) of the engineer. The PC needs a LAN port to control the laser.

Note: At the end of the course the trainees get a certification with a duration of validity of 18 months.
After 18 months we recommend a refreshment training (3 days) to renew the certification.

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of the laser and any other applied circuitry. An understanding of basic laser theory is also recommended.

Training at Hamburg: Trainees from Germany need EFK qualification and all others need an electrical qualification.

Slab – Service Junior

Location: Factory  Part #: 1391914  Course length: 10 days  Day(s): Monday – Friday (2 weeks)
Plymouth, MI, USA; Hamburg, Germany; Shanghai, China

Audience: FSEs, Reps  Number of Students: min-2 / max-4

Course Description: The Slab Laser Service Engineer Junior course is designed for people that service, maintain, and/or integrate the Slab Laser system. The course covers theory of operation, safety regulations, operation, preventive maintenance and installation. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the Junior level.

Key Topics: Laser, electrical, and lab safety. Basic operation, specifications, basic theory of operation, site requirements, installation; 3000h inspection, 6000h preventive maintenance, advanced troubleshooting, beam mode analysis, telescope beam alignment, software installation and update, RF-tube exchange and mounting plate for tube base exchange.

Note: At the end of the course the trainees get a certification with a duration of validity of 18 months.
After 18 months we recommend a refreshment training (5 days) to renew the certification.

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

Training at Hamburg: Trainees from Germany need EFK qualification and all others need an electrical qualification.
**Slab – Service Senior**

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #: 1391915</th>
<th>Course length: 5 days</th>
<th>Day(s): Monday – Friday</th>
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</thead>
<tbody>
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<td>Begin: 8:30 AM</td>
<td>End: 4:00 PM</td>
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</table>

**Audience:** FSEs, Reps  

**Number of Students:** min-2 / max-4

**Course Description:** The Slab Service Engineer Senior course is designed for people that are trained on Slab Laser Junior Level and service, maintain, and/or integrate the Slab Laser system already. The course covers exchange of RF-generator and –recipient, exchange of the resonator mirrors and performing an advanced performance check. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the senior level.

**Key Topics:** Laser, electrical, and lab safety, advanced troubleshooting, exchange of RF-generator and -recipient, exchange and adjust resonator mirrors and a performance check.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (5 days) to renew the certification.

**Prerequisites:** Successful completion of the Slab Laser Junior Level course. Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of the laser and any other applied circuitry.

**Training at Hamburg:** Trainees from Germany need EPK qualification and all others need an electrical qualification.
Desktop Laser Systems

**EasyJewel – Operation, Service, and Maintenance**

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391742</th>
<th>Course length: 2 days</th>
<th>Day(s): Tuesday – Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td>Begin: 8:30 AM</td>
<td>End: 5:00 PM</td>
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</tr>
<tr>
<td>Audience: FSEs, Reps, Customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
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</tr>
</tbody>
</table>

**Course Description:** The EasyJewel Operation, Service, and Maintenance course is designed for people that operate, maintain, and/or integrate the EasyJewel laser system. The course covers theory of operation, site requirements, and troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the major component level. The EasyGUI™ and Visual Laser Marker (VLM) applications will be reviewed with the operators.

**Versions:** EasyJewel 1, 2, 4, 5

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Optional Topics:** More in-depth EasyGUI™ and VLM programming and applications basic training is available upon request.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

**EasyMark 4 – Operation, Service, and Maintenance**

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391743</th>
<th>Course length: 2 days</th>
<th>Day(s): Tuesday – Wednesday</th>
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<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
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</tr>
<tr>
<td>Audience: FSEs, Reps, Customers</td>
<td>Number of Students: min-2 / max-5</td>
<td></td>
<td></td>
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</table>

**Course Description:** The EasyMark 4 Operation, Service, and Maintenance course prepares trainees to install, operate, optimize, and maintain the EasyMark 4 laser. Firmware upgrades, computer control, data logs and remote diagnostics and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Note:** This course only teaches Version 4.

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
**DIODE INDUSTRIAL LASERS**

**Dilas Series**

**Dilas Compact AC/LC – Service Course**

<table>
<thead>
<tr>
<th>Location:</th>
<th>Customer’s Site or Factory</th>
<th>Part #:</th>
<th>1391717</th>
<th>Course length:</th>
<th>2 days</th>
<th>Day(s):</th>
<th>Tuesday – Wednesday</th>
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<tbody>
<tr>
<td></td>
<td>Plymouth, MI, USA; Mainz, Germany</td>
<td></td>
<td></td>
<td>Begin:</td>
<td>8:30 AM</td>
<td>End:</td>
<td>4:00 PM</td>
</tr>
<tr>
<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students:</td>
<td>min-2 / max-4</td>
<td></td>
<td></td>
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</table>

**Course Description:** The Compact Service course prepares trainees to install and operate the Compact AC/LC system. Upon successful completion of the course, trainees should be able to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser head overview; USB/Customer Interface operation.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

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**Dilas Compact Evolution – Maintenance and Operation**

<table>
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<tr>
<th>Location:</th>
<th>Customer’s Site or Factory</th>
<th>Part #:</th>
<th>1391719 or 1391720</th>
<th>Course length:</th>
<th>1 day</th>
<th>Day(s):</th>
<th>Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plymouth, MI, USA; Mainz, Germany</td>
<td></td>
<td></td>
<td>Begin:</td>
<td>8:30 AM</td>
<td>End:</td>
<td>4:00 PM</td>
</tr>
<tr>
<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students:</td>
<td>min-2 / max-5</td>
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</table>

**Course Description:** The Dilas Compact Evolution Maintenance and Operation course is designed for people that service and maintain the Compact Evolution and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
Dilas Compact Evolution – Service Course

**Location:** Factory  
**Part #:** 1391721  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday

**Plymouth, MI, USA; Mainz, Germany**

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-5

**Course Description:** The Compact Evolution Service course prepares trainees to install, operate, optimize, and maintain the Compact Evolution laser system. Firmware upgrades, external control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; TCP-IP/Customer Interface and website operation; board replacement; PSU and diode replacement; firmware updates, fault code identification and service response.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

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Dilas Evolution XL – Service Course

**Location:** Factory  
**Part #:** 1391718  
**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday

**Mainz, Germany**

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** FSEs, Reps  
**Number of Students:** min-2 / max-5

**Course Description:** The Evolution XL Service course prepares trainees to install, operate, optimize, and maintain the Evolution XL laser system. Firmware upgrades, external control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; TCP-IP/Customer Interface and website operation; board replacement; PSU and diode replacement; firmware updates, fault code identification and service response.

**Prerequisites:** Successful completion of the Compact Evolution Service course. An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
## Dilas Compact – Maintenance and Operation

<table>
<thead>
<tr>
<th>Location:</th>
<th>Customer’s Site or Factory</th>
<th>Part #:</th>
<th>1391724 or 1391723</th>
<th>Course length:</th>
<th>1 day</th>
<th>Day(s):</th>
<th>Upon availability</th>
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<tbody>
<tr>
<td>Location:</td>
<td>Mainz, Germany</td>
<td>Begin:</td>
<td>8:30 AM</td>
<td>End: 4:00 PM</td>
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<tr>
<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students:</td>
<td>min-2 / max-4</td>
<td>Course Description:</td>
<td>The Compact, Maintenance and Operation course is designed for people that service and maintain the Dilas Compact and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.</td>
<td>Key Topics:</td>
<td>Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.</td>
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</table>

## Dilas Compact Mini – Service Course

<table>
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<tr>
<th>Location:</th>
<th>Factory</th>
<th>Part #:</th>
<th>1391722</th>
<th>Course length:</th>
<th>2 days</th>
<th>Day(s):</th>
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<tbody>
<tr>
<td>Location:</td>
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<td>Begin:</td>
<td>8:30 AM</td>
<td>End: 4:00 PM</td>
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<tr>
<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students:</td>
<td>min-2 / max-4</td>
<td>Course Description:</td>
<td>The Compact Mini Service course prepares trainees to install, operate, optimize, and maintain the Compact Mini laser. Firmware upgrades, computer control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.</td>
<td>Key Topics:</td>
<td>Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.</td>
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## Dilas Mini Operation and Maintenance Course

<table>
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<th>Location:</th>
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<th>Part #:</th>
<th>1391840 1391839</th>
<th>Course length:</th>
<th>½ day</th>
<th>Day(s):</th>
<th>Upon availability</th>
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<tr>
<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students:</td>
<td>min-2 / max-4</td>
<td>Course Description:</td>
<td>The Mini, Operation and Maintenance course prepares trainees to install and operate the Mini system. Upon successful completion of the course, trainees should be able to control and operate the laser.</td>
<td>Key Topics:</td>
<td>Laser, electrical, and lab safety; ESD awareness; thermal management; laser head overview; USB/Customer Interface operation.</td>
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</table>
**Dilas Combined Mini, Compact, Compact Evolution – Service Course**

**Location:** Factory  
Part #: 1391838  
Course length: 5 days  
Day(s): Monday – Friday

Plymouth, MI, USA; Mainz, Germany

Begin: 8:30 AM  
End: 4:00 PM

**Audience:** FSEs, Reps  
Number of Students: min-2 / max-4

**Course Description:** The Dilas Combined Service course prepares trainees to install, operate, optimize, and maintain the laser. Firmware upgrades, computer control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser. This course includes Mini, Compact as well as Compact Evolution.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; USB TCP/IP Customer Interface operation; board replacement; PSU and diode replacement; firmware upgrade; fault code identification and service response.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

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**Dilas LLDROP – Operation Course**

**Location:** Customer’s Site or Factory  
Part #: 1391832 or 1391833  
Course length: 1 day  
Day(s): Upon availability

Plymouth, MI, USA; Mainz, Germany

Begin: 8:30 AM  
End: 4:00 PM

**Audience:** FSEs, Reps, Customers  
Number of Students: min-2 / max-4

**Course Description:** The Dilas LLDROP Operation course prepares trainees to install and operate the Dilas LLDROP system. Upon successful completion of the course, trainees should be able to control and operate the LLDROP systems.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser head overview; USB/Customer Interface operation.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
Coherent Laser Training Catalog

**Dilas Accessories – Service Course**

**Location:** Factory

**Part #:** 1391829

**Course length:** 5 days

**Day(s):** Monday – Friday

Plymouth, MI, USA; Mainz, Germany

**Begin:** 8:30 AM

**End:** 4:00 PM

**Audience:** FSEs, Reps, Customers

**Number of Students:** min-2 / max-5

**Course Description:** The Dilas Accessories Service course prepares trainees to install, operate, optimize, and maintain the laser accessories like processing heads, Pyrometer and Galvo systems. Firmware upgrades, computer control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to operate the accessories.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser head overview; USB/Customer Interface operation; component replacement; firmware upgrade; fault code identification and service response.

**Prerequisites:** Successful completion of the Compact AC/LC Service course or Compact Evolution Service course. An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

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**HighLight Series**

**HighLight DL Series – Maintenance and Operation**

**Location:** Customer’s Site or Factory

**Part #:** 1391753 or 1391754

**Course length:** 1 day

**Day(s):** Upon availability

Mainz, Germany

**Begin:** 8:30 AM

**End:** 5:00 PM

**Audience:** FSEs, Reps, Customers

**Number of Students:** min-2 / max-5

**Course Description:** The HighLight DL Series Maintenance and Operation course prepares trainees to install and operate and maintain the HighLight DL laser system. External control and adjustments are covered. Upon successful completion of the course, trainees should be able to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; TCP-IP/Customer Interface and website operation; board replacement; PSU and diode replacement; firmware updates, fault code identification and service response.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
HighLight DL XXXX HP – Service Course

**Location:** Factory | **Part #:** 1391756 | **Course length:** 3 days | **Day(s):** Tuesday – Thursday

Mainz, Germany | Begin: 8:30 AM | End: 5:00 PM

**Audience:** FSEs, Reps, Customers | **Number of Students:** min-2 / max-5

**Course Description:** The HighLight DL XXXX HP Service course prepares trainees to install, operate, optimize, and maintain the HighLight DL XXXX HP laser system. Firmware upgrades, external control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; Customer Interface operation; fault code identification and service response.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

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HighLight DL XXXX HPR – Service Course

**Location:** Factory | **Part #:** 1391757 | **Course length:** 3 days | **Day(s):** Tuesday – Thursday

Mainz, Germany | Begin: 8:30 AM | End: 5:00 PM

**Audience:** FSEs, Reps, Customers | **Number of Students:** min-2 / max-5

**Course Description:** The HighLight DL XXXX HPR Service course prepares trainees to install, operate, optimize, and maintain the HighLight DL XXXX HPR laser. Firmware upgrades, external control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; TCP-IP/Customer Interface and website operation; board replacement; PSU and diode replacement; firmware updates, fault code identification and service response.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

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HighLight Fap 60 – Maintenance and Operation

**Location:** Customer’s Site or Factory | **Part #:** 1391762 or 1391763 | **Course length:** 1 day | **Day(s):** Upon availability

Mainz, Germany | Begin: 8:30 AM | End: 5:00 PM

**Audience:** FSEs, Reps, Customers | **Number of Students:** min-2 / max-5

**Course Description:** The HighLight Fap 60 Maintenance and Operation course prepares trainees to install and operate the HighLight Fap 60 laser system. Upon successful completion of the course, trainees should be able to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser head overview; USB/Customer Interface operation.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
# Coherent Laser Training Catalog

## HighLight Fap Duo 60 – Service Course

**Location:** Factory  
Mainz, Germany  
**Part #:** 1391761  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday  
**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** FSEs, Reps  
**Number of Students:** min-2 / max-4

**Course Description:** The HighLight Fap Duo 60 Service course prepares trainees to install, operate, optimize, and maintain the HighLight Fap Duo 60 laser system. Firmware upgrades, external control and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; RS-232/Customer Interface operation; board replacement; PSU and diode replacement; fault code identification and service response.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

## HighLight D-Series – Maintenance and Operation

**Location:** Customer’s Site or Factory  
Mainz, Germany  
**Part #:** 1391758 or 1391759  
**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday  
**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The HighLight D-Series, Maintenance and Operation course prepares trainees to install and operate the system. Upon successful completion of the course, trainees should be able to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser head overview; USB/Customer Interface operation.

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.

## HighLight D-Series – Service Course

**Location:** Factory  
Mainz, Germany  
**Part #:** 1391760  
**Course length:** 5 days  
**Day(s):** Monday – Friday  
**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** FSEs, Reps  
**Number of Students:** min-2 / max-4

**Course Description:** The HighLight D-Series Service course prepares trainees to install and operate and maintain the laser. External control and adjustments are covered. Upon successful completion of the course, trainees should be able to control and operate the laser.

**Key Topics:** Laser, electrical, and lab safety; ESD awareness; thermal management; laser overview; Customer Interface operation; fault code identification and service response.

**Prerequisites** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
### HighLight Fiber Laser – Customer Basic Operation

**Location:** Factory  
**Part #:** 1391765  
**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday  
**Location:** Plymouth, MI, USA; Hamburg, Germany; Shanghai, China  
**Begin:** 8:30 AM  
**End:** 4:00 PM  
**Audience:** Customers  
**Number of Students:** min-2 / max-4  

**Course Description:** The HighLight Fiber Laser Customer Basic Operation course is designed for people that operate the HighLight Fiber Laser. The course covers principals of laser operation and basic troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose minor faults at the major component level. Handling and cleaning of process fibers will also be discussed.

**Key Topics:** Laser, electrical, and lab safety. Basic laser theory, specifications, basic operation, basic troubleshooting and site requirements.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various components of the laser device. Technical knowledge would be helpful for completing the training course.

### HighLight Fiber Laser – Customer Scanner

**Location:** Factory  
**Part #:** 1391766  
**Course length:** 1 days  
**Day(s):** Upon availability  
**Location:** Hamburg, Germany  
**Begin:** 8:30 AM  
**End:** 4:00 PM  
**Audience:** Customers  
**Number of Students:** min-2 / max-4  

**Course Description:** The HighLight Fiber Laser Customer Scanner course is designed for people that operate the Scanner system together with a HighLight Fiber Laser. The course covers basic Visual Laser Marker (VLM) operation and understanding the scanner system. It covers how to backup scanner configuration parameters and log files.

**Key Topics:** Laser, electrical, and lab safety; basic scanner operation, specifications, basic scanner theory and site requirements. VLM software basics as well as production tool VMC2.

**Prerequisites:** Successful completion of the Fiber Laser Customer Basic or Advanced training course. Complete product knowledge requires a thorough understanding of various components of the laser device. Technical knowledge would be helpful for completing the training course.
Coherent Laser Training Catalog

HighLight Fiber Laser – Customer Advanced Maintenance

**Location:** Factory  
**Part #:** 1391764  
**Course length:** 4 days  
**Day(s):** Tuesday – Friday

Plymouth, MI, USA; Hamburg, Germany; Shanghai, China

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The HighLight Fiber Laser Customer Advanced Maintenance course is designed for people that operate and maintain the HighLight Fiber Laser. The course covers principals of laser operation, changing and adjustment of the fiber incoupling, backup of laser parameters and programs, and advanced troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the component level. Handling and cleaning of process fibers will also be discussed.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications, basic laser theory, advanced troubleshooting and site requirements. GUI/HMI software at maintenance PC (bring with you to training) and laser inspection.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (2 days) to renew the certification.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of the laser and any other applied circuitry.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.

HighLight Fiber Laser – OEM Maintenance

**Location:** Factory  
**Part #:** 1391767  
**Course length:** 5 days  
**Day(s):** Monday – Friday

Plymouth, MI, USA; Hamburg, Germany; Shanghai, China

**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** OEM Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The HighLight Fiber Laser OEM Maintenance course is designed for people that service, maintain, and/or integrate the HighLight Fiber Laser into their system. The course covers installation, principals of laser operation, changing and adjustment of the fiber incoupling, backup of laser parameters and programs, and advanced troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose major faults at the component level. Handling and cleaning of process fibers will also be discussed.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications, basic laser theory, installation, advanced troubleshooting and site requirements. GUI/HMI software at maintenance PC (bring with you to training) and laser inspection.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (3 days) to renew the certification.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of the laser and any other applied circuitry.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.
HighLight Fiber Laser – Service Engineer

**Location:** Factory  
**Part #:** 1391769  
**Course length:** 10 days  
**Day(s):** Monday – Friday (2 weeks)

**Course Details:**
- **Location:** Plymouth, MI, USA; Hamburg, Germany; Shanghai, China
- **Begin:** 8:30 AM  
**End:** 4:00 PM
- **Audience:** FSEs, Reps  
**Number of Students:** min-2 / max-4
- **Course Description:** The HighLight Fiber Laser Service Engineer course is designed for people that service, maintain, and/or integrate the HighLight Fiber Laser. The course covers installation, principals of laser operation, advanced troubleshooting and changing of laser components. Handling and cleaning of process fibers as well as the adjustments of the fiber incoupling will be trained. It also covers how to backup laser parameters and programs. Trainees will learn to identify proper operation and will be qualified to diagnose major faults on all components of the system.

**Key Topics:** Laser, electrical, and lab safety; basic operation, specifications, basic laser theory, installation, advanced troubleshooting, repair and site requirements. GUI/HMI software at maintenance PC (bring with you to training) and laser inspection.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (5 days) to renew the certification.

**Prerequisites:** Successful completion of the Fiber Laser Service Engineer training course. Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of the laser and any other applied circuitry.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.

HighLight Fiber Laser – Service Scanner – Service Engineer

**Location:** Factory  
**Part #:** 1391770  
**Course length:** 5 days  
**Day(s):** Monday – Friday

**Course Details:**
- **Location:** Hamburg, Germany
- **Begin:** 8:30 AM  
**End:** 4:00 PM
- **Audience:** FSEs, Reps  
**Number of Students:** min-2 / max-4
- **Course Description:** The HighLight Fiber Laser Scanner Service Engineer course is designed for people that service, maintain, and/or integrate the Scanner system to a HighLight Fiber Laser installation. The course covers installation, principals of Visual Laser Marker (VLM) operation, advanced troubleshooting, changing of scanners, optics and ALI-Macro. Handling of scanner system and scanner optics including cleaning of its cover slight will be trained. It covers how to backup scanner configuration parameters and log files, too. Trainees will learn to identify proper operation and will be qualified to diagnose major faults at all components of the system.

**Key Topics:** Laser, scanner, electrical and lab safety; basic scanner operation, specifications, basic scanner theory, installation, advanced troubleshooting, repair and site requirements. VLM software basics as well as production setup with VMC2.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (5 days) to renew the certification.

**Prerequisites:** Successful completion of the Fiber Laser Service Engineer training course. Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit.

**Training at Hamburg:** Trainees from Germany need EFK qualification and all others need an electrical qualification.
HighLight Fiber Laser – Splicing (Passive) Part 1

**Location:** Factory  **Part #:** 1391771  **Course length:** 10 days  **Day(s):** Monday – Friday (2 weeks)  
Plymouth, MI, USA; Hamburg, Germany; Shanghai, China  
**Begin:** 8:30 AM  **End:** 4:00 PM

**Audience:** FSEs  **Number of Students:** min-1 / max-2

**Course Description:** The HighLight Fiber Laser, Splicing Part 1 course is designed for FSEs who are trained on the Fiber Laser. The course covers basic knowledge of splicing procedures, practice in basic handling of required splice tooling, practice in splicing of process fiber and pump fiber at laser components.

**Key Topics:** Training lab safety and safety for working with glass fiber, passive splicing theory, Splice tooling content, function of cleaver, and cleave meter, function of splice system, function of recoat system, function of recoat system, function of recoat system, practice splicing of process fiber with 50µm or 100µm core size and splicing of pump fiber with 240µm or 270µm cladding size (IS58).

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (5 days) to renew the certification. Available splicing tool kits may vary from training center to training center.

**Prerequisites:** Complete product knowledge requires a thorough understanding of the HighLight FL. Trainees should be able to perform fine mechanical work in a concentrated, focused and calm manner. Normal to good eyesight should be given. Tooling handling software needs to be install at their PC (bring with you to training).

HighLight Fiber Laser – Splicing (Active) Part 2

**Location:** Factory  **Part #:** 1391772  **Course length:** 10 days  **Day(s):** Monday – Friday (2 weeks)  
Plymouth, MI, USA; Hamburg, Germany; Shanghai, China  
**Begin:** 8:30 AM  **End:** 4:00 PM

**Audience:** FSEs  **Number of Students:** min-1 / max-2

**Course Description:** The HighLight Fiber Laser Splicing Part 2 course is designed for FSEs trained on the HighLight Fiber Laser and on splicing part 1. The course covers knowledge of SM splicing procedures, practice in basic handling of required splice tooling, practice in active splicing of SM process fiber and MMU exchange at laser components. FLU and/or FLC exchange by jump fiber splicing is practiced on a representative laser. These splices will be operated with laser light during the ramp-up operation of the FLUs and FLC.

**Key Topics:** Training lab safety, FL safety and safety for working with glass fibers, active splicing theory, splice tooling content, function of ILX Lightwave 82XX, practice splicing of process fiber with 20µm core size, standard splice kit only SM, automatically and MMU – manually, practice splicing of jump fiber (FLU – FLC), standard splice kit and ILX feedback and/or compact splice kit, and laser start up after FLU/FLC exchange, LASER finish and accelerating FLUs / FLC.

**Note:** At the end of the course the trainees get a certification with a duration of validity of 18 months. After 18 months we recommend a refreshment training (5 days) to renew the certification. Available splicing tool kits may vary from training center to training center.

**Prerequisites:** Complete product knowledge requires a thorough understanding of the HighLight FL Splicing part 1 training. Compact Splice Kit can be used for a particular splice only, if this was trained before in Splicing part 1 or SKC refresh training. Trainees should be able to perform fine mechanical work in a concentrated, focused and calm manner. Normal to good eyesight should be given. Tooling handling software needs to be install at their PC (bring with you to training).
HighLight Fiber Laser – Service Tech Support

**Location:** Factory  
**Part #:** 1391773  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday

Hamburg, Germany  
**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** TSEs, Reps  
**Number of Students:** min-2 / max-4

**Course Description:** The HighLight Fiber Laser Service Tech Support course is designed for people that support the HighLight Fiber Laser by phone or remote service access. The course covers advanced troubleshooting by analyzing laser errors, live data and laser settings online or offline. It covers understanding of how to use the analyzing tool Remote Service Helper (RSH). By practical analysis tasks we will deepen the knowledge of the RSH tool as well as understanding of service cases. Trainees will learn to identify proper operation and will be qualified to diagnose major faults at all components of the system to prepare and/or support Field Service Engineers (FSE) cases.

**Key Topics:** Laser, electrical and lab safety, advanced troubleshooting, analyzing typical service cases, Return to Operation (RTO) in 72h, Field Replaceable Units (FRUs)/ non FRUs, and site requirements. Remote Service Helper (RSH) and GUI software at engineer laptop (bring with you to training).

**Note:** A Highlight Fiber Laser Service Training is not mandatory but it is a good background for this course would lead to a higher qualification of the FSE.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of the laser and any other applied circuitry. Understanding of the FSE tools like MS Windows and its software programs as well as communications skills.
**INDUSTRIAL LASERS FOR MARKING**

## PowerLine D

### PowerLine D – Repair and Maintenance

<table>
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<tr>
<th>Location</th>
<th>Part #</th>
<th>Course length</th>
<th>Day(s):</th>
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<tr>
<td>Munich, Germany</td>
<td>1391864</td>
<td>4 days</td>
<td>Tuesday – Friday</td>
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<td>Audience: FSEs, Reps, Customers</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
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**Course Description:** The PowerLine D Repair and Maintenance course is directed toward experienced maintenance personnel with as much in-depth knowledge in electronics as possible who, by attending this course, will be able to independently maintain, service, and adjust the laser system. The trainee will become able to personally analyze and correct errors that may occur.

**Key Topics:** Laser, electrical, and lab safety; laser principle; overview of the components of a laser system; error analysis, working with an laser power meter, signal flow between components, exchange of optical components like diode cavity, mirrors, Q-switch and beam expander, laser alignment using alignment tools, executing simple layouts after repair work.

**Optional Topics:** More in-depth Visual Laser Marker (VLM) Programming and Application training course is available upon request.

**Prerequisites:** Experienced maintenance personnel. Trainees should be able to read schematics and relate them to the actual assembly of the electrical supply cabinet, basic electromechanical principals and safety knowledge is required.

## PowerLine E

### PowerLine E-Air/E-Air ITX – Maintenance

<table>
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<th>Part #</th>
<th>Course length</th>
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<td>Plymouth, MI, USA</td>
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<td>Begin: 8:30 AM</td>
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**Course Description:** The PowerLine E-Air Maintenance course is designed for people that service, maintain, and/or integrate the PowerLine E-Air laser system. The course covers theory of operation, installation and site requirements, and troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the major component level. Beam delivery optics and integration may also be discussed. Visual Laser Marker (VLM) programming and applications will be reviewed at a basic level.

**Versions:** E Air and E Air ITX

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
PowerLine E-Air/E-Air ITX – Repair and Maintenance

**Location:** Factory
**Part #:** 1391869
**Course length:** 4 days
**Day(s):** Tuesday – Friday

Munich, Germany

**Begin:** 8:30 AM
**End:** 4:00 PM

**Audience:** FSEs, Reps, Customers
**Number of Students:** min-2 / max-5

**Course Description:** The PowerLine E-Air Repair and Maintenance course is designed for people that service, maintain, and/or integrate the PowerLine E-Air laser system. The course covers theory of operation, installation and site requirements, and troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the major component level. Beam delivery optics and integration may also be discussed. Visual Laser Marker (VLM) programming and applications will be reviewed at a basic level.

**Versions:** E Air and E Air ITX

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

PowerLine E-Water – Maintenance

**Location:** Customer’s Site or Factory
**Part #:** 13918687 or 1391868
**Course length:** 4 days
**Day(s):** Tuesday – Friday

Plymouth, MI, USA

**Begin:** 8:30 AM
**End:** 5:00 PM

**Audience:** FSEs, Reps, Customers
**Number of Students:** min-2 / max-6

**Course Description:** The PowerLine E-Water Cooled Maintenance course is designed for people that service, maintain, and/or integrate the PowerLine E-Water laser system. The course covers theory of operation, installation and site requirements, and troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the major component level. Beam delivery optics and integration may also be discussed. Visual Laser Marker (VLM) or LaserCAD programming and applications will be reviewed at a basic level.

**Versions:** IR (infrared), SHG (second harmonic generator), THG (third harmonic generator)

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Optional Topics:** More in-depth VLM or LaserCAD Programming and Applications basic training course is available upon request.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
PowerLine F (Fiber Laser) – Maintenance

**Location:** Customer’s Site or Factory  
**Part #:** 1391870 or 1391871  
**Course length:** 4 days  
**Day(s):** Tuesday - Friday  
**Begin:** 8:30 AM  
**End:** 5:00 PM

**Plymouth, MI, USA**  
**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-6

**Course Description:** The PowerLine F Maintenance course is designed for people that service, maintain, and/or integrate the PowerLine F laser system. The course covers theory of operation, installation and site requirements, and troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the major component level. Beam delivery optics and integration may also be discussed. Visual Laser Marker (VLM) programming and applications will be reviewed at a basic level.

**Versions:** 20, 30, 50, 100

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Optional Topics:** More in-depth VLM Programming and Applications basic training course is available upon request.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

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PowerLine F (Fiber Laser) – Repair and Maintenance

**Location:** Factory  
**Part #:** 1391872  
**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday  
**Begin:** 9:00 AM  
**End:** 5:00 PM

**Munich, Germany**  
**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The PowerLine F Repair and Maintenance course is directed toward experienced maintenance personnel with as much in-depth knowledge in electronics as possible who, by attending this course, will be able to independently maintain service and adjust the laser system. The trainee will become able to personally analyze and correct errors that may occur.

**Versions:** 20, 30, 50, 100

**Key Topics:** Laser, electrical, and lab safety; laser principle; overview of the components of a laser system; error analysis, working with an laser power meter, exchange of the fiber laser beam source, shutter and beam expander, laser alignment using alignment tools, executing simple layouts after repair work.

**Optional Topics:** More in-depth Visual Laser Marker (VLM) Programming and Application course is available upon request.

**Prerequisites:** Experienced maintenance personnel. Trainees should be able to read schematics and relate them to the actual assembly of the electrical supply cabinet, Basic electromechanical principals and safety knowledge is required.
PowerLine Pico and Prime

PowerLine Pico – Basic Repair

<table>
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<th>Course length: 2 Days</th>
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Course Description: The PowerLine Pico Basic Repair course is designed for people that maintain, and/or integrate the PowerLine Pico laser system. The course covers machine operation, laser applications, user interface, advanced troubleshooting and maintenance. Trainees will learn to properly troubleshoot and maintain the laser.

Key Topics: Laser, electrical, and lab safety; machine set-up and operation; preventive maintenance; specifications; basic troubleshooting and maintenance; and materials processing.

Prerequisites: Trainees should be able to read schematics. Basic electromechanical principals and safety knowledge is required.

PowerLine Pico – Repair

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<th>Location</th>
<th>Part #: 1391875</th>
<th>Course length: 2 Days</th>
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<td>Audience:</td>
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<td>Number of Students: min-2 / max-5</td>
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Course Description: The PowerLine Pico Repair course gives the trainee an overview about the properties and function of the PowerLine Pico laser system, furthermore how to change the laser head, and supply parts in the cabinet. Moreover, the trainees learn how to handle the laser software and the laser system independently, including detection and removal of error messages.

Key Topics: Laser, electrical, and lab safety; laser principle; overview of the components of a laser system; machine setup and operation; preventive maintenance; basic troubleshooting; exchange of ALI board, and power supplies; properties and possibilities with Visual Laser Marker (VLM) /VMC2.

Optional Topics: More in-depth VLM programming and application course is available upon request.

Prerequisites: Solid basic knowledge of Windows based PCs and experience in the operation of Microsoft WIN is required. Trainees should be able to read schematics, basic electromechanical principals and safety knowledge is required.
PowerLine NX

**PowerLine NX – Repair and Maintenance**

| Location: | Munich, Germany |
| Part #: | 1391873 |
| Course length: | 4 days |
| Day(s): | Tuesday – Friday |
| Begin: | 9:00 AM |
| End: | 5:00 PM |
| Audience: | FSEs, Reps, Customers |
| Number of Students: | min-2 / max-4 |

**Course Description:** The PowerLine NX course is for experienced maintenance personnel with as much in-depth knowledge in electronics as possible who, by attending this course, will be able to independently maintain service and adjust the laser system. The trainee will become able to personally analyze and correct errors that may occur.

**Key Topics:** Laser, electrical, and lab safety; laser principle; overview of the components of the PowerLine NX subsystem; error analysis, working with an laser power meter, exchange of the Rapid NX beam source, head board, shutter and beam expander, laser alignment using alignment tools, executing simple layouts after repair work.

**Optional Topics:** More in-depth Visual Laser Marker (VLM) Programming and Application course is available upon request.

**Prerequisites:** Experienced maintenance personnel. Trainees should be able to read schematics and relate them to the actual assembly of the electrical supply cabinet, Basic Electromechanical principals and safety knowledge is required.

StarMark

**StarMark – Operation, Service, and Maintenance**

| Location: | Plymouth, MI, USA; Munich, Germany |
| Part #: | 1391926 |
| Course length: | 2 days |
| Day(s): | Tuesday – Wednesday |
| Begin: | 8:30 AM |
| End: | 5:00 PM |
| Audience: | FSEs, Reps, Customers |
| Number of Students: | min-2 / max-5 |

**Course Description:** The StarMark Operation, Service, and Maintenance course is designed for people that operate, maintain, and/or integrate the StarMark laser system. The course covers theory of operation, site requirements, and troubleshooting. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the major component level. The user interface (LaserCAD) application will be reviewed in depth with the operators.

**Key Topics:** Laser, electrical, and lab safety; daily operation; preventive maintenance; specifications; basic theory of operation; troubleshooting; laser mode evaluation; installation and site requirements.

**Optional Topics:** More in-depth LaserCAD programming and applications basic training course is available upon request.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
WaferLase

**WaferLase – Basic Operation and Maintenance**

<table>
<thead>
<tr>
<th>Location: Customer’s site</th>
<th>Part #: 1391974</th>
<th>Course length: 2 days</th>
<th>Day(s): Tuesday – Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td></td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
</tr>
</tbody>
</table>

**Audience:** Reps, Customers

**Number of Students:** min-2 / max-6

**Course Description:** The WaferLase Basic Operation and Maintenance course is designed for people that operate, maintain, and/or integrate the WaferLase laser system. The course covers machine operation, laser applications, user interface, advanced troubleshooting and maintenance. Trainees will learn to properly operate the system and software interface, and will receive advanced troubleshooting and maintenance knowledge. The custom user interface application will be reviewed.

**Key Topics:** Laser, electrical, and lab safety; advanced machine set-up and operation; preventive maintenance; specifications; advanced troubleshooting and maintenance; and materials processing.

**Optional Topics:** Secs/GEM remote control software may be covered, upon request.

**Prerequisites:** Complete material process knowledge of substrates and machine mode of operation is required. Trainees should be able to read schematics. Basic electromechanical principals and safety knowledge is required.

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**WaferLase – Advanced Operation and Maintenance**

<table>
<thead>
<tr>
<th>Location: Customer’s site</th>
<th>Part #: 1391973</th>
<th>Course length: 4 days</th>
<th>Day(s): Tuesday – Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td></td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
</tr>
</tbody>
</table>

**Audience:** Reps, Customers

**Number of Students:** min-2 / max-6

**Course Description:** The WaferLase Advanced Operation and Maintenance course is designed for people that operate, maintain, and/or integrate the WaferLase laser system. The course covers machine operation, laser applications, user interface, advanced troubleshooting and maintenance. Trainees will learn to properly operate the system and software interface and will receive advanced troubleshooting and maintenance knowledge. The custom user interface application will be reviewed.

**Key Topics:** Laser, electrical, and lab safety; advanced machine set-up and operation; preventive maintenance; specifications; advanced troubleshooting and maintenance; and materials processing.

**Optional Topics:** Secs/GEM remote control software may be covered, upon request.

**Prerequisites:** Complete material process knowledge of substrates and machine mode of operation is required. Trainees should be able to read schematics. Basic electromechanical principals and safety knowledge is required.
Laser Machine Tools

Laser Machine Tool Applications Overview

Location: Customer’s Site or Factory
Part #: see list
Course length: 3 days
Day(s): Tuesday – Thursday

Plymouth, MI & Santa Clara, CA, USA
Begin: 9:00 AM
End: 5:00 PM

Audience: OEMs and end customers
Number of Students: minimum-2 / maximum-4

Course Description: The Laser Machine Tool Applications Overview course prepares trainees to understand the basics of materials processing using laser cutting and engraving as the primary medium. The primary focus of the course is based on metal processing, since applied knowledge of metals is the basis for cutting all organic materials using laser procedures. Trainees will learn the operation and troubleshooting of a complex laser machine system. They will learn a variety of procedures to clean cut metals, develop “machine ready” programs and conversions from CAD databases, move prototype jobs to high volume “step and repeat” production runs, and many other production ready procedures. Course content ranges from basic laser theory of operation to advanced LaserLink programming. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of efficient use of the product in the field.

Key Topics: Laser, electrical, and lab safety; CAD database program conversion; laser machining basics; materials and process parameter selection; LaserLink software operation; Vision system set-up and control; system set-up, and calibration; troubleshooting and fault diagnosis procedures; laser machining center optimization procedures.

Prerequisites: Technically oriented vocational training or experience in sheet metal or material processing. Product operation requires basic computer skills and network infrastructure knowledge. Understanding of CAD based source files for the object that will be machined. Technical understanding of basic automation machine tools and the operator interface required to run the machine. Trainees should be able to read mechanical drawings and verify the machined result using appropriate measurement tools.
Laser Machine Tool System Preventative Maintenance

Location: Customer's Site or Factory
Part #: 1391813 or 1391814
Course length: 3 days
Day(s): Tuesday – Thursday

Begin: 9:00 AM
End: 5:00 PM

Audience: OEMs, end customers, Coherent FSEs, subs, and reps
Number of Students: minimum-2 / maximum-4

Course Description: The Laser Machine Tool (LMT) System Preventative Maintenance course covers the entire LMT System family of products. It is designed for customers and engineers who require the ability to install and maintain LMT systems. The course covers installation and site requirements and some troubleshooting. Trainees will learn how to perform routine maintenance and preventative maintenance on the LMT systems including how to remove and clean optics, level and square the cutting pallet, align, focus and measure the power of the laser beam. Upon successful completion of the course, Coherent FSEs, subs, and reps should be able to train others to control and operate the system.

Key Topics: Laser, electrical, and lab safety; NVRAM capturing and system parameters via MotionMechanic, door and cover maintenance, system leveling, cutting pallet maintenance and cleaning, exhaust cleaning, laser power testing, optics alignment and cleaning, belt tensioning and encoder cleaning, nozzle centering and Capacitive Head Sensor calibration and operation, Vision system setup, and voltage measurement.

Prerequisites: Good understanding of mechanical systems and maintenance, electrical measurement procedures, machine tool components, integrated Operation, and maintenance management.

Laser Machine Tool Service

Location: Factory
Part #: 1391817
Course length: 3 days
Day(s): Tuesday – Thursday

Begin: 9:00 AM
End: 5:00 PM

Audience: Coherent FSEs, subs, and reps
Number of Students: minimum-2 / maximum-4

Course Description: The Laser Machine Tool (LMT) Service course covers the entire LMT System family of products. It is designed for engineers who require the ability to install, maintain, and service LMT systems. It is a hands-on course that involves removal and installation of assemblies, breakdown of components, and use of diagnostic tools to help with troubleshooting. Trainees will receive and in depth review of the electronics bay, gantry, pallet/plenum, laser, RF, DC, and HMI. Supplemental installation and maintenance items will be covered along with basic applications and operation. Upon successful completion of the course, trainees should be able to train others to control and operate the system.

Key Topics: Laser, electrical, and lab safety; factory and short beam alignment, X, Y, and Z motor replacement, X, Y, and Z belt tensioning, laser and RF removal/install, Z ball screw removal/install, gantry removal/install, focus head assembly breakdown, focus sensor assembly breakdown, CHS nozzle breakdown, LaserLink, HMI, Motion Mechanic, Pueblo, CanBus reader, and circuit board testing.

Prerequisites: Successful completion of the LMT System Preventative Maintenance course. Complete product knowledge requires a full understanding of different electronic devices and their role in the circuit. The trainee should be able to read schematics and block diagrams and relate them to actual assembly of printed circuit boards and any other applied circuitry.
Manual Laser Welding Tools

StarWeld Performance – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th>Location: Customer’s Site or Factory</th>
<th>Part #: 1391932 or 1391933</th>
<th>Course length: 1 day or 2 days</th>
<th>Day(s): Upon availability or Tuesday – Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
</tbody>
</table>

Audience: FSEs, Reps, Customers

Number of Students: min-2 / max-4

Course Description: The StarWeld Performance Maintenance, Service and Operation course is designed for people that service, maintain the StarWeld Performance and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

Key Topics: Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting; beam mode analysis and beam alignment.

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

StarWeld Desktop – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th>Location: Factory or Customer’s site</th>
<th>Part #: 1391731</th>
<th>Course length: 1 day</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
</tbody>
</table>

Audience: FSEs, Reps, Customers

Number of Students: min-2 / max-4

Course Description: The StarWeld Desktop Maintenance, Service, and Operation course prepares trainees to install, operate, optimize, and maintain the laser. Firmware upgrades, computer control, data logs and remote diagnostics and adjustments are covered. Upon successful completion of the course, trainees should be able to train others to control and operate the laser.

Key Topics: Laser, electrical, and lab safety; daily operation; specifications; site requirements; basic theory of operation; advanced troubleshooting; beam mode analysis and beam alignment.

Prerequisites: An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic AC/DC electronics is helpful. Complete product knowledge requires a good understanding of different electronic and optical devices and their role in the circuit.
### StarWeld Select or Select CNC – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th><strong>Location:</strong></th>
<th>Factory</th>
<th><strong>Part #:</strong></th>
<th>1391905</th>
<th><strong>Course length:</strong></th>
<th>2 days</th>
<th><strong>Day(s):</strong></th>
<th>Tuesday – Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td><strong>Begin:</strong></td>
<td>9:00 AM</td>
<td><strong>End:</strong></td>
<td>5:00 PM</td>
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</tr>
<tr>
<td><strong>Audience:</strong></td>
<td>FSEs, Reps, Customers</td>
<td><strong>Number of Students:</strong></td>
<td>min-2 / max-4</td>
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</tbody>
</table>

**Course Description:** The StarWeld Select Maintenance, Service, and Operation course is designed for people that service and maintain the StarWeld Select and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

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### StarWeld Integral – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th><strong>Location:</strong></th>
<th>Factory</th>
<th><strong>Part #:</strong></th>
<th>1391791</th>
<th><strong>Course length:</strong></th>
<th>2 days</th>
<th><strong>Day(s):</strong></th>
<th>Tuesday – Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td><strong>Begin:</strong></td>
<td>9:00 AM</td>
<td><strong>End:</strong></td>
<td>5:00 PM</td>
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</tr>
<tr>
<td><strong>Audience:</strong></td>
<td>FSEs, Reps, Customers</td>
<td><strong>Number of Students:</strong></td>
<td>min-2 / max-4</td>
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</table>

**Course Description:** The StarWeld Integral Maintenance, Service, and Operation course is designed for people that service and maintain the StarWeld Integral and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
**StarWeld – Process Development**

**Location:** Customer’s Site or Factory  
**Part #:** 1391934 or 1391935  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday  

Plymouth, MI, USA  
**Begin:** 9:00 AM  
**End:** 5:00 PM  

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-5  

**Course Description:** The StarWeld Process Development course covers briefly, in overview: application and system overview; making a weld; weld parameter setup; application and process techniques. hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of efficient use of applications in the field. Upon successful completion of the course, trainees should be able to control, set up, program, and operate the laser. Trainees will be taught on their specific laser system. Topics are customizable, upon written request.

**Versions:** Select, Integral, Performance  

**Key Topics:** Laser, electrical, and lab safety; basic operation; software overview; programming and G-codes; laser welding.

**Prerequisites:** Basic G-code knowledge would be useful.

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**StarPulse – Maintenance, Service, and Operation**

**Location:** Factory  
**Part #:** 1391930  
**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday  

Plymouth, MI, USA; Munich, Germany  
**Begin:** 9:00 AM  
**End:** 5:00 PM  

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4  

**Course Description:** The StarPulse Maintenance, Service, and Operation course is designed for people that service and maintain the StarPulse and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, and beam mode analysis.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
MODULAR PROCESSING SYSTEMS (MPS)

MPS Series

MPS Level 1 – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #:</th>
<th>Course length</th>
<th>Day(s):</th>
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</thead>
<tbody>
<tr>
<td>Factory</td>
<td>1391855</td>
<td>3 days</td>
<td>Tuesday – Thursday</td>
</tr>
<tr>
<td>or Plymouth, MI, USA; Munich, Germany</td>
<td>1391856</td>
<td>or 4 days</td>
<td>or Tuesday – Friday</td>
</tr>
<tr>
<td>Audience</td>
<td>FSEs, Reps, Customers</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
</tr>
<tr>
<td>Number of Students</td>
<td>min-2 / max-4</td>
<td></td>
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</tbody>
</table>

Course Description: The MPS Level 1 course is designed for people that maintain and perform basic operation to the MPS system. For laser operation, maintenance and application additional training courses might be necessary. The course covers safety regulations, structure of MPS hardware and software, theory of operation with HMI with Beckhoff-NCI-programming, and operation of the system and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at basic level.

Optional Topics: The 4 day course also covers fault simulations/analysis/corrections/diagnosis, Bootable back-up Beckhoff-CF-card create and restore.

Key Topics: Laser, electrical, and lab safety; MPS operation, NCI-programming, Beckhoff-NCI-syntax; MPS-troubleshooting.

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should have IT knowledge.

MPS Level 2 – TwinCAT System Manager and PLC Control/NC-Programming

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #:</th>
<th>Course length</th>
<th>Day(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory</td>
<td>1391857</td>
<td>2 days</td>
<td>Tuesday – Wednesday</td>
</tr>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
</tr>
</tbody>
</table>

Course Description: The MPS Level 2 course is designed for people that maintain and perform higher functioning operation to the MPS system. The course covers safety regulations, TwinCAT System Manager, TwinCAT PLC Control, and NC Programming. Trainees will learn to identify proper operation and will be qualified to diagnose faults at basic level.

Key Topics: Laser, electrical, and lab safety; MPS operation, NCI-programming, Beckhoff-NCI-syntax; MPS-troubleshooting

Prerequisites: Successful completion of the MPS Level 1 training course. Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should have IT knowledge, G-Code knowledge.
MPS Workstation – Maintenance, Service, and Operation

Location: Factory  Part #: 1391858  Course length: 3 days  Day(s): Tuesday – Thursday
Plymouth, MI, USA; Munich, Germany  Begin: 9:00 AM  End: 5:00 PM
Audience: FSEs, Reps, Customers  Number of Students: min-2 / max-4

Course Description: The MPS Maintenance, Service, and Operation course is designed for people that operate, maintain, and do basic service to the MPS system. For laser operation, maintenance and application additional training courses might be necessary (see training courses for applicable laser systems). The course covers safety regulations, introduction into system hardware and software, theory of operation with HMI with Beckhoff-NCI-programming, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at a basic level.

Key Topics: Laser, electrical, and lab safety; MPS operation, NCI-programming, Beckhoff-NCI-syntax; MPS-troubleshooting

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
PACKAGING

StarPack

StarPack CW / WD – Maintenance, Service, and Operation

| Location: Factory | Part #: 1391927 or 1391928 or 1391929 | Course length: 3 days or 4 day or 5 day | Day(s): Tuesday – Thursday Tuesday – Friday Monday – Thursday |
| Plymouth, MI, USA; Munich, Germany | Begin: 8:30 AM | End: 5:00 PM |
| Audience: FSEs, Reps, Customers | Number of Students: min-2 / max-4 |

Course Description: The StarPack Maintenance, Service, and Operation course is designed for people that service and maintain the StarPack and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

Key Topics: Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

StarShape

StarShape – Maintenance, Service, and Operation

| Location: Factory | Part #: 1391931 | Course length: 2 days | Day(s): Tuesday – Wednesday |
| Plymouth, MI, USA; Munich, Germany | Begin: 9:00 AM | End: 5:00 PM |
| Audience: FSEs, Reps, Customers | Number of Students: min-2 / max-4 |

Course Description: The StarShape Maintenance, Service, and Operation course is designed for people that service and maintain the StarShape and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

Key Topics: Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

Prerequisites: Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
**StarFlex – Software Course**

**Location:** Factory  
Munich, Germany

**Part #:** 1391925  
**Course length:** 1 day

**Begin:** 8:30 AM  
**End:** 5:00 PM

**Day(s):** Upon availability

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The StarFlex Software course prepares trainees to operate the StarFlex software. Training includes general on-the-fly/trigger settings; covers the power scale, and layout offsets (CW/WD direction). Trainees will learn to back up the system, and to navigate the IO-Unit, and User Manager and access rights. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Trigger option (length, eye mark and WD-margin). General on-the-fly / Triggers Settings, (Trigger Offset, Offset Trigger, Ref-Velocity, Encoder Resolution)

**Prerequisites:** An understanding of basic laser theory and electro-optic devices is recommended. An understanding of basic electronics and IT knowledge is required.
**SOFTWARE**

**Visual Laser Marker (VLM)**

**VLM – Programming and Applications Course**

<table>
<thead>
<tr>
<th>Location:</th>
<th>Customer's Site or Factory</th>
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</thead>
<tbody>
<tr>
<td>Part #:</td>
<td>1391962 or 1391963</td>
</tr>
<tr>
<td>Course length:</td>
<td>4 days</td>
</tr>
<tr>
<td>Day(s):</td>
<td>Tuesday – Friday</td>
</tr>
</tbody>
</table>

- **Location:** Customer’s Site or Factory
- **Part #:** 1391962 or 1391963
- **Course length:** 4 days
- **Day(s):** Tuesday – Friday
- **Begin:** 8:30 AM
- **End:** 12:00 PM
- **Audience:** FSEs, Reps, Customers
- **Number of Students:** min-3 / max-6
- **Course Description:** This course covers the following topics: application and system overview; creating a mark; marking parameter setup; backing up files; application and process techniques, VMC and VMC2 usage. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of efficient use of the VLM application in the field.
- **Current Version:** 5.3
- **Key Topics:** Laser and electrical safety; laser machining basics; materials and process parameter selection; VLM application subjects; the different marking processes, and a brief overview of VMC/VMC2.
- **Prerequisites:** Solid basic knowledge of Windows based PCs and experience in the operation of Microsoft WIN is required. Basic Electromechanical principals and safety knowledge is required.

**Vision V60 and VLM Course**

<table>
<thead>
<tr>
<th>Location:</th>
<th>Factory</th>
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<tbody>
<tr>
<td>Part #:</td>
<td>1391958</td>
</tr>
<tr>
<td>Course length:</td>
<td>3 days</td>
</tr>
<tr>
<td>Day(s):</td>
<td>Tuesday – Thursday</td>
</tr>
</tbody>
</table>

- **Location:** Factory
- **Part #:** 1391958
- **Course length:** 3 days
- **Day(s):** Tuesday – Thursday
- **Begin:** 9:00 AM
- **End:** 5:00 PM
- **Audience:** FSEs, Reps, Customers
- **Number of Students:** min-2 / max-4
- **Course Description:** The aim of this course is to give the user in the first step an overview about the basics of image processing as well as basic functions of the V60 working together with the VLM software. Then in a second step the user, will be enabled to handle the processing system independently, including the detection and elimination of operator error.
- **Key Topics:** Laser safety and laser principle; basics about image processing, illumination, camera and Vision V60; camera calibration; dispersion correction; creation of VLM layouts (TTL SearchPos1 and2); creation of various Vision parameter files; Properties and function of VMC Vision flexible.
- **Prerequisites:** Solid basic knowledge of Windows based PCs and experience in the operation of Microsoft WIN is required.
Coherent Laser Training Catalog

VLM – Software and Application Course

Location: Factory          Part #: 1391960          Course length: 2 days          Day(s): Two consecutive business days
Munich, Germany          Begin: 9:00 AM          End: 5:00 PM
Audience: FSEs, Reps, Customers

Course Description: The aim of this course is to give the trainees an overview of the basic features and capabilities of the VLM software and laser parameter. The trainees learn how to create laser layouts. Upon completion the trainees will be able to execute the created laser layouts on different materials on a comparable laser system. The trainees should bring their own material to find ideal parameter for the marking.

Key Topics: Laser safety and laser principle; laser system overview; creation of VLM layouts including variables, properties of the various laser parameter ideally on the customer’s material, overview of the functionality of VMC2.

Prerequisites: Solid basic knowledge of Windows based PCs and experience in the operation of Microsoft WIN is required.

VLM – Software Course

Location: Factory          Part #: 1391959          Course length: 2 days          Day(s): Two consecutive business days
Munich, Germany          Begin: 9:00 AM          End: 5:00 PM
Audience: FSEs, Reps, Customers

Course Description: This course covers the following topics, briefly, in overview: application and system overview; creating a mark; marking parameter setup; backing up files; application and process techniques, VMC and VMC2 usage; with a wrap-up and review session during the conclusion on the last day. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of efficient use of the VLM application in the field. Topics are customizable, upon written request.

Current Version: 5.3

Key Topics: Laser and electrical safety; laser machining basics; materials and process parameter selection; VLM application subjects; the different marking processes, and a brief overview of VMC/VMC2.

Prerequisites: The trainees should be computer literate with experience using MS Windows©, basic electromechanical principals and safety knowledge is required.

VLM – Software and Maintenance Course

Location: Factory          Part #: 1391961          Course length: 2 days          Day(s): Tuesday – Wednesday
Munich, Germany          Begin: 9:00 AM          End: 5:00 PM
Audience: FSEs, Reps, Customers

Course Description: The aim of this course is to give an overview of VLM and VMC. The course also includes VLM system coordination, drawing, editing, filling objects, preparing objects and texts for the laser, bar code and ID check, DFX data exchange with other software; and how to scan and prepare pictures and logos. The Trainees will learn how to set laser parameters, activate the external device, and operate the program.

Key Topics: Laser safety and laser principle; basics about image processing, illumination, camera and Vision V60; camera calibration; dispersion correction; creation of VLM layouts (TTL SearchPos1 and 2); creation of various Vision parameter files; properties and function of VMC Vision flexible.

Prerequisites: Solid basic knowledge of Windows based PC’s and experience in the operation of Microsoft WIN is required.
LaserCAD

LaserCAD Software Course

**Location:** Factory  
**Part #:** 1391797  
**Munich, Germany**

**Course length:** 3 days  
**Day(s):** Tuesday – Thursday

**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** Reps, Customers

**Number of Students:** min-2 / max-5

**Course Description:** This course covers the following topics, briefly, in overview: application and system overview; creating a mark; marking parameter setup; backing up files; application and process techniques, with a wrap-up and review session during the conclusion on the last day. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of efficient use of the LaserCAD application in the field. Topics are customizable, upon written request.

**Key Topics:** Laser and electrical safety; laser machining basics; materials and process parameter selection; LaserCAD application subjects; and the different marking processes.

**Prerequisites:** Trainees should be able to read schematics. Basic electromechanical principals and safety knowledge is required.

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LaserCAD Software – StarShape/StarScribe/StarPack Course

**Location:** Factory  
**Part #:** 1391798  
**Munich, Germany**

**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday

**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** FSEs, Reps, Customers

**Number of Students:** min-2 / max-5

**Course Description:** This course covers the following topics: application and system overview; creating a mark; marking parameter setup; backing up files; application and process techniques, with a wrap-up and review session during the conclusion on the last day. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of efficient use of the LaserCAD application in the field.

**Key Topics:** Laser, electrical, and lab safety; laser machining basics; materials and process parameter selection; LaserCAD application subjects; and the different marking processes.

**Prerequisites:** Trainees should be able to read schematics. Basic electromechanical principals and safety knowledge is required.
**TUBE CUTTING SYSTEMS**

**StarCut**

**StarCut – Maintenance, Service, and Operation**

<table>
<thead>
<tr>
<th>Location:</th>
<th>Customer’s Site or Factory</th>
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<tbody>
<tr>
<td>Part #:</td>
<td>1391922 or 1391923</td>
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<tr>
<td>Course length:</td>
<td>3 days</td>
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<tr>
<td>Day(s):</td>
<td>Tuesday – Thursday</td>
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</tbody>
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Plymouth, MI

Begin: 9:00 AM  End: 5:00 PM

Audience: FSEs, Reps, Customers

Number of Students: min-2 / max-4

**Course Description:** The StarCut Maintenance, Service, and Operation course is designed for people that service and maintain the StarCut and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

**StarFiber**

**StarFiber – Maintenance, Service, and Operation**

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<tr>
<td>Part #:</td>
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<tr>
<td>Course length:</td>
<td>2 days</td>
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<tr>
<td>Day(s):</td>
<td>Tuesday – Wednesday</td>
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</table>

Plymouth, MI, USA; Munich, Germany

Begin: 8:30 AM  End: 4:00 PM

Audience: FSEs, Reps, Customers

Number of Students: min-2 / max-4

**Course Description:** The StarFiber Maintenance, Service, and Operation course is designed for people that service and maintain the StarFiber and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, and beam mode analysis.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
Lasag Series

Lasag SLS – Maintenance and Operation

**Location:** Customer’s Site or Factory  
**Part #:** 1391917 or 1391918  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday

Plymouth, MI, USA; Belp, Switzerland  
**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-5

**Course Description:** The Lasag SLS Maintenance and Operation course is designed for people that service and maintain the Lasag SLS and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

Lasag FLS – Maintenance and Operation

**Location:** Customer’s Site or Factory  
**Part #:** 1391751 or 1391752  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday

Plymouth, MI, USA; Belp, Switzerland  
**Begin:** 8:30 AM  
**End:** 5:00 PM

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4

**Course Description:** The Lasag FLS Maintenance and Operation course is designed for people that service and maintain the Lasag FLS and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.
## Lasag KLS – Maintenance and Operation

**Location:** Customer’s Site or Factory  
**Part #:** 1391792 or 1391793  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday  
**Location:** Plymouth, MI, USA; Belp, Switzerland  
**Begin:** 8:30 AM  
**End:** 5:00 PM  
**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4  

**Course Description:** The Lasag KLS Maintenance and Operation course is designed for people that service and maintain the Lasag KLS and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.

## Lasag QFS – Maintenance and Operation

**Location:** Customer’s Site or Factory  
**Part #:** 1391879 or 1391880  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday  
**Location:** Plymouth, MI, USA; Belp, Switzerland  
**Begin:** 8:30 AM  
**End:** 5:00 PM  
**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-2 / max-4  

**Course Description:** The Lasag QFS Maintenance and Operation course is designed for people that service and maintain the Lasag QFS and laser system. The course covers theory of operation, safety regulations, advanced laser theory for the system, and operation and preventive maintenance. Trainees will learn to identify proper operation and will be qualified to diagnose faults at the basic level.

**Key Topics:** Laser, electrical, and lab safety; daily operation; specifications; site requirements, basic theory of operation; advanced troubleshooting, beam mode analysis and beam alignment.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various electronic devices and their role in the circuit. Trainees should be able to read schematics and relate them to the actual assembly of printed circuit boards and any other applied circuitry.