Coherent Laser Training Catalog
Customer and Service Training Program

Description of Courses
for Industrial Laser Sources (ILS)
Copyrighst

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INTRODUCTION

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.
Coherent Laser Training Catalog

- 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 Göttingen and 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
• Dieburg, Germany
• Göttingen, Germany
• Hamburg, Germany
• Kaiserslautern, Germany
• Mainz, Germany
• Munich, Germany
• Belp, Switzerland
• Tampere, Finland
• Shanghai, China
• Nanjing, China
• Tokyo, Japan
• Anseong, Korea

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
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
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

<table>
<thead>
<tr>
<th>#</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Title of laser training course.</td>
<td></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>Indicates the location of the factory Laser Training Center.</td>
<td></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>
</tr>
<tr>
<td>8</td>
<td>Number of Students</td>
<td>Minimum and maximum number of students per course.</td>
</tr>
<tr>
<td>9</td>
<td>Course Description</td>
<td>Overview of educational objectives for the training course.</td>
</tr>
<tr>
<td>10</td>
<td>Key Topics &amp; Optional Topics</td>
<td>Specific topics addressed during the training course. Requests for training on any of the listed optional topics should be made at least 30 days prior to the scheduled course start date.</td>
</tr>
<tr>
<td>11</td>
<td>Prerequisites</td>
<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>
</tr>
</tbody>
</table>
Description of Courses for ILS

CO₂ INDUSTRIAL LASERS

Diamond

Diamond CO₂ OEM Course

<table>
<thead>
<tr>
<th>Location: Customer’s Site or Factory</th>
<th>Part #: 1391738 or 1391739</th>
<th>Course length: 1 day</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Clara, CA, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
</tbody>
</table>

Audience: OEMs and end customers

Course Description: The Diamond CO₂ OEM course 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

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391732</th>
<th>Course length: 1 days</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Clara, CA, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
</tbody>
</table>

Audience: Coherent FSEs, subs, and reps

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

**Location:** Factory  
**Part #:** 1391734  
**Course length:** 2 days  
**Day(s):** Tuesday – Thursday  
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 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 J-Series (J2, J3, J5, and J5V) Service Course

**Location:** Factory  
**Part #:** 1391737  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday  
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.
Diamond CO₂ J5V Gas Refill Cart Use and Operation Service Course

Location: Factory  Part #: 1391736  Course length: 1 day  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 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

Location: Factory  Part #: 1391907  Course length: 3 days  Day(s): Tuesday – Thursday
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 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

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #:  1391906</th>
<th>Course length: 5 days</th>
<th>Day(s): Monday – Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Hamburg, Germany; Shanghai, China</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.

## Slab Lascon – OEM Maintenance

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #:  1391908</th>
<th>Course length: 5 days</th>
<th>Day(s): Monday – Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Hamburg, Germany; Shanghai, China</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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

Location: Factory  Part #:  1391910  Course length: 3 days  Day(s): Tuesday – Thursday
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 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

Location: Factory  Part #:  1391909  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 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

**Location:** 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 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.

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Slab RCU – Service Tech Support

**Location:** Factory  
**Part #:** 1391912  
**Course length:** 3 days  
**Day(s):** Tuesday – Thursday

**Location:** Hamburg, Germany

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

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

**Course Description:** The Slab RCU Laser Service Tech Support course is designed for people that support the Slab Laser by phone or remote service access. The course covers advanced troubleshooting by analyzing laser errors. Live data and laser settings online and offline. It includes an 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 an 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 Filed Service Engineers (FSE) cases.

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

**Note:** A Slab Laser Service Junior/Senior Training is not mandatory, but it is a good background for this course and would lead to a higher qualification of the TSE.

**Software:** Remote Service Helper, Slab Laser GUI, MS Office

**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 communication skills.
Slab – Service Junior

Location: Factory Part #: 1391914 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, 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

Location: Factory Part #: 1391915 Course length: 5 days Day(s): Monday – Friday

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 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 EFK qualification and all others need an electrical qualification.
Desktop Laser Systems

EasyJewel – Operation, Service, and Maintenance

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<tr>
<th>Location</th>
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<th>Course length: 2 days</th>
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</table>

**Audience:** FSEs, Reps, Customers

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

**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

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<th>Location</th>
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<th>Course length: 2 days</th>
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</tr>
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<td></td>
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</table>

**Audience:** FSEs, Reps, Customers

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

**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.
EasyMark 5 / EasyJewel 5 – Operation and Software

Location: Factory  Part #: 1438919  Course length: 2 days  Day(s): Tuesday – Wednesday
Munich, Germany  
Begin: 9:00 AM  End: 5:00 PM

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

Course Description: The EasyMark 5 / EasyJewel 5 Operation and Software course gives the trainees an overview of the basic features and capabilities of the VisualLaserMarker (VLM) Software and Laser parameter. Moreover, the students learn how to handle the laser software and the laser system independently, including detection and removal of error messages.

Key Topics: Laser safety and Laser principle; Overview of the components of the laser system; Function and Turn-On and Turn-Off process, Maintenance and operation of the EasyMark 5 / EasyJewel 5, Creation of elementary layouts, use of logos, bitmaps, bar codes, Creation of Variable and Serial numbers. Explanation of laser parameters – current, frequency, speed, delays

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.

EasyMark 5 / EasyJewel 5 – Repair and Maintenance

Location: Factory  Part #: 1438920  Course length: 3 days  Day(s): Tuesday – Wednesday
Munich, Germany  
Begin: 9:00 AM  End: 5:00 PM

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

Course Description: The EasyMark 5 / EasyJewel 5 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 training participant shall become able to personally analyze and correct errors, which may occur.

Key Topics: Laser safety and Laser principle; Overview of the components of the laser system; Error analysis, working with an laser power meter, Signal flow between components, Exchange of components like Laser source, Shutter, Camera, Axis and Beam expander, Laser alignment using alignment tools, executing simple layouts after repair work.

Optional Topics: More in-depth VLM programming and application training 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.
**Compact Series**

### Compact – Maintenance and Operation

**Location:** Customer’s Site or Factory  
**Part #:** 1391724 or 1391723  
**Course length:** 1 day  
**Day(s):** Upon availability

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

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

**Course Description:** The Compact, Maintenance and Operation course is designed for people that service and maintain the 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.

**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.

### Compact AC/LC – Service Course

**Location:** Customer’s Site or Factory  
**Part #:** 1391717  
**Course length:** 2 days  
**Day(s):** Tuesday – Wednesday

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 Compact AC/LC 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.
### Compact Evolution – Maintenance and Operation

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<th>Location: Customer’s Site or Factory</th>
<th>Part #: 1391719 or 1391720</th>
<th>Course length: 1 day</th>
<th>Day(s): Upon availability</th>
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</table>

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

**Course Description:** The 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.

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### Compact Evolution – Service Course

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**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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### Compact Mini – Service Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391722</th>
<th>Course length: 2 days</th>
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</table>

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

**Course Description:** 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.

**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.
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.

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 LLDROP Operation course prepares trainees to install and operate the 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.

Mini – Operation and Maintenance Course

Location: Customer’s Site or Factory  Part #: 1391840 or 1391839  Course length: ½ day  Day(s): Upon availability
Mainz, Germany  Begin: 8:30 AM  End: 4:00 PM

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

Course Description: 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.

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.
# Description of Courses for ILS

## Mini, Compact, Compact Evolution (Combined) – Service Course

<table>
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<td><strong>Part #:</strong></td>
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<td><strong>Course length:</strong></td>
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<td><strong>Day(s):</strong></td>
<td>Monday – Friday</td>
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<tr>
<td><strong>Location:</strong></td>
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<tr>
<td><strong>Begin:</strong></td>
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<td><strong>Audience:</strong></td>
<td>FSEs, Reps</td>
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<tr>
<td><strong>Number of Students:</strong></td>
<td>min-2 / max-4</td>
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**Course Description:** The Combined Mini, Compact, Compact Evolution 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.

## Mini, Compact AC/LC, Compact Evolution, and Compact Evolution XL Accessories (Pyro, Galvo, VLM) – Service Course

<table>
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<td><strong>Part #:</strong></td>
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<tr>
<td><strong>Number of Students:</strong></td>
<td>min-2 / max-5</td>
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</table>

**Course Description:** The Mini, Compact AC/LC, Compact Evolution, and Compact Evolution XL Accessories (Pyro, Galvo, VLM) 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.
HighLight Series

HighLight DL Series – Maintenance and Operation

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<td>or Factory</td>
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<td>Mainz, Germany</td>
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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

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<td>Audience: FSEs, Reps, Customers</td>
<td>Number of Students: min-2 / max-5</td>
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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.
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

Location: 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 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.

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.
### 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.
Fiber Industrial Lasers

HighLight FL-ARM

HighLight FL-ARM – Operation and Installation

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1440904</th>
<th>Course length: 1 days</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tampere, Finland</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audience: FSEs, Subs, Reps</td>
<td>Number of Students: min-1 / max-3</td>
<td></td>
<td></td>
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</table>

Course Description: The HighLight FL-ARM Operation and Installation course is designed for people that install and operate the HighLight FL-ARM/FL. The course covers principals and minimum requirements of laser operation and basic troubleshooting. Trainees will learn different operating modes (local, remote, profile SW and profile HW) and will be qualified to diagnose minor faults. Proper handling and cleaning of process fibers will also be trained.

Key Topics: Laser, electrical, and lab safety; Basic laser theory, specifications, basic operation, basic troubleshooting and site requirements. Overview of the components of a laser system. RS-232/USB/Ethernet operation. GUI. Fault code identification and service response.

Note: Bring your PC with you to training with administrative rights. Personal RS232 to USB adapter and laser safety glasses are also required.

Prerequisites: An understanding of basic laser theory and electro-optic devices is recommended. Technical knowledge would be helpful for completing the training course. Complete product knowledge requires a thorough understanding of various components of the laser device.

HighLight FL-ARM – Service

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1440905</th>
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<tr>
<td>Audience: FSEs, Subs, Reps</td>
<td>Number of Students: min-1 / max-3</td>
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</tbody>
</table>

Course Description: The HighLight FL-ARM Service course is designed for people that service, maintain and/or integrate HighLight FL-ARM/FL. The course covers installation, principals of laser operation, troubleshooting and changing of laser components. Handling and cleaning of process fibers as well as the adjustments of the fiber incoupling (FFC) will be trained. Course also covers how to update laser software, how to backup laser parameters and programs and how to calibrate a fiber laser source. Trainees will learn to identify proper operation and will be qualified to diagnose major faults at all components of the system. After training trainees should be able to understand the alarms and how to solve them.

Key Topics: Laser, electrical, and lab safety; Basic laser theory, specifications, operation, troubleshooting, repair and site requirements. Structure of the laser system. RS-232/USB/Ethernet operation; GUI; Alarms; Logs; CPU card replacement; software upgrade; fault code identification and service response.

Note: Bring your PC with you to training with administrative rights. Personal RS232 to USB adapter and laser safety glasses are also required.

Prerequisites: It is highly recommended that person has completed the HighLight FL-ARM - Operation and Installation course or otherwise has experience of operating the HighLight FL-ARM/FL. 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.
HighLight FL-ARM – Process Cable Replacement

**Location:** Factory  
**Part #:** 1440906  
**Course length:** 1 days  
**Day(s):** Upon availability

**Tampere, Finland**  
**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** FSEs, Subs, Reps  
**Number of Students:** min-1 / max-3

**Course Description:** The HighLight FL-ARM Process Cable Replacement course is designed for Coherent FSEs who are trained on the HighLight FL-ARM/FL and who also know splicing. The course focus is on splicing the dual core fiber that is used as a process fiber in HighLight FL-ARM series. Trainees get familiar with TAM Splice Protection, know how to calibrate and set the splicing equipment according to situation and they are trained how to evaluate/confirm a good splice.

**Key Topics:** Splice equipment; cleaver; splicer; dual core fiber; other tools. Splice practice; how to use TAM Splice Protection; TAM Splice Kit; how to change FLS (feeding fiber splice 20/400) and how to evaluate/confirm a good splice.

**Prerequisites:** Complete product knowledge requires a thorough understanding of the HighLight FL-ARM/FL. Successful completion of courses “HighLight FL-ARM - Operation and Installation” and “HighLight FL-ARM - Service Training” should be completed before “HighLight FL-ARM - Process Cable Replacement”. Trainee must know splicing, must be familiar with splicing tools and optical fibers before the training.

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HighLight FL-ARM – Advanced

**Location:** Factory  
**Part #:** 1440907  
**Course length:** 2 days  
**Day(s):** Upon availability

**Tampere, Finland**  
**Begin:** 8:30 AM  
**End:** 4:00 PM

**Audience:** FSEs, Subs, Reps  
**Number of Students:** min-1 / max-3

**Course Description:** The HighLight FL-ARM Advanced course is designed for people that operate, optimize and maintain the HighLight FL-ARM/FL. The course covers principals of laser operation, changing laser components and adjustment of fiber incoupling (FFC), backup of laser parameters and advanced troubleshooting. Software upgrades, computer control, logs, deeper level of understanding the laser commands and alarms are covered. Proper handling and cleaning of process fibers will also be trained. Upon successful completion of the course, trainees should be able to support other FSEs with HighLight FL-ARM/FL related issues.

**Key Topics:** Laser, electrical, and lab safety; operation, specifications, installation, advanced troubleshooting repair and site requirements. RS-232/USB/Ethernet operation; GUI; Alarms; Logs; component replacement; structure of the laser system; software upgrade; fault code identification and service response.

**Note:** Bring your PC with you to training with administrative rights. Personal RS232 to USB adapter and laser safety glasses are also required.

**Prerequisites:** Experienced maintenance personnel. Completion of the courses “HighLight FL-ARM - Operation and Installation” and “HighLight FL-ARM - Service Training” or otherwise broad expertise and experience on HighLight FL-ARM/FL. 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.
HighLight Fiber Laser

HighLight Fiber Laser – Customer Basic Operation

<table>
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<tr>
<th>Location: Factory</th>
<th>Part #: 1391765</th>
<th>Course length: 2 days</th>
<th>Day(s): Tuesday – Wednesday</th>
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<tr>
<td>Plymouth, MI, USA; Hamburg, Germany; Shanghai, China</td>
<td>Begin: 8:30 AM</td>
<td>End: 4:00 PM</td>
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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

<table>
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<th>Course length: 1 days</th>
<th>Day(s): Upon availability</th>
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<tr>
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<td>End: 4:00 PM</td>
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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 VMCZ.

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

<table>
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<tr>
<th>Location: Factory</th>
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<td>Audience: Customers</td>
<td>Number of Students: min-2 / max-4</td>
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**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

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391767</th>
<th>Course length: 5 days</th>
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<tr>
<td>Audience: OEM Customers</td>
<td>Number of Students: min-2 / max-4</td>
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**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)

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: 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

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, 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).

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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

Location: Factory  Part #: 1391864  Course length: 4 days  Day(s): Tuesday – Friday
Munich, Germany  Begin: 9:00 AM  End: 5:00 PM
Audience: FSEs, Reps, Customers  Number of Students: min-2 / max-4

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 a 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

LME Basic Operation and Troubleshooting

Location: Factory  Part #: 1440909  Course length: 2 days  Day(s): Upon availability
Plymouth, MI, USA  Begin: 9:00 AM  End: 5:00 PM
Audience: FSEs, Subs, Reps, Customers  Number of Students: min-2 / max-6

Course Description: This course prepares trainees for ownership of the workstation and production process after acceptance testing through get hands-on learning with the system, software, and part production. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of effective use of the tool in the field. Upon successful completion of the course, trainees should be able to control, set up, program, and run the production of parts. In addition, trainees should be able to perform a focus run successfully. Trainees will be taught on their specific laser system or one comparable. Topics are customizable, upon written request.

Key Topics: Laser processing; System platform and components; Motion control and tooling; Laser, electrical, and lab safety; Production process; Process parameters and evaluation; Factory standards; Basic maintenance; System diagnostics; Evaluating laser focus.

Predetermined Tooling: Marking

Software: Standard software: Berger Lhar, etc.; Custom software (if applicable)

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. Production parts with quality and quantity assessment.
Description of Courses for ILS

PowerLine E-Air/E-Air ITX – Maintenance

Location: Customer’s Site or Factory
Part #: 1391865 or 1391866
Course length: 4 days Day(s): Tuesday – Friday
Location: Plymouth, MI, USA
Begin: 8:30 AM End: 4:30 PM
Audience: FSEs, Reps, Customers
Number of Students: min-2 / max-6
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
Location: 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

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<th>Course length:</th>
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**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) 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 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

<table>
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<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
<td>Number of Students:</td>
<td>min-2 / max-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.
Description of Courses for ILS

PowerLine F (Fiber Laser) – Repair and Maintenance

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

**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 NX

PowerLine NX – Repair and Maintenance

**Location:** Factory  **Part #:** 1391873  **Course length:** 4 days  **Day(s):** Tuesday – Friday
Munich, Germany  **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.
## PowerLine Pico and Prime

### PowerLine Pico – Basic Repair

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #</th>
<th>Course length</th>
<th>Day(s)</th>
<th>USA</th>
<th>Part #</th>
<th>Course length</th>
<th>Day(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer’s site</td>
<td>1391874</td>
<td>2 Days</td>
<td>Tuesday – Wednesday</td>
<td>Begin: 8:30 AM</td>
<td>End: 5:00 PM</td>
<td>1391875</td>
<td>2 Days</td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
<td></td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td>Munich, Germany</td>
<td></td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #</th>
<th>Course length</th>
<th>Day(s)</th>
<th>Munich, Germany</th>
<th>Part #</th>
<th>Course length</th>
<th>Day(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory</td>
<td>1391875</td>
<td>2 Days</td>
<td>Tuesday – Wednesday</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td>min-2 / max-6</td>
<td></td>
</tr>
<tr>
<td>Munich, Germany</td>
<td></td>
<td></td>
<td></td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
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</tr>
</tbody>
</table>

**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.
## 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>

**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.

### 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>

**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 TOOLS AND SYSTEMS

Laser Machine Tools

CREATOR Customer Course

<table>
<thead>
<tr>
<th>Location: Customer’s Site or Factory</th>
<th>Part #: 1391728 1391729</th>
<th>Course length: 3 days</th>
<th>Day(s): Mon – Wed or Wed - Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>dieburg, Germany; Plymouth, MI, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: OEMs and end customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
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</tbody>
</table>

**Course Description:** The CREATOR Customer Level Training Course prepares students to work with all different CREATOR laser systems. Upon successful completion of the course, students should be able to generate the machine code (G-Code) with the software APPSUITE, set up the machine, work with metallic powder and operate the metallic 3D Printer CREATOR. After the training, they also should be able to train others to operate the system. Course content ranges from theory of additive manufacturing, practical sessions and work with the software APPSUITE.

**Key Topics:** Safety of CREATOR, components, usage of CREATOR UI (installed on the windows surface), functionality of the CAM software APPSUITE and its licensing, orientation and supporting of the CAD model on the building platform, parameter settings, slicing strategies and generation of the Gcode. Preparing the CREATOR for the print job: setting up the system, adjustment of the building platform, change of the rubber lip, fill in the required amount of metal powder, preparation of demo jobs independently, equipping the system, cleaning by vacuum and removal of the finished part. Furthermore, introduction into additive manufacturing (AM) basic theory and basics of installations, service and maintenance in customer level.

**Prerequisites:** Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the CREATOR. Basic CAD knowledge, milling and/or lathe knowledge, an understanding of basic software handling (installation, updates etc.) is also recommended.

CREATOR Service Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391730</th>
<th>Course length: 4 days</th>
<th>Day(s): Mon – Thur or Tue - Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>dieburg, Germany; Plymouth, MI, USA</td>
<td>Begin: 8:30 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: FSEs, Subs and Reps</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
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</tbody>
</table>

**Course Description:** The CREATOR Service Level Training Course prepares students to install, troubleshoot, repair and maintain all CREATOR laser systems. Upon successful completion of the course, students should be able to do the complete service for all CREATOR systems and should be able to train others to operate the system on a basic level (no process development). Course content ranges from theory of additive manufacturing to mechanical troubleshooting.


**Prerequisites:** Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the CREATOR. Participants should be able to read schematics and block diagrams and should have a basic understanding of mechanical elements. An understanding of basic software handling (installation, updates etc.) is also recommended.
Laser Machine Tool (LMT) Applications Overview

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

Plymouth, MI, 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 (LMT) System Preventative Maintenance

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

Plymouth, MI, USA  
**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 (LMT) Introduction to Process Development

<table>
<thead>
<tr>
<th>Location: Customer’s Site or Factory</th>
<th>Part #: 1391815 or 1391816</th>
<th>Course length: 3 days</th>
<th>Day(s): Tuesday – Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA</td>
<td>Begin: 8:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: OEMs, end customers, Coherent FSEs, subs, and reps</td>
<td>Number of Students: minimum-2 / maximum-5</td>
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</tbody>
</table>

**Course Description:** This course covers the following topics, briefly, in overview: Operation and System overview; Applications and Process Development techniques. Trainees will learn a variety of procedures to clean-cut metals, plastics, and organics to develop machine ready programs; conversions from CAD databases; move prototype jobs to high volume step and repeat production runs and many other production-ready procedures. Hands-on laboratory time allows trainees to test their knowledge and develop skills to assist with Process Development in the field. Upon successful completion of the course, trainees should be able to control, set up, program, and operate the Laser Machine Tool. Trainees will be taught on their specific Laser Machine Tool System. Specific Processes can be focused on, upon written request.

**Key Topics:** Basic operations; software overview; file manipulation; laser processing.

**Prerequisites:** Proficiency in tool operation.

### Laser Machine Tool (LMT) Service

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391817</th>
<th>Course length: 3 days</th>
<th>Day(s): Tuesday – Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: Coherent FSEs, subs, and reps</td>
<td>Number of Students: minimum-2 / maximum-4</td>
<td></td>
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</tbody>
</table>

**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.
ProLas Series Repair and Maintenance

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

- Plymouth, MI, USA

**Part #:** 1440911
- 1440912

**Course length:** 2 days

**Day(s):** Upon availability

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

**Audience:** FSEs, Subs, Reps, customer

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

**Course Description:** The course is directed toward experienced maintenance personnel with a working knowledge in electronics, which, by attending this course, will be able to independently maintain, service, and adjust the workstation motion, pneumatic, electronic systems, and adjust the laser system. At the conclusion of this course, the student will be able to analyze and correct any error(s) which may occur.

**Key Topics:** Laser safety and Laser principle; Overview of the components of a ProLas workstation and laser system. Error analysis, working with a laser power meter, Exchange of the Laser Beam Source, beam delivery video alignment, and creating/executing simple welding programs after repair work.

**Optional Topics:** More in-depth laser maintenance and application training 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. Additionally, a working knowledge of CNC Machine G-code programming is desired, as G-code programming is not taught in this course.

ProLas Process Development Course

**Location:** Factory

- Plymouth, MI, USA

**Part #:** 1440910

**Course length:** 3 days

**Day(s):** Upon availability

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

**Audience:** FSEs, Subs, Reps, customer

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

**Course Description:** This course covers the following topics, briefly, in overview: Application and System overview; 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, perform a focus run, and operate the laser. Trainees will be taught on their specific laser system. Topics are customizable, upon written request.

**Key Topics:** Basic Operations; Software overview; Programming and G-codes; laser processing.

**Predetermined Tooling:** Cutting, Welding, etc.

**Prerequisites:** Basic G-code knowledge would be useful.
## ROBOLASER Basic Customer Level

**Location:** Customer's Site or Factory  
**Part #:** 1391893 1391894  
**Course length:** 3 days  
**Day(s):** Mon – Wed or Wed - Fri  
**Begin:** 9:00 AM  
**End:** 5:00 PM  
**Dieburg, Germany**  
**Audience:** OEMs and end customers  
**Number of Students:** min-2 / max-4

### Course Description:
The ROBOLASER Customer Level Training Course prepares students to work with a specific ROBOLASER system and the APPSUITE software. Upon successful completion of the course, students should be able to set up the machine, work with metallic powder, and operate the ROBOLASER. After the training, they also should be able to train others to operate the system. Course content ranges from the theory of additive manufacturing, practical sessions. This training is meant to be a preparation for the second training (ROBOLASER, APPSUITE Customer Level Training).

### Key Topics:
- Safety of ROBOLASER, components, usage of KUKA UI (installed on the KUKA Smart Pad), preparing the ROBOLASER for the job: setting up the system, preparation of demo jobs independently, equipping the system, cleaning by vacuum and removal of the finished part.
- Furthermore, the introduction to additive manufacturing (AM) basic theory and basics of installations, service, and maintenance at the customer level.

### Prerequisites:
Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the ROBOLASER. Basic CAD knowledge, milling, and/or lathe knowledge.

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## ROBOLASER, APPSUITE Customer Level

**Location:** Customer's Site or Factory  
**Part #:** 1391903 1391904  
**Course length:** 2 days  
**Day(s):** Mon – Wed or Wed - Fri  
**Begin:** 9:00 AM  
**End:** 5:00 PM  
**Dieburg, Germany**  
**Audience:** OEMs and end customers  
**Number of Students:** min-2 / max-4

### Course Description:
The ROBOLASER, APPSUITE Customer Level Training Course prepares students to work with a specific ROBOLASER system. Upon successful completion of the course, students should be able to generate the machine code (KUKA-Code) with the software APPSUITE, set up the machine, work with metallic powder, and operate the ROBOLASER. After the training, they also should be able to train others to operate the system. Course content ranges from the theory of additive manufacturing, practical sessions, and work with the software APPSUITE.

### Key Topics:
- Safety of ROBOLASER, components, usage of KUKA UI (installed on the KUKA Smart Pad), the functionality of the CAM software APPSUITE and its licensing, orientation, and supporting of the CAD model, parameter settings, slicing strategies and generation of the KUKA-Code. Preparing the ROBOLASER for the job: setting up the system, preparation of demo jobs independently, equipping the system, cleaning by vacuum, and removal of the finished part.
- Furthermore, the introduction to additive manufacturing (AM) basic theory and basics of installations, service, and maintenance at the customer level.

### Prerequisites:
Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the ROBOLASER. Basic CAD knowledge, milling, and/or lathe knowledge, an understanding of basic software handling (installation, updates, etc.), is also recommended. Successful completion of the ROBOLASER Customer Level Training.
Manual Laser Welding Tools

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>
<tr>
<td>Audience: FSEs, Reps, Customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Course Description: The 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.

Integral – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391791</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: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: FSEs, Reps, Customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
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</table>

Course Description: The Integral Maintenance, Service, and Operation course is designed for people that service and maintain the 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.
## Performance – Maintenance, Service, and Operation

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #:</th>
<th>Course length</th>
<th>Day(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer’s Site or Factory</td>
<td>1391932 or 1391933</td>
<td>1 day or 2 days</td>
<td>Upon availability or 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>
</tbody>
</table>

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

**Course Description:** The Performance Maintenance, Service and Operation course is designed for people that service, maintain the 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.

## Select or Select CNC – Maintenance, Service, and Operation

<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>1391905</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>
</tbody>
</table>

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

**Course Description:** The Select Maintenance, Service, and Operation course is designed for people that service and maintain the 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.
**Select, Integral, Performance – 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 Select, Integral, Performance 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.

**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.
# Universal Workstation (UW) Basic Operation Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1402819</th>
<th>Course length: 3 days</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: FSEs, Subs, Reps, Customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Course Description:** This course prepares trainees for ownership of the workstation and production process after acceptance testing through get hands-on learning with the system, software, and part production. Hands-on laboratory time allows trainees to test their knowledge and develop skills to ensure that they are capable of effective use of the tool in the field. Upon successful completion of the course, trainees should be able to control, set up, program, and run the production of parts. In addition, trainees should be able to perform a focus run successfully. Trainees will be taught on their specific laser system or one comparable. Topics are customizable, upon written request.

**Key Topics:** Laser processing; System platform and components; Motion control and tooling; Laser, electrical, and lab safety; Production process; Process parameters and evaluation; Factory standards; Basic maintenance; System diagnostics; Evaluating laser focus.

**Predetermined Tooling:** Cutting, Welding, Cladding, etc.

**Software:** Standard software: Beckoff, Aerotech, etc.; Custom software (if applicable)

**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. Production parts with quality and quantity assessment.

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# Universal Workstation (UW) Series Service Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1402818</th>
<th>Course length: 2 days</th>
<th>Day(s): Tuesday – Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: FSEs, Subs and Reps</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Course Description:** The UW Series Service course prepares trainees to install, operate, optimize, and maintain the workstation. 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 workstation. Note: Workstations will have a one type of laser installed for training purposes, laser specific training is available in other courses.

**Key Topics:** Laser, electrical, mechanical and lab safety; thermal management; UW-180; UW-150 RT (tooling changes/adjustments); HMI/Remote 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.
### Universal Workstation (UW) Basic Process Development Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1427278 and 1427279</th>
<th>Course length: 2 days and 3 day</th>
<th>Day(s): Upon Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: FSEs, Subs, Reps, Customer</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Course Description:** This course prepares trainees for ownership of the UW from the F.A.T. by having them get hands-on with the system, software, and part production. 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, perform a focus run successfully. Trainees will be taught on their specific laser system or one comparable.

**Key Topics:** Laser processing; system platform and components; laser machining; motion control and tooling; laser, electrical, and lab safety; production process; laser and system process; parts throughput; production process training; factory standards.

**Predetermined Tooling:** Cutting, Welding, Cladding, etc.

**Software:** Beckoff, Aerotech, etc.

**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. Production parts, and quality and quantity assessment.

### Universal Tool Platform (UTP) Cladding Customer Level

<table>
<thead>
<tr>
<th>Location: Customer’s Site or Factory</th>
<th>Part #: 1391945 and 1391946</th>
<th>Course length: 3 days</th>
<th>Day(s): Mon – Wed or Wed - Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dieburg, Germany</td>
<td>Begin: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>Audience: OEMs and end customers</td>
<td>Number of Students: min-2 / max-4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Course Description:** The Cladding Customer Level Training Course prepares students to work with all different laser cladding systems and the associated hardware like the powder nozzle and the powder conveyor. Upon successful completion of the course, students should be able to set up and operate the machine, create different geometries with the software, and know-how to choose suitable parameters. The students will learn how to prepare different cladding jobs in three dimensions with an additional rotating device and how to work with CAD files. After the training, they also should be able to train others to operate the system and the basics of the software APP Suite. Course content ranges from practical sessions on the cladding machine to work with the software.

**Key Topics:** Safety regulations, explanation of the components, the functionality of display and axis, positioning of the workpiece, calibration of the powder nozzle, and find the right focus. During the practical session, the trainer will show; how to create and teach in geometries with the software in up to 4 dimensions and how to choose a suitable parameter for them. The trainer will also show how a good cladding look and how to achieve this and will train how to prepare jobs for an inclined surface. Additionally, how to control axes: the teaching of lines, circles, and polylines, coordinate transformation and usage of the rotating device.

**Prerequisites:** Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the welding machine. Basic technical knowledge, handling of machines, and basic software knowledge. Experience in using CAD/CAM software is recommended.
### Universal Tool Platform (UTP) Welding Customer Level

**Location:** Customer's Site or Factory  
**Part #:** 1391953  
1391954  
**Course length:** 2 day  
**Day(s):** Mon - Tues or Thu - Fri  
**Begin:** 9:00 AM  
**End:** 5:00 PM  
**Dieburg, Germany**  
**Audience:** OEMs and end customers  
**Number of Students:** min-2 / max-4

**Course Description:** The Welding Customer Level Training Course prepares students to work with all different UTP laser systems. Upon successful completion of the course, students should be able to set up and operate the machine, weld different geometries, and know how to choose suitable parameters. After the training, they also should be able to train others to operate the system.

Course content ranges from practical sessions and work with the welding machine.

**Key Topics:** Safety regulations, explanation of the components, the functionality of display and axis, positioning of the workpiece, and find the right focus. During the practical session, the trainer will show how to hold the wire, different wire thickness, and how to choose a suitable parameter for them. The trainer will also show how a good welding look and how to achieve this and will train to weld a line, a square, a precision welding, an edge, inclined planes, and corners. Additionally, how to control axes: the teaching of lines, circles, and polylines, coordinate transformation and usage of the rotating device.

**Prerequisites:** Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the welding machine. Basic technical knowledge, handling of machines, and basic software knowledges. Craftsmanship, good eyes and a steady hand is also recommended.

### Universal Tool Platform (UTP) Welding Refresher Customer Level

**Location:** Customer’s Site  
**Part #:** 1440908  
**Course length:** 1 day  
**Day(s):** Upon availability  
**Begin:** 9:00 AM  
**End:** 5:00 PM  
**Dieburg, Germany**  
**Audience:** OEMs and end customers  
**Number of Students:** min-2 / max-4

**Course Description:** The 1-day Welding Customer Level Training Course is a refreshment training, and the trainer repeats all the procedures from a welding training (1391953). The trainer prepares students to work with all different UTP laser systems. Upon successful completion of the course, students should be able to set up and operate the machine, weld different geometries, and know how to choose suitable parameters. After the training, they also should be able to train others to operate the system.

Course content ranges from practical sessions and work with the welding machine.

**Key Topics:** Safety regulations, the functionality of display and axis, positioning of the workpiece, and find the right focus. During the practical session, the trainer will show how to hold the wire, different wire thickness, and how to choose a suitable parameter for them. The trainer will also show how a good welding look and how to achieve this and will train to weld a line, a square, a precision welding, an edge, inclined planes, and corners. Additionally, how to control axes: the teaching of lines, circles, and polylines, coordinate transformation and usage of the rotating device.

**Prerequisites:** Participation of the welding training (1391953). Complete product knowledge requires a thorough understanding of lasers and electronic devices and their role inside the welding machine. Basic technical knowledge, handling of machines, and basic welding knowledge. Craftsmanship, good eyes and a steady hand is also recommended.
Universal Tool Platform (UTP) Product Learning

**Location:** Factory  
**Part #:** 1391950  
**Course length:** 2 day  
**Day(s):** Thu - Fri  
**Begin:** 9:00 AM  
**End:** 5:00 PM

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

**Course Description:** UTP product learning gives an overview of all the welding machines from Tools Dieburg. Upon successful completion of the course, participants should be able to understand the functionalities, differences, and advantages of each machine and to be able to advise customers. Course content ranges from presentations and practical welding sessions on the machines.

**Key Topics:** Overview of open welders (ECO and EVO series), practical welding methods, presentation of additive manufacturing in general, an overview of low and high-power cladding, and practical sessions on the CUBE with powder welding.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various lasers systems. Participants should have an overview of the market and the competitive systems. An understanding of technical basics, handling of machines, basic welding knowledge, and basic CAD software handling is also recommended.

Universal Tool Platform (UTP) Service Level

**Location:** Factory  
**Part #:** 1391944  
**Course length:** 4 days  
**Day(s):** Mo – Thu or Tue - Fri  
**Begin:** 9:00 AM  
**End:** 5:00 PM

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

**Course Description:** The UTP Service Level Training Course prepares students to install, operate, troubleshoot, repair, and maintain all UTP (universal tool platform) laser systems. Upon successful completion of the course, students should be able to do the complete service for all UTP tools and should be able to train end-users to operate the system (no process development). Course content ranges from the theory of operation to electronic troubleshooting.

**Key Topics:** Laser, electrical, and lab safety. Resonator and optic: Change mirrors and lens, clean optic components, build up pump chamber, lamp change, beam way inside the resonator, function of the beam expander, resonator and beam expander adjustment, measuring of laser power. Display functions: HTS, lilly board, EVO controller, EVO display, blueline displays. Software: Install/update, power supply controller circuit board, TMC4 platine lilly board, B&R PLC, EVO controller. Power supply lamp-pumped laser systems troubleshooting. DPL systems: Difference lamp-pumped and diode line systems, optical and system components, calibration beam expander, settings and measurement of laser power. Cooling system: Different systems, sensors, filters. Table drives and mechanics: General functions TMC – B&R controller, Checkpoints, limited switches, joysticks.

**Prerequisites:** Complete product knowledge requires a thorough understanding of various lasers and electronic devices and their role inside the UTP. Participants should be able to read schematics and block diagrams and should have a basic understanding of mechanical elements and electronic engineering. An understanding of basic software handling (installation, updates, etc.) is also recommended.
**MODULAR PROCESSING SYSTEMS (MPS)**

MPS Series

**MPS Level 1 – Maintenance, Service, and Operation**

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391855 or 1391856</th>
<th>Course length: 3 days or 4 days</th>
<th>Day(s): Tuesday – Thursday or Tuesday – Friday</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

**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: Factory</th>
<th>Part #: 1391857</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: 9:00 AM</td>
<td>End: 5:00 PM</td>
<td></td>
</tr>
</tbody>
</table>

Audience: FSEs, Reps, Customers

**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**

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391858</th>
<th>Course length: 3 days</th>
<th>Day(s): Tuesday – Thursday</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 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.
Coherent Laser Training Catalog

PACKAGING

StarPack

**StarPack CW / WD – Maintenance, Service, and Operation**

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #: 1391927 or 1391928 or 1391929</th>
<th>Course length: 3 days or 4 day or 5 day</th>
<th>Day(s): Tuesday – Thursday or Tuesday – Friday or Monday – Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td>Begin: 8:30 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 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**

<table>
<thead>
<tr>
<th>Location</th>
<th>Part #: 1391931</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: 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 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

StarFlex – Software Course

<table>
<thead>
<tr>
<th>Location: Factory</th>
<th>Part #: 1391925</th>
<th>Course length: 1 day</th>
<th>Day(s): Upon availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munich, Germany</td>
<td></td>
<td>Begin: 8:30 AM</td>
<td>End: 5:00 PM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience: FSEs, Reps, Customers</th>
<th>Number of Students: min-2 / max-4</th>
</tr>
</thead>
</table>

**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.
Visual Laser Marker (VLM)

VLM – Programming and Applications Course

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

Plymouth, MI, USA

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

Munich, Germany

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

**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.

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

**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.

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

**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.
Coherent Laser Training Catalog

**TUBE CUTTING SYSTEMS**

**StarCut**

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

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

<table>
<thead>
<tr>
<th>Location:</th>
<th>Customer’s Site or Factory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part #:</td>
<td>1391924</td>
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<tr>
<td>Course length:</td>
<td>2 days</td>
</tr>
<tr>
<td>Day(s):</td>
<td>Tuesday – Wednesday</td>
</tr>
<tr>
<td>Plymouth, MI, USA; Munich, Germany</td>
<td></td>
</tr>
<tr>
<td>Begin:</td>
<td>8:30 AM</td>
</tr>
<tr>
<td>Audience:</td>
<td>FSEs, Reps, Customers</td>
</tr>
<tr>
<td>Number of Students:</td>
<td>min-2 / max-4</td>
</tr>
</tbody>
</table>

**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):** Upon request
- **Location:** Plymouth, MI, USA; Belp, Switzerland
- **Begin:** 8:30 AM
- **End:** 5:00 PM
- **Audience:** FSEs, Reps, Customers
- **Number of Students:** min-1 / max-4

**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):** Upon request
- **Location:** Plymouth, MI, USA; Belp, Switzerland
- **Begin:** 8:30 AM
- **End:** 5:00 PM
- **Audience:** FSEs, Reps, Customers
- **Number of Students:** min-1 / 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):** Upon request

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

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-1 / 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.

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Lasag QFS – Maintenance and Operation

**Location:** Customer’s Site or Factory  
**Part #:** 1391879 or 1391880  
**Course length:** 3 days  
**Day(s):** Upon request

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

**Audience:** FSEs, Reps, Customers  
**Number of Students:** min-1 / 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.