Training and Consulting
Connected Industry
Program 2021
Foreword

The pandemic has changed production in a lasting way. Suddenly other products must be manufactured, and comprehensive hygiene and safety concepts are required. This reveals the enormous potential of digitalization: it increases flexibility and makes it possible to keep an eye on production while adhering to physical distancing rules, as well as travel and contact restrictions.

Bosch has been relying on the digitalization of manufacturing and logistics for years. Of course, we would like to share our success with you. For example, with crtlX from Bosch Rexroth. This control technology puts an end to isolated applications and becomes the control center of the factory of the future. The Nexeed Industrial Application System ensures higher efficiency and significant cost savings along the value chain in manufacturing and logistics by allowing you to combine and flexibly expand the various applications as required.

Whether on site or remotely, a digitalization strategy still depends on the employees. Only those who understand new technologies and know their added value will be motivated to work with them. Accordingly, we have also developed new training programs for our Nexeed Industrial Application System. We support you and your employees in digital change and look forward to shaping the journey to the factory of the future together!

The past year has of course also presented our training program with extraordinary challenges. From one day to the next, all courses had to be shifted to the digital world. It was clear to us that this would only be possible if the online courses were just as inspiring as our classroom training – from group work and stimulating discussions to a joint coffee break.

Digital learning concepts will play a more important role in the future than ever before. On the one hand, they help us to be prepared for further crises. On the other hand, they will save participating companies time and money and can be easily integrated into employees’ everyday lives. After receiving a great deal of positive feedback, we are therefore again focusing on a colorful mix of digital training, classroom courses and offerings that combine both options in 2021.

Be a part of it!

Rolf Najork
Member of the Board of Management, Robert Bosch GmbH and Chairman of Bosch Rexroth AG

Sven Hamann
Senior Vice President Bosch Connected Industry

Aleksandar Mitrovic
Chief Executive Officer Bosch.IO
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Our offer for your i4.0-success
Our consultation and training offer support with the digital transformation of production and logistics, of management processes and organizations: from the development of digital strategies to support in the implementation of Industry 4.0 solutions and change management to specific product training. Solution-oriented consultants, pragmatic change experts, as well as experienced and field-tested trainers make this possible.

Bosch Industry Consulting
The team at Bosch Industry Consulting helps to optimize production and logistics processes according to lean and Industry 4.0 principles. The experts will find the ideal smart solution and will be happy to help with the implementation. In this process, independence and objectivity are the top priority.

More than just technology
People are and will continue to be the number one factor for efficient manufacturing. They develop machines, steer and control processes and procedures. To do so, they require a digital mindset that enables them to comprehend and promote the dynamic of change. Our experts actively and purposefully support in achieving successful change.

Increased qualification needs
Industry 4.0 and digitization are accompanied by changed competence profiles. Our training portfolio supports the professional development on all levels – with a strong focus on practical relevance, methodical diversity and the use of modern media.

Bosch is leading user and leading provider for Industry 4.0. Our hardware and software for connected manufacturing and logistics are developed and tested in our own facilities before we offer them to external customers. We have extensive production expertise at our disposal, from manufacturing automobile components by the millions to job-order production of complex machines. This knowledge is complemented by software skills in engineering, the Internet of Things and process control. Hardly any other company is as well-positioned as we are for connected production.

Our services
Provider and Locations

Our offer
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i4.0 Guided Tours
See how it works
We will open our factory gates for you: experience Industry 4.0 at first hand and benefit from our extensive implementation experience.

Consultation offer
Comprehensive and target-oriented concepts
You want to forward Industry 4.0 – but don’t know where and how to start? Together, we will identify, we identify chances and risks and develop appropriate strategies in order to turn your vision into reality.

Training
We support you in your qualification
We provide general knowledge about Industry 4.0 to you and your employees, as well as the necessary know-how for our Industry 4.0 products and solutions.

Training systems
An entire plant in miniature
The training system mMS 4.0 is an Industry 4.0 mini-factory. It was developed for vocational schools and colleges, as well as for training facilities in industrial establishments.
The following Bosch units provide consulting and training for industry 4.0:

<table>
<thead>
<tr>
<th>Provider</th>
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* certified according to DIN EN ISO 9001
14.0 GUIDED TOURS
Experience Industry 4.0 at first hand
i4.0 Guided Tours

We open our factory doors

Our plant tours demonstrate the benefits of connecting real production with the virtual world of software and the Internet. Bosch shows that the connected factory is already a reality today and is happy to share this experience, as well as the success and obstacles. Apart from our own solutions, we will above all show how production and logistics can be successfully digitized.

Accompany us on a tour through one of our Bosch plants in
- Blaichach,
- Homburg,
- Lohr am Main,
- Nuremberg,
- Reutlingen,
- Salzgitter or
- Stuttgart-Feuerbach
and experience Industry 4.0 at first hand.
Introduction

General information

Blaichach Plant
Homburg Plant
Lohr am Main Plant
Nuremberg Plant
Reutlingen Plant
Salzgitter Plant
Stuttgart Plant

I4.0 GUIDED TOURS

The Blaichach/Immenstadt plant is part of the Chassis System Control division and is one of the largest industrial employers in the Allgäu region with around 3,850 associates. The product portfolio for the two locations includes electronic brake systems, systems for use in electric and hybrid vehicles, components for the powertrain system such as injection technology and the turbocharger, as well as sensors for engine management and multifunction cameras.

Industry 4.0 in Blaichach Plant

As the leading plant for ABS/ESP, the Blaichach plant manages a global production network of 11 locations and over 5,000 connected systems. The Industry 4.0 software solution Nexeed Production Performance Manager helps the plant to systematically improve production processes. The software harmonizes various manufacturing data in order to make relevant information from this data available to users. As a result, response times can be shortened, errors can be avoided, tasks can be assigned precisely and newly acquired information can be accessible at all times.

Registration and queries
Guided.Tours@de.bosch.com

Provider
The tour is conducted by Bosch Connected Industry.

Bosch Connected Industry
**I4.0 GUIDED TOURS**

**Homburg Plant**

The Robert Bosch GmbH plant in Homburg/Saar produces, with a high technical expertise, components of the Common-Rail-System, a modern and fuel-efficient high-pressure injection technology for diesel engines. The location in Homburg, as a leading plant and center of excellence for various diesel products and technologies, has a major importance in the international Bosch manufacturing and development network.

The Bosch Rexroth AG at the plant in Homburg/Saar manufactures hydraulic controls with corresponding electrical units, used in mobile applications, with focus on agricultural engineering technology and industrial hydraulics.

**Industry 4.0 in Homburg Plant**

The Homburg plant (HoP2) acts as a lead plant in the Bosch Group for the vision of connected small-series production. Technologies are used to network the entire value flow - starting with the supplier all the way to the end customer.

**Registration and queries**

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**Provider**

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Bosch Connected Industry

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**I4.0 GUIDED TOURS**

**Lohr am Main Plant**

A tour of the Lohr plant illustrates the importance of Industry 4.0 in practice. Here, production of numerous versions using inhouse products has gradually been upgraded to an i4.0 environment. Reduced downtimes and inventories show a significant increase in productivity.

**Industry 4.0 in Lohr am Main Plant**

Guests will also be shown other i4.0 developments. The Web Connector combined with Open Core Engineering provides an easy method of connecting machines to the world of IT and thus enables further benefits to be achieved. Meanwhile, with ActiveAssist we demonstrate an assistance system that provides optimum interactive support for employees in production of different product versions by using visual instructions. A tour highlights not only the many issues involved, but also specific services and solutions that Rexroth is now providing for its customers. These include self-learning software and open solutions that can be implemented directly in a huge range of system environments and optimized or expanded at a later date.

You can find an Industry 4.0 production example from the Lohr location in the video at:

**Registration and queries**

training@boschrexroth.de

**Provider**

The tour is conducted by Bosch Rexroth.
The Nuremberg plant is part of the Powertrain Solutions division and employs around 2,000 associates. The Nuremberg plant plays an important role in the international Bosch production and development network as the Powertrain Solutions leading plant for 12 production locations and as a center of excellence for manufacturing and development.

**Industry 4.0 in Nuremberg Plant**

At the Nuremberg plant, Industry 4.0 approaches for holistic process optimization in mass production can be experienced, such as the technology of 3D printing or magnetic field measuring technology. In the additive production and industrialization of 3D printing, the Nuremberg plant serves as a center of excellence and is a superb source of expertise for other Bosch plants worldwide. Transparent data management in practice enables production to be efficient along the connected value stream. Fields of application at the Nuremberg plant include dashboards in production, the digital shop floor management cycle, data analytics, management view and proactive maintenance.

The use of collaborative robots, APAS and YUMI, for example, show how human beings will be supported in the future within a production plant. Furthermore, autonomous transport systems (Active Shuttle) are used to bring the material supply from the supermarket to the production line.

**Registration and queries**

Guided.Tours@de.bosch.com

**Provider**

The tour is conducted by Bosch Connected Industry.

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The Automotive Electronics division of Bosch, with its headquarters in Reutlingen, develops, produces and sells microelectronics for automotive applications. Additional core competences of the semiconductor plant include system integration and application technology for vehicles. By applying Industry 4.0 solutions, the plant expertly handles a highly efficient production process when it comes to manufacturing over 1,000 different semiconductors and micromechanical sensors, each comprising up to 600 steps.

**Industry 4.0 in Reutlingen Plant**

A virtual map of all production systems, products and processes in the Manufacturing Execution System (MES) guarantees a high degree of transparency while several thousand batches are being produced simultaneously. Cyber-physical systems update this virtual map in real time. At the Reutlingen plant, machines automatically exchange process information with one another so that production processes can be optimized and stabilized sustainably. By capturing big data, the Reutlingen plant can not only increase efficiency, but also guarantee higher quality by evaluating errors.

**Registration and queries**

Guided.Tours@de.bosch.com

**Provider**

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I4.0 GUIDED TOURS

Salzgitter Plant

Salzgitter Plant combines the functions of a lead plant, a production site, an international warranty analysis, a sample shop and several centers of competence. In its role as a lead plant, Salzgitter coordinates one of the biggest international production networks at Bosch with 13 locations worldwide. Salzgitter Plant belongs to the business unit Automotive Electronics. Approximately 1,500 employees produce electronic control units for gasoline and diesel engines as well as transmission control units and battery-management-systems. In 2018 approximately 4.5 Mio. electronic control units have been produced.

Industry 4.0 in Salzgitter Plant
To match with fast changing customer requirements, Salzgitter Plant focuses on a flexible production process with highly connected employees and machines. Therefore, Salzgitter has implemented a system of automated guided vehicles (AGV), intelligent supermarkets and manufacturing machines that order their material automatically. This system has already been in use since 2017 and is constantly being optimized. In cases of machine failures, Salzgitter Plant uses a solution called virtual assist to show affected components within a digital 3D model, which supports fast maintenance. This fast maintenance is also achieved with Remote Shopfloor Access, a solution that allows reliable and, most of all, secure remote maintenance together with machine manufacturers.

Additionally, Salzgitter Plant focuses on RFID, Smart Energy Management and Predictive Maintenance, which has been realized with Production Performance Manager and other solutions.

Registration and queries
Guided.Tours@de.bosch.com

Provider
The tour is conducted by Bosch Connected Industry.

Bosch Connected Industry

I4.0 GUIDED TOURS

Stuttgart-Feuerbach Plant

Around 13,500 employees from 82 different nations work in different fields of activity at the Stuttgart-Feuerbach location. The location, which is steeped in tradition, looks back on more than 100 years of history. Today, the Powertrain Solutions division, among others, is located here. The three market segments, Electric Vehicles, Passenger Cars and Commercial Vehicles/Off-Road, offer comprehensive solutions and an extensive powertrain product and service portfolio, regardless of fuel type.

Industry 4.0 in Feuerbach Plant
Various technologies are used at the Feuerbach plant to connect production and logistics in the automotive industry in order to implement individualized customer requirements in a more flexible, efficient as well as resource-efficient manner. One central application is the Industry 4.0 solution Nexeed Intralogistics Execution, which digitizes, analyzes and optimizes processes within the supply chain. At the shopfloor level, a MES system from Bosch provides transparency as the basis for successful optimization, planning and control of production. The goal is to continuously optimize production based on real-time data and to respond quickly to changes.

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Provider
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Bosch Connected Industry
CONSULTING SERVICES

Holistic and targeted
With our consulting services, we guide and support the Industry 4.0 transformation process. The offer extends from consultation and conception through to the implementation of complex assignments. We constantly have the big picture in view. Because successful digital transformation requires the intelligent connection of technology, organization and people. Only if all three perspectives are taken into account, can the maximum effect be realized.

Bosch understands the challenges of connected production and logistics. We benefit from the experience of more than 270 plants and 700 warehouses globally. This experience is complemented by the relevant specialists. This way we jointly develop customer-specific solutions - quickly and pragmatically.
INDUSTRY CONSULTING

Individual and solution-oriented
Industry Consulting

From lean management to Industry 4.0

Bosch Industry Consulting is the ideal partner for the connected value stream. We ensure that your processes are leaner, and your production is more efficient. We not only make suggestions, but also develop concrete solutions together with our customers – which we then implement expediently by drawing on Bosch’s wealth of experience as both a leading user and leading provider of Industry 4.0.

We offer a practice-oriented consulting service backed by substantial, practical experience in various sectors, which has just one goal: finding the optimum Industry 4.0 strategy for each customer. Independence and objectivity are our top priorities. Just as we at Bosch rely on a mix of inhouse products and third-party solutions, we will find the most suitable option for each project.

We are convinced that Industry 4.0 starts with lean management. Accordingly, we consider holistic process optimization as the basis for a successful connectivity.

Our lean consulting starts at exactly the point it is needed. Whether the goal is to connect a single manufacturing line or to transform an entire factory – our customers benefit from the experience and expertise from Bosch facilities around the globe. And they receive precisely the type of consulting, support and solutions they need to digitize their production and logistics.
Our tailor-made strategies and concepts help you to increase efficiency of production and logistics and to achieve competitive advantages. Our pool of experts complements and expands this expertise.

The consulting offer of Bosch Industry Consulting is suited for suppliers and manufacturers, and from medium-sized enterprises to corporations. We currently specialize in those sectors that we know best from our own work: mechanical engineering, as well as the automotive industry and the packaging industry. Of course, we are also happy to offer our consulting services for Industry 4.0 projects to companies from other sectors.

Our comprehensive pool of experts consists of both experienced Industry 4.0 consultants and experts from a diverse range of areas, who we call depending on the specific project and focus. All our experts have one thing in common: profound technological expertise and processing skills, gathered in operational practice.
**WORKSHOP**

**i4.0 orientation week**

**User groups**
- Plant management
- Production management
- Logistics management
- Management for digitization

**Objective**
- Translation of your plant and production strategies into Industry 4.0
- Creation of an understanding that can generate the added value of digitization for you
- Generation of use cases to optimize your value-added chain
- Roadmap with concrete measures and projects to realize potential

**Content**
We determine the content of the workshop together with you. In the process, we incorporate your i4.0 strategies and activities thus far, as well as already existing solutions.

For example, a workshop could include the following items:
- Common understanding of your goals and strategies
- Detailed analysis of the value stream, production and logistics processes and identification of existing pain points
- Performance of our lean and i4.0 assessments, in order to assess your current point of departure in both areas
- Integration of known pain points and derivation of appropriate use cases
- Development of a road map, including areas of activity for implementation

**Note**
The i4.0 innovation workshop can be a follow-up workshop to the Orientation Week, in order to implement the identified use cases and to develop first prototypes

**Dates, Location and Prices**
5 days on-site in your value stream plus preparation and follow-up. 30-40 k€ (dependent upon location and project scope). We are happy to prepare an individual offer for you.

**Contact**
Do you have questions about this workshop, or would you like to make an appointment? Please contact us at the following e-mail address: Industry.Consulting@de.bosch.com, or give us a call: +49 711 811 17750.

**Provider**
The workshop is conducted by Bosch Industry Consulting.

**Bosch Industry Consulting**

**Agenda i4.0 orientation week:**

1. **Monday**
   - Kick-off, first value stream walk and interviews with management

2. **Tuesday**
   - Detailed value stream analysis and identification of pain points

3. **Wednesday**
   - Interviews on the shop floor and assessment of maturity level with regard to lean production and i4.0

4. **Thursday**
   - Detailed analysis of focused value stream segments and functional areas for derivation of use cases

5. **Friday**
   - Presentation of findings, including identified areas of activity and use cases

**Results:**
- Lean maturity level and pain points, as well as i4.0 maturity level and use cases
- Road map with concrete measures for implementation
WORKSHOP

i4.0 innovation workshop

User groups
- Technical decision makers
- Technical managers
- Plant managers

Objectives
The i4.0 innovation workshop is designed in conjunction with you to address your requirements and circumstances. Typically, we focus on the following workshop objectives:

Understand
- Analysis of established processes and products regarding potential of industry 4.0 technologies
- Introduction and overview of relevant industry 4.0 technologies and proven development principles

Sketch
- Derivation of use cases and description of methods for user-oriented development
- Creation of solution scenarios (solution sets)

Build
- Scouting of potential technological solution modules (building blocks)
- Creation of mock-ups and prototypes

Learn
- User test to verify plausibility of use cases

Contents
- Status Quo review through factory walk, interviews or user observation
- Potential of Industry 4.0 technologies and key questions for conceptualization
- Fundamental principles of user-oriented development
- User story boarding and user description (persons)
- Overview of potential technological building blocks
- Creation and evaluation of solution sets
- Hands-on work with industrial grade technologies for creation of functional prototypes

Note
It is possible to book the ATP-i4.0 training (page 60) or a Bosch factory tour (page 12 onwards) directly following the workshop to find out about a possible implementation of Industry 4.0 in practice.

Date, Location and Price
Customer specific agreement (ca. 1 to 3 Days). We would be happy to prepare an individual offer for you.

Contact
Do you have questions about the workshop or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Provider
The workshop is conducted by Consult&Connect on the grow platform GmbH.

Course ID: [Inno-WS-i4.0]
CHANGE MANAGEMENT & QUALIFICATION

Shaping change together
The introduction of Industry 4.0 is a change process that requires new qualifications, a new work culture and a digital mindset. Putting people at center stage as actors is an important factor for success. Industry 4.0 changes processes, work procedures and content. In order to successfully implement the change process, we have defined five areas of activity: qualification, communication, leadership, collaboration, as well as operational regulations. To introduce Industry 4.0 solutions comprehensively and sustainably, we offer tailor-made change concepts that integrate measures from all areas of activity.

Our strengths are active and target-oriented support on-site, through all phases and on all levels – from the shop floor to plant management. The introduction of Industry 4.0 must begin with a change process. Why? Because an early analysis of effects as well as considering all parties involved leads to a quick and smooth start. Good change management therefore saves time, prevents reactive task forces and avoids insecurity or even frustration among employees.

What challenges do you face? We look forward to helping you.

Qualification
We determine the qualification requirements, develop the suitable qualification measures together, and take care of strategic competence management.

Communication
Who must be informed about what, and when? We help you to communicate the Industry 4.0 change process, in order to avoid anxiety and resistance.

Leadership
With ever more dynamic work processes, the requirements of management skills change. We help you to establish a new management culture.

Collaboration
Industry 4.0 frequently requires new processes and forms of collaboration. We develop the appropriate solutions with you and qualify your employees.

Operational regulations
Do you need to convince your works council? Benefit from our experience in collaboration with employee representatives.

Supporting Industry 4.0 on-site

We support you with comprehensive change management concepts that unify our five areas of activity in one process.
**Change Management & Qualification**

**Use Case: Change Process**

**Point of Departure in the Plant**

- We want to optimize our intralogistic processes and introduce a new software.
- Introducing Industry 4.0 products leads to job cuts.
- How do I introduce the tool to my team?

**Our Approach**

- We support you with a presentation to your works council on Industry 4.0 and the long-term planning of the product.
- In a workshop, the perspectives of target groups are recorded and the effects of change are gauged. The results form the basis of the action plan.
- Employees are promptly informed, according to their target groups, about the purpose and necessity of change, as well as the planned steps.
- Competence requirements are recorded and employees are qualified through appropriate measures.

**Result**

- **Management**
  - is supported
- **Employees**
  - are contributors
  - are motivated to participate in the change
  - can use the product optimally
  - knows the project
- **Works Council**
  - is involved
- **Plant Management**
  - is an integral part of our communication and is constantly informed about the approach, the status quo and results

**Change Management & Qualification**

**Overview of our services**

1. **Customer tools requirement analysis**
   Tools tailored to for a needs analysis and discovery of necessary areas of activity.

2. **Specialist consulting for areas of activity**
   Specialist advice and conception of needs-based measures in our five areas of activity: qualification, communication, leadership, collaboration and operational regulations.

3. **Development of needs-based measures**
   Custom-fit and target group-oriented development and implementation of selected measures.

4. **Toolbox of existing measures and concepts**
   Provision of appropriate tools and concepts from change management projects that have been carried out successfully.

5. **Direct consultation and experience exchange on-site, in our plants**
   In-depth exchange of experiences and expert workshops on "People as Actors & Change Management" following a plant tour at one of our Industry 4.0 lead plants.

**Our Contact**

- Please contact us:
  - You can reach us by telephone: +49 711 811 40743,
  - or by e-mail: BCI.Training@bosch.com.
  - www.bosch-connected-industry.com

**Bosch Connected Industry**
Use case: qualification process

Point of departure in the plant

We want to improve our production with a new software
Our employees don’t know how to handle the new software
Teach me how to use it, so I can work with it
How do my people learn to handle the new software?

Plant management
Works council
Employees
Management

Our approach

Classroom trainings on-site or in our Training Center
Interactive trainings with use-cases, videos and a variety of methods
Concept and design for E-Learning and Blended Learning
Train-the-Trainer concept, to enable the transfer of knowledge

Result

Plant management
- qualified employees ensure that the maximum efficiency of i4.0 solutions can be achieved

Works council
- qualified employees re the key to job security
- career options of employees are supported and expanded

Employees
- are motivated
- are able to use the software efficiently and safely

Management
- is supported

Overview of our services

1 | Need for qualification of the target audience
Analyzing the need for qualification for different target audiences, identifying educational objectives, creating a suitable competence matrix

2 | Qualification strategy
Professional consulting and recommendation of a qualification strategy for different target audiences

3 | Development of needs-based trainings
Custom-fit and target audience oriented development and implementation of selected measures, fitting training formats with use-cases from your environment

4 | Toolbox of existing measures and concepts
Provision of appropriate tools and concepts from qualification projects that have been carried out successfully

5 | Implementation of trainings and workshops
Trainings and workshops can be conducted on-site or in our Training Center

6 | Train-the-Trainer
Training of persons who are responsible for qualification and enabling to turn them into experts and to ensure an overall qualification cascade

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Bosch Connected Industry
From practical experience for practical application
New challenges require new qualifications

Industry 4.0 and digitization are accompanied by changed competence profiles. They require technical know-how, IT knowledge, data affinity, cross-functional thought and action, as well as new management roles and forms of collaboration. Our training portfolio supports you in the process of building up the appropriate qualifications.

We offer specialist courses on topics such as production & logistics 4.0, data analysis and cloud computing, while our starter courses provide an introduction to Industry 4.0.

Our specialized training sessions make sure that our Industry 4.0 products and solutions are optimally used: from the automation platform Nexeed Automation and the Nexeed MES to the Bosch IoT Cloud and Bosch IoT Suite. Every participant can select the appropriate course according to product, area of application or knowledge level. The product training sessions are mostly built up in modules: the basic courses offer a sound introduction to the topic; the advanced courses build upon the foundation of the respective basic course.

Small seminar groups ensure lively exchange and intensive learning. The seminars offer time for both practical exercises and discussions. The content is presented by experienced and field-tested experts from the different specialist areas.

Tip
We offer (almost) all training sessions as inhouse training at your company. In the process, we focus on your company-specific requirements and problems. Furthermore, you save the cost of transportation and lodging for your employees.
The user groups

Our trainings are tailor-made for specific task fields and specially designed for different user groups.

The required specialist knowledge and the used specifications of our products and solutions differ, depending on the role and function. Are you a maintainer and need to ensure high machine reliability? Are you a planner and are you faced with the challenge of optimizing complex production systems and successfully implementing new solutions? With function-related training, we provide the appropriate knowledge.

User groups for training in overview:

**Operator**
- Operator of machinery and plants
- Employees in manufacturing

**Maintainer**
- Service technician
- Maintenance staff
- Commissioner

**Planner / Project manager**
- Production planner
- Process planner
- Constructor
- I4.0 coordinator

**Administrator**
- System administrator
- Configuration manager
- Database manager

**Programmer / Developer**
- Software developer
- Software architect
- Solution architect
- IT specialist
- Applicator

**Business Professionals**
- Employees from the field of Sales, Service, Quality, Procurement, Business Development
- IT-Consultant

**Decision-makers**
- Project manager
- Product manager
- Manager

**Trainer**
- Technical trainer
- Lecturer

Please note:

On the following four pages you can see an overview of our complete range of courses. The different user groups are categorized in superordinated groups and can be used for a first orientation. You can find a more detailed list of the user groups on the particular content sites.
### i4.0 subject-specific

<table>
<thead>
<tr>
<th>Course</th>
<th>Course-ID</th>
<th>User groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry Manager Digital Transformation (CCI)</td>
<td>[AT-Digit_IoTI4.0]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Digitization of the modern world of work - entry into Industry 4.0</td>
<td>[ATP-1]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Basic knowledge of automation with practical exercises</td>
<td>[ATP-I4.0]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Understand Industry 4.0</td>
<td>[AT-I4.0]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Industry 4.0 in practice (compact course) - technical add-on for i4.0 beginners</td>
<td>[ATP-I4.0cpt]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Converting production from Industry 3.0 to Industry 4.0</td>
<td>[ATP-I4.0]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
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</table>

<table>
<thead>
<tr>
<th>Course</th>
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<th>User groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>People &amp; Change</td>
<td>[BCI-I4.0-ppl030]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>What does digitization mean for the shopfloor level</td>
<td>[BCI-I4.0-ppl001]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Aspects of codetermination in the introduction of IT products</td>
<td>[BCI-I4.0-ppl010]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
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</table>

### Production & Logistic 4.0

<table>
<thead>
<tr>
<th>Course</th>
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<th>User groups</th>
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</thead>
<tbody>
<tr>
<td>BPS- LP - i4.0 - Industry 4.0 im Rahmen von Lean Production</td>
<td>[BPS-LP-I4.0]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>i4.0 roadmap workshop</td>
<td>[CNS-i4.0]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Logistics 4.0</td>
<td>[CNS-Log]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
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### Data Technology

<table>
<thead>
<tr>
<th>Course</th>
<th>Course-ID</th>
<th>User groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semantic modeling with Digital Twin and Knowledge Graph for interested parties</td>
<td>[BCI-I4.0-DTKG01]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Semantic modeling Digital Twin/ Knowledge Graph for advanced users</td>
<td>[BCI-I4.0-DTKG02]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
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<tr>
<td>Semantic modeling Digital Twin/ Knowledge Graph for experts</td>
<td>[BCI-I4.0-DTKG03]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
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<tr>
<td>Use Case Workshop Semantic Modeling with Digital Twin and Knowledge Graph</td>
<td>[BCI-I4.0-DTKG04]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
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### IT Security

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<th>User groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT security compact for machinery builder</td>
<td>[BCI-IT-SECMB101]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>IT-Security for the mechanical engineering</td>
<td>[EIT-IT-Security]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>IT in manufacturing</td>
<td>[BCI-IT-ITM001]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>IT in engineering laboratories</td>
<td>[BCI-IT-ITL001]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
</tr>
<tr>
<td>Network technology in manufacturing and engineering laboratories</td>
<td>[BCI-IT-ITM010]</td>
<td>Operator, Maintainer, Planner, Project manager, Administrator</td>
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</tbody>
</table>

### User groups

- Operator
- Maintainer
- Planner
- Project manager
- Administrator

**Note:** The assignment of the user groups is a recommendation. An additional overview to the user groups you can find on page 51.
### TRAINING

#### The range of courses in overview (2)

*Note: The assignment of the user groups is a recommendation. An additional overview to the user groups you can find on page 51.*

<table>
<thead>
<tr>
<th>Connected Hydraulics</th>
<th>Course-ID</th>
<th>User Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulics – electrification and digitalization – basics</td>
<td>[HED-G]</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Commissioning CytroPac</td>
<td>[HTP-CytroPac]</td>
<td>● ● ●</td>
</tr>
<tr>
<td>Best-in-class-hydraulic controller VT-HMC/IAC Multi-Ethernet</td>
<td>[HTP-IAC-HMC]</td>
<td>● ● ● ●</td>
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<tr>
<td>Motion Control for hydraulics – programming the VT-HMC motion controllers</td>
<td>[HTP-HMC-Prog]</td>
<td>● ● ● ●</td>
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<table>
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<tr>
<th>Indra Motion MTX</th>
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<tbody>
<tr>
<td>MTX efficiency workbench</td>
<td>[EST-MTX-EWB]</td>
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<table>
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<tr>
<th>ActiveCockpit</th>
<th>Course-ID</th>
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</thead>
<tbody>
<tr>
<td>Visualization of manufacturing data in real time and assistance system for manual assembly</td>
<td>[MOT-Prod4.0]</td>
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<table>
<thead>
<tr>
<th>IoT Gateway</th>
<th>Course-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of the IoT Gateway</td>
<td>[EST-IoT-Gateway]</td>
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<table>
<thead>
<tr>
<th>Bosch IoT Suite</th>
<th>Course-ID</th>
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</thead>
<tbody>
<tr>
<td>Introduction to the Bosch IoT Suite</td>
<td>[SI-F103]</td>
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<tr>
<td>Developing Solutions with the Bosch IoT Suite</td>
<td>[SI-B102]</td>
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<thead>
<tr>
<th>APAS assistant mobile</th>
<th>Course-ID</th>
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<tbody>
<tr>
<td>Safe handling</td>
<td>[BCI-SP-AP011]</td>
</tr>
<tr>
<td>Troubleshooting and fault removal</td>
<td>[BCI-SP-AP012]</td>
</tr>
<tr>
<td>Maintenance of the sensor skin</td>
<td>[BCI-SP-AP015]</td>
</tr>
<tr>
<td>Preparation of working plans</td>
<td>[BCI-SP-AP018]</td>
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<table>
<thead>
<tr>
<th>APAS assistant inline</th>
<th>Course-ID</th>
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</thead>
<tbody>
<tr>
<td>Safe handling</td>
<td>[BCI-SP-AP021/31]</td>
</tr>
<tr>
<td>Maintenance of the sensor skin</td>
<td>[BCI-SP-AP015]</td>
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<tr>
<td>Preparation of working plans</td>
<td>[BCI-SP-AP028/38]</td>
</tr>
<tr>
<td>Integration in projects</td>
<td>[BCI-SP-AP027/37]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open Core Engineering</th>
<th>Course-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basics of Open Core Engineering</td>
<td>[ESTG_OCI]</td>
</tr>
<tr>
<td>Introduction to Open Core Interface</td>
<td>[EST-XLC-MLC-OCI-EASY]</td>
</tr>
<tr>
<td>Windows programming with Open Core Interface</td>
<td>[EST-XLC_MLC_OCI_WIN]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nexeed Automation – Software system Control</th>
<th>Course-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>IndraLogic version 1</td>
<td>[BCI-SP-OP001]</td>
</tr>
<tr>
<td>Development of a system application</td>
<td>[BCI-SP-OP015-MAP]</td>
</tr>
<tr>
<td>Advanced system application</td>
<td>[BCI-SP-OP015-AP]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nexeed Automation – Electrical construction</th>
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</tr>
</thead>
<tbody>
<tr>
<td>EPLAN application in system applications</td>
<td>[BCI-SP-OP073]</td>
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<table>
<thead>
<tr>
<th>Nexeed MES</th>
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<tbody>
<tr>
<td>Nexeed Manufacturing Execution System – An Introduction</td>
<td>[BCI-SP-MES-INTRO]</td>
</tr>
<tr>
<td>Connected Manufacturing – The path of data from the machine to its visualization</td>
<td>[BCI-SP-MES-NET10]</td>
</tr>
<tr>
<td>Shiftbook usage and analysis of production and machine data</td>
<td>[BCI-SP-MES-PDA10]</td>
</tr>
<tr>
<td>Configuration of process/machine data acquisition and administration of the shiftbook</td>
<td>[BCI-SP-MES-PDA50]</td>
</tr>
<tr>
<td>Consulting workshop for the shiftbook and PDA/MDA</td>
<td>[BCI-SP-MES-PDA60]</td>
</tr>
<tr>
<td>Quality Data – analysis, verification and tracing</td>
<td>[BCI-SP-MES-QD10]</td>
</tr>
<tr>
<td>DirectDataLink</td>
<td>[BCI-SP-MES-DDL10]</td>
</tr>
<tr>
<td>LineControl</td>
<td>[BCI-SP-MES-LC10]</td>
</tr>
<tr>
<td>Installation and configuration of Condition MonitoringControl (CMControl)</td>
<td>[BCI-SP-MES-CMC10]</td>
</tr>
<tr>
<td>Working with the OrderManagement and Product-SetupManagement clients</td>
<td>[BCI-SP-MES-OM10]</td>
</tr>
<tr>
<td>Working with the Maintenance SupportSystem (MSS) tablet and smartphone app</td>
<td>[BCI-SP-MES-MSS10]</td>
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</table>
I4.0 SUBJECT-SPECIFIC

Expert knowledge about industry 4.0
Starting i4.0

Everyone is talking about Industry 4.0. The term represents the way forward and offers exciting opportunities for those who possess the expertise and vision to quickly realize these possibilities. The training course "Understand Industry 4.0" provides you with a solid introduction to the world of Industry 4.0 – and uses many sample applications and the necessary vision to ensure you have the i4.0 knowledge you need.

When talking about Industry 4.0, the following questions often come up: What does it look like in reality? And how can it be implemented? The training courses "Industry 4.0 in practice (compact course) – Technical Add-On for i4.0 beginners" and "Converting production from Industry 3.0 to industry 4.0" offers answers and suggestions.

The certificate course, "Manager – Digital Networking in the Industry (CCI)" is offered in cooperation with the Chamber of Commerce and Industry (CCI). It is directed on the one hand toward skilled workers in production and the production environment who are involved in the concrete implementation of Industry 4.0 projects, and on the other hand toward technical specialists who must plan and conceptualize Industry 4.0 projects. The course consists of five modules and conveys the competencies required for contributing to the conception, implementation and selection of methods and technologies for Industry 4.0 in a work environment.

---

**CERTIFICATE COURSE**

- Industry Manager Digital Transformation (CCI)

---

**LIVE ONLINE TRAINING**

- Digitization of the modern world of work - entry into Industry 4.0
  - [eT-Digit_iOT4.0] Page 62

**BASIC TRAINING COURSE**

- Basic knowledge of automation with practical exercises
  - [ATP-1] Page 64
- Understand Industry 4.0
  - [AT-I4.0] Page 65
- Industry 4.0 in practice (compact course) – technical add-on for i4.0 beginners
  - [ATP-I4.0cpt] Page 66
- Converting production from Industry 3.0 to Industry 4.0
  - [ATP-I4.0] Page 67
CERTIFICATE COURSE
Industry Manager Digital Transformation (CCI)

Understanding, shaping and implementing the digital transformation in industry. Compact intensive training course in cooperation with the CCI Würzburg-Schweinfurt.

User groups
▶ Planners / project managers (Production planners, process planners, design engineers, i4.0 coordinators)
▶ Decision-makers (Project managers, product managers, managerial staff from all business units)
▶ Administrators (System administrators, configuration managers, database managers)

Objective
▶ Digitization offers companies the opportunity to rethink and restructure their own processes from the ground up. In order to achieve a successful digital transformation, it is essential to know about the enormous potential of new technologies, methods and approaches.
▶ With the certification course Industrial Manager - Digital Networking (CCI), you get to know approaches for the implementation of digitization in the fields logistics, production and maintenance. You will learn how to recognize the industry 4.0 potential in your own company and to develop solution approaches. Following the certification course, the CCI certification will take place on a separate date.

Requirements
▶ Experience and knowledge in the production.

Equipment
No equipment is required for this course.

Date (German) Location
Start 06/07/2021 Würzburg

Training times
Monday to Friday: 09:00 a.m. – 05:30 p.m.
(50 lessons in total)

Net price
1,650 € plus 650 € certification

Registration
Please contact CCI Würzburg-Schweinfurt:
David Seubert
Phone +49 931 4194-284
Email: david.seubert@wuerzburg.ihk.de

Training provider
The training is conducted by Bosch Rexroth Academy and the CCI Würzburg-Schweinfurt.

Module 1
Steps to a smart factory
▶ Variant production in the smart production, added value due to digital strategies and innovative business models
▶ Mega trends with application examples from Bosch and Bosch Rexroth
▶ Potential due to artificial intelligence in production and logistics

Module 2
Connected business models in production and logistics
▶ Introduction to supply chains and supply chain management
▶ Logistics and supply chains in a digital world
▶ Connected work in the digital supply chain
▶ Analysis methods

Module 3
Implementation of digitization and smart production
▶ IT architectures in the production:
▶ IT infrastructure (security, network architecture)
▶ Application examples of data acquisition to data analysis and use

Module 4
The design of work and organization in the age of digital change
▶ Individual-technology-organization
▶ Digitization and changes to work
▶ SCRUM approach
▶ Agile working methods

CCI certificate
Certificate "Industry Manager Digital Transformation (CCI)" by passing the certification

The CCI certificate course comprises four consecutive training modules.

The modules in overview

The training is conducted by Bosch Rexroth Academy and the CCI Würzburg-Schweinfurt.

CERTIFICATE COURSE
Industry Manager Digital Transformation (CCI)
LIVE ONLINE TRAINING
Digitization of the modern world of work – entry into Industry 4.0

User groups
▶ Service technicians
▶ Programmer
▶ Planners/application engineers
▶ Leader
▶ Trainers
▶ HR associates

Objective
▶ Identify new business models and added value
▶ Understanding and applying data collection within the value chain
▶ Overview of new technology trends of the future

Requirements
▶ Interest in new technologies related to digitization

Contents
▶ Introduction to the world of IoT
▶ Advantages of Big Data & Data Mining in an industrial environment
▶ Industry 4.0 in the factory of the future
▶ Megatrends with application examples from Bosch & Bosch Rexroth

▶ The easy way to IoT, connect your machines
▶ Generate added value through data and digital strategies, such as -> Data Governance
▶ Optimization potential through artificial intelligence in production & logistics
▶ New possibilities through the use of Blockchain

Equipment
No equipment is required for this course.

Date (German) | Training times
---|---
02/11/2021 | 10:00 a.m. – 12:00 a.m. (CEST/CET)
04/15/2021 | 10:00 a.m. – 12:00 a.m. (CEST/CET)
06/17/2021 | 10:00 a.m. – 12:00 a.m. (CEST/CET)
07/01/2021 | 10:00 a.m. – 12:00 a.m. (CEST/CET)
10/14/2021 | 10:00 a.m. – 12:00 a.m. (CEST/CET)
12/02/2021 | 10:00 a.m. – 12:00 a.m. (CEST/CET)

Date (English) | Training times
---|---
02/11/2021 | 07:00 a.m. – 09:00 a.m. (CEST/CET)
04/15/2021 | 04:00 p.m. – 06:00 p.m. (CEST/CET)
06/17/2021 | 07:00 a.m. – 09:00 a.m. (CEST/CET)
07/01/2021 | 04:00 p.m. – 06:00 p.m. (CEST/CET)
10/14/2021 | 07:00 a.m. – 09:00 a.m. (CEST/CET)
12/02/2021 | 04:00 p.m. – 06:00 p.m. (CEST/CET)

You can also arrange an individual training. For Dates and prices please contact us directly.

Net price
70 €

Registration
Online via this Link or via QR Code.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth
Course ID: [eT-Digit_IoTi4.0]
BASIC TRAINING COURSE

Basic knowledge of automation with practical exercises

User groups
▶ Operators
▶ Service technicians
▶ Planners/application engineers
▶ Trainers

Objective
▶ Fieldbus systems, overview and application
▶ iNetwork technology, overview and application
▶ Practical exercises

Date (German) | Location
---|---
06/28 – 07/02/2021 | Ulm

You can also arrange an individual training. For Dates and prices please contact us directly.

Training times
Day 1: 10:00 a.m. - 04:15 p.m.
Day 2-4: 08:00 a.m. - 04:15 p.m.
Day 5: 08:00 a.m. - 12:30 p.m.

Net price
2.135 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth
Course ID: [ATP-1]

BASIC TRAINING COURSE

Understand Industry 4.0

User groups
▶ Operator
▶ Maintenance technician
▶ Planner/applicator
▶ Administrator
▶ Programmer/developer
▶ Business professionals
▶ Leader
▶ Trainer

Objective
▶ Gain a clear understanding of Industry 4.0
▶ Being able to define the Internet of Things and classify solutions
▶ Know what Bosch and Bosch Rexroth are doing in the field of Industry 4.0
▶ Know Rexroth concepts
▶ Know products, systems and their uses

Equipment
No equipment is required for this course.

Date (German) | Location
---|---
05/03/2021 | Würzburg
06/12/2021 | Würzburg

You can also arrange an individual training. For Dates and prices please contact us directly.

Training times
Day 1: 10:00 a.m. – 05:00 p.m.

Net price
584 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth
Course ID: [AT-i4.0]
BASIC TRAINING COURSE

Industry 4.0 in practice (compact course) – technical add-on for i4.0 beginners

User groups
- Operator
- Technical sales support
- Technical supervisors
- Beginners to Industry 4.0 needing more in-depth technical knowledge
- Trainer

Objective
- See Contents

Requirements
- Good technical understanding
- Basic knowledge of automation and control technology
- Completion of the AT-i4.0 - Understanding Industry 4.0 training course or comparable knowledge

Contents
- Basics of Ethernet and communication
- Introduction to RFID
- Introduction to the following topics with live demonstration:
  - IoT gateway
  - Open Core Engineering
  - Manufacturing Execution System
  - Production Performance Manager
  - Data Analytic Server
- Presentation of the mMS4.0 training system incl. the components relevant to i4.0
- ActiveAssist
- ActiveCockpit
- Web-based visualization (Node-RED)
- Presentation of the possibilities for the maintenance and monitoring of systems

Equipment
No equipment is required for this course.

Note
Training contents are similar to course ATP-i4.0 but optimized for operational requirements.

Date (German) | Location
07/05 – 07/06/2021 | Ulm
10/12 – 10/13/2021 | Ulm

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 10:00 a.m. – 04:30 p.m.
Day 2: 08:30 a.m. – 04:00 p.m.

Net price
844 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth
Course ID: [ATP-i4.0cpp]

Converting production from Industry 3.0 to Industry 4.0

User groups
- Operator
- Maintenance technician
- Planner/applicator
- Programmer/developer
- Leader
- Trainer

Objective
- Familiarity with the assemblies and system components of an automated industrial system
- Know the opportunities to expand an industrial plant with additional sensors and identification components (RFID)
- Identify data sources
- Know how to connect to databases
- Know possibilities for sending alerts
- Visualization possibilities for data (e.g. Active-Cockpit or web page)

Requirements
- Knowledge of PLC programming according to IEC 61131-3
- Excellent technical understanding
- Basic knowledge of automation and control technology
- Completion of the AT-i4.0 - Understanding Industry 4.0 training course or comparable knowledge

Contents
- Step-by-step upgrade to an Industry 4.0 system
- Data capture using intelligent components
- Data collection via an IoT gateway (e.g. via OPC-UA)
- Connecting data to databases
- Analyzing the data and possibilities for sending alerts

Equipment
No equipment is required for this course.

Note
Our service team will be pleased to support you with an upgrade of your existing systems for industry 4.0.

Date, location and price
4 days at the Bosch Rexroth Academy. We would be happy to prepare an individual quote for you.

Training times
Day 1: 10:00 a.m. – 05:00 p.m.
Day 2-3: 08:00 a.m. – 04:00 p.m.
Day 4: 08:00 a.m. - 12:30 p.m.

Net price
1.813 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth
Course ID: [ATP-i4.0]
Industry 4.0 changes the work environment. New qualification and competence requirements are emerging. Employees’ scope of action is changing. This leads to new forms or leadership, project management and collaboration.

A train-the-trainer concept conveys foreman and production managers how to prepare employees for the changes brought by Industry 4.0 and help to shape the necessary changes.

In the course, "Work 4.0 – How i4.0 Technologies and Digitization are Changing our Work Environment", you will learn how to systematically measure and classify changes. The mutual dependence and interactions among people, technology and organizations are presented. Additionally, participants discover why new forms of collaboration (e.g. agile work) are becoming increasingly important.

In the webinar, "Aspects of Codetermination in the Introduction of IT Tools", you will discover how you can incorporate employee representatives in the introduction of IT tools from the beginning.

User groups
- Foremen and managers in the plant, who are being trained to become trainers

Objective
- Sensibilize/sensitize employees for the change through digitalization and Industry 4.0
- Encourage employees to shape the change
- Encourage employees to get fit for Industry 4.0

Requirements
- The company should be ready to start the journey to a digitalized and connected factory
- The company needs to support the employees’ will for further education

Contents
- Change in our working environment through megatrends
- Reflection of change at one’s own workplace
- Needed competencies for i4.0 skills required under i4.0
- Self-assessment of training needs
- Self-evaluation of training needs

Equipment
No equipment is required for this course

Procedure
- At the beginning there are preparatory talks with the various participants from your company (HR, i4.0 project managers to ensure the connection to your i4.0 strategy).
- In a workshop we make your employees fit for the dialogue with the employees. This includes the execution and practice of the learning session, coaching and clarification of open questions.

Hints
The programme will be adapted to the local needs and digitisation strategy of your company.

Date and price
Dates can be arranged individually. We will be happy to prepare an individual offer for you!

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
WEBINAR

Aspects of codetermination in the introduction of IT products

User groups
- Technical functions, product owners, project managers and roles that are involved in the development, rollout or implementation of IT tools

Objective
- Discover what is required to position new IT tools in your production environment successfully and with a sense of purpose from the beginning
- You will understand how the inclusion of employee representatives in the introduction of new IT tools can be successful

Requirements
No specific knowledge is necessary.

Contents
- What must be taken into account with regards to employee representation during the introduction of IT tools
- Overview of legal regulations and inclusion of employee representatives in the rollout of IT tools
- Based on practical examples, steps for integrating employee representatives and the workforce are conveyed
- Assessment of measures taken in use cases conducted

Equipment
No equipment is required for this course

Webinar
Participation in the course takes place over Skype.

Date, location and price
After arrangement.
We would be happy to prepare an individual offer for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-i4.0-ppl10]

WEBINAR

Aspects of codetermination in the introduction of IT products
When thinking about Industry 4.0, we primarily have manufacturing companies in mind. However, Industry 4.0 also means digitization and flexibilization of logistics processes. In this area, you will learn to analyze production and logistics with regard to lean production and we will show concrete examples of how Industry 4.0 solutions are used in production and logistics.

Have you ever wondered how Industry 4.0 can be implemented in the real world? As part of the Connected Sensor Devices – Hackathon ("hacking" & "marathon") you will have the opportunity. Customer-individual topics will be discussed in a four-day workshop in small groups and lead by experienced moderators.

For Bosch, the Bosch Production System (BPS) provides the framework for Industry 4.0. What does this mean in practice? How can value streams be designed so that the aspects of Lean Production ideally complement the solutions of Industry 4.0? In the course "BPS-LP-i4.0 - Industry 4.0 as part of Lean Production", material movements are recorded and visualized in real time using the playful example of a "ballpoint pen assembly". They optimize the value stream over several simulation rounds according to the principles of the Bosch Production System. The participants experience how the appropriate use of IT can significantly increase the efficiency of value streams.

For more information: Industry.Consulting@de.bosch.com

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**BASIC TRAINING COURSE**

**Visualization of process data**

- **User groups**
  - Production managers
  - i4.0 officers
  - Lean managers
  - Production and IT staff

- **Objective**
  - Being familiar with the basic concepts of Industry 4.0
  - Knowing the potential uses and functionality of ActiveCockpit
  - Gaining insight into the uses and applications of Industry 4.0 for assembly purposes
  - How can you get into networking step by step?

- **Requirements**
  - Principles of Lean Production (concept of value stream, idea of consumption control)

- **Contents**
  - The principles of Industry 4.0
  - The ActiveCockpit interactive communication platform
  - Standard app for the shop floor

- **Equipment**
  - No equipment is required for this course.

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**BASIC TRAINING COURSE**

**Course ID:** [BPS-LP-i4.0]
BASIC TRAINING COURSE

i4.0 roadmap workshop

User groups
- Plant Management / Executives
- Production Manager
- Logistics Manager
- i4.0 Coordinators
- Project/Product Manager

Objective
- Awareness and understanding an Industry 4.0 plant strategy and various Industry 4.0 use cases as well as related solutions at the example Bosch Homburg plant
- Discussion of own company focal points in the Industry 4.0 context
- Classification of the company in an i4.0 roadmap and concretization of next steps
- Identification of methods to deduce possible measures and potentials

Requirements
- Basic knowledge of lean manufacturing principles
- Basic knowledge Industry 4.0 and initial application experience

Contents
- Factory tour at the Bosch Homburg plant with Industry 4.0 practical examples from production and logistics
- Discussion of own approaches in pilot projects and Industry 4.0 implementation processes
- Categorization of different pain points and activities in the Industry 4.0 context
- Discussion of possible use cases and further approach

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: Industry.Consulting@de.bosch.com, or give us a call +49 711 811 17750.

Training provider
The training is conducted by Bosch Industry Consulting.

Bosch Industry Consulting

Course ID: [CNS-i4.0]

Date, location and price
1 day.
We would be happy to prepare an individual offer for you!

BASIC TRAINING COURSE

Logistics 4.0

User groups
- Logistics Manager
- Production Manager
- Project/Product Manager
- i4.0 Coordinators

Objective
- Experience of a connected supply chain at the example Bosch Homburg plant: Getting to know various use cases in association with RFID: Dynamic Milkrun, iSupermarket, Visual Tags, AGVs and Track & Trace
- Discussion of own company activities and strategies to optimize the supply chain
- Deduction of concrete requirements, potentials and possible use cases in the field of logistics

Requirements
- No specific knowledge is necessary.

Contents
- Tour through the Homburg logistics center: understanding the RFID technology (used) in pairing, routing and aggregation
- Visit the production hall: getting to know smart intralogistics route optimization and digital supermarket management
- Identification of requirements and levers for a connected supply chain
- Discussion of own company focal points and pilot projects in the field of logistics 4.0
- Concretization and target setting for the different company activities in the field of logistics

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: Industry.Consulting@de.bosch.com, or give us a call +49 711 811 17750.

Training provider
The training is conducted by Bosch Industry Consulting.

Bosch Industry Consulting

Course ID: [CNS-log]

Date, location and price
1 day.
We would be happy to prepare an individual offer for you!
Industrial image processing enables early and comprehensive quality control. Additional important fields of application are robotics and handling technology. Through industrial image processing, pick-and-place applications can be optimized and the interaction between people and machines becomes more secure. Image processing is also used in the reading of codes, such as barcodes. Hence it is an important requirement for flexible production in the sense of Industry 4.0.

The Bosch Connected Industry Training Center also offers courses for diverse image processing systems (overview on the right side). In the courses, you learn how to securely set up and operate the systems.

The Image Processing courses in overview

**Image processing Basics**
- Basic training courses
  - System Setup
  - System Maintenance
  - Optics & Sensoric
  - Smart Camera Cognex
  - Advanced training courses
  - Optics & Sensoric

**Image processing with NeuroCheck**
- Basic training courses
  - Neurocheck Basic
  - Neurocheck Plug-in Functions
  - Advanced training courses
  - Neurocheck Application Training
  - Neurocheck Development

**Image processing with OMS**
- Basic training courses
  - NI TestStand Basic
  - OMS Basic
  - Advanced training courses
  - OMS Application Training
  - OMS Advanced
  - OMS System Development

**Image processing with Halcon**
- Basic training courses
  - Halcon Basic
  - Advanced training courses
  - Halcon Integration in OMS and NeuroCheck
  - Halcon Advanced

**Image processing with AI**
- Basic training courses
  - AI Basic
  - AI Using Tool Chain
  - AI Workshop

**Contact**
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address:

MachineVisionServices.ATMO1@bosch.com.

**Training provider**
The training conducted by Bosch Connected Industry Training Center and Robert Bosch Manufacturing Solutions GmbH (ATMO).
Manufacturing processes generate a large amount of data of various kinds – data constitutes the most important resource in the era of digitalization and industry.

The significantly increased amount of available data offers numerous possibilities. Using Digital Twins and Knowledge Graphs you can simulate your processes in advance and evaluate them afterwards.

Improvements that lead to greater efficiency can be implemented on this basis.

Facilitating the unified semantic description and provisioning of the data, it can be used in applications regardless the original data source. New software solutions can easily be built and open the door for the development of new software solutions.

Due to the semantic modeling and Knowledge Graphs data can be stored in a reusable fashion removing the burden of repeated integration of software with heterogeneous data sources. The clear presentation is also a basis for evaluating and continuously improving your processes (for example data analytics on data that span multiple data sources and require links between the data).

The course “Semantic Modeling – Digital Twins and Knowledge Graph for interested parties [BCI-i4.0-DTKG01]” gives you a first overview of the technology, typical use cases and the value proposition (benefits) of the RB Semantic Stack.

The courses “Semantic Modeling– Digital Twin and Knowledge Graph for Advanced and Experts” [BCI-i4.0-DTKG02 and 03] lead you to a deeper insight into the semantic modeling with the Bosch Aspect Meta Model Editor (BAME) and the Knowledge Graphs. They enable the participants to produce digital twins themselves with their own data and integrate heterogeneous data using Knowledge Graphs.

Furthermore, there is the possibility to bring in your specific use cases and to work on semantic models together with our experts in workshops [BCI-i4.0-DTKG04].

**User groups**
- Interested parties who want to understand the benefits and function of semantic modeling, e.g. executives
- Anyone who wants to understand how products and processes can be improved with systematic data analysis
- Anyone who wants to understand how more scalability can be achieved with systematic data reuse

**Objective**
- Rough overview / “Management Summary” on semantic modeling
- Rough overview / “Management Summary” of the tools BAME (Bosch Aspect Model Editor) and Knowledge Graph

**Requirements**
No specific knowledge is necessary.

**Contents**
- Understanding of the functionality of semantic modeling
- Getting to know BAMM (Bosch Aspect Meta Model)
- Getting to know BAME (Bosch Aspect Meta Model Editor) for creating aspect models according to BAMM
- Getting to know the knowledge graph and the semantic data integration of the graphs
- Getting to know the interaction of Bosch Aspect Meta Models and knowledge graphs under the Framework of the semantic stack
- Example Use Cases, how semantic modeling can increase scalability, quality and efficiency

**Equipment**
No equipment is required for this course.

**Note**
Currently only bookable for Bosch employees.

**Date, location and price**
Minimum 1 day. We would be happy to prepare an individual offer for you!

**Registration / Contact**
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

**More information**
Online via this link or via QR Code.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

**Course ID**: [BCI-i4.0-DTKG01]
BASIC TRAINING COURSE
Semantic modeling Digital Twin/ Knowledge Graph for advanced users

User groups
▶ All those who want to improve their products and processes with systematic data analysis
▶ All those who want to achieve more scalability with systematic data reuse
▶ Project managers in the field of semantic modeling and data analysis should participate to understand the approach and tools
▶ The advanced training is recommended to implementers of these processes, i.e. to those who will implement the data in semantic models
▶ These can be software architects, data architects, database managers or system administrators

Objective
▶ Introduction to semantic modeling
▶ Use of the tools BAME (Bosch Aspect Model Editor) and Knowledge Graph

Requirements
▶ Basic technical understanding. Prior knowledge of UML (Unified Modeling Language) or mathematical modelling is recommended
▶ Installation of the BAME (Bosch Aspect Model Editor) tool
▶ Installation of the web browser Google Chrome

Contents
▶ Introduction to semantic modeling
▶ Introduction of BAME (Bosch Aspect Model Editor) for the creation of aspect models according to BAMM (Bosch Aspect Meta Model)
▶ Also introduction of the knowledge graph and Semantic Data Integration of the Graphs
▶ Interaction of aspect models and knowledge graphs within the Robert Bosch Semantic Stack
▶ Includes “from use case to model” - the path from use case to semantic model

Equipment
No equipment is required for this course.

Note
Currently only bookable for Bosch employees.

Date, location and price
Minimum 1 day.
We would be happy to prepare an individual offer for you!

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address:
BCI.Training@bosch.com, or give us a call +49 711 811 40743.

More information
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-i4.0-DTKG02]

ADVANCED TRAINING COURSE
Semantic modeling Digital Twin/ Knowledge Graph for experts

User groups
▶ All those who want to improve their products and processes with systematic data analysis
▶ All those who want to achieve more scalability with systematic data reuse
▶ Expert training is particularly recommended to all implementers of these processes, i.e. to those who will implement the data in semantic models
▶ These can be software architects, data architects, database managers or system administrators
▶ It may also make sense for project managers to participate in semantic modeling and data analysis to better understand the approach and tools
▶ It may also make sense for project managers to participate in semantic modeling and data analysis to better understand the approach and tools
▶ All those who want to achieve more scalability with systematic data reuse

Objective
▶ Deep dive into semantic modeling
▶ Use of the tools BAME (Bosch Aspect Model Editor) and Knowledge Graph

Requirements
▶ Basic technical understanding. Prior knowledge of UML (Unified Modeling Language) or mathematical modelling is recommended
▶ Installation of the BAME (Bosch Aspect Model Editor) tool
▶ Installation of the web browser Google Chrome
▶ Transfer to own modeling projects

Note
Currently only bookable for Bosch employees.

Date, location and price
Minimum 1 day.
We would be happy to prepare an individual offer for you!

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address:
BCI.Training@bosch.com, or give us a call +49 711 811 40743.

More information
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-i4.0-DTKG03]
WORKSHOP

Use Case Workshop Semantic Modeling with Digital Twin and Knowledge Graph

User groups
- Areas that want to start semantic modeling projects together or need support for existing projects

Objective
- Joint identification of meaningful use cases for semantic modeling
- E.g. joint conception of next steps, first joint steps with the tools BAME (Bosch Aspect Model Editor) and Knowledge Graph possible

Requirements
No specific knowledge is necessary.

Contents
Can be adapted to your needs.

Equipment
No equipment is required for this course.

Note
Currently only bookable for Bosch employees.

Date, location and price
Minimum 1 day.
We would be happy to prepare an individual offer for you!

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

White Paper: “Data Homogenization in the Age of Industry 4.0”

What do we need to digitalize production and logistics? First of all, we need data, which is available in large amounts. However, we often still lacking a common basis for communication between humans, software and hardware. The answer lies in semantic data homogenization - not only for machine operators on site but also for mechanical engineers and software developers. It turns data into useful information that everyone can understand.

Bosch Connected Industry is currently working on making this value-adding information available beyond the factory borders with the Digital Twin System. In addition, connecting the data makes it possible to trace assets throughout their whole life cycle. The Digital Twin System thus opens up completely new possibilities, such as digital services for maintenance or ready-to-use software applications.

Do you want to learn more? Our whitepaper provides everything you need to know about our cross-plant approach to data homogenization!

Download the whitepaper here.
IT Security

Protecting IT systems from attacks is essential for the connectivity of the entire values stream. The courses “IT security for machinery builder” deals with risk assessment, security solutions, norms and organizational framework.

The basic training course “IT in manufacturing” provides an introduction to the subject matter of IT security in manufacturing. It is the objective to receive a practice-oriented overview of the tasks of a Local-ITM.

The basic training course “Network technology for manufacturing and engineering laboratories” is aimed at the person responsible for IT in manufacturing and engineering laboratories. The objective of this training is to provide an introduction in the subject matter of network basics for Bosch manufacturing and engineering laboratories.

The basic training course “IT in engineering laboratories” is aimed at security responsible in engineering laboratories, and offers a sound introduction in the tasks of a Local-ITL.

LIVE ONLINE TRAINING
IT security compact for machinery builder

User groups
- Executives, whom employees are IT security role owners according to Bosch norm N103. Division: development, sales, purchasing, quality assurance and service
- Project manager and persons who are responsible for hardware and software development (PMO, ...)
- Software developers in engineering
- Machine integrators
- Machine operators

Objective
- Introduction into the topic of IT security for engineering
- Overview and knowing the relevant norms and Bosch-processes

Requirements
No specific knowledge is necessary.

Contents
- Basics of IT security
- Need of action in MAE
- Responsibilities / definitions
- Risk assessment
- Best practices
- Overview of relevant norms (ISO, IEC, VDI)
- Overview of Bosch regulations (CDs, N103)
- Overview of and insight into the Bosch Security Engineering Process

Equipment
No equipment is required for this course.
## BASIC TRAINING COURSE
### IT-Security for the mechanical engineering

#### User groups
- Planner/Applicators
- Service technician
- Managers

#### Objective
- Creating Awareness
- Acquiring advanced knowledge for evaluating and increasing the current security status in own projects
- Getting to know the normative and regulatory requirements for IT security in the field of mechanical engineering

#### Requirements
No specific knowledge is necessary.

#### Contents
- IT security in the industry: current threat situation
- Safe configuration of an industrial control system
- Vulnerability Assessment
- Introduction to IEC 62443

#### Equipment
No equipment is required for this course.

#### Date
On request

#### Location
Lohr am Main, Ulm

#### Trainingszeiten
08:30 a.m. – 04:30 p.m.

#### Net price
610 €

#### Registration
Online via this link or via QR Code.

#### Training provider
The training is held by DC-AE.

Bosch Rexroth

Course ID: [EST-IT-Security]

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## BASIC TRAINING COURSE
### IT in manufacturing

#### User groups
- Local-ITM
- Manufacturing IT Planner
- Zone Manager
- DSO
- IT-Security responsible in manufacturing
- Master of Data

#### Objective
- Introduction to the tasks of a Local-ITM

#### Requirements
- Basic IT knowledge

#### Contents
- Introduction to the topic “IT security in manufacturing”
- Get to know roles, responsibilities and ITM organization
- Overview about IT risk management
- Apply basic protection (zone protection concept and network security)
- ITM-inventory hard/software – get to know requirements and scope
- Documentation of location concept for IT in manufacturing, emergency plan, operation concept
- Handling machine software
- Plan remote access to machines
- Apply purchasing guideline
- Perform capacity planning for Local-ITM activities
- Prepare an audit (self audit, independent audit)

#### Equipment
No equipment is required for this course.

#### Date
On request

#### Location
Lohr am Main, Ulm

#### Trainingszeiten
08:30 a.m. – 04:30 p.m.

#### Net price
610 €

#### Registration
Online via this link or via QR Code.

#### Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-IT-ITM001]
BASIC TRAINING COURSE
IT in engineering laboratories

User groups
- Local-ITL
- Zone Manager
- DSO
- IT-Security responsible in laboratory
- Responsible management in engineering laboratory

Objective
- Introduction to the tasks of a Local-ITL

Requirements
- Basic IT knowledge

Contents
- Introduction to IT Security in IT-Security in Engineering and Research laboratories
- Getting to know responsibilities, roles and ITL organization
- Getting an overview of IT risk management
- Apply basic protection (zone protection concept, network security, etc.)
- ITL inventory - Know requirements and scope
- Create and maintain of IT Engineering and Research laboratory documentation, emergency plan, operating concept, etc.
- Carrying out of self-audit questionnaire

Equipment
No equipment is required for this course.

Note
Currently only bookable for Bosch employees.

Date (German)         Location
02/23 – 02/24/2021   Online
19/11/2021           Stuttgart-Feuerbach

Date (english)        Location
03/09 – 03/10/2021   Online
11/26/2021           Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Net price
690 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-ITL001]

BASIC TRAINING COURSE
Network technology in manufacturing and engineering laboratories

User groups
- Local-ITM
- Local-ITL
- Manufacturing IT Planer
- Zone Manager
- DSO
- IT-Security responsible in manufacturing/engineering laboratories
- IT specialists from FCM
- Master of Data

Objective
- Getting to know network technologies in manufacturing and engineering laboratories

Requirements
- Basic IT knowledge

Contents
- Understanding network technologies
- Get to know hardware descriptions
- Overview about ISO/OSI model
- Get to know network protocols
- Network security at Bosch
- Get to know network relevant central directives and guidelines from Bosch
- Planning IT Security for manufacturing and engineering laboratories
- Apply central directives from IT in manufacturing and engineering laboratories
- Overview about tools for network topics, e.g., analysis, logging etc.
- Plan a manufacturing or laboratory network
- Insights to new technologies in network technology
- Create network documentation for manufacturing and engineering laboratories
- Get to know and find good practices

Equipment
No equipment is required for this course.

Note
Currently only bookable for Bosch employees.

Date (German)         Location
03/23 – 03/25/2021   Stuttgart-Feuerbach
11/16 – 11/18/2021   Stuttgart-Feuerbach

Date (english)        Location
04/13 – 04/15/2021   Stuttgart-Feuerbach
11/23 – 11/25/2021   Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 09:15 a.m. – 05:15 p.m.
Day 2-3: 08:30 a.m. – 04:30 p.m.

Net price
1,450 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-ITM010]
Internet of Things (IoT) and Cloud Computing

Internet of Things (IoT) and platforms are the fuel of digital transformation. In the interactive training “IoT & Platform Business Model Innovation”, you will learn the methods & tools to build a successful IoT-based business model.

The training course “Technical Introduction to the IoT” considers various aspects of the Internet of Things from a technical point of view. It gives an overview of new challenges and tasks for solution architects, product owners and developers.

The training “Hardware Prototyping for IoT Developers” gives participants the opportunity to build their own devices and to see different hardware products in a real-life IoT scenario. The amount of different hardware types and platforms can be overwhelming, especially when it comes to the right usage under certain constraints, such as time, money and necessary voltage. In this training, we will have a look at different devices (e.g. Raspberry Pi, Arduino, XDK, NodeMCU) and set them to the appropriate scenario for the respective constraint. A key-element of this training is the hands-on part and the construction of each participant’s own prototype by combining different devices and platforms.

There are many possibilities for the usage of Beacons within the Internet of Things (IoT) field. The training course “Entering the World of Beacons” provides technical basics, potential use cases and advantages of these compact devices. In the training process, the content will be explained and can be tried out based on an ongoing practical example. Thereby, the participants can get in touch with Beacon technology easily. The interactive format offers the opportunity to gain knowledge about a very exiting category of IoT devices. Furthermore, the training should enable the participants to realize their own ideas.

Starting i4.0
People & Change
Production & Logistics 4.0
Image Processing
Data Technology
IT Security
IoT & Cloud Computing

User groups
▶ Decision-makers and executives passionate for IoT, who want to embrace for their companies the opportunities the IoT brings
▶ Startups and founders who want to create new products & services

Objective
▶ You will be equipped with tooling to identify and sharpen opportunities for your organization
▶ You will understand the iterative process and relevant success factors for IoT & platform business model innovation
▶ You will be motivated to trigger business innovation initiatives in your company
▶ You will get in touch with experts just as passionate about IoT & platform economics as you are

Requirements
No specific knowledge is necessary.

Contents
▶ IoT and platform business models
▶ IoT Business Model Builder 2.0
▶ Innovation canvas
▶ Value proposition canvas
▶ IoT business model patterns
▶ Validation of assumptions
▶ User journey mapping
▶ IoT value network
▶ IoT solution sketch
▶ Data value assessment
▶ Business case & strategy

Equipment
No equipment is required for this course.

Date (Deutsch) Location
06/15 – 06/16/2021 Berlin
03/16 – 03/17/2021 Berlin
11/16 – 11/17/2021 Berlin

Date (English) Location
03/16 – 03/17/2021 Berlin
11/16 – 11/17/2021 Berlin

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
09:00 a.m. – 04:30 p.m.

Net price
1.400 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by IoT Academy.

Bosch.IO

Course ID: [BC-F105]
BASIC TRAINING COURSE
Technical introduction to the IoT

User groups
- IT solution architects
- Hardware and Software developers
- Hardware and Software product owners
- IT consultants
- IoT enthusiasts

Objective
After this training course, the participants will have an understanding of challenges of IoT solutions as well as have an overview of typical IoT protocols, tools and services.

Requirements
- Basic programming skills in any main programming language

Content
- IoT - A new kind of technical challenge for "internet" and "things" companies
- IoT Use Cases - Implications for Solution Architecture
- IoT Solution Architecture: Building Blocks and Patterns/Antipatterns
- Connecting Things - The Internet (of Things) protocols
- Rapid IoT Prototyping Tools
- Cloud Services for the IoT

Equipment
No equipment is required for this course.

Date (German) | Location
---|---
01/18 – 01/19/2021 | Berlin
05/03 – 05/04/2021 | Berlin
09/13 – 09/14/2021 | Berlin

Date (English) | Location
---|---
03/09 – 03/10/2021 | Berlin
07/05 – 07/06/2021 | Berlin
11/08 – 11/09/2021 | Berlin

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
09:00 a.m. – 04:30 p.m.

Net price
1.360 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by IoT Academy.

Bosch.IO

BASIC TRAINING COURSE
Hardware prototyping for IoT developers

User groups
- (IoT) developers
- IT employees
- Anybody with an interest in IoT

Objective
After this training course, participants will know different type of devices and are able to connect it in order to read sensor data.

Requirements
No specific knowledge is necessary.

Contents
- Finding an IoT use case
- Foundations of necessary electrical engineering for prototyping
- Overview of different hardware (Raspberry Pi, Arduino Uno, XDK und NodeMCU)
- Introduction to different platforms (Adafruit, Blyncl, NodeRED & Co.) for fitting scenarios
- Building a device in our own IoT assembling shop
- Usage of different digital and analog sensors and actuators
- Connecting to prototype to an IoT platform

Equipment
No equipment is required for this course.

Date (German) | Location
---|---
02/08 – 02/09/2021 | Berlin
10/25 – 10/26/2021 | Berlin

Date (English) | Location
---|---
06/07 – 06/08/2021 | Berlin
12/07 – 12/08/2021 | Berlin

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
09:00 a.m. – 04:30 p.m.

Net price
1.360 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by IoT Academy.

Bosch.IO
BASIC TRAINING COURSE

Entering the World of Beacons

User groups

▶ IT- and IoT-Enthusiasts

Objective

▶ After completion the training, the participants will be able to classify Beacons in IoT context and to map their advantages to potential use cases. Moreover, this training creates fundamentals to develop individual Beacon-projects – without the need of prior programming skills.

Requirements

No specific knowledge is necessary.

Contents

▶ Basics of Beacons within the IoT
▶ Variants of Beacons
▶ Advantages and disadvantages
▶ Use cases
▶ Basics of Bluetooth Low Energy (BLE)
▶ Practical experience: Prototyping of a Beacon solution

Equipment

No equipment is required for this course.

Date (German)  Location
03/18 – 03/19/2021  Berlin

Date (English)  Location
09/30 – 01/10/2021  Berlin

You can also arrange an individual training. For dates and prices please contact us directly.

Training times

09:00 a.m. – 04:30 p.m.

Net prices

1.360 €

Registration

Online via this link or via QR Code.

Training provider

The training is conducted by IoT Academy.

Bosch.IO

Want to become a specialist for IoT solutions?

The IoT Academy offers a wide range of trainings, workshops, and certifications for IoT solutions. More information can be found here: www.bosch-iot-academy.com

The training areas in overview

IoT Device & Connectivity

Our training courses focused on IoT devices and connectivity deal with the challenges and solutions that are connected to this area. We offer a broad spectrum of courses, where topics range from a technical introduction to specific security aspects of IoT products.

IoT Backend

Our training courses focused on the IoT Backend deal with the challenges and solutions that are connected to this area. We offer a broad spectrum of courses, where topics range from a technical introduction to specific security aspects of IoT products.

IoT Business

The Internet of Things (IoT) and platforms are driving the digital transformation. In our interactive courses taught by experts, you will learn methods for developing successful IoT-based business models.

Bosch IoT Suite

In our Bosch IoT Suite course, you will get to know each service as well as its functions and operating principles. Topics range from an overview of the basics to development of a tailored solution utilizing different pieces of hardware.

Industry 4.0

Courses in our Industry 4.0 solutions will introduce you to the relevant software program. These introductory courses are ideal for people who have little or no experience with our software. Participants learn to operate and manage Industry 4.0 solutions and to find opportunities for implementing them.
I4.0 PRODUCT-SPECIFIC

Trainings for our industry 4.0 products und solutions
Nexeed Industrial Application System

The Nexeed Industrial Application System combines many years of manufacturing experience from Bosch plants, lean principles of the Bosch Production System (BPS) and state-of-the-art technology for the digitalization of factories. Together, our solutions make day-to-day work easier for employees and optimize production and logistics processes in terms of transparency, agility, cost, quality and time.

We will offer you and your employees a brief online introduction once a month so that as many participants as possible can get an overview at the start of your digitalization project. In just two hours and without any travel expenses, you will get a compact overview of the Nexeed Industrial Application System.

In the user trainings our experienced trainers will introduce you to the functions of the Nexeed Industrial Application System in a balanced blend of theory and practice. You can test all the functions and you can try out all the administration options on test systems.

User groups
- The course is directed to all who want to catch up on the Nexeed Industrial Application System (IAS) in order to get a quick overview of its functionalities – without any travel expenses.

Objective
- Developing a basic understanding for Nexeed IAS as a whole system
- Getting to know the functions of Nexeed IAS via its web interface

Requirements
No specific knowledge is necessary.

Contents
- Nexeed IAS in the context of a modern production
- Nexeed Portal and Dashboard
- Task Tracking (Tickets, Ticket Administration and Subscriptions)
- Performance Analysis (Equipment and Condition Monitoring, Equipment Error Statistics)
- Connectivity
- Master Data Management
- Access Management
- Further functionalities depending on the software release status

Equipment
- Notebook

Date (German) Location
02/22/2021 Stuttgart-Feuerbach
05/05/2021 Stuttgart-Feuerbach
09/17/2021 Stuttgart-Feuerbach
11/12/2021 Stuttgart-Feuerbach

Date (English) Location
02/22/2021 Stuttgart-Feuerbach
05/05/2021 Stuttgart-Feuerbach
09/17/2021 Stuttgart-Feuerbach
11/12/2021 Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training duration
2 hours

Net price
190 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
BASIC TRAINING COURSE

Nexeed Industrial Application System – system operation

User groups
- The course is directed to all who want to catch up on the Nexeed Industrial Application System (IAS) in order to get an overview of its functionalities and especially its operation.

Objective
- Developing a basic understanding for Nexeed IAS as a whole system
- Getting to know the functions of Nexeed IAS via its web interface
- Using Nexeed IAS

Requirements
No specific knowledge is necessary.

Date (German) | Location
--- | ---
02/23/2021 | Stuttgart-Feuerbach
05/06/2021 | Stuttgart-Feuerbach
11/11/2021 | Stuttgart-Feuerbach

Date (English) | Location
--- | ---
09/16/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
08:30 a.m. – 12:30

Net price
390 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-IAS-USER]

Contents
- Nexeed IAS in the context of a modern production
- Nexeed Portal and Dashboard
- Task Tracking (Tickets, Ticket Administration and Subscriptions)
- Performance Analysis (Equipment and Condition Monitoring, Equipment Error Statistics)
- Connectivity
- Master Data Management
- Access Management
- Further functionalities depending on the software release status

Equipment
- Notebook

BASIC TRAINING COURSE

Nexeed Industrial Application System – system administration

User groups
- The course is directed to all who want to catch up on the Nexeed Industrial Application System (IAS) in order to get an overview of its functionalities with focus on its administration.

Objective
- Developing a basic understanding for Nexeed IAS as a whole system
- Getting to know the administrative functions of Nexeed IAS via its web interface
- Using Nexeed IAS from an administrator point of view

Requirements
- Basic knowledge of Nexeed IAS
- Recommended: Nexeed Industrial Application System – crash course online, Course ID: [BCI-SP-IAS-CC] or Nexeed Industrial Application System – system operation, Course ID: [BCI-SP-IAS-USER]

Date (German) | Location
--- | ---
02/23/2021 | Stuttgart-Feuerbach
05/06/2021 | Stuttgart-Feuerbach
11/11/2021 | Stuttgart-Feuerbach

Date (English) | Location
--- | ---
09/16/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
01:00 p.m. – 05:00 p.m.

Net price
390 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-IAS-ADMIN]
Control plus is the current control system within the Nexeed Automation platform with a modern and forward-looking architecture. It replaces the previous Control generation and is not downwards compatible.

Control plus is based on the current IEC 61131 programming standard and is available for Rexroth IndraLogic (as of Q2/19) and Beckhoff TwinCAT V3. In addition to the actual control programming, Control plus also enables the implementation of tasks from the areas of HMI, motion, robotics, safety and MATLAB.

In our training courses, you will discover the system as a whole in practical application.

You can find training courses for the Generation Control from page 122.

### Nexeed Automation – Software system Control plus

#### BASIC TRAINING COURSE

- Introduction to Nexeed Automation [BCI-SP-OP107] Page 104
- Safe machine operation [BCI-SP-OP105] Page 105
- Safe system support [BCI-SP-OP110] Page 106

#### COURSE – SPECIFIC FOR BECKHOFF TWINCAT V3

- Development of a system application with Control plus [BCI-SP-OP120] Page 108
- Integrated robotics workshop [BCI-SP-OP180] Page 116
- Integrated vision [BCI-SP-OP186] Page 117

#### COURSE – SPECIFIC FOR REXROTH INDRAMOTION

- Development of a system application with Control plus [BCI-SP-OP125] Page 110

#### ADVANCED TRAINING COURSE

- Development of objects [BCI-SP-OP150] Page 111
- Connectivity of a control system to the MES [BCI-SP-OP170] Page 112
- Connectivity of a control system to the MES with XML [BCI-SP-OP170-XML] Page 113
- Connectivity of a control system to the MES with OPC UA [BCI-SP-OP170-OPCUA] Page 113
- Safe support of the MES connection with XML [BCI-SP-OP171] Page 114
- Safe support of the MES connection with OPC UA [BCI-SP-OP172] Page 115

#### LIVE ONLINE TRAINING

- Configuration of the 3D diagnostic system Virtual Assist [BCI-SP-OP187] Page 118
- Deep dive into Control plus [BCI-SP-OP010-WN] Page 120

- Nexeed Automation – Software system Control from Page 122
- Nexeed Automation – Electrical construction from Page 126
**BASIC TRAINING COURSE**

**Introduction to Nexeed Automation**

**User groups**
- Operator
- Planner
- Administrator
- Maintenance technician
- Programmer, applicator, constructor

**Objective**
- Overview and familiarization of the Nexeed Automation control concept

**Requirements**
No specific knowledge is necessary.

**Contents**
- Introduction of the control typologies
- Overview of the areas of application and variants of the systems
- Presentation of the development process for project handling
- Overview of the control systems and control equipment
- Cost considerations
- Overview of the competence management for IT Shopfloor Solutions – Shopfloor Automation
- Introduction of the platform functionalities, such as PLC, MATLAB/Simulink, Motion

**Equipment**
No equipment is required for this course.

**Date and prices**
1 day inhouse or in the BCI Training Center in Feuerbach. We would be happy to prepare an individual quote for you.

**Registration / Contact**
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center.

Course ID: [BCI-SP-OP107]

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**BASIC TRAINING COURSE**

**Safe machine operation**

**User groups**
- Operator
- Also open to maintenance technicians

**Objective**
- Familiarization with the hardware and its operation

**Requirements**
No specific knowledge is necessary.

**Contents**
- Hardware introduction
- HMI tree structure
- Manual mode, automatic mode and individual station mode
- Maintenance and diagnostics
- Event Management

**Equipment**
No equipment is required for this course.

**Date and prices**
This training course is arranged according to the customer’s wishes and can optionally also be held on-site. Dates and prices after arrangement.

**Length**
This is a half-day course. Course can be held in the morning or in the afternoon or twice a day, so that early shift and late shift are enabled to participate.

**Registration / Contact**
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center.

Course ID: [BCI-SP-OP105]
User groups
- Maintenance technician, service team, electrician / technician

Objective
- Maintenance and error analysis of an Control plus-Station
- Familiarization with the bus design and hardware
- Diagnostics with the Control plus Visualization and the TwinCAT3 system manager
- Connect notebook with target systems

Requirements
- Basic technical training, basic electrical knowledge and PC & EDV knowledge

Contents
- Familiarization with the fundamental concepts
- Operation of the HMI
- Initial commissioning
- Installing an existing application
- Exercises with the training model
- Activate and modify bus configuration
- Diagnostics and error analysis in soft- and hardware
- Diagnostics and measurement possibilities when using field bus gateways (e.g. Profibus)
  - Operating principle of Master, Slave Profibus
  - Diagnostics via the visualization and the TwinCAT3 system manager
  - Measurement possibilities in a Profibus field bus
- Handling and working with OES/TC3

Equipment
- Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher – software has to be installed before training begins
- Administrator rights
- TCP/IP network services installed
- Visual Studio is installed during the training course

Date (German) | Location
--- | ---
02/01 – 02/05/2021 | Stuttgart-Feuerbach
10/04 – 10/08/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 11:30 a.m. – 04:30 p.m.
Day 2-4: 08:30 a.m. – 04:30 p.m.
Day 5: 08:30 a.m. - 12:00 p.m.

Net price
1,950 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

LEVEL 1
Basic training course for programming of a system with OES 4.

LEVEL 2
Advanced programming
Requirements: Programming experience with Control plus.

SPECIAL KNOW-HOW
Specific functionalities.
- Integrated vision*
- Integrated robotics*
- Connectivity of a control system to the MES
- Configuration of the 3D diagnostic system Virtual Assist

Start with the basic course on "Developing a system application" and gradually expand your knowledge about Nexeed Automation in the advanced courses.

*on the basis of software TwinCAT V3 Beckhoff
COURSE – SPECIFIC FOR BECKHOFF TWINCAT V3
Development of a system application with Control plus

User groups
▶ PLC programmer
▶ Service team with advanced programming skills

Objective
▶ Commissioning, error analysis and programming of a system with OES 4 and TwinCAT3 according to IEC 61131-3

Requirements
▶ Basic knowledge of the control technology
▶ Basic programming skills ST/AS

Contents
▶ Introduction of the IEC 61131-3 and the programming system TwinCAT3
▶ Logical links, program organization units
▶ Step sequences, library administration, structures and variables
▶ Communication connection, target systems
▶ Key points are the utilized IEC programming languages ST (structured text) and AS (sequence language)
▶ Familiarization with the fundamental concepts of Control plus
▶ Structuring of system software
▶ Using finished objects from the object database
▶ Preparing process sequences and manual functions
▶ Configuring the visualization
▶ Integration of data administration
▶ Insert the message system and user administration
▶ Exercises with the training model

Equipment
▶ Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher – software has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed
▶ Visual Studio is installed during the training course

Note
Setting up virtual machines is not supported during the training.

Particularity for online course
▶ Equipment
▶ Stable internet connection, headset, 2nd monitor to display the virtual training station
▶ Important about the online course
▶ Participants and trainer meet in an online session
▶ Blended learning with a mixture of presentation, instruction, group work and exercises
▶ Group work in a virtual room
▶ Exercises with local TwinCAT runtime and virtual training station

Presece course

<table>
<thead>
<tr>
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<td>04/19 – 04/30/2021</td>
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<td>10/11 – 10/22/2021</td>
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<td>11/29 – 12/10/2021</td>
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<th>Date (englisch)</th>
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<td>03/08 – 03/19/2021</td>
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<td>09/20 – 10/01/2021</td>
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<td>11/08 – 11/19/2021</td>
<td>Stuttgart-Feuerbach</td>
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</tbody>
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You can also arrange an individual training. For dates and prices please contact us directly.

Net price
4.450 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Online course

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<th>Date (German)</th>
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<tr>
<td>09/20 – 10/01/2021</td>
<td>Stuttgart-Feuerbach</td>
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</tbody>
</table>

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 11:30 a.m. – 04:30 p.m.
Day 2-9: 08:30 a.m. – 04:30 p.m.
Day 10: 08:30 a.m. – 01:00 p.m.

Net price
3.550 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
User groups
▶ PLC programmer

Objective
▶ Commissioning, error analysis and programming of a system with OES 4 and IndraWorks according to IEC 61131-3

Requirements
▶ Basic knowledge of the control technology

Contents
▶ Introduction of the IEC 61131-3 and the programming system IndraWorks
▶ Logical links, program organization units
▶ Step sequences, library administration, structures and variables
▶ Communication connection, target systems
▶ Key points are the utilized IEC programming languages ST (structured text) and AS (sequence language)
▶ Familiarization with the fundamental concepts
▶ Structuring of system software
▶ Using finished objects from the object database
▶ Preparing process sequences and manual functions
▶ Configuring the visualization
▶ Integration of data administration
▶ Insert the message system and user administration
▶ Exercises with the training model

Note
Setting up virtual machines is not supported during the training.

Date (German) Location
01/18 – 01/29/2021 Stuttgart-Feuerbach

Date (englisch) Location
07/19 – 07/30/2021 Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 11:30 a.m. – 04:30 p.m.
Day 2-9: 08:30 a.m. – 04:30 p.m.
Day 10: 08:30 a.m. – 01:00 p.m.

Net price
4,450 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP125]

User groups
▶ Experienced Control plus applicator

Objective
▶ Fundamental knowledge in the creation of Control plus objects
▶ Deep dive into Control plus framework

Requirements
▶ Basic training course: Development of a system application, Course ID: [BCI-SP-OP120]
▶ Programming experience with Control plus applications

Contents
▶ Introduction of the encapsulation of software modules
▶ Specialization in object-oriented programming
▶ Design and range of functions
▶ Encapsulation of a functional unit in a new object
▶ Following topics are deepened:
  ▶ Introduction of the encapsulation of Software
  ▶ Design and range of functions of an object
  ▶ Encapsulation of functional units in a new object
▶ Preparation and integration of additional object contents:
  ▶ PLC library
  ▶ Object visualization
  ▶ Event texts
  ▶ Manual functions
  ▶ Sequences
  ▶ Templates
  ▶ Documentation
▶ Preparation of description files for use of the prepared object in OES4
▶ Programming of the object interface to the peripherals (e.g. EtherCAT)

Equipment
▶ Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, currently released TwinCAT version and Control plus Studio (OES) version – software has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed

Date (German) Location
03/24 – 03/31/2021 Stuttgart-Feuerbach
09/22 – 09/29/2021 Stuttgart-Feuerbach

Date (englisch) Location
05/05 – 05/12/2021 Stuttgart-Feuerbach
10/11 – 11/17/2021 Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 09:15 a.m. – 04:30 p.m.
Day 2-5: 08:30 a.m. – 04:30 p.m.
Day 6: 08:30 a.m. – 02:00 p.m.

Net price
2,950 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP150]
ADVANCED TRAINING COURSE
Connectivity of a control system to the MES

User groups
▶ PLC programmer
▶ Applicator

Objective
▶ The participant is able to connect a Control plus system to Nexeed MES

Requirements
▶ Basic training course: Development of a system application, Course ID: [BCI-SP-OP120]

Contents
▶ Overview of the relationship between system and Nexeed MES
▶ Possibilities for connection to Nexeed MES
▶ Connectivity of a training system to the Nexeed MES with XML
▶ Introduction into the technique of XML communication and engineering workflow
▶ Including of XML telegrams
▶ Error analysis and diagnostic possibilities (telegrams to Nexeed MES server)
▶ Show typical pitfalls
▶ Connectivity of a training system to the Nexeed MES with OPC UA
▶ Introduction into the technique of OPC UA and engineering workflow
▶ Including of OPC UA objects
▶ Commissioning
▶ Error analysis and diagnostic tools (UA Client, PIT, telegrams to Nexeed MES server)
▶ Show typical pitfalls
▶ Implement security of OPC UA server

Equipment
▶ Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, currently released TwinCAT version and Control plus Studio (OES) version – software has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed

Date (German) | Location
--- | ---
02/22 – 02/26/2021 | Stuttgart-Feuerbach
10/25 – 10/29/2021 | Stuttgart-Feuerbach

Date (englisch) | Location
--- | ---
06/21 – 06/25/2021 | Stuttgart-Feuerbach
11/22 – 11/26/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 11:00 a.m. – 04:30 p.m.
Tag 2-4: 08:30 a.m. – 04:30 p.m.
Day 5: 08:30 a.m. – 02:00 p.m.

Net price
1.950 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP170]

Connectivity of a control system to the MES with XML

Date (German) | Location
--- | ---
02/22 – 02/24/2021 | Stuttgart-Feuerbach
10/25 – 10/27/2021 | Stuttgart-Feuerbach

Date (englisch) | Location
--- | ---
06/21 – 06/23/2021 | Stuttgart-Feuerbach
11/22 – 11/24/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 11:00 a.m. – 04:30 p.m.
Day 2: 08:30 a.m. – 04:30 p.m.
Day 3: 08:30 a.m. – 12:00 p.m.

Net price
1.150 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP170-OPCUA]

Connectivity of a control system to the MES with OPC UA

Date (German) | Location
--- | ---
02/24 – 02/26/2021 | Stuttgart-Feuerbach
10/27 – 10/29/2021 | Stuttgart-Feuerbach

Date (englisch) | Location
--- | ---
06/23 – 06/25/2021 | Stuttgart-Feuerbach
11/24 – 11/26/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 01:00 p.m. – 04:30 p.m.
Day 2: 08:30 a.m. – 04:30 p.m.
Day 3: 08:30 a.m. – 02:00 p.m.

Net price
1.150 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP170-XML]
ADVANCED TRAINING COURSE
Safe support of the MES connection with XML

User groups
▶ Maintenance technicians
▶ Applicator

Objective
▶ The participant understands the data exchange via XML between station and Nexeed MES, and is able to diagnose and solve problems

Requirements
▶ Basic training course: Safe system support, Course ID: [BCI-SP-OP110] or
▶ Basic training course: Development of a system application, Course ID: [BCI-SP-OP120]

Contents
▶ Short introduction to MES
▶ Introduction into the technique of XML and Engineering Workflow
▶ Explanation of DDL connection
▶ XML telegram structure between PLC and MES
▶ Explanation of different OES events
▶ Setup events
▶ Parts required events
▶ Changeover events
▶ Data events
▶ Processing events
▶ Error analysis and troubleshooting with the training model
▶ Typical pitfalls

Equipment
▶ Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, currently released TwinCAT version and Control plus Studio (OES) version – software has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed

Dates, Location and Prices
1 day inhouse or in the BCI Training Center in Feuerbach.
We would be happy to prepare an individual quote for you.

Registration
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address:
BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP171]
**COURSE BASED ON THE SOFTWARE TWINCAT**

**Integrated robotics workshop**

**User groups**
- PLC programmer
- Applicator

**Objective**
- Programming and error analysis of a robot with integrated robotics objects for OES4 and TwinCAT3 according to IEC 61131-3

**Requirements**
- Basic training course: Development of a system application, Course ID: [BCI-SP-OP120]

**Contents**
- Integration of robot object and periphery
- Configuration options at HMI level
- Create and execution of point lists
- Create a coordination system
- Create palettes and use palette features
- Commands of objects
- Programming exercises with the robotic object (pick & place, palletising, stacking etc.)
- Recovery of the system

**Equipment**
- Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, currently released TwinCAT version and Control plus Studio (OES) version – software has to be installed before training begins
- Administrator rights
- TCP/IP network services installed

**Date (German) | Location**
03/17 – 03/18/2021 | Stuttgart-Feuerbach
06/15 – 06/16/2021 | Stuttgart-Feuerbach
10/12 – 10/13/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

**Training times**
Day 1: 09:15 a.m. – 05:15 p.m.
Day 2: 08:30 a.m. – 04:30 p.m.

**Net price**
1.150 €

**Registration**
Online via this [link](#) or via QR Code.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center

**Bosch Connected Industry**

**Course ID: [BCI-SP-OP180]**

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**COURSE BASED ON THE SOFTWARE TWINCAT**

**Integrated vision**

**User groups**
- Machine Vision application programmer (day 1)
- PLC application programmer (day 2)

**Objective**
- Machine Vision application programmers can deploy a HALCON solution with Integrated Vision and connect it to a Control plus PLC application.
- PLC application programmers can set up communication and visualization with an Integrated Vision solution in a Control plus PLC application.

**Requirements**
- Machine Vision application programmers: Knowledge about the Image Processing Software HALCON
- PLC application programmers: Basic training course: Development of a system application, Course ID: [BCI-SP-OP120]

**Contents**
- Structure of HDE2
- Structuring of the image processing solutions
- Definition of data structures and visualization
- Commissioning, basic setup and diagnosis
- Implementation resp. integration and testing of the image processing solution

**Equipment**
- Notebook running Windows 10 (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, currently released TwinCAT version and Control plus Studio (OES) version – software has to be installed before training begins
- Administrator rights
- TCP/IP network services installed

**Date (German) | Location**
02/18 – 02/19/2021 | Stuttgart-Feuerbach
06/17 – 06/18/2021 | Stuttgart-Feuerbach
10/14 – 10/15/2021 | Stuttgart-Feuerbach

Day 1 for machine vision application programmers
Day 2 for PLC application programmers
Can be booked individually or together

You can also arrange an individual training. For dates and prices please contact us directly.

**Training times**
09:15 a.m. – 05:15 p.m.

**Net price**
650 € (1 day) / 1.150 € (both days)

**Registration**
Online via this [link](#) or via QR Code.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center

**Bosch Connected Industry**

**Course ID: [BCI-SP-OP186]**

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LIVE ONLINE TRAINING

Configuration of the 3D diagnostic system Virtual Assist

User groups
▶ Applicator

Objective
▶ Participants have the skills to use and to configure the VirtualAssist for a machine.

Requirements
▶ Basic knowledge of the control technology
▶ Recommended: Basic training course: Development of a system application, Course ID: [BCI-SP-OP120]

Contents
▶ Opportunities and usage of the 3D-visualisation Virtual Assist
▶ Introduction to Unity3D
▶ Requirements for 3D models
▶ Configuration of Virtual Assist
▶ Prepare target system (SPS and HMI)
▶ Start-up of VirtualAssist
▶ Outlook for augmented reality glasses (HoloLens)

Equipment
▶ Notebook running Windows 7 Professional SP1 or higher (64-bit), graphic card with DX9 (Shadermodell 3.0) or DX11 with Feature-Level 9.3-skills
▶ Administrator rights
▶ Unity (Pro-Version) is installed during the training.

Date (German)     Location
02/11/2021         Online
08/11/2021         Online

Date (english)     Location
05/11/2021         Online
11/11/2021         Online

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
09:00 a.m. – 12:00 p.m.

Net price
This webinar is for free

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-OP187]

You would like to focus on your specific requirements? We create tailor-made trainings and workshops for you.

Individual offers for Nexeed Automation

Our offer
▶ Analysis of requirements and objective definition
▶ Elaboration of the training contents
▶ Performance of an Inhouse Training with individual dates
▶ Optional bookable: Individual courses on-site

Examples for topics
▶ Machine update on the latest OES4 version
▶ Support by commissioning on-site
▶ and many more

Your benefits
▶ Flexible scheduling and duration of the training
▶ Individual and tailor-made contents for your application
▶ Learning on-site in your own work environment

Contact us
Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743. We will be pleased to advice you and to create an individual offer.

Training provider
This training is conducted by Bosch Connected Industry Training.

Bosch Connected Industry
LIVE ONLINE TRAINING
Deep dive into Control plus

User groups
- PLC programmer

Objective
- The participants receive answers on questions which arise whilst the regular handling with Control plus and experience how Control plus can be used more efficiently.

Requirements
- Basic training course: Development of a system application, Course-ID: [BCI-SP-OP120]
- Experienced in programming with Control plus-applications

Procedure
1. Registered yourself online for the desired topic
2. The Webinar is held per Skype. You get the invitation for the Skype date two days in advance.
3. The Skype session starts with a keynote
4. Short discussion afterwards

Note
The maximum number of participants is 15 persons.

Price
The Skype Sessions are free of charge.

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-OP10-WN]

Subjects and dates in overview

Deep Dive #1
Design user interaction in the HMI well
We show how to design a well user-centered user interaction in the HMI (human user interface).

Date 05/28/2021, 10:00 - 11:00 a.m.

Deep Dive #2
Optimal use of cycle time recording of machines
We show how to reach great benefits for machine users by using the new functions of Cycle Time Assist.

Date 09/09/2021, 10:00 - 11:00 a.m.

Deep Dive #3
Efficient implementation of machine sequences
We show how to implement typical machine process requirements in step sequences in an efficient way.

Date 11/10/2021, 10:00 - 11:00 a.m.
Nexeed Automation – Software system Control

The system generation Control utilizes structured programming and reuse of software modules. The system is based on the IEC 61131 tool IndraLogic V1 by Rexroth.

The system control is not developed further and is only suited for the modernization of existing systems. In the event of new constructions, the successor system Control plus is used. Training for the software system Control plus can be found on pp 101.

In our training courses, you will learn the system as a whole in practical application.

### BASIC TRAINING COURSE

**IndraLogic version 1**

- User groups
  - Maintenance technicians
  - Programmer
- **Objective**
  - Familiarization with the programming tool IndraLogic
  - Introduction of PLC programming according to IEC 61131-3
- **Requirements**
  - Basic knowledge of the control technology
- **Contents**
  - Introduction of IEC 61131-3 and the programming system IndraLogic
  - Learning the functions and tools for commissioning
  - Logical links, program organization units
  - Step sequences, library administration, structures and indicators
  - Communication connection, target systems
  - Exercises and troubleshooting
  - Key points are the IEC programming languages ST (structured text) and AS (sequence language)
  - Use of Nexeed Automation programming guidelines
  - Exercises on a small control system and a machine model
- **Equipment**
  - Notebook running Windows 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher,.NET Framework 4.5.2 or higher, no Rexroth IndraWorks with Logic – software has to be installed before training begins
  - Administrator rights
  - TCP/IP network services installed
- **Date (German) Location**
  - 02/02 – 02/04/2021 Stuttgart-Feuerbach
  - 09/21 – 09/23/2021 Stuttgart-Feuerbach
- **Date (english) Location**
  - 03/02 – 03/04/2021 Stuttgart-Feuerbach
  - 10/19 – 10/21/2021 Stuttgart-Feuerbach
- **You can also arrange an individual training. For dates and prices please contact us directly.**

### ADVANCED TRAINING COURSE

- **IndraLogic version 1**
  - [BCI-SP-OP001] Page 123
- **Development of a system application**
  - [BCI-SP-OP015-MAP] Page 124
- **Advanced system application**
  - [BCI-SP-OP015-AP] Page 125

Bosch Connected Industry Training Center.

**Course ID:** [BCI-SP-OP001]

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**Nexeed IAS**
**Nexeed Automation**
**Nexeed MES**
**Open Core Engineering**
**Connected Hydraulics**
**IndraMotion MTX**
**ActiveCockpit**
**IoT Gateway**
**Bosch IoT Suite**
**APAS**
BASIC TRAINING COURSE

Development of a system application

User groups
- Maintenance technician
- Programmers

Objective
- Commissioning, error analysis and programming of a control system

Requirements
- Safe handling of the elements of the IEC 61131-3 and the programming tool IndraLogic or
- Basic training course: IndraLogic version 1, Course ID [BCI-SP-OP001]

Contents
General
- System design/architecture
- Installing a target system
- Field bus configuration
- Project administration on the development system
- Error analysis, troubleshooting on the training system

Control technology
- Libraries
- Software structure BaseStation
- Programming of step sequences for automatic and special operation
- Use of the development tool OES (OPCON Engineering System), IndraLogic, AtmoScan, OPCONStudio

Visualization
- Function
- Diagnostics

Configuration / parameterization
- Structure and syntax of the configuration files
- Dynamic windows (user images)

Equipment
- Notebook running Windows 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher,
  .NET Framework 4.5.2 or higher, no Rexroth IndraWorks with Logic – software has to be
  installed before training begins
- Administrator rights
- TCP/IP network services installed
- Recommended: Drives "W, X" available (are required as virtual drives for the active station)

<table>
<thead>
<tr>
<th>Date (German)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/08 – 02/12/2021</td>
<td>Stuttgart-Feuerbach</td>
</tr>
<tr>
<td>09/27 – 10/01/2021</td>
<td>Stuttgart-Feuerbach</td>
</tr>
</tbody>
</table>

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 09:15 a.m. – 04:30 p.m.
Day 2-4: 08:30 a.m. – 04:30 p.m.
Day 5: 08:30 a.m. – 01:00 p.m.

Net price
2.150 €

Registration
Online via this link or via QR Code.

ADVANCED TRAINING COURSE

Advanced system application

User groups
- Programmer

Objective
- Extended use of the visualization and its components, the data administration and the file handler

Requirements
- Basic training course: IndraLogic version 1, Course ID [BCI-SP-OP001]
- Basic training course: Development of system application, Course ID: [BCI-SP-OP015-MAP]

Contents
Visualization
- Introduction of the VEP30 image structure and the HMICompact image management
- Image administration on the storage medium of the development computer (XML, INC and other files)
- Installation of own menu structures
- Working with the SMART editor
- Compiling own user images (smart forms)
- Communication between user image and BaseStation (data access to the PLC)
- Image control from the PLC program
- Dialogs and input masks
- User administration
- Message and diagnostic system

Data administration
- Overview of the data administration (result, station and type data)
- Safety mechanisms in the station (security)
- Familiarization with the tools and interfaces for the accessing of data (data editor)
- Examples and exercises

File handler
- Function of the file handler

Equipment
- Notebook running Windows 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher,
  .NET Framework 4.5.2 or higher, no Rexroth IndraWorks with Logic – software has to be
  installed before training begins
- Administrator rights
- TCP/IP network services installed
- Recommended: Drives “W, X” available (are required as virtual drives for the active station)

Date, location and price
4,5 days inhouse or in the Bosch Connected Industry Training Center in Feuerbach.
We would be happy to prepare an individual offer for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-OP015-AP]
Nexeed Automation – Electrical construction

Electrical construction, which is based on EPLAN P8, is a fixed part of the automation platform Nexeed Automation. The efficient engineering workflow in mechanical engineering is supported by a closed tool chain and data transfer between electrical construction and programming. The EPLAN construction procedure is oriented on a modular design principle and is supported by guidelines, basic wiring diagrams as well as re-usable wiring diagram macros.

A good and complete construction in this system provides important data for the downstream project phases and serves as a basis for programming.

The training enables participants to perform electrical construction for Nexeed Automation independently.

BASIC TRAINING COURSE
EPLAN application in system applications

User groups
- Constructor

Objective
- Use of the ECAE system EPLAN as a central tool in the electrical construction
- Working methods and interface concepts of the areas electrical construction and programming

Requirements
- Knowledge of EPLAN P8

Contents
- Device tags
  - Structure of device tags
  - Specifications
  - Examples
- Structure of wiring diagrams
  - Page structure
  - Definition of cables, clamps and connectors
  - PLC presentation
  - Analysis
- Nexeed Automation interface for programming
  - Functioning
  - Installation on laptop
- Creating macros for the Nexeed Automation interface
  - Macro-structure
  - Parameter settings

Equipment
- Laptop with Eplan P8 Version 2.7

Date (German) | Location
--- | ---
02/25/2021 | Stuttgart-Feuerbach
10/21/2021 | Stuttgart-Feuerbach
05/20/2021 | Stuttgart-Feuerbach
12/02/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
10:00 a.m. – 04:00 p.m.

Net price
690 €

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-OP073]
In the context of Industry 4.0, the control of production using a Manufacturing Execution System (MES) is one of the main topics. This is because transparency in real-time forms the basis for successful optimization, planning and control of production. The modular highly scalable Nexeed MES delivers precisely the information that companies require for active control, complete documentation, traceability, quality assurance and monitoring of their entire manufacturing operations. The goal is to continuously optimize processes, to react quickly to changes and thus to increase production efficiency.

Nexeed MES offers a wide spectrum of functions for the following Nexeed MES modules, which are oriented towards the VDI Standard 5600:

- Information management
- Quality management & traceability
- Planning and process control
- Production and machine data acquisition
- Material management
- Operating equipment management
- Shop floor integration

In our training courses, you receive practical insight into our Nexeed MES functionalities. For example, we explain how to establish lean process sequences and how to plan and control the shop floor more efficiently.

You will be introduced to the use of Nexeed MES and discover, how it can guarantee your quality in production, how cycle times can be reduced and much more.

Didn’t find the right training course? Contact us. We offer MES coaching and tailor-made training courses that are customized for your needs and requirements.

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**BASIC TRAINING COURSE**

<table>
<thead>
<tr>
<th>COURSE ID</th>
<th>COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>[BCI-SP-MES-INTRO]</td>
<td>Nexeed Manufacturing Execution System – An Introduction</td>
</tr>
<tr>
<td>[BCI-SP-MES-NET10]</td>
<td>Connected Manufacturing – The path of data from the machine to its visualization</td>
</tr>
<tr>
<td>[BCI-SP-MES-PDA10]</td>
<td>Shiftbook usage and analysis of production and machine data</td>
</tr>
<tr>
<td>[BCI-SP-MES-QD10]</td>
<td>Quality Data – analysis, verification and tracing</td>
</tr>
<tr>
<td>[BCI-SP-MES-DDL10]</td>
<td>DirectDataLink – Connecting machines to Nexeed MES</td>
</tr>
<tr>
<td>[BCI-SP-MES-LC10]</td>
<td>LineControl</td>
</tr>
<tr>
<td>[BCI-SP-MES-CMC10]</td>
<td>Installation and configuration of ConditionMonitoring (CMControl)</td>
</tr>
<tr>
<td>[BCI-SP-MES-MSS10]</td>
<td>Working with the MaintenanceSupportSystem (MSS) tablet and smartphone app</td>
</tr>
</tbody>
</table>

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**ADVANCED TRAINING COURSE**

<table>
<thead>
<tr>
<th>COURSE ID</th>
<th>COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>[BCI-SP-MES-PDA50]</td>
<td>Configuration of production and machine data and administration of the shiftbook</td>
</tr>
</tbody>
</table>

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**WORKSHOP | COACHING**

<table>
<thead>
<tr>
<th>COURSE ID</th>
<th>COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>[BCI-SP-MES-PDA60]</td>
<td>Consulting Workshop for the shiftbook and PDA/MDA</td>
</tr>
</tbody>
</table>
BASIC TRAINING COURSE

Nexeed Manufacturing Execution System – An Introduction

User groups
- The course is directed to all who should become familiar with Nexeed MES and its scope of functions. The course is designed for participants with little or no previous knowledge.

Objective
- Introducing to the Nexeed MES in a practice-oriented manner
- Developing a basic understanding for Nexeed MES as a whole system
- Familiarizing with different functions in a theoretical and practical way

Requirements
No specific knowledge is necessary.

Contents
- Definition of the term MES
- Explanation of the benefits of Nexeed MES
- Theoretical and practical basics of Nexeed MES
- Introduction to basic functions of Nexeed MES and, in part, its operation

Equipment
- Notebook

Date (German) Location
02/01 – 02/03/2021 Stuttgart-Feuerbach
05/10 – 05/12/2021 Stuttgart-Feuerbach
09/13 – 09/15/2021 Stuttgart-Feuerbach
11/08 – 11/10/2021 Stuttgart-Feuerbach

Date (English) Location
04/07 – 04/09/2021 Stuttgart-Feuerbach
09/27 – 09/29/2021 Stuttgart-Feuerbach

Training times
Day 1: 01:00 p.m. – 04:30 p.m.
Day 2: 08:30 a.m. – 04:30 p.m.
Day 3: 08:30 a.m. – 12:00

Net price
1.150 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-MES-INTRO]

BASIC TRAINING COURSE

Connected Manufacturing – The path of data from the machine to its visualization

User groups
- The course is directed to all who want to understand the topic of connected manufacturing in an end-to-end scope from the production machine over the network towards the Manufacturing Execution System (MES). The course is designed to give insights into configuration topics of selected use cases with the help of digital training models, also for persons with little or no previous knowledge.

Objective
- Developing a basic understanding for connected manufacturing as a whole (eco-)system and in the context of the various persons and roles involved into its processes
- Familiarizing with different configuration applications and programs used for connecting the production in a use case based manner
- Configuring a complete use case and further advanced examples
- Familiarizing with troubleshooting approaches

Requirements
No specific knowledge is necessary.

Contents
- Overview of Nexeed MES
- Structure of a modern production from a data technical point of view
- The physical data network of a production
- Roles and responsibilities on the path to a connected production
- Focus on the manufacturing station (specification, basics of programming, PLC programming tools and applications, communication and connectivity of a station)
- Focus on the Manufacturing Execution System (specification, architecture, machine interface configuration, visualization possibilities)

Equipment
- Notebook

Date (German) Location
05/17 – 05/21/2021 Stuttgart-Feuerbach
11/15 – 11/19/2021 Stuttgart-Feuerbach

Date (English) Location
05/17 – 05/21/2021 Stuttgart-Feuerbach
11/15 – 11/19/2021 Stuttgart-Feuerbach

Training times
Day 1: 10:00 a.m. – 05:00 p.m.
Day 2-4: 08:30 a.m. – 04:30 p.m.
Day 5: 08:30 a.m. – 01:00 p.m.

Net price
2.490 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-MES-NET10]
**BASIC TRAINING COURSE**

**Shiftbook usage and analysis of production and machine data**

**User groups**
- The course is directed to all who need to understand and to operate the shiftbook and PDA/MDA reports - with focus on full functionality.

**Objective**
- Getting to know and using the functions of the shiftbook within the production
- Getting to know and using the OIS.NET Webportal for the PDA/MDA module

**Requirements**
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]

**Contents**
- Management and administration of the shiftbook (e.g. target values, type groups, shift models, downtime causes)
- Functionalities of shift planning (e.g. planned downtimes, special shifts, cancellation of shifts, assigning shift models, administration of the number of workers)
- Functionalities of team leaders (e.g. unplanned downtimes, tracking of hourly part count, manual part count input, shift finalize)
- Usage of the PDA/MDA module within the OIS.NET Webportal
- Creation of the daily shopfloor Management Cycle reports
- Overview of further PDA/MDA tools

**Equipment**
- Notebook

**Date (German) Location**
- 02/10 – 02/12/2021 Stuttgart-Feuerbach
- 09/29 – 10/01/2021 Stuttgart-Feuerbach

**Training times**
- Day 1: 01:00 p.m. – 04:30 p.m.
- Day 2: 08:30 a.m. – 04:30 p.m.
- Day 3: 08:30 a.m. – 12:00

**Net price**
- 1.150 €

**Registration**
- Online via this link or via QR Code.

**Training provider**
- The training is conducted by Bosch Connected Industry Training Center.
- Bosch Connected Industry

**Course ID:** [BCI-SP-MES-PDA10]

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**ADVANCED TRAINING COURSE**

**Configuration of production and machine data and administration of the shiftbook**

**User groups**
- The course is directed to all who need to modify configuration parameters of shiftbook and PDA/MDA.

**Objective**
- Introducing the administrative functions of the PDA/MDA module in the OIS.NET Webportal
- Configuring of the PDA/MDA module
- Managing and administrating the shiftbook

**Requirements**
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]
- Basic knowledge of PDA/MDA and shiftbook
- Recommended: Shiftbook usage and analysis of production and machine data, Course ID: [BCI-SP-MES-PDA10]

**Contents**
- Authorization management in the OIS.NET Webportal
- Administration of OIS.NET Webportal
- Parameter configuration of PDA/MDA and shiftbook via OIS admin client
- Parameter configuration of shiftbook by configuration files and publishing the shiftbook via MES installer
- Creation of automatically generated reports

**Equipment**
- Notebook

**Date, location and price**
- 1 day inhouse or in the Bosch Connected Industry Training Center in Feuerbach.
- We would be happy to prepare an individual offer for you.

**Registration / Contact**
- Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

**Training provider**
- The training is conducted by Bosch Connected Industry Training Center.
- Bosch Connected Industry

**Course ID:** [BCI-SP-MES-PDA10]
WORKSHOP | COACHING
Consulting workshop for the shiftbook and PDA/MDA

User groups
The course is directed to all who already use shiftbook and PDA/MDA reports on site.

Objective
Analyzing and optimizing the work with the shiftbook and PDA/MDA and clarifying unresolved questions about the shiftbook and PDA/MDA.

Requirements
Participants already work with the shiftbook
Recommended: Shiftbook usage and analysis of production and machine data, Course ID: [BCI-SP-MES-PDA10] and if applicable Configuration of production and machine data and administration of the shiftbook Course ID: [BCI-SP-MES-PDA50]

Contents
Analysis of the work with the shiftbook and PDA/MDA reports on site
Advice for the functionalities and usage of the shiftbook and PDA/MDA, based on the analysis
Explain the configuration options and variances on shiftbook
Focus on the use cases and needs of the participants

Equipment
Notebook or PC’s on site

Hints
If necessary, first questions about the usage of PDA/MDA and the shiftbook can be collected in advance (via e-mail, Skype or on site). The preparation helps during the workshop to cater even better to the use cases.

Agenda
Preliminary talk with the participants (identify current knowledge status, catch up, adjust content): 2 hrs. via Skype
Workshop: 1 day on site

Date and price
Dates can be arranged individually.
We would be happy to prepare an individual offer for you!

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-MES-PDA60]

Hints
The course is directed to all who already use shiftbook and PDA/MDA reports on site.

Objective
Analyzing and optimizing the work with the shiftbook and PDA/MDA in the plant

Requirements
Participants already work with the shiftbook

Contents
Analysis of the work with the shiftbook and PDA/MDA reports on site
Advice for the functionalities and usage of the shiftbook and PDA/MDA, based on the analysis

Equipment
Notebook or PC’s on site

Hints
If necessary, first questions about the usage of PDA/MDA and the shiftbook can be collected in advance (via e-mail, Skype or on site). The preparation helps during the workshop to cater even better to the use cases.

Agenda
Preliminary talk with the participants (identify current knowledge status, catch up, adjust content): 2 hrs. via Skype
Workshop: 1 day on site

Date and price
Dates can be arranged individually.
We would be happy to prepare an individual offer for you!

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry

Course ID: [BCI-SP-MES-PDA60]
### BASIC TRAINING COURSE

#### DirectDataLink – Connecting machines to Nexeed MES

**User groups**
- The course is directed to all who want to get an initial insight into the topic of connecting machines to Nexeed MES - with focus on configuration of Nexeed MES OSS via OPCON XML communication protocol.

**Objective**
- Understanding of the DirectDataLink (DDL) service
- Configuring of the DirectDataLink (DDL) service via the Nexeed MES OSS with a focus on the OPCON XML communication module
- Configuring and testing of events with the XML CommTester

**Requirements**
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]
- Preferred: Knowledge of automation and control technology

**Contents**
- DirectDataLink concept and Nexeed MES OSS components (communication modules, processing modules and internal services)
- Nexeed MES OSS installation
- DirectDataLink events
- Configuration of various events with Nexeed MES OSS (OPCON XML)
- Writing and reading DAT files
- Testing the configured events via XML CommTester on an MES test server
- Template PdaMda
- IdBuilder concept and configuration

**Equipment**
- Notebook with administrator rights

**Date (German) | Location**

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**Date (English) | Location**

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**Net price**
990 €

**Registration**
Online via this [link](#) or via QR Code.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center.

### BASIC TRAINING COURSE

#### LineControl

**User groups**
- The course is directed to all who need to administrate and to configure the Nexeed MES components for LineControl.

**Objective**
- Configuring of LineControl, including vMDT
- Creating route lists
- Understanding fundamental concepts for ensuring the process sequence during production and the blocking concept within Nexeed MES
- Being aware of the expanded options for using LineControl, such as distribution control, supermarket and time-based process monitoring

**Requirements**
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]
- Basic knowledge of DirectDataLink and Nexeed MES OSS
- Recommended: DirectDataLink – Connecting machines to Nexeed MES, Course ID: [BCI-SP-MES-DDL10]
- Preferred: Knowledge of automation and control technology

**Contents**
- Basic configuration of LineControl (incl. vMDT)
- Basic functions of LineControl (incl. vMDT): Topology modeling for a production line, Process chain definition, Route list creation, Evaluation of report and station information, Processing routing requests, Interface management

**Equipment**
- Notebook with administrator rights
- Current version Nexeed MES OSS

**Date (German) | Location**

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**Date (English) | Location**

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**Net price**
990 €

**Registration**
Online via this [link](#) or via QR Code.

**Training provider**
The training is conducted by Bosch Connected Industry Training Center.
BASIC TRAINING COURSE
Installation and configuration of ConditionMonitoring (CMControl)

User groups
- The course is directed to all who need to install and to configure ConditionMonitoring - with focus on installation and setup in an own environment.

Objective
- Introducing to the added value of Condition Monitoring in production
- Introducing to ConditionMonitoring’s scope of functions
- Installing and configuring of Condition Monitoring

Requirements
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]
- Basic knowledge of DirectDataLink and Nexeed MES OSS
- Recommended: DirectDataLink – Connecting machines to Nexeed MES, Course ID: [BCI-SP-MES-DDL10]

Contents
- Basic knowledge
- Architecture
- Visualization
- Installation
- Insights into the database schema
- Configuration of limits and threshold values
- Configuration of alarms
- Connectivity via DirectDataLink
- Connecting to MaintenanceSupportSystem

Equipment
- Notebook with administrator rights
- Current version Oracle VM VirtualBox

Date, location and price
1 day inhouse or in the Bosch Connected Industry Training Center in Feuerbach. We would be happy to prepare an individual offer for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center/
Bosch Connected Industry

Course ID: [BCI-SP-MES-CMC10]

BASIC TRAINING COURSE
Working with the OrderManagement and ProductSetupManagement clients

User groups
- The course is directed to all who need to operate with the OrderManagement and ProductSetupManagement clients.

Objective
- Introducing to the basic functionalities of the following Nexeed MES products:
  - OrderManagement
  - ProductSetupManagement
- Using the functionalities based upon practical examples

Requirements
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]

Contents
OrderManagement
- Management of orders (creating, pausing, deleting)
- Station-specific count (station counter)
- Management of individual orders
- Analysis via OIS.NET Webportal

ProductSetupManagement
- Management of product setups
- Management of custom building plans line product setups

Equipment
- Notebook

Date, location and price
1 day inhouse or in the Bosch Connected Industry Training Center in Feuerbach. We would be happy to prepare an individual offer for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center/
Bosch Connected Industry

Course ID: [BCI-SP-MES-OM10]

Course ID: [BCI-SP-MES-DDL10]
BASIC TRAINING COURSE

Working with the Maintenance Support System (MSS) tablet and smartphone app

User groups
- The course is directed to all who need to operate the Nexeed MSS apps (tablet and/or smartphone).

Objective
- Using the applications for Nexeed Maintenance Support System (MSS) in basic functionality on tablets as well as smartphones
- Creating notifications
- Processing of single operations within a service order
- Reserving components, requesting the inventory and location information of spare parts

Requirements
- Basic knowledge of Nexeed MES
- Recommended: Nexeed Manufacturing Execution System – An Introduction, Course ID: [BCI-SP-MES-INTRO]

Contents
- Usage of the Tablet and Smartphone app
- Main functions of planned and unplanned maintenance
  - Creating notifications
  - Processing of service orders
  - Adding operations to service orders and their processing
  - Reserving components
  - Confirmation of service orders
- Display of machine-relevant documents
- Spare parts management

Equipment
- Notebook or tablet with Windows operating system
- Smartphone with MSW access

Date, location and price
1 day inhouse or in the Bosch Connected Industry Training Center in Feuerbach. We would be happy to prepare an individual offer for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
Course ID: [BCI-SP-MES-MSS10]

Individual offers for Nexeed MES

Our offer
- Analysis of requirements and objective definition
- Elaboration of the training contents
- Conduct of an inhouse training with individual dates
- Optional bookable: Individual courses on-site

Examples for topics
- Nexeed MES training for administration staff
- Key user training
- etc.

Your benefits
- Flexible scheduling and duration of the training
- Individual and tailor-made contents for your application
- Learning onsite in your own work environment

Qualification is the basis for a successful implementation of MES. We develop individual MES training concepts – focusing on the Nexeed MES solution in your location.

Contact us
Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743. We will be pleased to advice you and to create an individual offer.

Training provider
This training is conducted by Bosch Connected Industry Training.

Bosch Connected Industry
Open Core Engineering

Open Core Engineering combines classic automation with the possibilities of modern high-level language-based applications and IT-based technologies. For the first time, the previously separate worlds of PLC and IT automation are ideally joined in an integrated engineering portfolio. If you want to know what is behind it and understand the advantages it offers, this training course is right for you.

The course "Introduction to Open Core Interface" provides an overview of the possible applications of the Open Core Interface (OCI). The course delves into the subject by using simple exercises with Microsoft Office Tools based on VBA. The exercises will be completed with real training devices (IndraLogic XLC/IndraMotion MLC). In the course "Windows Programming with Open Core Interface", you will learn how to program Windows applications based on the Open Core Interface (OCI). After an overview of the possibilities of the Open Core Interface, you will use practical programming examples to independently work out the core steps for using the OCI in Windows. All exercises will be completed with real training devices (IndraLogic XLC/IndraMotion MLC). The Visual Studio projects created during the exercises can also be reproduced after the course with Visual Studio Express.

Open Core Engineering

User groups
- Technical decision-makers
- Technical sales representatives
- Technical managers

Objective
- Knowing the background of Open Core Engineering
- Being able to classify the Open Core Interface into Open Core Engineering
- Recognizing potential application
- Being able to distinguish between various application areas

Requirements
- Interest in Open Core Engineering and the Open Core Interface

Contents
- What is Open Core Engineering? What is the Open Core Interface (OCI)?
- How does Open Core fit into Industry 4.0?
- What are the competitive advantages?
- Practical presentation
- Using smart devices
  - Using smart devices
  - OCI in IT automation
  - Rapid Control Prototyping
  - Individual functions

Equipment
No equipment is required for this course.

Dates, Location and Prices
2 days inhouse or in the Bosch Rexroth Academy in Würzburg.
We would be happy to prepare an individual quote for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: training@boschrexroth.de, or give us a call +49 9352 18 19 20.

Training provider
The training is conducted by Bosch Rexroth Academy.
BASIC TRAINING COURSE
Introduction to Open Core Interface

User groups
▶ Technicians and engineers in the project planning and servicing areas
▶ Planner/applicator

Objective
▶ Recognizing the possible uses of OCI
▶ Being able to read diagnostic information, parameters, etc. using Excel

Requirements
▶ Basic programming knowledge
▶ Knowledge of IndraLogic XLC or IndraMotion MLC
▶ Experience with Microsoft Office Tools

Contents
▶ Overview of OCI
▶ Installing SDK
▶ OCI documentation
▶ Using OCI in Excel

Equipment
No equipment is required for this course.

Dates, Location and Prices
2 days inhouse or in the Bosch Rexroth Academy in Erbach.
We would be happy to prepare an individual quote for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: training@boschrexroth.de, or give us a call +49 9352 18 19 20.

Bosch Rexroth

BASIC TRAINING COURSE
Windows programming with Open Core Interface

User groups
▶ Technicians and engineers in the project planning and application areas
▶ Planner/applicator

Objective
▶ Participants are able to create their own OCI-based Windows programs in C# in order to, e.g., record diagnostic information, command axes or create their own HMI applications.

Requirements
▶ Knowledge of the C# programming language
▶ Knowledge of IndraLogic XLC or IndraMotion MLC

Contents
▶ Introduction to the toolbox
▶ Installing SDK
▶ Overview of OCI
▶ Overview of OCI
▶ Existing libraries
▶ OCI documentation
▶ OCI user management
▶ Programming examples in C# and programming exercises

Equipment
No equipment is required for this course.

Dates, Location and Prices
2 days inhouse or in the Bosch Rexroth Academy in Erbach.
We would be happy to prepare an individual quote for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: training@boschrexroth.de, or give us a call +49 9352 18 19 20.

Bosch Rexroth

Course ID: [EST-XLC-MLC-OCI-EASY]
The interaction and connection of hydraulic systems and components with electrical and digital systems have long become industry standard.

The result is an almost inexhaustible "intelligent" toolkit for realizing application-specific, smart hydraulic systems. Ultra-modern asynchronous motors, servo synchronous motors and servo torque motors, flexible and compact frequency converters, controller systems, bus systems, sensor technology, servo drives, interface systems, software, and more bring classical hydraulics to a new league. Parameterization, communication, multi-functionality, visualization, diagnostics, etc. are becoming the standard in hydraulic systems.

In this practice-oriented training "Commissioning CytroPac", the small compact unit "CytroPac" with "Multi-Ethernet" connection to higher management communication levels is the focus. The emphasis is on the communication with higher control systems.

The practical training of "Motion Control for Hydraulics – Programming the VT-HMC Motion Controller" is intended for automation specialists and programmers who use the VT-HMC hydraulic motion controller by Rexroth. This training shows how to work with the programming environment of the motion controller. Within the scope of practical exercises, you will program motion sequences in Indra-Works based on the standard IEC 61131-3.

### User groups
- Hydraulic technicians
- Operators
- Service technicians
- Planner/applicator
- Trainer

### Objective
- Receive an overview of the components, modules and systems for the electrification of the hydraulics / hydraulic systems
- Receive an overview of the software, bus systems, interfaces for the digitalization of the hydraulics / hydraulic systems
- Deepen one's understanding of parameterization and dialog communication with practical examples
- Overview of upcoming integration possibilities for further electrification and digitization of hydraulic systems

### Requirements
- Participation in the HTG/eHTG and EHG training sessions or comparable knowledge

### Contents
- Intelligent pressure supply aggregates
  - Rexroth CytroPac
- Learning the structure, function, electrical connection and shortening, configuration, parameterization and commissioning using practical exercises
- Hydraulic linear drive / axis controller (Rexroth IAC / HMC) with valve and sensor technology
- Position control with practical exercises
- Basic knowledge of bus technology
- Industrial Ethernet bus, iO-link valves and sensors, practical exercises
- Basic knowledge of sensor technology
- Overview of sensor technology and typical application examples

### Equipment
- No equipment is required for this course.

### Date (German) Location
- 02/22 – 02/24/2021 Würzburg
- 09/27 – 09/29/2021 Ulm
- 11/29 – 12/01/2021 Ulm

### Training times
- Day 1: 10:00 a.m. – 04:30 p.m.
- Day 2: 08:00 a.m. – 04:30 p.m.
- Day 3: 08:00 a.m. – 02:30 p.m.

### Net price
- 1.353 €

### Registration
- Online via this link or via QR Code.

### Training provider
- The training is conducted by Bosch Rexroth Academy.
BASIC TRAINING COURSE

Commissioning CytroPac

User groups
▶ Hydraulic technicians
▶ Service technicians
▶ Operators
▶ Planners / application engineers

Objective
▶ Overview structure and function CytroPac
▶ Connections, power, cooling, accessories
▶ Documentation (RD51055, RD51055-B)
▶ Media: Rexroth ICS, AB WIKI
▶ Commissioning CytroPac
▶ Connect correctly, configuration, start system, optimize system

Requirements
▶ Completion of the HTG/eHTG training course or comparable knowledge

Contents
▶ Basics of a variable speed drive
▶ Parameter structure EFC5610
▶ CytroPac-specific settings
▶ System limits
▶ Integration via bus technology
▶ Configuration via "IndraWorks Ds"
▶ Troubleshooting

Equipment
No equipment is required for this course.

Date (German)   Location
02/25 – 02/26/2021 Würzburg
05/31 – 06/01/2021 Würzburg
12/02 – 12/03/2021 Würzburg

Date (English)   Location
08/12 – 08/13/2021 Ulm

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 10:00 a.m. – 04:15 p.m.
Day 2: 08:00 a.m. – 03:00 p.m.

Net price
897 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth

Course ID: [HTP-CytroPac]
**BASIC TRAINING COURSE**

**Best-in-class hydraulic controller**

VT-HMC/IAC Multi-Ethernet

**User groups**
- Maintenance technician
- Programmer
- Planner/applicator
- Trainer

**Objective**
- Knowing the structure and use of IAC Multi-Ethernet valves and the VT-HMC motion controller
- Understanding the procedure for commissioning the products
- Being able to set and optimize parameters for the best-in-class controller
- Understanding the Multi-Ethernet interface
- Being able to set up communication with a higher control system
- Being able to back up and restore data

**Requirements**
- Participants with no previous knowledge of hydraulic are required to complete the HTG training course or the eHTG eLearning course. A further prerequisite is the DCA_eT_Regelung eTraining course.

**Contents**
- Hardware and software properties of the IAC Multi-Ethernet valves and the VT-HMC motion controller
- Structure and initial commissioning of a hydraulic axis on the training system with the IAC Multi-Ethernet valve or the VT-HMC motion controller
- Carrying out axis motions in position control and pressure/force control and using the substitutional closed-loop control
- Being able to optimize the axis controller
- VT-HMC: Parametrization synchronism
- Understanding the procedure for commissioning the products
- Structure of communication with a higher control system via PROFINET.RT

**Equipment**
No equipment is required for this course.

**Date (German) Location**
- 03/29 – 03/31/2021 Würzburg
- 10/25 – 10/27/2021 Würzburg

**Date (English) Location**
- 09/13 – 09/15/2021 Würzburg

You can also arrange an individual training. For dates and prices please contact us directly.

**Training times**
- Day 1: 10:00 a.m. – 04:30 p.m.
- Day 2-3: 08:00 a.m. – 04:30 p.m.

**Net price**
1.538 €

**Registration**
Online via this link or via QR Code.

**Training provider**
The training is conducted by Bosch Rexroth Academy.

**Course ID:** [HTP-IAC-HMC]

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**BASIC TRAINING COURSE**

Motion Control for hydraulics – programming the VT-HMC motion controller

**User groups**
- Maintenance technician
- Programmer
- Planner/applicator
- Leader

**Objective**
- Knowing the structure and use of the VT-HMC motion controller
- Being able to program motion sequences
- Being able to back up and restore data

**Requirements**
- This training builds on the HTP-IAC-HMC training. Completion of this training is therefore an essential requirement.
- Participation with no programming knowledge is recommended and the eESTG eLearning course should be completed in advance.

**Contents**
- Parameterizing the system with IndraWorks MLD
- The programming environment of the motion controller
- Programming motion sequences using IEC 61131-3
- Carrying out axis motions in position control and pressure/force control as well as with the substitutional closed-loop control
- Backing up data and replacing components with the VT-HMC system

**Equipment**
No equipment is required for this course.

**Dates, Location and Prices**
2 days inhouse or in the Bosch Rexroth Academy. We would be happy to prepare an individual quote for you.

**Registration / Contact**
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: training@boschrexroth.de, or give us a call +49 9352 18 19 20.

**Training provider**
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth

**Course ID:** [HTP-HMC-Prog]
Participants will become familiar with the functions of the MTX Efficiency Workbench. This training not only deals with the cycle time analyzer to optimize the cycle time and productivity, but also focuses on the functions for optimizing the media consumption.

**User groups**
- Planner
- Applicator
- Maintenance technician

**Objective**
- Knowing the advantages and application possibilities of the MTX Efficiency Workbench for cycle time and energy optimization
- Being able to commission the software
- Being able to optimize the cycle time and media consumption using EWB

**Requirements**
- Basic knowledge of control technology
- Completion of the EST-MTX-BedProg training or comparable knowledge

**Contents**
- Concept of the MTX Efficiency Workbench
- Overview and explanation of the individual analysis functions
- Commissioning the MTX Efficiency Workbench
- Performing a recording
- Analysis and interpretation of a recording to optimize the cycle time
- Analysis and interpretation of a recording to analyze the media consumption
- Practical sample applications

**Equipment**
No equipment is required for this course.

**Dates, Location and Prices**
3 days inhouse or in the Bosch Rexroth Academy in Erbach.
We would be happy to prepare an individual quote for you.

**Registration / Contact**
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following email address: training@boschrexroth.de, or give us a call +49 9352 18 19 20.

**Training provider**
The training is conducted by Bosch Rexroth Academy.

**Bosch Rexroth**

**Course ID:** [EST-MTX-EWB]
As an interactive communication platform ActiveCockpit processes and visualizes production data in real time. ActiveCockpit connects IT applications such as production planning, quality data management and e-mailing with the software functionality of machines and plants. The information is the basis for decisions and process improvements.

Learn more about ActiveCockpit in the training “Visualization of Manufacturing Data in Real Time and Assistance System for Manual Assembly”. Insights into the ActiveAssist assistance system for varied assembly round off this training.

### Basic Training Course

**Visualization of manufacturing data in real time and assistance system for manual assembly**

<table>
<thead>
<tr>
<th>User groups</th>
<th>Date (German)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>◀ Sales engineers</td>
<td>02/08/2021</td>
<td>Stuttgart-Bad Cannstatt</td>
</tr>
<tr>
<td>◀ Project engineers</td>
<td>10/28/2021</td>
<td>Stuttgart-Bad Cannstatt</td>
</tr>
<tr>
<td>◀ Production engineers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>◀ Users of ActiveCockpit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>◀ Planner/applicator</td>
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</tr>
</tbody>
</table>

**Objective**

- Familiarity with the basic concepts of Industry 4.0
- Knowing the potential uses and functionality of ActiveCockpit
- Recognizing the possible use of assistance system
- Gaining insight into the uses and applications of Industry 4.0 in assembly technology

**Requirements**

No specific knowledge is necessary.

**Contents**

- The principles of Industry 4.0
- The ActiveCockpit interactive communication
- PlatformField of use for ActiveAssist assistance system

**Equipment**

No equipment is required for this course.

**Date (English) Location**

<table>
<thead>
<tr>
<th>Date (english)</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/08/2021</td>
<td>Stuttgart-Bad Cannstatt</td>
</tr>
</tbody>
</table>

You can also arrange an individual training. For dates and prices please contact us directly.

**Training times**

09:00 a.m. – 05:00 p.m.

**Net price**

495 €

**Registration**

Online via this link or via QR Code.

**Training provider**

The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth

Course ID: [MOT-Prod-i4.0]
In this training course, you will learn how to configure IoT Gateway and IoT Insights as well as how to implement sensor technology and controls quickly and easily.

Further topics are the connection to systems such as Cloud services, databases or MES, the recognition of use cases and user benefits as well as the implementation of solutions.

User groups
- Service technicians
- Programmers
- Planners/application engineers
- Managers

Objective
- Configuring and commissioning IoT Gateway and IoT Insight independently
- Integrating sensor technology and the user-specific Insights configuration quickly
- Recognizing use cases independently and implementing the application

Requirement
No specific knowledge is necessary.

Contents
- Hardware and interfaces of the IoT Gateways
- Connection of the sensor technology
- Configuration and function of IoT Insights
- Analysis and assessment of signals, threshold values and warnings
- Possible applications and getting to know the customer value

Equipment
No equipment is required for this course.

Dates, Location and Prices
2 days inhouse or in the Bosch Rexroth Academy in Lohr am Main. We would be happy to prepare an individual quote for you.

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: training@boschrexroth.de, or give us a call +49 9352 18 19 20.

Training provider
The training is conducted by Bosch Rexroth Academy.

Bosch Rexroth

Course ID: [EST-IoT-Gateway]
Bosch IoT Suite

The training course “Introduction to the Bosch IoT Suite” provides participants with an overview of the possible uses of the Bosch IoT Suite and the interaction between individual services. A practical example will demonstrate the benefits of the software to participants.

The “Developing Solutions with the Bosch IoT Suite” training course gives a deeper technical understanding of the Bosch IoT Suite services. The purpose and use cases of the service packages and single services are introduced and discussed. Furthermore, the most important APIs and user interfaces will be explained and used. In a comprehensive exercise, participants will try out the interaction of the services while developing their first IoT application.

For this, participants will use common prototyping IDEs and will develop several small microservices based on the Bosch IoT Suite APIs. Ranging from a history persistence layer to a simple web UI, the exercises show how to leverage the Bosch IoT Suite services to develop typical building blocks of an IoT solution.

User groups
▶ IT employees
▶ Business analysts
▶ Consultants
▶ Employees from business departments with an affinity for IT

Objective
▶ After this training course, the participants will be familiar with the services of the Bosch IoT Suite and understand how they can be used in combination.

Requirements
No specific knowledge is necessary.

Contents
▶ Overview of the Bosch IoT Cloud
▶ Overview of the services of the Bosch IoT Suite
▶ Architecture of the Bosch IoT Suite
▶ Applications and use cases
▶ Interaction between the different services of the Bosch IoT Suite
▶ Practical example

Equipment
No equipment is required for this course.

Date (German) | Location
--- | ---
01/20/2021 | Berlin
05/05/2021 | Berlin
09/15/2021 | Berlin

Date (english) | Location
--- | ---
03/11/2021 | Berlin
07/07/2021 | Berlin
11/10/2021 | Berlin

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
09:00 a.m. – 04:30 p.m.

Net price
680 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by IoT Academy.

Bosch.IO

Course ID: [SI-F103]
BASIC TRAINING COURSE

Developing Solutions with the Bosch IoT Suite

User groups
▶ IT employees
▶ IT consultants
▶ Solution architects
▶ Developers

Objective
▶ After this training course, the participants will be familiar with the services of the Bosch IoT Suite and understand how they can develop own solutions using them.

Requirements
▶ Basic knowledge of Apache Maven, JavaScript and advanced Java skills

Contents
▶ Introduction to the Bosch IoT Suite services and their concepts
▶ Connecting devices to the cloud with the Bosch IoT Hub
▶ Device interaction and abstraction with Bosch IoT Things
▶ Integration of external Identity providers
▶ Data aggregation and evaluation with Bosch IoT Insights
▶ Software updates with Bosch IoT Rollouts
▶ Device and gateway management with the Bosch IoT Remote Manager
▶ Bosch IoT Gateway Software for indirectly connected devices
▶ Introduction to all essential APIs of the Bosch IoT Suite
▶ Describing device semantics with Eclipse Vorto
▶ Developing a first IoT application with the Bosch IoT Suite

Equipment
No equipment is required for this course.

Date (German) | Location
--- | ---
01/20 – 01/22/2021 | Berlin
05/05 – 05/07/2021 | Berlin
09/15 – 09/17/2021 | Berlin

Date (English) | Location
--- | ---
03/15 – 03/17/2021 | Berlin
07/07 – 07/09/2021 | Berlin
11/10 – 11/12/2021 | Berlin

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
09:00 a.m. – 04:30 p.m.

Net price
2.040 €

Registration
Online via this [link] or via QR Code.

Training provider
The training is conducted by IoT Academy.

Bosch.IO

Course ID: [SI-B102]
The APAS assistant mobile is a collaborative, flexible, and mobile robot for the Smart Factory. It can be used independent of location and can adapt to different tasks. The intelligent robot system is primarily intended for end users, who require a fast and budget-priced realization of new operations, as well as a highly robust, easy-to-handle and intuitively controllable system.

The APAS assistant inline is a kinematic robot without safety fence designed for human-robot collaboration in the Smart Factory. As automation component, it is suited for plant installation or expansion. It is thus primarily designed for system integrators and mechanical engineers, who wish to extend their scope of solutions through collaborative robotics without having to forego the familiar construction and programming environment.

The system is available in two different variants: with a KUKA and a Fanuc basis. Task-oriented and user-specific trainings are provided for both variants.

In our training sessions, you will become as an expert familiar with all the functions in detail and learn how to configure them.

**APAS assistant mobile**

<table>
<thead>
<tr>
<th>BASIC TRAINING COURSE</th>
<th>COURSE ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe handling</td>
<td>[BCI-SP-AP011] Page 164</td>
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<table>
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<tr>
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<tr>
<td>Troubleshooting and fault removal</td>
<td>[BCI-SP-AP012] Page 166</td>
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<tr>
<td>Maintenance of the sensor skin</td>
<td>[BCI-SP-AP015] Page 167</td>
</tr>
<tr>
<td>Preparation of working plans</td>
<td>[BCI-SP-AP018] Page 168</td>
</tr>
</tbody>
</table>

**APAS assistant inline Fanuc F7-R911**

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<thead>
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</thead>
<tbody>
<tr>
<td>Safe handling</td>
<td>[BCI-SP-AP021] Page 165</td>
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<td>[BCI-SP-AP015] Page 167</td>
</tr>
<tr>
<td>Preparation of working plans</td>
<td>[BCI-SP-AP028] Page 169</td>
</tr>
<tr>
<td>Integration of projects</td>
<td>[BCI-SP-AP027] Page 170</td>
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</table>

**APAS assistant inline kuka k10-R1100**

<table>
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<tr>
<td>Safe handling</td>
<td>[BCI-SP-AP031] Page 165</td>
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<td>[BCI-SP-AP015] Page 167</td>
</tr>
<tr>
<td>Preparation of working plans</td>
<td>[BCI-SP-AP038] Page 169</td>
</tr>
<tr>
<td>Integration of projects</td>
<td>[BCI-SP-AP037] Page 170</td>
</tr>
</tbody>
</table>
BASIC TRAINING COURSE

Safe handling

User groups
- Operator
- Maintenance technician
- Applicator

Objective
- Understanding and safe operation of the APAS assistant mobile
- First steps of the troubleshooting process

Requirements
No specific knowledge is necessary.

Contents
- Familiarization with the flexible production assistant APAS assistant from the APAS family and obtaining of the basic knowledge of an operator
- Start / stop the unit
- Start / stop / switch the working plan
- Clear the robot
- Handling error messages
- First steps of the troubleshooting process
- Bypass safety technology
- Understanding diagnostic displays
- Practical training

Equipment
No equipment is required for this course.

Note
This course is available for the following options:
- APAS assistant mobile, Course ID: [BCI-SP-AP011]
- APAS assistant inline Fanuc F7-R911, Course ID: [BCI-SP-AP021]
- APAS assistant inline kuka k10-R1100, Course ID: [BCI-SP-AP031]

APAS assistant mobile

<table>
<thead>
<tr>
<th>Date (German)</th>
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<tbody>
<tr>
<td>02/02 – 02/03/2021</td>
<td>Stuttgart-Feuerbach</td>
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<tr>
<td>06/29 – 06/30/2021</td>
<td>Stuttgart-Feuerbach</td>
</tr>
<tr>
<td>11/09 – 11/10/2021</td>
<td>Stuttgart-Feuerbach</td>
</tr>
</tbody>
</table>

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
Day 1: 01:00 p.m. - 04:30 p.m.
Day 2: 08:30 a.m. – 04:30 p.m.

Net price
1.150 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP011]

APAS assistant inline Fanuc F7-R911

Dates and prices
On request

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP021]

APAS assistant inline kuka k10-R1100

Dates and prices
On request

Registration / Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP031]
ADVANCED TRAINING COURSE
Troubleshooting and fault removal

User groups
▶ Maintenance technician

Objective
▶ Safe performance of maintenance work for the APAS assistant mobile
▶ Recognition and correction of faults

Requirements
▶ Basic training course: Safe handling, Course ID: [BCI-SP-AP011]
▶ Technical vocational training
▶ “EuP” certificate − Electro-technically instructed person

Contents
▶ Regular maintenance activities
▶ Software backup
▶ Remote access
▶ Fault detection and correction

Equipment
No equipment is required for this course.

Date (German) | Location
---|---
03/17/2021 | Stuttgart-Feuerbach
10/13/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
08:30 a.m. – 04:30 p.m.

Net price
850 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP012]

ADVANCED TRAINING COURSE
Maintenance of the sensor skin

User groups
▶ Maintenance technician

Objective
▶ Recognition and correction of faults in the sensor skin of the APAS assistant mobile

Requirements
▶ Basic training course: Safe handling, Course ID: [BCI-SP-AP011]
▶ Technical vocational training
▶ “EuP” certificate − Electro-technically instructed person

Contents
▶ Safety specifications for the operation of the sensor skin
▶ Disassembly and assembly of the sensor skin
▶ Design and function
▶ Fault detection and correction

Equipment
No equipment is required for this course.

Note
The signature of a declaration of commitment on the adherence of the safety regulations is required in order to obtain the certificate.

Date (German) | Location
---|---
03/18/2021 | Stuttgart-Feuerbach
10/14/2021 | Stuttgart-Feuerbach

You can also arrange an individual training. For dates and prices please contact us directly.

Training times
08:30 a.m. – 04:30 p.m.

Net price
850 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP015]
ADVANCED TRAINING COURSE
Preparation of working plans

User groups
▶ Applicator

Objective
▶ Creating of own applications for the
  APAS assistant mobile/ APAS assistant inline

Requirements
▶ Basic training course: Safe handling,
  ▶ Course ID: [BCI-SP-AP011]

Contents
▶ Preparation of working plan components
▶ Teaching the reference position
▶ Pick & place without vision
▶ Pick & place with vision
▶ Pick & place with vision and pallet
▶ Handshake of inputs/outputs
▶ Practical exercises

Equipment
▶ Notebook running Windows 7 Professional SP1
  or higher (64-bit), Internet Explorer 8 or higher,
  .NET Framework 4.5.2 or higher – software
  has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed

Note
This course is available for the following options:
▶ APAS assistant mobil, Course ID: [BCI-SP-AP011]
▶ APAS assistant inline Fanuc F7-R911, Course
  ID: [BCI-SP-AP021]
▶ APAS assistant inline kuka k10-R1100, Course
  ID: [BCI-SP-AP031]

APAS assistant mobile

<table>
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<tr>
<td>07/06 – 07/08/2021</td>
<td>Stuttgart-Feuerbach</td>
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<tr>
<td>11/16 – 11/18/2021</td>
<td>Stuttgart-Feuerbach</td>
</tr>
</tbody>
</table>

You can also arrange an individual training. For
dates and prices please contact us directly.

Training times
Day 1-2: 08:30 a.m. – 04:30 p.m.
Day 3: 08:30 a.m. - 12:00 p.m.

Net price
2.450 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected
Industry Training Center

Bosch Connected Industry

APAS assistant inline

Fanuc F7-R911

Dates and prices
On request

Registration / Contact
Do you have questions about the training or do
you want to arrange an appointment? Please con-
tact us via the following e-mail address:
BCI.Training@bosch.com, or give us a call
+49 711 811 40743.

Training provider
The training is conducted by Bosch Connected
Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP028]

APAS assistant inline

kuka k10-R1100

Dates and prices
On request

Registration / Contact
Do you have questions about the training or do
you want to arrange an appointment? Please con-
tact us via the following e-mail address:
BCI.Training@bosch.com, or give us a call
+49 711 811 40743.

Training provider
The training is conducted by Bosch Connected
Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP038]

You can also arrange an individual training. For
dates and prices please contact us directly.

Training times
Day 1-2: 08:30 a.m. – 04:30 p.m.
Day 3: 08:30 a.m. - 12:00 p.m.

Net price
2.450 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Bosch Connected
Industry Training Center

Bosch Connected Industry

Course ID: [BCI-SP-AP028]
ADVANCED TRAINING COURSE
Integration in projects

User groups
▶ Applicator
▶ Project Manager

Objective
▶ Introduction of the system architecture to integrate the APAS in line in projects

Requirement
▶ Basic training course: Safe handling
▶ Course ID: [BCI-SP-AP021] / [BCI-SP-AP031]
▶ Technical education

Contents
▶ Detailed introduction of the system architecture
▶ Control cabinet – Concept
▶ Safety-Concept
▶ Control system concept
▶ Discussion based on sample projects
▶ Approach for a reachability analysis and maximum weight calculation with simulation tools
▶ Approach to estimate the cycle time

Equipment
No equipment is required for this course.

Note
This course is available for the following options:
▶ APAS assistant inline Fanuc F7-R911,
▶ Course ID: [BCI-SP-AP021]
▶ APAS assistant inline kuka k10-R1100,
▶ Course ID: [BCI-SP-AP031]

APAS assistant inline Fanuc F7-R911

Dates, Location and Prices
1 day in the Bosch Connected Industry Training Center in Feuerbach.
We would be happy to prepare an individual quote for you.

APAS assistant inline kuka k10-R1100

Dates, Location and Prices
1 day in the Bosch Connected Industry Training Center in Feuerbach.
We would be happy to prepare an individual quote for you.

Interested in robotics?
The Bosch Connected Industry Training Center offers courses for Stäubli robotics too. In the training courses you will be introduced to the programming language VAL3 and learn the handling of this robot with the use of practice-relevant exercises.

The Stäubli courses in overview

Basic training course
Safe operation and teaching
▶ User group: Operator
▶ Date, Location and Price: On request
▶ Course ID: [BCI-SP-OP080-OT]

Basic training course VAL3
▶ User group: Programmer
▶ Date, Location and Price: On request
▶ Course ID: [BCI-SP-OP080-P]

Basic training course
Advanced programming VAL3
▶ User group: Programmer
▶ Date, Location and Price: On request
▶ Course ID: [BCI-SP-OP080-AP]

Registration
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: BCI.Training@bosch.com, or give us a call +49 711 811 40743.

Training provider
The training is conducted by Bosch Connected Industry Training Center.

Bosch Connected Industry
I4.0 TRAINING SYSTEMS
A whole Industry 4.0 factory in miniature
The mMS 4.0 training system – a complete Industry 4.0 system in miniature. The system addresses a real-life cube assembly, from the removal out of a rack to processing with a pressing machine and through to storage in the high-bay storage. Assembled from standard components, completely interconnected, programmable and extensively secured, the system can be complemented by further cells, for instance with a 6-axis robot. The entire system or individual stations are shipped fully assembled, installed, and programmed. You can get started right away. Special Industry 4.0 device sets with training exercises are added to the system, thus showing the transition to the Industry 4.0 world with a strong practical touch.
### I4.0 TRAINING SYSTEMS

#### The training system mMS 4.0

**Cyber-physical system**

Functional adaptations to the manufacturing process are made via smart devices, data capturing and fault diagnostics in real-time. Solutions can be simulated and then seamlessly implemented into the production line – without physical adjustments.

**Connectivity**

PLC control units can communicate with almost any programs and other participants via the all-round Open Core interface. For example, for controlling a 6 axis robot with the Rexroth PLC.

**New configuration in production**

Thanks to vertical data flow the operating times are maximized. Newly-configured data, such as parts lists, are transferred to each level in the corporate structure. The MES-system monitors and controls.

**Cloud engineering**

Cloud platforms collect and store process data. The cloud provides engineering data whenever a module is accessed. With mMS 4.0, for example, maintenance instructions or the stock status can be sent all over the world via the cloud.

**Smart workstations**

The operators are detected, and there is an automatic adaptation of the workplace preferences, such as language or workplace height. In addition, there is simple and individually adaptable worker guidance in real-time.

**RFID in production**

Industry 4.0 products carry an RFID tag that tells each manufacturing station precisely what is to be done – decentralized and autonomously. This includes, for instance, data for documentation, material or quality control. The data is then accessed via a smart device.

**Bosch Rexroth Academy:**

Discover training, media and training systems for Industry 4.0.

www.boschrexroth.de/training/industrie-4-0

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You can see here our video about the training system mMs 4.0: https://www.youtube.com/watch?v=CI3hgJX7sFU

Scan the QR codes for explanatory videos
The training contents: a sophisticated concept, suitable for all fields of education – and a training system that will grow with the requirements. Using the mMS 4.0 training system as an example, you can see the applications in the different educational fields. A flexible system that grows with your needs.

### Vocational education
- Exercises for training to become a mechatronics engineer
- Getting started in robotics programming
- Understanding safety technology

### Getting started with Industry 4.0
- Using tablets and smartphones in an industrial environment
- Learning about integrated augmented reality
- Applying apps for status information and error recognition
- Operating the system (production line and robots) using apps via OCE (Open Core Engineering)
- Identifying opportunities for the use of RFID in manufacturing
- Customization of manual workstations using RFID or other identification possibilities
- Understanding an industrial plant (from production to the MES and ERP systems)
- Understanding horizontal and vertical communication
- Installing, setting up and implementing communication via open standards
- Understanding approaches to distributed intelligence and analyzing communication between systems
- And many more Industry 4.0 topics

### Skill development / Further education
- A general understanding of mechatronics, automation and manufacturing processes
- Advanced programming of robots
- Integration of safety technology

### Industry 4.0
- Rexroth Open Core Engineering (OCE): How to transfer data directly from a controller to an analysis software program without the use of a PLC program
- Receiving and storing data from the machine by means of the PLC, especially with OCE
- Using Big data to collect, analyze and display information (e.g. energy efficiency of a machine), for example via NodeRed on a HTML page.
- Setting up and understanding predictive maintenance
- Setting up and understanding automatic service alerts
- Integration of RFID-assisted manufacturing
- Integration of an MES or ERP system
- And many more Industry 4.0 topics

### Polytechnics / Universities
- A general understanding of mechatronics, automation and manufacturing processes
- iPlanning and implementation of machine communication vertically and horizontally using open standards
- Setting up of systems with decentralized controls and integration into an overall system
- Implementation of self diagnostics in decentralized machines, as well as the transfer of this status in connected systems

### Educational information
- Teachers and trainers receive additional information and teaching material for their lessons in the Learning World of the Bosch Rexroth Academy.
- After activating the free account, you will find an additional menu item “LernWorld for teachers and trainers” in the respective technologies, hydraulics, pneumatics and automation.

### Contact
Do you have questions about the training or do you want to arrange an appointment? Please contact us via the following e-mail address: training@boschrexroth.de, or give us a call: +49 9352 18 19 20.