Training and Consulting
Connected Industry
Program 2020
Foreword

The digitization of production and logistics is progressing rapidly. Apart from processes and procedures in factories and warehouses, the tasks of employees are also changing. In principle, this is not a new development. What is new, however, is the speed at which changes occur and become necessary. This makes qualification the decisive success factor for Industry 4.0.

Companies who want to keep up with these developments are well advised to involve employees in digitization projects right from the start and to offer them new opportunities to acquire skills. The German Bitkom study ‘Education for the Digital Workplace’ shows that companies are moving in the right direction: for example, 99 percent of the companies surveyed believe that lifelong learning is becoming increasingly important, and 63 percent are already training their employees in digital skills.

Nevertheless, there is still a high need for qualification in manufacturing and logistics – for example in IT security, in dealing with new software systems, in building up process knowledge or in process design. Digitization will only bring the promised gain in efficiency when this potential is fully exploited. For employees, this means both a noticeable work facilitation and long-term employability. At the same time, the employer ensures that production and logistics remain competitive in the future.

As a user and supplier of Industry 4.0, we take a holistic view of digital change. The path to an optimally integrated IIoT solution begins on the shopfloor and supports employees according to their individual needs. They must first and foremost accept and understand new technologies. Only then will they be able to use them efficiently. Accordingly, we see our training and consulting services as an empowerment program that focuses on people. We accompany employees and companies on their way to the factory of the future and encourage them to play an active role in shaping change.

Together we can achieve more!

Sven Hamann
Senior Vice President
Bosch Connected Industry

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

Stefan Ferber
Chief Executive Officer
Bosch Software Innovations
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GENERAL INFORMATION
General Information

Our offer

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 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.

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.

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>
<th>Address</th>
<th>Contact</th>
</tr>
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<tbody>
<tr>
<td>Bosch Connected Industry Training Center *</td>
<td>Leitzstraße 47, 70469 Stuttgart-Feuerbach</td>
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<td>Blaichach Plant, Sontheimstr. 30, 78754 Blaichach</td>
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* certified according to DIN EN ISO 9001
I4.0 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.
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.
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
Guided.Tours@de.bosch.com

Provider
The tour is conducted by Bosch Connected Industry.

Bosch Connected Industry

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 Drive and Control Academy.

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. Besides, innovative production processes 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.

Bosch Connected Industry

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
The tour is conducted by Bosch Connected Industry.

Bosch Connected Industry
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

Available from April 2020

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.

Registration and queries

Guided.Tours@de.bosch.com

Provider

The tour is conducted by Bosch Connected Industry.

Bosch Connected Industry
CONSULTING SERVICES
Holistic and targeted
The big picture, at a glance

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

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.

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 expeditiously 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.

Table of contents
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.

INDUSTRY CONSULTING
Our Industry 4.0 consulting competency

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.

INDUSTRY CONSULTING
An overview of our services

Technology evaluation
We examine in detail, which innovative and cutting-edge technologies suit your production and logistics best.

Value stream optimization
Lean management is the basis for Industry 4.0. We make sure that you have the process maturity on the shopfloor to implement Industry 4.0 projects without complications.

Development of technical Industry 4.0 concepts
To realize your use cases, we develop customized concepts which enable you to implement Industry 4.0 solutions on your shopfloor.

Individual Industry 4.0 strategy
We analyze your initial situation and develop an Industry 4.0 roadmap together with you – so that you can digitize processes efficiently and increase competitiveness.

Please contact us:
You can reach us by phone: +49 (711) 811-17750, or email: Industry.Consulting@de.bosch.com
www.bosch-industry-consulting.com

Bosch Industry Consulting
**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**

**Course ID:** [CNS-WS-i4.0-Wk]

**Introduction**

**Consulting competency & services**

**Workshops**

---

**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 ( personas)
- 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
Introduction

Use Case & Services

Change Management & Qualification

Supporting Industry 4.0 on-site

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.
**Introduction**

**Use Case & Services**

**CHANGE MANAGEMENT & QUALIFICATION**

**Use case: change process**

**Overview of our services**

**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**

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<th>Management</th>
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<td>are contributors</td>
<td>is involved</td>
<td>is an integral part of our communication and is constantly informed about the approach, the status quo and results</td>
</tr>
<tr>
<td></td>
<td>are motivated to participate in the change</td>
<td>knows the project</td>
<td></td>
</tr>
<tr>
<td></td>
<td>can use the product optimally</td>
<td></td>
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</tbody>
</table>

**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.

**6 | Process support on-site**

 Provision of an expert team to carry out change management projects and selected measures on your site.

**7 | Train the trainer**

Training to turn those responsible for your change & enabling into change experts.

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
CHANGE MANAGEMENT & QUALIFICATION

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
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  Works council  Employees  Management
▶ qualified employees ensure that the maximum efficiency of i4.0 solutions can be achieved
▶ qualified employees are motivated
▶ career options of employees are supported and expanded
▶ are able to use the software efficiently and safely
▶ is supported

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

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
From practical experience for practical application
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

Starting i4.0 Course-ID

- Industry specialist 4.0 (IHK) [ATP-1]
- Basic knowledge of automation with practical exercises [ATP-I.0]
- Understand Industry 4.0 [AT-I.0]
- Industry 4.0 in practice (compact course) - technical add-on for i4.0 beginners [ATP-I.0-opt]
- Converting production from Industry 3.0 to Industry 4.0 [ATP-I.0]
- The production of tomorrow - technologies for implementing Industry 4.0 [BCI-I.0-tec]

People & Change

Course-ID

- What does digitization mean for the shopfloor level [BCI-I.0-opt030]
- Work 4.0 - how i4.0 technologies and digitization change our workplace [BCI-I.0-opt020]
- Aspects of codetermination in the introduction of IT products [BCI-I.0-opt010]

Production & Logistic 4.0

Course-ID

- Visualization of process data [BPS-LP-I.0]
- i4.0 roadmap workshop [CNS-I.0]
- Logistics 4.0 [CNS-log]

Data Analytics

Course-ID

- Von den Daten der Maschine zur Datenanalyse auf dem Dashboard [MA-F401]
- Use case workshop [MA-F402]

IT Security

Course-ID

- IT security info for machinery builder [BCI-IT-SECMB102]
- IT security compact for machinery builder [BCI-IT-SECMB101]
- IT security for machinery builder with SEP process guide [BCI-IT-SECMB100]
- IT in manufacturing [BCI-IT-ITM001]
- IT in engineering laboratories [BCI-IT-ITL001]
- Network technology in manufacturing and engineering laboratories [BCI-IT-ITM010]
**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>Course-ID</th>
<th>User Groups</th>
<th>Operator</th>
<th>Maintainer</th>
<th>Planner</th>
<th>Project manager</th>
<th>Administrator</th>
<th>Programmer</th>
<th>Developer</th>
<th>Business Professionals</th>
<th>Decision-maker</th>
<th>Trainer</th>
<th>User groups</th>
</tr>
</thead>
</table>

**Nexeed Automation – Software system Control**

- IndraLogic version 1
  - Course-ID: [BCI-SP-OP001]
- Development of a system application
  - Course-ID: [BCI-SP-OP015-MAP]
- Advanced system application
  - Course-ID: [BCI-SP-OP015-AP]

**Nexeed Automation – Electrical construction**

- EPLAN application in system applications
  - Course-ID: [BCI-SP-OP073]

**Nexeed MES**

- Nexeed Manufacturing Execution System – An Introduction
  - Course-ID: [BCI-SP-MES-INTRO]
- Shiftbook usage and analysis of production and machine data
  - Course-ID: [BCI-SP-MES-PDA10]
- Configuration of process-/machine data acquisition and administration of the shiftbook
  - Course-ID: [BCI-SP-MES-PDA50]
- Consulting workshop for the shiftbook and PDA/MDA
  - Course-ID: [BCI-SP-MES-PDA60]
- Quality Data – analysis, verification and tracing
  - Course-ID: [BCI-SP-MES-QD10]
- DirectDataLink
  - Course-ID: [BCI-SP-MES-DDL10]
- DirectDataLink via OPC UA
  - Course-ID: [BCI-SP-MES-DDL50]
- LineControl – production control
  - Course-ID: [BCI-SP-MES-LC10]
- Installation and configuration of Condition Monitoring Control (CMControl)
  - Course-ID: [BCI-SP-MES-CMC10]
- Application of OrderManagement and Product SetupManagement Clients
  - Course-ID: [BCI-SP-MES-OM10]
- Administration of OrderManagement and Product SetupManagement
  - Course-ID: [BCI-SP-MES-OM20]
- Operating the MSS tablet and smartphone app
  - Course-ID: [BCI-SP-MES-MSS10]
- Configuration and management of the MaintenanceSupportSystems (MSS)
  - Course-ID: [BCI-SP-MES-MSS20]
- Microsoft SQL reporting services – creation of customer-specific reports
  - Course-ID: [BCI-SP-MES-MSR10]

**Open Core Engineering**

- Basics of Open Core Engineering
  - Course-ID: [ESTG_OCI]
- Introduction to Open Core Interface
  - Course-ID: [EST-XLC_MLC_OCI-EASY]
- Windows programming with Open Core Interface
  - Course-ID: [EST-XLC_MLC_OCI_WIN]

**Connected Hydraulics**

- Hydraulics – electrification and digitalization – basics
  - Course-ID: [HED-G]
- Best-in-class-hydraulic controller VT-HMC/IAC Multi-Ethernet
  - Course-ID: [HTP-IAC-HMC1]
- Motion Control for hydraulics – programming the VT-HMC motion controllers
  - Course-ID: [HTP-HMC2]

**Indra Motion MTX**

- MTX efficiency workbench
  - Course-ID: [EST-MTX-EWB]
- Inbetriebnahme CytroPac
  - Course-ID: [HTP-CytroPac]

**ActiveCockpit**

- Visualization of manufacturing data in real time and assistance system for manual assembly
  - Course-ID: [MOT-Prod4.0]

**IoT Gateway**

- Application of the IoT Gateway
  - Course-ID: [EST-Iot-Gateway]

**Bosch IoT Suite**

- Introduction to the Bosch IoT Suite
  - Course-ID: [SI-F103]
- Developing Solutions with the Bosch IoT Suite
  - Course-ID: [SI-B102]

**APAS assistant mobile**

- Safe handling
  - Course-ID: [BCI-SP-AP011]
- Troubleshooting and fault removal
  - Course-ID: [BCI-SP-AP012]
- Maintenance of the sensor skin
  - Course-ID: [BCI-SP-AP015]
- Preparation of working plans
  - Course-ID: [BCI-SP-AP028/38]

**APAS assistant inline**

- Safe handling
  - Course-ID: [BCI-SP-AP021/31]
- Maintenance of the sensor skin
  - Course-ID: [BCI-SP-AP015]
- Preparation of working plans
  - Course-ID: [BCI-SP-AP028/38]
- Integration in projects
  - Course-ID: [BCI-SP-AP027/37]
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, “Specialist in Industry 4.0”, is offered in cooperation with the Chamber of Commerce and Industry (CCI). It is directed on the one hand towards 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 towards 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 specialist 4.0 (CCI) Page 60

BASIC TRAINING COURSE

<table>
<thead>
<tr>
<th>COURSE ID</th>
<th>COURSE ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ATP-1]</td>
<td>Basic knowledge of automation with practical exercises Page 62</td>
</tr>
<tr>
<td>[AT-i4.0]</td>
<td>Understand Industry 4.0 Page 63</td>
</tr>
<tr>
<td>[ATP-i4.0pt]</td>
<td>Industry 4.0 in practice (compact course) – technical add-on for i4.0 beginners Page 64</td>
</tr>
<tr>
<td>[ATP-i4.0]</td>
<td>Converting production from Industry 3.0 to Industry 4.0 Page 65</td>
</tr>
<tr>
<td>[BCI-i4.0-tec]</td>
<td>The production of tomorrow – technologies for implementing Industry 4.0 Page 67</td>
</tr>
</tbody>
</table>
CERTIFICATE COURSE
Industry specialist 4.0 (CCI)

Understanding, shaping and implementing the digital transformation in industry. Course in cooperation with the CCI Würzburg-Schweinfurt and the CCI Stuttgart Region.

User groups
- The first group are the skilled workers on the shop floor or in a factory environment who are directly involved in implementing Industry 4.0 projects
- Technical specialists devising and planning Industry 4.0 projects

Objective
- The German federal standardised training programme provides specialists with the necessary skills to support devising, selecting and implementing methods and technologies for Industry 4.0 in workplace environments.
- Depending on their initial qualification and experience these specialists will be able to carry out and coordinate projects independently.

Requirements
No specific knowledge is necessary.

Contents (Focus areas)
- Understanding the fundamentals of Industry 4.0
- Realizing new opportunities for new business models by implementing Industry 4.0
- Understanding of the system topology and the entire process chain
- Specific Industry 4.0 applications and practical implementation examples from different, production areas, ranging from manual workplaces to fully automated production and being able to transfer these examples into the own production
- Data security in the implementation of Industry 4.0
- Insight into future working methods in the digital world

Equipment
No equipment is required for this course.

Date, Price and Registration for the Location: Stuttgart
Please contact CCI Stuttgart:
Hans-Georg Schappacher
Phone: +49 7151 7095-8821
Email: hans.schappacher@stuttgart.ihk.de

Date, Price and Registration for the Location: Würzburg
Please contact CCI Würzburg-Schweinfurt:
Christian Kroll
Phone: +49 931 4194-204
Email: christian.kroll@wuerzburg.ihk.de

Training provider
The training is conducted by Bosch Connected Industry Training Center and the CCI Stuttgart Region.
The training in Würzburg is conducted by Drive and Control Academy and the CCI Würzburg-Schweinfurt.

The CCI certificate course comprises five consecutive training modules incl. CCI-Test.

The modules in overview

Module 1
Understanding Industry 4.0 (1 Day)
- Basics of Industry 4.0
- Prerequisites for Industry 4.0
- Typical fields of application
- Industry 4.0 as an industrial revolution
- Trends in Industry 4.0

Module 2
Connected business models in production and logistics (4 Days)
- Higher technologies
- Techn. parameters for identification of components
- Business models
- Data transmission
- Supply chains and supply chain management
- Logistics and supply chains in a digital world
- Specific applications (use cases)
- Networking in the digital supply chain

Module 3
Technologies for implementing Industry 4.0 – cyberphysical systems (2 Days)
- Cyber-physical systems
- Sensor, actuator and processor technology
- Data analysis, data sources
- Software applications
- Man-machine interface

Module 4
Designing work and organisation organisational considerations in the age of digital change (3 Days)
- Humans-Technology-Organisation
- Digitalisation and the change of work
- Traditional versus agile working methods
- SCRUM

Module 5
CCI test
- Final thesis
- Presentation and expert discussion

CCI certificate
If all modules are attended and test is passed, the participants receive a certificate.
### BASIC TRAINING COURSE

#### Basic knowledge of automation with practical exercises

**User groups**
- Operators
- Service technicians
- Planners/application engineers
- Trainers

**Objective**
- Principles of automation technology
- Being able to network electrical, pneumatic and hydraulic components to automation controls
- Know the operation and signals from sensors and implement them in the context of automation technology
- Having an overview of field buses and learning to implement them inside the machine
- Program manual and automatic processes according to IEC 61131-3 PLC
- Apply protective and diagnostic functions in the programming
- Understand the basics of network technology based on Ethernet

**Requirements**
- Basic knowledge in the fields of pneumatics, mechanics, electrical engineering and network technology

**Contents**
- Introduction to automation technology
- PLC programming according to IEC 61131-3
- How automation systems work
- Basics of electricity
- Measurement of current, voltage and resistance
- Reading electrical schematics
- Basic pneumatic and hydraulic principles

- Fieldbus systems, overview and application
- Network technology, overview and application
- Practical exercises

**Date (German) | Location**
--- | ---
06/22 – 06/26/2020 | Würzburg

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

**Training times**
Day 1: 10:00 a.m. - 04:15 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**
2.093 €

**Registration**
Online über diesen [Link](#) or via QR Code.

**Training provider**
The training is conducted by Drive & Control Academy.

Bosch Rexroth

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### 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

**Requirements**
- Good technical understanding
- Basic knowledge of automation and control technology

**Contents**
- General introduction to the topic
- Where the term "Industry 4.0" comes from and what's behind it
- Explanation of important concepts
- Organizations and associations
- Concepts for engineering, manufacturing and production
- Industry 4.0 at Bosch and Bosch Rexroth
- System and product overview
- Best practice

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

**Date (German) | Location**
--- | ---
05/04/2020 | Würzburg
10/12/2020 | Würzburg

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

**Training times**
10:00 a.m. – 05:00 p.m.

**Net price**
573 €

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

**Training provider**
The training is conducted by Drive & Control Academy.

Bosch Rexroth
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
--- | ---
05/25 – 05/26/2020 | Würzburg
10/01 – 10/02/2020 | 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: 08:30 a.m. – 04:00 p.m.

Net price
827 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Drive & Control Academy.

Bosch Rexroth

Course ID: [ATP-i4.0cpt]

BASIC TRAINING COURSE

Converting production from Industry 3.0 to Industry 4.0

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

Objective
▶ Gain a clear understanding of Industry 4.0
▶ 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 and implement ways of capturing data
▶ 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

Contents
▶ Introduction to Industry 4.0
▶ 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
The first day of the training is equal to the training AT-i4.0. Our service team will be pleased to support you with an upgrade of your existing systems for industry 4.0.

Date (German) | Location
--- | ---
05/04 – 05/08/2020 | Würzburg
10/12 – 10/16/2020 | Würzburg

Date (English) | Location
--- | ---
04/20 – 04/24/2020 | 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.
Day 2-4: 08:00 a.m. – 04:00 p.m.
Day 5: 08:00 a.m. - 12:30 p.m.

Net price
2,093 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Drive & Control Academy.

Bosch Rexroth

Course ID: [ATP-i4.0]
BASIC TRAINING COURSE
The production of tomorrow – technologies for implementing Industry 4.0

User groups
▶ Operators
▶ Team leaders
▶ Foremen
▶ Project Leaders
▶ Production planners
▶ Interested parties who are involved in i4.0 projects

Objective
▶ To have a clear understanding of how Industry 4.0 can be applied on a technical level.
▶ For details, see Contents

Requirements
No specific knowledge is required.

Contents
▶ Be aware of concrete options for the practical implementation of Industry 4.0
▶ Be aware of practical examples of the implementation of Industry 4.0
▶ Be aware of fundamental Industry 4.0 technologies, such as cyber-physical systems, sensors and actuators
▶ Understand how these can be implemented in the networking of a factory
▶ Understand the fundamental structure of IT
▶ Understand the foundations of Big Data
▶ Understand project-oriented programming
▶ Be aware of classical and modern human-machine interfaces (VR, AR)

Equipment
▶ Smartphone

Dates, Location and Prices
3 days inhouse or in the Bosch Connected Industry Training Center in Feuerbach. We are happy to prepare an individual offer for you.

Registration / 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: 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-tec]
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
- 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' willingness 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).

The following session is a joint lessons learned online meeting
Afterwards there will be consultation for the participants, a contingent of altogether 8 hours is offered.
The TTT trainers are provided with materials such as presentation templates and flyers, which they can use for the learning session.

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
BASIC TRAINING COURSE

Work 4.0 – how i4.0 technologies and digitization change our workplace

User groups
▶ Team Leaders
▶ Foremen
▶ Project Leaders
▶ Production planners
▶ Interested parties who are involved in i4.0 projects or are preparing to do so

Objective
▶ Understand how work and organization change through i4.0 technologies
▶ For details, see Contents

Requirements
▶ An interest in understanding the changes in a company caused by modern IT technology

Contents
▶ Understand qualification needs changed by Industry 4.0
▶ Obtain insight into future methods of working in the digital world
▶ Understand the effects and presentation of change for people/associates
▶ Be aware of chances and risks of change from i4.0
▶ Understand the reason for agile work methods
▶ Be introduced to old and new methods of project management

Equipment
▶ Smartphone

Dates, Location and Prices
3 days inhouse or in the Bosch Connected Industry Training Center in Feuerbach. We are happy to prepare an individual offer for you.

Registration / 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: 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.

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

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.
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.

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### BASIC TRAINING COURSE

**Visualization of process data**

- **Course ID:** [BPS-LP-i4.0]
- **Page:** 73

- **I4.0 roadmap workshop**
  - **Course ID:** [CNS-i4.0]
  - **Page:** 74

- **Logistics 4.0**
  - **Course ID:** [CNS-log]
  - **Page:** 75

### User groups

- Production managers
- I.4.0 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.

### Dates, Location and Prices

1 day.

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 and BPS Academy.
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

Training provider
Bosch Industry Consulting

Course ID: [CNS-i4.0]

Equipment
No equipment is required for this course.

Date, location and price
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: Industry.Consulting@de.bosch.com, or give us a call +49 711 811 17750.

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

Training provider
Bosch Industry Consulting

Course ID: [CNS-log]

Equipment
No equipment is required for this course.

Date, location and price
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: Industry.Consulting@de.bosch.com, or give us a call +49 711 811 17750.
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 1
  - Smart Camera Cognex
  - Advanced training courses
  - Optics & Sensoric 2

- **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

**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: Visionservice.ATMO@de.bosch.com.

**Training provider**

The training conducted by Bosch Connected Industry Training Center and Robert Bosch Manufacturing Solutions GmbH (ATMO).

Bosch Connected Industry
Data Analytics

Production and logistics data are key resources in the age of digitization and Industry 4.0. Data analytics and machine learning help us extract new information from this data. The training course "From the data of the machine to the data analysis on a dashboard" addresses itself to experts in production as well as process and production planners and teaches how to evaluate, analyze and visualize production data in an useful way.

The two-day workshop "Data Analytics: Use case workshop" focuses on your individual use case: with evaluation of potential and effort and preparation of the next steps.

**User groups**
- Experts in production, who want to improve production processes
- Process and production planners who want to improve existing lines

**Objective**
- Know data evaluation tools
- Know the basic functions of data evaluation
- Know quality improvement strategies through data analysis

**Requirements**
- Interested in numbers
- Technical affinity

**Contents**
- Overview of the most important key figures in production
- The Crisp Model of data evaluation
- Data evaluation with KNIME
- Data evaluation with Tableau
- Visualization of data

**Equipment**
- You need a PC
- You also need an installed KNIME license on your PC and an installed license of Tableau (Test license is also possible, this is valid for 14 days, so buy it immediately before training)

**Agenda**
- Preparation and getting to know: 2 hours via Skype
- Workshop: 1 day on-site
- Follow-up and open questions: 2 hours via Skype

**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**
BASIC TRAINING COURSE

Data Analytics: Use case workshop

User groups
- Managers, engineers and technicians who are responsible for improvement activities in production and logistics
- I4.0 coordinators

Objective
- Participants understand the principles, technologies and typical use cases of data analytics
- Participants understand how data analytics can help them achieve their targets for quality and costs performance in production

Requirements
- Information on current problems in production environments, and integration of the right group of persons (for example process and planning experts)

Contents
Can be adapted to your needs, for example:
- Introduction to algorithms, methods, data quality, key terminology
- Roles and responsibilities within an analytics project team
- Overview of the variety of applications through practical examples
- Introduction to Cross Industry Standard Process for Data Mining (CRISP-DM)
- Shop floor visit: Presentation of actual pain points and challenges from customer perspective (based on business requirements).
- Evaluation of potential use cases, e.g. by Business impact (return on invest), Data availability
- Prioritization

Equipment
No equipment is required for this course.

Date, location and price
2 days.

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: [MA-F402]

Please see here, how to benefit from Data Analytics:
IT Security

Protecting IT systems from attacks is essential for the connectivity of the entire value 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.

WEBINAR

IT security info for machinery builder

User groups
- Employees with need of information regarding product security/IT security. Division: development, PMO, project management, sales, purchasing, quality assurance, service

Objective
- Information about the topic of IT security for engineering with an overview of relevant norms and Bosch-processes

Requirements
There are no requirements for this course.

Contents
- Need for action in the field of engineering
- Information about relevant norms (ISO, IEC, VDI)
- Information about Bosch regulations (CDs, N103)
- Information about the Security Engineering Process
- Responsibilities
- Processes

Equipment
No equipment is required for this course.

Note
The maximum number of participants is 15 persons.
BASIC TRAINING COURSE
IT security compact for machinery builder

Available as classroom training or as webinar

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
There are no requirements for this course.

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.

Date (German)       Location
03/31/2020           Stuttgart-Feuerbach
08/31/2020           Stuttgart-Feuerbach

Date (German)       Webinar
03/31/2020
08/31/2020

Training times
Classroom training: 08:00 a.m. - 12:00 p.m.
Webinar: 09:00 a.m. - 12:00 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-IT-SECMB101]
**BASIC TRAINING COURSE**

### IT security for machinery builder with SEP process guide

**User groups**
- Employees, who are IT security role owners according to Bosch norm N103 (SEP). Division: development, quality assurance and service
- Project managers or persons who are responsible for hardware and software development (PMO, ...) and who are IT security role owners according to Bosch norm N103 (SEP)
- Software developers in engineering
- Machine integrators
- Machine operators

**Objective**
- Getting in to targeted SEP process for engineering and implementation in own projects
- Introduction and deepening into the topic of IT security for engineering
- Know and use the relevant norms and Bosch processes

**Requirements**
- Basic IT knowledge

**Contents**
- Basics
- Need of action
- Responsibilities / definitions
- Risk assessment
- Best practices
- Extract of relevant norms
  - EU DSGVO
  - ISO 27001
  - IEC 62443
  - VDI 2128
- Extract of Bosch processes
  - GF 182
  - CD 02900
  - IoT Principles
  - N103 / SEP
  - Basic model development plan
  - Network structure
  - Customer requirements
  - Practical SEP exercises with real use cases
  - Use of Bosch Security Engineering Process

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

**Date (German) | Location**
- 04/01 – 04/03/2020 | Stuttgart-Feuerbach
- 09/01 – 09/02/2020 | Stuttgart-Feuerbach

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

**Nettopreis**
1.850 €

**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-IT-SECMB100]

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**BASIC TRAINING COURSE**

### IT in manufacturing

**User groups**
- Local-ITM
- Manufacturing IT Planer
- 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.

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

**Date (German) | Location**
- 02/11/2020 | Stuttgart-Feuerbach
- 05/29/2020 | Stuttgart-Feuerbach
- 10/27/2020 | Stuttgart-Feuerbach
- 11/30/2020 | Stuttgart-Feuerbach

**Date (english) | Location**
- 02/03/2020 | Stuttgart-Feuerbach
- 10/02/2020 | Stuttgart-Feuerbach

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**
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-IT-ITM001]
BASIC TRAINING COURSE
IT in engineering laboratories

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

Objective
▶ Introduction to the tasks of a Local-ITL

Requirements
▶ Basic IT knowledge

Contents
▶ Introduction to the topic “IT in engineering laboratories”
▶ Get to know roles, responsibilities and ITL 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 engineering laboratory concept, emergency plan, operation concept
▶ Plan remote access for laboratory equipment
▶ Prepare an audit (self audit, independent audit)

Equipment
No equipment is required for this course.

Note
Currently only bookable for Bosch employees.

Date (German) | Location
---|---
02/12/2020 | Stuttgart-Feuerbach
05/25/2020 | Stuttgart-Feuerbach
10/28/2020 | Stuttgart-Feuerbach
12/04/2020 | Stuttgart-Feuerbach

Date (englisch) | Location
---|---
02/07/2020 | Stuttgart-Feuerbach
09/28/2020 | 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-IT-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
▶ Responsible management in manufacturing and engineering laboratories

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
---|---
05/26 – 05/28/2020 | Stuttgart-Feuerbach
12/01 – 12/03/2020 | Stuttgart-Feuerbach

Date (englisch) | Location
---|---
02/04 – 02/06/2020 | Stuttgart-Feuerbach
09/29 – 10/01/2020 | 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]
Sensor-based connected devices lay the foundation for the Internet of Things and offer unlimited possibilities for designing the factory of the future. Monitoring industrial plants, machines and processes with connected sensors provides the database for the significant increase of the total plant efficiency by:
- Early recognition of signs of wear
- Reduced downtimes
- Process optimization
- Quality assurance
- Automatic documentation

Bosch Connected Devices and Solutions GmbH (BCDS) provides an industrial portfolio comprising different sensor devices, each consisting of multiple sensors. This also includes wired solutions as well as wireless, battery-operated variants with a particularly efficient energy management. The product portfolio ranges from multi-functional devices to specialized devices that are provided with an integrated intelligence or available as a freely programmable variant to creatively design individual solutions.

On the following pages, we offer basic technical training and a hackathon in order to introduce you to the topics Industry 4.0 and Internet of Things. Besides the technical basics of the measured value acquisition and the functioning of the sensor devices, you will get to know the various possibilities of implementing the IoT in the industry during the technical training. The four-day hackathon offers the possibility to realize your own ideas with the help of Bosch experts, where appropriate.

**BASIC TRAINING COURSE**

**Technical introduction to the IoT sensor technology for factories of the future**

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

**Objective**
- Better understanding of the Internet of Things (IoT) and Industry 4.0 (I4.0)
- Functionality of MEMS sensor technology
- Recognizing processes that could be optimized by the IoT sensor technology
- Commissioning of the BCDS sensor technology

**Requirements**

There are no requirements for this course.

**Contents**
- Measurement recording: Measurement principle and possible applications of different sensors
- Data processing and preprocessing
- Selection of suitable methods of transferring data
- Energy management of wireless sensor units

**Equipment**
- Windows PC with Windows 10, freely usable USB port and the possibility to install applications/software
- Smartphone (iOS / Android)

**Date (German)**  
05/11/2020 Ulm  
09/14/2020 Ulm  
11/30/2020 Ulm

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

**Training times**
08:00 - 16:30 Uhr

**Net price**
- 838 € (training course including XDK)
- 1350 € (training course including XDK and IVAS)
- 1849 € (training course including five BCDS Sensor Devices)
- 1959 € (training course including sensor sales demo case)

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

**Training provider**
The training is conducted by Drive & Control Academy.

Bosch Rexroth

**Course ID:** [AT-IoT-Sens-Basic]
WORKSHOP
Connected Sensor Devices – Hackathon

User groups
▶ Programmers (software developers) and everyone who wants to initiate a project as a team

Objective
▶ Becoming familiar with the sensor technology products by Bosch Connected Devices and Solutions (BCDS) and their possible uses
▶ Using the universal BCDS sensor hardware and the workbench as a starting point for solving special problems caused by free programmability
▶ Developing innovative ideas into customer-oriented solutions
▶ Cooperative and creative working in interdisciplinary teams

Requirements
There are no requirements for this course.

Contents
▶ Independent commissioning of the hardware and gaining first experiences
▶ Conceptualizing and developing IoT solutions and apps
▶ Realizing own topics with the support of Bosch experts

Equipment
▶ Windows PC with Windows 10, freely usable USB port and the possibility to install applications/software
▶ Smartphone (iOS / Android)

Industrial portfolio of Bosch Connected Devices and Solutions GmbH

Cross Domain Development Kit | XDK
Your “Swiss army knife” for the Internet of Things. The XDK offers eight different sensors, various integrated connectivities, the possibility of flexible expansion and free programmability. XDK is certified for 24/7 usage, giving you the complete freedom to employ it either as short-term proof-of-concept or as XDK Node for long-term IoT projects.

Connected Industrial Sensor Solution | CISS
CISS – a pioneer of its class. The CISS is a small and robust multi-sensor device with eight different sensors as well as BLE and USB connectivity that can be configured individually. It was designed for the application in harsh industrial environments and is used for process and condition monitoring in order to increase total machine efficiency.

Sense Connect Detect | SCD
The SCD enables companies to get started easily with Industry 4.0. The sensor device is equipped with four different sensors and BLE connectivity. As a cost-effective and easy-to-install solution, the SCD can be attached to almost any component in order to start the data acquisition process right away. The data is visualized and stored via an app that can be operated without prior knowledge.

Transport Data Logger | TDL110
Your transported and stock goods always in view. The TDL110 can be individually configured and measures and records relevant data such as temperature, humidity and shock events. This data can be read out via BLE. By this, the TDL110 ensures reliable, continuous and efficient monitoring as well as documentation of the entire supply chain.

Intelligent Vibration Analysis Sensor | IVAS
The specialist for vibration measurement. The IVAS is equipped with two accelerometers with a high bandwidth and a high resolution and provides basic data via the Ethernet connectivity for the realization of process optimizations, preventive maintenance and quality assurance by vibration-based condition monitoring. This way, the IVAS contributes to considerable cost savings.

Date (German) | Location
05/12 – 15/05/2020 | Ulm
09/15 – 09/18/2020 | Ulm
12/01 – 12/04/2040 | Ulm

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

Net price
▶ 2.187 € (training course including XDK)
▶ 2.699 € (training course including XDK and IVAS)
▶ 3.198 € (training course including five BCDS Sensor Devices)
▶ 3.308 € (training course including sensor sales demo case)

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Drive & Control Academy.
Bosch Rexroth

Course ID: [AT-IoT-Sens-Hack]

For further information, please go to: https://www.bosch-connectivity.com/products/
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 those compact devices.

Augmented Reality (AR) is a cutting-edge visual interactive experience of a real-world environment. The training course “Introduction to Augmented Reality” explains the main characteristics of AR systems and specifies the main components of AR in an IoT architecture.

In addition, this two-day training introduces the basics of AR and some surrounding contexts. How and why it was developed, and how it compares to and differs from its technological cousin, Virtual Reality (VR). Furthermore, this training explains business aspects of AR, the AR market and the potential IoT applications. Through a hands-on project, you will learn practical techniques to rapidly prototype AR IoT applications. You will also learn more about the current industry landscapes, the hardware needed to view AR content and how people are using AR in IoT today. At the end of the training, you will be able to implement AR functionality to realize your own AR IoT ideas.

Please find the training offer for IoT solutions from Bosch on pages 164-166.
**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

---

**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

**Contents**
- 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**
- 01/21 – 01/22/2020 Berlin
- 05/05 – 05/06/2020 Berlin
- 11/03 – 11/04/2020 Berlin

**Date (English) | Location**
- 03/10 – 03/11/2020 Berlin
- 09/29 – 09/30/2020 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.
**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.

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**DATE (German) | Location**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
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</tr>
<tr>
<td>10/05 – 10/06/2020</td>
<td>Berlin</td>
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</table>

**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.

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**Date (German) | Location**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/02 – 03/03/2020</td>
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</tr>
<tr>
<td>06/02 – 06/03/2020</td>
<td>Berlin</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. – 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 Software Innovations**

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**Course ID:** [IoT-B504]
BASIC TRAINING COURSE

Introduction to Augmented Reality

User groups
- (UI/UX) Designers
- Marketing
- Sales
- Entrepreneurs
- Developers

Objective
- After completion this training, the participants will be able to comprehend AR concept and to use it with IoT for potential use cases.

Requirements
No specific knowledge is necessary.

Contents
- Comparison the differences of AR, VR and MR
- Introduction of the different types of AR experiences and how to use them in IoT use cases
- Overview of the main AR products and technologies on the market today
- Overview of popular use cases for AR with IoT
- Building different AR applications using an AR Development kits and tools
- Building an AR IoT scenes in 3D space using live objects
- Development of an AR App within the IoT scene

Equipment
No equipment is required for this course.

Date (English) | Location
--- | ---
03/17 – 03/18/2020 | 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 Software Innovations

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
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 124.

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### Nexeed Automation – Software system Control plus

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<td>Connectivity of a control system to the MES</td>
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**Nexeed Automation – Software system Control** from Page 124

**Nexeed Automation – Electrical construction** from Page 128
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.

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.

Bosch Connected Industry

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 hard-ware
- 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
- Introduction of the hardware
- Initial commissioning
- Installing an existing application
- Exercises with the training model
- Activate and modify bus configuration
- 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 7 Professional SP1 or higher (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
--- | ---
01/27 – 01/31/2020 | Stuttgart-Feuerbach
09/21 – 09/25/2020 | Stuttgart-Feuerbach

Date (english) | Location
--- | ---
04/20/ – 04/24/2020 | Stuttgart-Feuerbach
11/02/ – 11/06/2020 | 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

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

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.

OR
Developing of objects

Connectivity of a control system to the MES

*on the basis of software TwinCAT V3 Beckhoff

Integrated vision*

Integrated robotics*

Configuration of the 3D diagnostic system Virtual Assist
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 7 Professional SP1 or higher (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.

Date (German)               Location
01/27 – 02/07/2020           Stuttgart-Feuerbach
02/24 – 03/06/2020           Stuttgart-Feuerbach
03/16 – 03/27/2020           Stuttgart-Feuerbach
05/04 – 05/15/2020           Stuttgart-Feuerbach
06/29 – 07/10/2020           Stuttgart-Feuerbach
10/19 – 10/30/2020           Stuttgart-Feuerbach
11/02 – 11/13/2020           Stuttgart-Feuerbach
12/07 – 12/18/2020           Stuttgart-Feuerbach

Date (englisch)              Location
02/10 – 02/21/2020           Stuttgart-Feuerbach
04/20 – 04/20/2020           Stuttgart-Feuerbach
06/15 – 06/26/2020           Stuttgart-Feuerbach
09/21 – 10/02/2020           Stuttgart-Feuerbach
11/16 – 11/27/2020           Stuttgart-Feuerbach

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

You can also arrange an individual training. For dates and prices please contact us directly.
COURSE BASED ON IN德拉WORKS

Development of a system application with Control plus

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
- Communication connection, target systems
- 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 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 version – software has to be installed before training begins
- Administrator rights
- TCP/IP network services installed

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

Date (German) Location
01/13 – 01/24/2020 Stuttgart-Feuerbach
09/07 – 09/18/2020 Stuttgart-Feuerbach

Date (englisch) Location
06/15 – 06/26/2020 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]

ADVANCED TRAINING COURSE

Development of objects

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, A 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 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 version – software has to be installed before training begins
- Administrator rights
- TCP/IP network services installed

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

Date (German) Location
03/18 – 03/25/2020 Stuttgart-Feuerbach
07/01 – 07/08/2020 Stuttgart-Feuerbach
11/25 – 12/02/2020 Stuttgart-Feuerbach

Date (englisch) Location
05/13 – 05/20/2020 Stuttgart-Feuerbach
09/23 – 09/30/2020 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]

Table of contents
### 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

**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 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 version – software has to be installed before training begins

**Date (German) | Location**
| 02/10 – 02/14/2020 | Stuttgart-Feuerbach  
| 10/12 – 10/16/2020 | Stuttgart-Feuerbach  
| 05/25 – 05/29/2020 | Stuttgart-Feuerbach

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

#### Date (english) | Location**
| 02/10 – 02/14/2020 | Stuttgart-Feuerbach  
| 10/12 – 10/16/2020 | Stuttgart-Feuerbach  
| 05/25 – 05/27/2020 | 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**

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### Connectivity of a control system to the MES with XML

**Date (German) | Location**
| 02/10 – 02/10/2020 | Stuttgart-Feuerbach  
| 10/12 – 10/14/2020 | Stuttgart-Feuerbach  
| 05/25 – 05/27/2020 | 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**

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### Connectivity of a control system to the MES with OPC UA

**Date (German) | Location**
| 02/12 – 02/14/2020 | Stuttgart-Feuerbach  
| 10/14– 10/16/2020 | Stuttgart-Feuerbach  
| 05/27 – 05/29/2020 | 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**
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 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 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.

ADVANCED TRAINING COURSE
Safe support of the MES connection with OPC UA

User groups
▶ Maintenance technicians
▶ Applicator

Objective
▶ The participant understands the data exchange via OPC UA 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 OPC UA and Engineering Workflow
▶ OPC UA interface between PLC and MES
▶ Server configuration
▶ UA Sample Client
▶ License management
▶ OPC UA encoding
▶ Features of OPC UA variables
▶ OES add-ons for public interface
  ▶ EventList
  ▶ Heartbeat
  ▶ StationInfo
  ▶ PartMissingSwitch
  ▶ PartType
  ▶ DataSet
  ▶ WorkProcess
▶ Working with public interface tester
▶ Error analysis and troubleshooting with the training model
▶ Typical pitfalls

Equipment
▶ Notebook running Windows 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 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.
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 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 version – software has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed

Date (German) Location
03/25 – 03/26/2020 Stuttgart-Feuerbach
06/15 – 06/15/2020 Stuttgart-Feuerbach
10/12 – 10/13/2020 Stuttgart-Feuerbach

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.

The training is conducted by Bosch Connected Industry Training Center

Course ID: [BCI-SP-OP180]

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

COURSE BASED ON THE SOFTWARE TWINCAT
Integrated vision

User groups
▶ Applicator (in the area of image processing)

Objective
▶ The applicator is able to structure and create an image processing solution with HDE2, to configure a visualisation and data exchange, run in operation and to test.

Requirements
▶ Basic training course; Development of a system application, Course ID: [BCI-SP-OP120]
▶ Knowledge about the Image Processing Software HALCON

Contents
▶ Structure of HDE2
▶ Structuring of the image processing solutions
▶ Defining of data structures and visualization
▶ Commissioning, basic settings and diagnosis of camera options
▶ Commissioning and diagnosis of communication interfaces
▶ Implementation and testing of the image processing solution

Equipment
▶ Notebook running Windows 7 Professional SP1 or higher (64-bit), Internet Explorer 8 or higher, .NET Framework 4.6 or higher, TwinCAT 3.1.4022.27 and latest OES4 version – software has to be installed before training begins
▶ Administrator rights
▶ TCP/IP network services installed

Date (German) Location
02/19 – 02/19/2020 Stuttgart-Feuerbach
06/17 – 06/18/2020 Stuttgart-Feuerbach
10/14 – 10/15/2020 Stuttgart-Feuerbach

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.

The training is conducted by Bosch Connected Industry Training Center

Course ID: [BCI-SP-OP186]

You can also arrange an individual training. For dates and prices please contact us directly.
WEBINAR
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 AugmentedAssist and Virtual Assist
▶ Prepare target system (SPS and HMI)
▶ Start-up of AugmentedAssist and 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-Rechte
▶ Unity (Pro-Version) is installed during the training.

Date (German)       Webinar
02/12/2020
08/12/2020

Date (englisch)       Webinar
05/13/2020
11/11/2020

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

Training times
09:00 a.m. – 12:00

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

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.

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

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

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
WEBINAR
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

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).

Course ID: [BCI-SP-OP10-WN]

Date 05/28/2020, 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 09/09/2020, 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 11/10/2020, 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
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
- 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)

Date (German) | Location
--- | ---
03/02 – 03/06/2020 | Stuttgart-Feuerbach
09/14 – 09/18/2020 | Stuttgart-Feuerbach
11/09 – 11/13/2020 | 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 2-4: 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.

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

Bosch Connected Industry
Course ID: [BCI-SP-OP015-MAP]
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
▶ System overview in single-pole representation
▶ 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
--- | ---
02/26 – 02/27/2020 | Stuttgart-Feuerbach
10/20 – 10/21/2020 | Stuttgart-Feuerbach
05/26 – 05/27/2020 | Stuttgart-Feuerbach
12/08 – 12/09/2020 | 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]
Nexeed MES

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.

**BASIC TRAINING COURSE**

- Shiftbook usage and analysis of production and machine data [BCI-SP-MES-PDA10] Page 133
- Quality Data – analysis, verification and tracing [BCI-SP-MES-QD10] Page 137
- DirectDataLink – Connecting machines to Nexeed MES [BCI-SP-MES-DDL10] Page 138
- LineControl – production control [BCI-SP-MES-LC10] Page 140
- Installation and configuration of ConditionMonitoring (CMControl) [BCI-SP-MES-CMC10] Page 141
- Working with the OrderManagement and ProductSetup Management Clients [BCI-SP-MES-OM10] Page 142
- Working with the MaintenanceSupportSystem (MSS) tablet and smartphone app [BCI-SP-MES-MSS10] Page 144
- Configuration and management of the MaintenanceSupport System (MSS) [BCI-SP-MES-MSS20] Page 145
- Microsoft SQL Server Reporting Services – creation of customer-specific reports [BCI-SP-MES-MSR10] Page 146

**ADVANCED TRAINING COURSE**

- Configuration of production and machine data and administration of the shiftbook [BCI-SP-MES-PDAS0] Page 134
- DirectDataLink via OPC UA [BCI-SP-MES-DDLS0] Page 139

**WORKSHOP | COACHING**

- Consulting Workshop for the shiftbook and PDA/MDA [BCI-SP-MES-PDAS60] Page 135

**NEW**
**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
- Client applications of Nexeed MES and, in part, its operation

**Equipment**
- Notebook

**Date (German) | Location**

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<td>09/28 – 09/30/2020</td>
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**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.

**Bosch Connected Industry**

**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**

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**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.

**Bosch Connected Industry**

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

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<< Table of contents
CONFERENCE 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

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 - with focus on configuration optimization and use of the system.

Objective
▶ Analyzing and optimizing the work with the shiftbook and with PDA/MDA in the plant
▶ 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]
BASIC TRAINING COURSE

Quality Data – analysis, verification and tracing

User groups
▶ The course is directed to all who need to analyze quality data via OIS.NET Webportal. The course is designed for participants with little or no previous knowledge.

Objective
▶ Analyzing of quality data in relation to use cases
▶ Getting to know additional MES quality products

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

Contents
▶ Storage of quality data (additional components, station results, measurements, information on processes and production)
▶ Visualization and analysis of quality data in the OIS.NET Webportal
▶ Top down and bottom up traceability
▶ Analysis options for manufacturing and production errors
▶ Basic functionalities of additional quality management functions inside the Nexeed MES

Equipment
▶ Notebook

Date (German)  Location
03/05/2020  Stuttgart-Feuerbach

Date (English)  Location
10/01/2020  Stuttgart-Feuerbach

Training times
08:30 a.m. – 04:30 p.m.

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-SP-MES-QD10]
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 OPC 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]
▶ Preferable: 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
--- | ---
02/10 – 02/11/2020 | Stuttgart-Feuerbach
09/21 – 09/22/2020 | Stuttgart-Feuerbach

Date (English) | Location
--- | ---
05/04 – 05/05/2020 | Stuttgart-Feuerbach
10/12 – 10/13/2020 | Stuttgart-Feuerbach

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

Net price
990 €

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-DDL10]

ADVANCED TRAINING COURSE
DirectDataLink via OPC UA

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 OPC UA communication protocol.

Objective
▶ Configuring of the DirectDataLink (DDL) service via the Nexeed MES OSS with a focus on the OPC UA communication module
▶ Configuring and testing of events with a training station

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 OSS, Course ID: [BCI-SP-MES-DDL10]
▶ Preferable: Knowledge of automation and control technology

Contents
▶ DirectDataLink concept via OPC UA
▶ Differences in communication via OPCON XML and OPC UA
▶ Import of station public interfaces
▶ Components of public interfaces
▶ Configuration of various events with Nexeed MES OSS (OPC UA)
▶ Test of configured events via Nexeed Automation Control plus training station with an MES test server

Equipment
▶ Notebook with administrator rights
▶ Current version Nexeed MES OSS

Date (German) | Location
--- | ---
02/11 – 02/12/2020 | Stuttgart-Feuerbach
09/22 – 09/23/2020 | Stuttgart-Feuerbach

Date (English) | Location
--- | ---
05/05 – 05/06/2020 | Stuttgart-Feuerbach
10/13 – 10/14/2020 | Stuttgart-Feuerbach

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

Total price
990 €

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-DDL50]
BASIC TRAINING COURSE

LineControl – production control

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]
- Preferable: 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
- Blocks and locks (material blocks, tool blocks, equipment blocks, process blocks, parts blocks)
- Additional options for using LineControl (distribution control, supermarket, time-based process monitoring)

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

Date (German) Location
02/13 – 02/14/2020 Stuttgart-Feuerbach
09/24 – 09/25/2020 Stuttgart-Feuerbach

Date (English) Location
05/07 – 05/08/2020 Stuttgart-Feuerbach
10/15 – 10/16/2020 Stuttgart-Feuerbach

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

Net price
990 €

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-LC10]

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 (German) Location
04/02 – 04/03/2020 Stuttgart-Feuerbach
11/05 – 11/06/2020 Stuttgart-Feuerbach

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

Net price
990 €

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-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]

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**BASIC TRAINING COURSE**

**Administration of Order Management and Product SetupManagement**

**User groups**
- The course is directed to all who need to configure OrderManagement and ProductSetupManagement.

**Objective**
- Installing and configuring of the following Nexeed MES products:
  - OrderManagement
  - ProductSetupManagement
  - ERPConnectivity
- Using the functionalities based upon practical examples
- Outlook on SmartReplenishmentService (SRS) as possible specialization

**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**
- **Basics:**
  - OrderManagement
  - ProductSetupManagement
  - Connection to SAP and DirectDataLink
- **Configuration:**
  - OrderManagement
  - ProductSetupManagement
  - Configuration and Monitoring of ERPConnectivity

**Equipment**
- Notebook with administrator rights

**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-OM20]
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 of 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**

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BASIC TRAINING COURSE

Configuration and management of the Maintenance Support System (MSS)

**User groups**
- The course is directed to all who need to configure Nexeed MSS.

**Objective**
- Creating users
- Defining new roles
- Defining the escalation management
- Storing necessary documents on the server

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

**Contents**
- User management
- Escalation management
- Document management
- As needed: selected content from the basic course on the MSS tablet and smartphone app

**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**

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**Course ID:** [BCI-SP-MES-MSS10]

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Table of contents
BASIC TRAINING COURSE
Microsoft SQL Server Reporting Services
– Creation of customer-specific reports

User groups
▶ The course is directed to all who are interested in the creation of customer-specific reports via Microsoft SQL Server Reporting Services.

Objective
▶ Basic technological training in Microsoft SQL Server Reporting Services
▶ Understanding and operating with Microsoft SQL Server Reporting Services as a tool for creating custom reports

Requirements
▶ Recommended: Microsoft SQL know-how

Contents
▶ Introduction to Microsoft SQL Server Reporting Services
▶ Tools for creating, managing and displaying reports
▶ Explanation of the main components of a report project: Data sources, Datasets and Reports
▶ Available "controls" for visualizing data (tables, matrix, graphic controls, text fields, etc.)
▶ Creation of basic reports (example based on learned content)
▶ Expansion of the basic report with special data visualization options
▶ Generation of project templates (Templates Corporate Identity)
▶ Generation of expanded reports (navigation, sub-reports, etc.)

Equipment
▶ Notebook with administrator rights
▶ Current version Microsoft SQL Server Data Tools (SSDT) for Visual Studio

Current version Microsoft SQL Server Management Studio (SSMS)

Note
▶ Tutorials are available for using Microsoft SQL Server Reporting Service in Nexeed MES environments.

Dates, Location and Prices
2 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 this workshop, or would you like to make an appointment? Please contact us at 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.

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.

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

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). The Visual Studio projects created during the exercises can also be reproduced after the course with Visual Studio Express.

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.

### 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.

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**BASIC TRAINING COURSE**

**Basics of Open Core Engineering**

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<thead>
<tr>
<th>BASIC TRAINING COURSE</th>
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<td>Basics of Open Core Engineering</td>
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<tr>
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<tr>
<td>Windows programming with Open Core Interface</td>
<td>[EST-XLC-MLC_OCI_WIN]</td>
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</tr>
</tbody>
</table>

**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.
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 Drive & Control 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.

Training provider
The training is conducted by Drive & Control Academy.

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 Drive & Control 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.

Training provider
The training is conducted by Drive & Control Academy.

Bosch Rexroth
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 the course 'Best-in-class Hydraulic Controller VT-HMC/IAC Multi-Ethernet' the basic structures of the best-in-class controller are addressed. You will work on a hydraulic axis with the IAC Multi-Ethernet valve or the VT-HMC motion controller. Within the scope of the practical tasks, you will commission the hydraulic components with IndraWorks Ds. You will become familiar with the hardware and software properties of the products, as well as the optimization options for this best-in-class controller. The course also focuses 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.

**BASIC TRAINING COURSE**

**Hydraulics – electrification and digitalization – basics**

- Project planning and configuration
- The use of design tools
- Outlook
  - Open Core Interface
  - WebConnector (NodeRed)
  - Matlab, Labview

**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
- Work on application examples
- Deepen one’s understanding of parameterization and dialog communication with practical examples
- Overview of upcoming integration possibilities for further electrification and digitalization 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**

- 02/17 – 02/19/2020 | Würzburg
- 08/10 – 08/12/2020 | Würzburg
- 09/28 – 09/30/2020 | 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: 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 Drive & Control Academy.

Bosch Rexroth
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
▶ Parameterization and commissioning with IndraWorks Ds
▶ 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 substitutio...
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.

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 in this course is projecting, commissioning, parameterization and network connection, which are taught in theory and practice.
BASIC TRAINING COURSE
Commissioning CytroPac

User groups
▶ 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
---|---
05/28 – 05/29/2020 | Würzburg
07/13 – 07/14/2020 | Würzburg
11/05 – 11/06/2020 | Würzburg

Date (English) | Location
---|---
08/13 – 08/14/2020 | Würzburg

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

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

Net price
879 €

Registration
Online via this link or via QR Code.

Training provider
The training is conducted by Drive & Control Academy.

Bosch Rexroth

Course ID: [HTP-CytroPac]
ActiveCockpit

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

User groups
- Sales engineers
- Project engineers
- Production engineers
- Users of ActiveCockpit
- Planner/applicator

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 (German) | Location
--- | ---
02/12/2020 | Stuttgart-Bad Cannstatt
10/27/2020 | Stuttgart-Bad Cannstatt

Date (english) | Location
--- | ---
03/16/2020 | Stuttgart-Bad Cannstatt

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 Drive & Control 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.

**Date (German) | Location**
- 05/26 – 05/27/2020 | Lohr am Main
- 11/24 – 11/25/2020 | Lohr am Main

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: 08:00 a.m. - 03:30 p.m.

**Net price**
1,020 €

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

**Training provider**
The training is conducted by Drive & Control Academy.

**Bosch Rexroth**

Course ID: [EST-IoT-Gateway]
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 different 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.

Participants will use a ready-to-use integrated Bosch XDK sensor device 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.

Bosch IoT Suite

BASIC TRAINING COURSE
Introduction to the Bosch IoT Suite

<table>
<thead>
<tr>
<th>User groups</th>
<th>Objective</th>
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</thead>
<tbody>
<tr>
<td>IT employees</td>
<td>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.</td>
</tr>
<tr>
<td>Business analysts</td>
<td></td>
</tr>
<tr>
<td>Consultants</td>
<td></td>
</tr>
<tr>
<td>Employees from business departments with an affinity for IT</td>
<td></td>
</tr>
</tbody>
</table>

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
01/20/2020 Berlin
05/04/2020 Berlin

Date (englisch) Location
03/09/2020 Berlin
09/28/2020 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.
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 all essential APIs of the Bosch IoT Suite
▶ Describing device semantics with Eclipse Vorto
▶ Developing a first IoT application with the Bosch IoT Suite
▶ Additional optional tutorials
  ▶ Short introduction to Java 8 (Lambda Expressions and Completable Futures)
  ▶ Introduction to Cloud Foundry
  ▶ Fundamentals of cloud development
  ▶ Bosch IoT Cloud as a runtime environment
  ▶ Service integration and service binding

Equipment
No equipment is required for this course.

Date (German) | Location
--- | ---
01/21 – 01/23/2020 | Berlin
05/05 – 05/07/2020 | Berlin
11/03 – 11/05/2020 | Berlin

Date (English) | Location
--- | ---
03/10 – 03/12/2020 | Berlin
09/29 – 10/01/2020 | 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 Software Innovations

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 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.

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.

### APAS assistant mobile

**BASIC TRAINING COURSE**

- Safe handling  
  [BCI-SP-AP011]  
  Page 170

**ADVANCED TRAINING COURSE**

- Troubleshooting and fault removal  
  [BCI-SP-AP012]  
  Page 172
- Maintenance of the sensor skin  
  [BCI-SP-AP015]  
  Page 173
- Preparation of working plans  
  [BCI-SP-AP018]  
  Page 174

### APAS assistant inline Fanuc F7-R911

**BASIC TRAINING COURSE**

- Safe handling  
  [BCI-SP-AP021]  
  Page 171

**ADVANCED TRAINING COURSE**

- Maintenance of the sensor skin  
  [BCI-SP-AP015]  
  Page 173
- Preparation of working plans  
  [BCI-SP-AP028]  
  Page 175
- Integration of projects  
  [BCI-SP-AP027]  
  Page 176

### APAS assistant inline kuka k10-R1100

**BASIC TRAINING COURSE**

- Safe handling  
  [BCI-SP-AP031]  
  Page 171

**ADVANCED TRAINING COURSE**

- Maintenance of the sensor skin  
  [BCI-SP-AP015]  
  Page 173
- Preparation of working plans  
  [BCI-SP-AP038]  
  Page 175
- Integration of projects  
  [BCI-SP-AP037]  
  Page 176
## 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 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>
<thead>
<tr>
<th>Date (German)</th>
<th>Location</th>
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<tbody>
<tr>
<td>02/17 – 02/18/2020</td>
<td>Stuttgart-Feuerbach</td>
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<tr>
<td>06/29 – 06/30/2020</td>
<td>Stuttgart-Feuerbach</td>
</tr>
<tr>
<td>11/09 – 11/10/2020</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

#### 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

### 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-AP021]

**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
---|---
03/18/2020 | Stuttgart-Feuerbach
10/14/2020 | 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
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>07/01 – 07/03/2020</td>
<td>Stuttgart-Feuerbach</td>
</tr>
<tr>
<td>11/11 – 11/13/2020</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

Course ID: [BCI-SP-AP018]

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-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 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-AP038]
ADVANCED TRAINING COURSE
Integration in projects

User groups
▶ Applicator
▶ Project Manager

Objective
▶ Introduction of the system architecture to integrate the APAS inline 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.

Course ID: [BCI-SP-AP021]

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.

Course ID: [BCI-SP-AP031]

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
i4.0 training systems

A whole 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.

You can see here our video about the training system mMs 4.0: https://www.youtube.com/watch?v=C13hgJX7sFU

Scan the QR codes for explanatory videos

New configuration in production
In Industry 4.0, digital boards, such as the ActiveCockpit, collect, filter, and visually depict data continuously in order to indicate possible improvements and problems. This happens in real time, so that downtime is minimized and productivity increased.

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.

Drive & Control Academy:
Discover training, media and training systems for Industry 4.0.
www.boschrexroth.de/training/industrie-4-0
I4.0 TRAINING SYSTEMS

Fields of application

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 and CNC 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
- Using the ActiveCockpit
- 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 analyze information and to depict it on the ActiveCockpit (e.g. energy efficiency, production deviations, ...)
- Setting up and understanding predictive maintenance
- Setting up and understanding automatic service alerts
- Integration of troubleshooting for the ActiveCockpit (such as a selection of possible errors, repair videos ...)
- 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

Industry 4.0
- Rexroth Open Core Engineering (OCE) – the university as a potential industrial partner for programming
- Develop new apps (Java) for ease of use
- Use simple, standard tools for quick access and the simple programming of an industrial PLC, such as LabVIEW, MATLAB/Simulink, C/C++, C#, Lua
- Use Visual Basic for Applications (VBA) for direct access to PowerPoint and Excel
- Use mobile devices (tablets and smartphones), rather than industrial HMIs (connection via Wi-Fi or cable)
- Use of Wi-Fi connections for the industrial sector
- Develop safety concepts
- Use Rexroth control systems as connections (server) with MES systems
- ERP systems – find efficient solutions
- And many more Industry 4.0 topics

Educational information
- Teachers and trainers receive additional information and teaching material for their lessons in the Learning-World of the Drive & Control 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.