Training programme 2023

PILZ
THE SPIRIT OF SAFETY

Enhanced success through professional development

- Training courses for safety and automation
- International qualification programme
- TÜV-certified training courses




Follow your individual qualification path for enhanced success through professional development.

Training programme 2023

Contents

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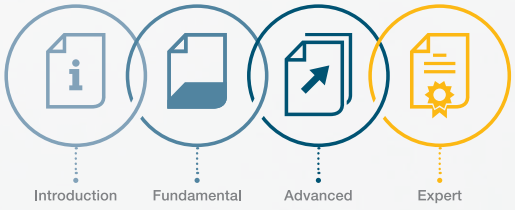
International Qualification Programme IQP

We offer you a training portfolio that meets all individual requirements for supplementary qualification in companies. We have organised all the contents and structure in such a way that they are optimised for your personal qualification path. This guides you from learning of the fundamentals to qualification as an expert in the subject areas you have selected.

Our training experts have developed a programme specially for this that enables you to enter the programme at your individual level and offers further training up to the desired degree of qualification, across four different levels.

We provide interactive training in accordance with the latest didactic concepts. In addition to the areas of machinery safety, automation and technology, our training courses also cover current topics from different subject areas.



The classification of the respective training is visible based on the corresponding symbol. Recommendations for qualification paths or training courses that build on one another can be found inside this brochure. We would also be happy to create a customised training concept specially for you.

International
We offer this qualification programme worldwide. Many of our trainings are internationally consistent and they can be attended at all the Pilz subsidiaries. We also offer them in other countries upon request. In this way, you can achieve a consistently high qualification level for your company all around the world.

Training courses for operators and manufacturers
Operators and manufacturers of plant and machinery must meet the specifications of different standards, directives and laws. In this brochure, you will find a note for each training course under the key word “Target groups” regarding for whom the respective training is particularly recommended irrespective of the industry in which they are active.

Made for you!

Arndt Christ, Vice President Customer Support International at Pilz, explains what new developments have occurred in our qualification programme in recent years.

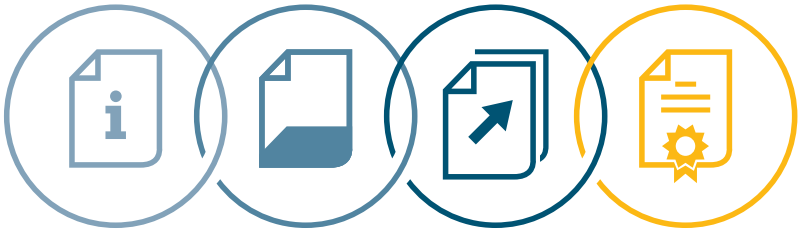
The past two years have shown how quickly a globalised, practically borderless world can shrink down to an individual country or even one’s own four walls. But even in such times, the world does not stand still. Qualification and regular training help you stay ready to meet these challenges. So you stay on top of things and remain an expert in your field!

The Pilz training programme is established globally and organised uniformly, meaning that we can offer you training courses with local trainers in a number of different countries – live, hybrid or digital.
We have successfully mastered the specific didactic challenges of this. Recent circumstances helped to accelerate what has become a solid alternative to a classic training course in a seminar room. No travel time, and can be integrated into day-to-day work as half-day blocks without compromising learning success.
We offer you the appropriate solution for every situation and all your personal preferences.

We hope you enjoy browsing through our new programme!

Yours,
Arndt Christ

International Qualification Programme IQP



Level: Introduction

You can attend the training courses on this level without special prior knowledge in the respective subject area. You receive an introduction to the topic, then you have a good overview and you can subsequently specialise further and participate in training courses of the following levels. On the Introduction level we also offer e-learning for self-study.

Level: Fundamental

On this level we provide all the relevant fundamentals to achieve a good technical understanding. This is not just the pure basics; we also offer less complex topics on this level. The Fundamental training courses cover over and above the basics in self-contained subjects and they serve as a basis for further qualification on the Advanced level.

Level: Advanced

If you already have good knowledge and experience in a subject area, our offer on an Advanced level is exactly what you need. To reach the minimum qualification level to attend training courses on this level, you can also attend courses from the Introduction or Fundamental level in advance. Here you can deepen your knowledge and expand your professional skills in key areas.

Level: Expert

We recommend this highest qualification stage for taking the step to becoming an absolute expert in a subject area. With the relevant professional experience or participation in training courses of the three previous levels, you will find comprehensive specialist knowledge at an expert level here. Additionally, all the qualifications are always confirmed and certified by an acknowledged test organisation. An additional benefit for you: Following successful participation, you will receive an internationally recognised title that confirms your qualification and that you can use in your e-mail signature or on your business cards.

Our International Network – Qualification all aro

15 000
Participants per year

50
Countries

10 000+
CMSE – Certified Machinery Safety Experts

An increasingly digitised and networked world poses new challenges for automation and for those who are involved with it. International standards are just as important to us as national regulations. We support you anywhere in the world with an extensive offer of training courses on an internationally uniform level. Our approximately 2 500 employees at 42 subsidiaries and 26 branches on all 5 continents make sure of this.

Allow our experts at subsidiaries around the world to train you further. Benefit from our expertise in the application of optimum manufacturing processes to optimise the availability and productivity of your plants all over the world.

> **Very experienced speakers.**

Your benefits at a glance

- You are trained by international trainers with many years of practical experience in the area of machinery safety.
- Our well networked global team ensures that you are always up to date with regard to national and regional requirements from standards and laws.

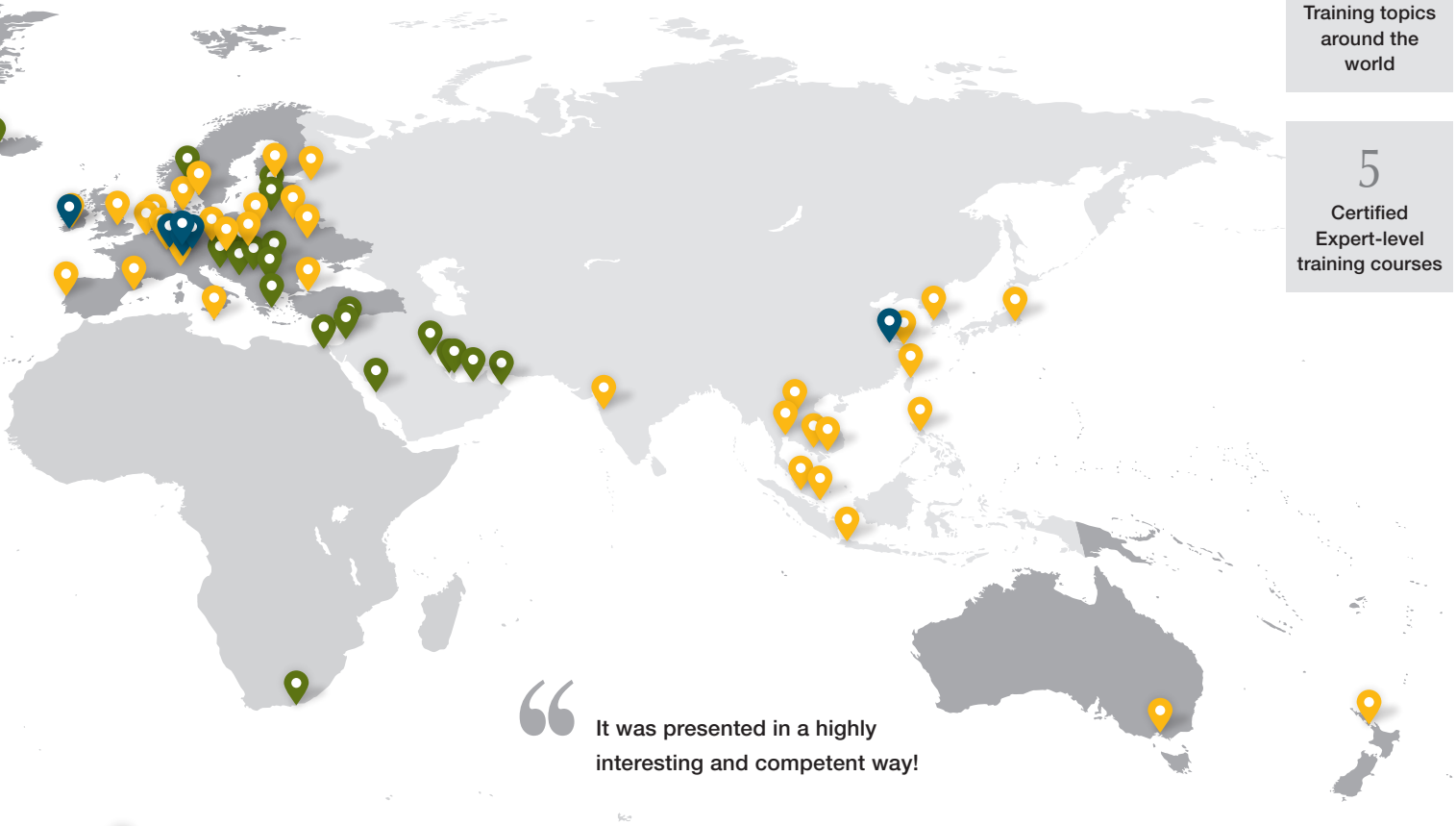
und the World

120
Trainers around the world

125
Training topics around the world

5
Certified Expert-level training courses

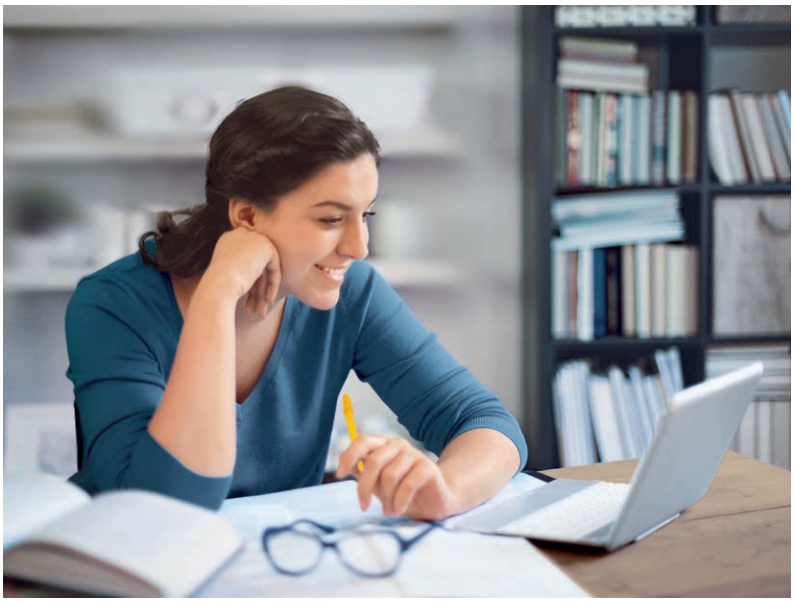
> The best basic training. Thank you!



> It was presented in a highly interesting and competent way!

- Subsidiaries and branches
- Sales partner
- Production sites

Digital Learning



Your benefits at a glance

- You see the trainer live, just like in face-to-face instruction
- Open discussions about your own questions
- Digital training documents are available to you in advance
- For our TÜV-certified training courses in an online format, we also offer an online test (multiple choice)
- Exclusive live online training – the contents are tailored to your company and the training is offered in-house for your employees
- For many topics, you can now choose between face-to-face and live online training

Live online training
During our live online training sessions, you are guided through the training live and virtually by our trainers.

We also ensure interaction within our online training courses using open discussions and rounds of questions.

Another component is the integrated exercises that are interactively performed during the training.
You have direct contact with the lecturer and other participants and learn intensively and focused in a shorter time. The live online training courses offer you opportunities for discussion with lecturers and people from other companies or your own company.

All this without travel time and the option of being integrated into day-to-day work as half-day blocks without compromising learning success.

You learn in real time with maximum flexibility, either from home or the office. Live online training enables skilled staff and managers to partake in regular training at lower cost and with a shorter time requirement.

E-learning

Your benefits at a glance

- Freedom to choose the time and place
- Individual learning speed
- Interactivity
- Multilingual capabilities
- Saves costs
- Multimedia learning

E-learning modules

Our e-learning modules offer you a simple solution with which you can gain knowledge over a short time. Our e-learning modules are interactive, multimedia-based and didactically sophisticated. Furthermore, they can also be integrated into your in-house learning management system.

Various learning formats can be introduced and tied together in our e-learning training courses – whether text, images, videos, podcasts or interactive modules. Depending on what type of learner you are, you can choose between various formats; these different formats and methods also guarantee more variety when learning.

The greatest advantage of e-learning is its flexibility with regard to space and time: there are no fixed dates and you can proceed according to your personal resources. Breaks are possible at any time and the learning workload can be perfectly adapted to the daily routine or weekly planning.

We also offer e-learning modules in different languages. Depending on programming, the same e-learning module can be shown in different languages. In international companies in particular, this allows for greater individualisation and enhanced user friendliness compared to a classic training course in a central base language.

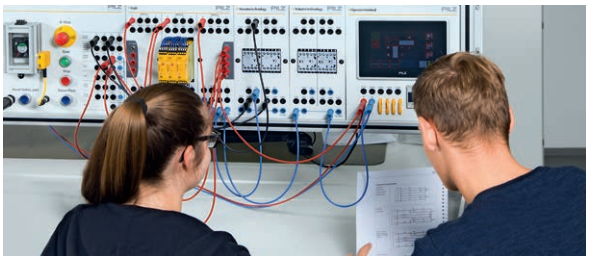
Your Partner for Teaching and Research Purposes

As a global Ambassador for Safety, we actively support universities and other educational institutions in the area of machinery safety and automation.

We provide knowledge of markets and standards across borders. For engineers and students, we offer bachelor's, master's or project theses on topical research subjects, particularly from the areas of automation and safety technology. The international exchange of scientific and practical knowledge that equally benefits both business and education is very important to us.

Our offer for universities and training institutions around the world:

- Information on the topic of machinery safety for self-study or as teaching support
- Specialist presentations for students
- Safety parts and components as equipment for laboratories, school and training workshops
- Pilz Education Systems PES – modular training systems with modern, industrial components for machine simulation for practical instruction (more information on PES is available on page 16)
- Creation and implementation of safety concepts for plants that are used for the purposes of further training



Personal Safety Logbook for all Attendees of our Seminars

In many firms a safety logbook is an obligatory prerequisite, to gain access to production for example, or to perform on-site services or engineering tasks. Many companies abide by the SCC (Safety Certificate Contractors) regulations. A safety logbook is obligatory in accordance with these regulations.

- Issued free of charge to those attending certified Pilz training courses
- Internationally recognised
- Consistent qualification certificate
- Documentation of medical check-ups including emergency ID card
- All the information in one document

Individual Training Courses – Specifically Tailored to your Requirements

Our individual training courses on machinery safety offer carefully coordinated course content – tailored to the needs of your employees. In line with your requirements, we can offer a one-day practical for your employees during which we provide practical examples of how to approach e.g. a CE process.

Individual training courses from Pilz

- Include specific application examples taken from your area of work
- Are specifically tailored to your requirements
- Provide manufacturer and product-neutral advice

In-Class System for a Unique Learning Experience

We aim to provide innovative education in our training courses. Learning concepts that are fun and establish the greatest practical relevance ensure long-term learning success, which is why we have developed the Pilz In-Class System.

Interactive. Innovative. Practical.
We aim to provide an interactive and forward-looking training environment. To achieve this, we use innovative technologies in our training to achieve an even more in-depth exploration of a topic and the best possible integration of existing knowledge. We use modern methods to create close practical relevance for the content presented. The In-Class System from Pilz is a completely digitalised learning environment that provides you with particularly efficient support when working through the course content. The result: Longer-term learning success and a direct transfer of the knowledge learned in the training to your everyday work.

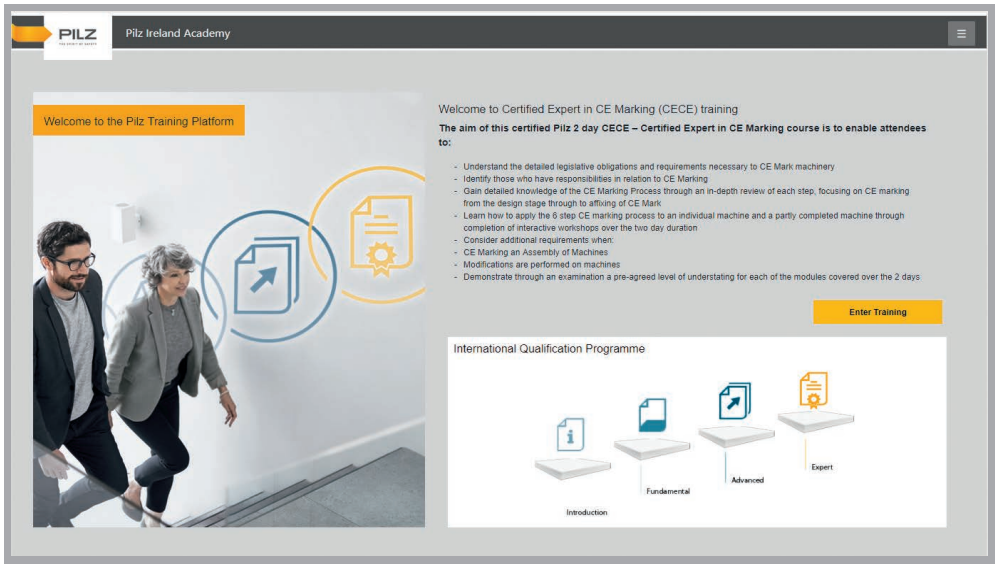
Further benefits of the Pilz In-Class System:

Online access
Online access via tablet to training materials that can be enhanced with comments and individually adapted.

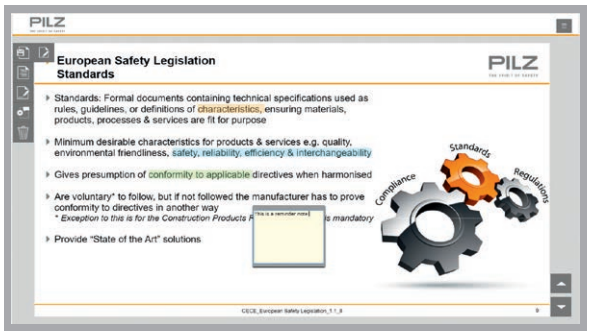
3D models
Experiencing various interactions with 3D models. During the training, the models help participants to complete tasks from the workshops and implement the learned theory in practice.

Live feedback
Opportunity to ask questions and ask for additional detailed information on selected topics during the training.

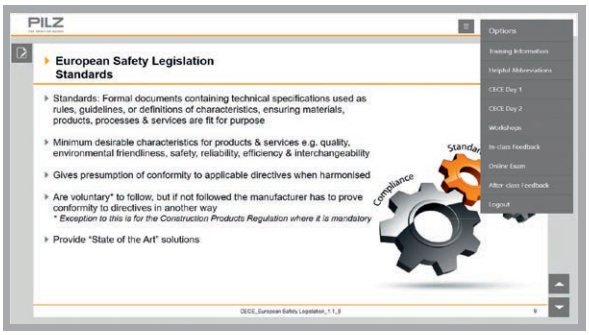
Training environment
The In-Class System guarantees a uniform training environment, no matter where the training is being completed.



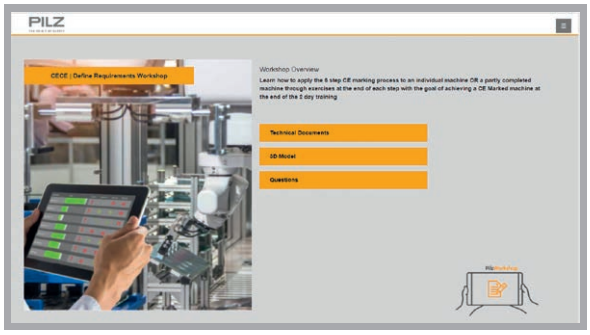
The Pilz In-Class System.



Online access to all training contents,
incl. commenting and editing options.



Test questions can be called up and live
feedback can be sent to the trainer via the menu.

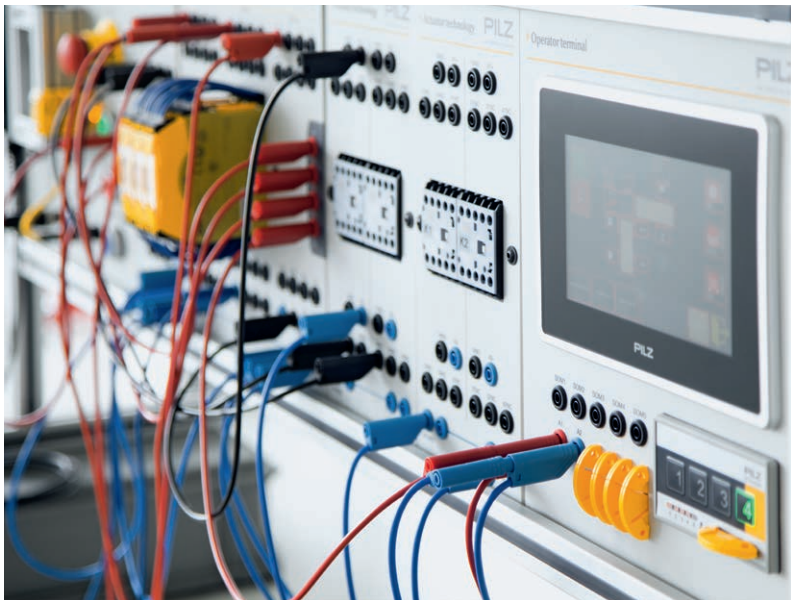


Workshop area with exercises,
in some cases on the 3D machine model.

3D machine model for visualisation
and individual knowledge check.

Pilz Education Systems PES – Training Systems for the Training Sector

Pilz Education Systems PES are modular training systems with industrially implemented components for practical training in electrical engineering. They consist of safety and automation functions that are clearly arranged on an operator board. The training systems allow apprentices, students or training delegates to learn to program controllers or implement safety functions for plant and machinery in a realistic setting.
The systems focus in particular on how Machinery Directive 2006/42/EC is to be correctly implemented and what requirements are placed on the safety functions for plant and machinery in accordance with ISO 13849-1.
You can choose from different operator boards that can be combined with one another from the sensor technology, control, operation and maintenance sectors as well as a board that simulates a real plant. Thanks to the use of genuine industrial components, the safety and automation functions of a plant or machinery can be realistically simulated.



Your benefits at a glance

- Optimal tool for knowledge transfer in the field of safe automation
- Realistic simulation modules for practical training in many fields of mechanical engineering
- Machine safety and automation functions are commissioned and configured directly on the system
- Use either in the lab or in training rooms
- Modular extension and simple exchange of individual operator boards
- For fast learning success, the corresponding accompanying documentation for each system such as exercises, technical documentation or theoretical background information is included
- Various application options: in-house training of trainees and apprentices, further in-house training of employees, at universities in the areas of electrical engineering, automation technology and mechanical engineering
- Also suitable for self-study

Pilz Education Systems PES operator boards

PES sensor board js en

PES sensor board enable en

PES operator board pmi en

PES logic board pnozs en

PES logic board pssu en

PES logic board ros-revpi en

PES actuator board op-conveyor en

Operator board	Components	Order number
Sensor board I PES sensor board js en	▸ E-STOP pushbutton PITestop ▸ Coded safety switch PSENcode ▸ Two-hand control relay PITjog ▸ Illuminated pushbuttons ▸ Fan (motor simulation) ▸ Safety gate	G9000004
II sensors PES sensor board enable en	▸ E-STOP pushbutton PITestop ▸ Coded safety switch PSENcode ▸ Enabling switches PITenable ▸ Illuminated pushbuttons ▸ Fan (motor simulation) ▸ Safety gate	G9000005
III sensors PES sensor board enable-motor en	▸ E-STOP pushbutton PITestop ▸ Coded safety switch PSENcode ▸ Enabling switches PITenable ▸ Illuminated pushbuttons ▸ Safety gate ▸ DC motor ▸ Proximity switch for speed monitoring	G9000006
Operation and monitoring PES operator board pmi en	▸ Human Machine Interface PMIvisu ▸ Visualisation software PASvisu ▸ Operating mode selector switch PITmode ▸ Transponder key	5S000002
Logic board PNOZsigma PES logic board pnozs en	PNOZsigma safety relays	2S000002
Logic board PNOZmulti PES logic board pnozm en	▸ Configurable, safe small controllers PNOZmulti 2 ▸ Safe I/O modules ▸ PNOZmulti Configurator	3S000002
Logic board PSS 4000 PES logic board pssu en	▸ Automation system PSS 4000 ▸ Electronic modules PSSuniversal ▸ Software platform PAS4000	4S000002
Logic board robot-ics PES logic board ros-revpi en	▸ RevPi Core 3 ▸ RevPi DIO ▸ RevPi AIO	3S000003
Actuator board contactor PES actuator board ec en	Auxiliary contactor 24 V DC	1S000009
Actuator board conveyor PES actuator board op-conveyor en	▸ Machine model with sliders, conveyor belts and drill/milling machine ▸ Optoelectronic protective devices	6S000002

On our website you can also find suitable accessories for wiring and commissioning individual components or connecting complete training systems to each other.

Keep up-to-date on Pilz Education Systems (PES):

Webcode: web193919

Online information at www.pilz.com

Machinery Safety and Expert Knowledge

Training topic	Page	Operator	Manufacturer	Dates
Standards and Directives				
E-learning: Machinery Safety – Introduction and Best Practice	20	◆	◆	e-learning
Introduction to Machinery Safety	22	◆		Dates on request
Fundamentals of Machinery Safety	23	◆		▸ 14-15/03/2023 ▸ 28-29/11/2023 ▸ 15-18/05/2023[5]
Safety Requirements and Approval Procedures for Machines in North America	24	◆		Dates on request
PL and SIL Calculation using the PAScal Safety Calculator	25	◆		▸ 29/06/2023
Complete CE Process in accordance with the Machinery Directive	26	◆		▸ 28/02-01/03/2023 ▸ 14-15/11/2023
CMSE® – Certified Machinery Safety Expert	28	◆	◆	▸ 23-26/01/2023 ▸ 03-06/07/2023 ▸ 21-24/03/2023[5] ▸ 06-09/11/2023 ▸ 27-30/03/2023
CMSE® – Recertification	30	◆	◆	▸ 09-10/05/2023[5] ▸ 21/09/2023
Design of Plant and Machinery				
Machinery Safety Workshop for Apprentices and Trainee Technicians	31	◆	◆	▸ 15/02/2023 ▸ 28/09/2023
Train the Trainer – Machinery Safety Workshop	32	◆	◆	Dates on request
Design of Safety Control Systems according to ISO 13849 and IEC 62061	33	◆		▸ 14/02/2023[1] ▸ 19-20/09/2023 [5]
Risk Assessment Workshop	34	◆		▸ 16/02/2023 ▸ 19/10/2023
EMC – Electromagnetic Compatibility in the Industrial Environment	36	◆		Dates on request
Safe Electrical and Pneumatic Design for Plant and Machinery	37	◆		▸ 07-08/03/2023 ▸ 26-27/09/2023
Safety Requirements for Software in accordance with ISO 13849	38	◆		▸ 09/05/2023 ▸ 05/10/2023
Electrical Safety in Industrial Installations – IEC 60204	39	◆	◆	▸ 16-17/05/2023
FSM – Functional Safety Management in accordance with ISO 13849	40	◆		▸ 20/03/2023 ▸ 16/11/2023
CEFS – Certified Expert in Functional Safety	42	◆	◆	▸ 01-03/03/2023 ▸ 17-19/10/2023
CESA – Certified Expert for Security in Automation	44	◆	◆	▸ 25-26/04/2023 ▸ 21-22/11/2023
Basis of CE Marking	46	◆		▸ 02/05/2023 ▸ 24/10/2023
CECE® – Certified Expert in CE Marking	48	◆		▸ 03-04/05/2023 ▸ 25-26/10/2023
CECE® – Recertification	50	◆		▸ 17/10/2023[5]
ZMSE – Certified Machinery Safety Expert/National (Germany)	52	◆	◆	▸ 06-10/02/2023 ▸ 09-13/10/2023 ▸ 22-26/05/2023 ▸ 04-08/12/2023 ▸ 11-15/09/2023
ZMSE – Refresher	54	◆	◆	▸ 21/02/2023 ▸ 04/10/2023
Operation and Maintenance				
Management of Risk in Machinery Procurement	56		◆	Dates on request
Qualification as Individual with Electrical Engineering Instruction	57		◆	Dates on request
Safe Electrical and Mechanical Upgrading for Maintenance Personnel	58		◆	▸ 14/06/2023
LOTO and Other Means of Energy Control	59		◆	Dates on request
Safe Use of Machinery in accordance with BetrSichV	60		◆	Dates on request
Press Setters for Mechanical and Hydraulic Presses	61		◆	▸ 11/07/2023
Retrofitting Old Presses	62		◆	▸ 09-10/05/2023 ▸ 07-08/09/2023
Inspection of Optoelectronic Protective Devices	63	◆	◆	▸ 14-15/03/2023 ▸ 17-18/10/2023

Unless stated otherwise, training courses are held at the Pilz Training Centre at Ostfildern, near Stuttgart.

[1] Hanover training location
[2] Dresden training location
[3] Nördlingen training location
[4] Munich training location
[5] Online training

E-learning: Machinery Safety – Introduction and Best Practice

Introduction

For self-study whenever and wherever you want, or for teaching support in apprenticeships and in-service training within the company. With our e-learning you can learn and develop interactively. The main advantage of the e-learning is that you can complete the course without any prior knowledge. The e-learning thus offers the ideal basis for an introduction to the topic and is also fun. You determine your individual learning speed.
To further deepen your knowledge, we offer the follow-up training courses "Introduction to Machinery Safety" and "Fundamentals of Machinery Safety", for example.

Good to know

- Ideal for beginners: communicating the fundamentals and increasing level of difficulty within the training course
- Separation into different modules that you can process at your own individual learning speed
- All modules are accompanied by exercises and subsequent solutions for checking your learning success. These can either be processed directly within the e-learning or printed out and completed in writing. You can thereby directly check whether your answers were correct and monitor your learning success
- Available in German and English (other languages possible on request)

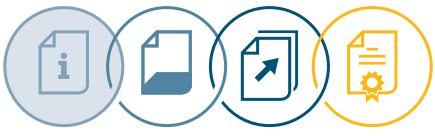
Target groups

- Apprentices
- Aspiring engineers
- Students
- People within the company interested in further training for beginners
- Mechatronics engineers
- Electronic technicians for automation engineering
- Trainers
- Standards officers
- Design engineers
- Safety officers

Contents

- Introduction to machinery safety
  - Motivation for safety and why we need safety technology
  - CE marking
  - Standards and Directives
  - Risk assessment
- Risk reduction
  - Safeguards
  - Functional safety
- All steps are explained using the application example of a real machine
- Practical section
  - Application examples (wiring with EPLAN)

Your optimum qualification path:



Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental: Risk Assessment Workshop

Advanced: Basis of CE Marking

Expert: CECE – Certified Expert in CE Marking

More information at www.pilz.com

Order number:	1T000156
Duration:	**approx. 3.5 hours**
Fee:	**Price on request**

Be safe and secure with Pilz.

Don‘t leave Safety and Security to chance! We protect your plants against unauthorised access and your employees from hazardous machinery. Our solutions cover authorisation and authentication, reliable guard locking of safety gates during operation and protection against manipulation of the control network. Play it safe with solutions from Pilz.

Further information on solutions
for secured access and secure data

PILZ
THE SPIRIT OF SAFETY

Introduction to Machinery Safety

Introduction

Objective

In this training, you receive a basic understanding of the safety requirements in industry – including information on regulations and standards as well as directives for plant safety.
This one-day training provides you with knowledge about the obligations to be met when commissioning a machine. This includes relevant laws, standards and a closer consideration of the plant safety directives. The course provides a good technical basis on the principles of machinery safety and a good foundation to allow further technical understanding as the International Qualification Programme (IPQ) develops.

Contents

- Introduction to safety:
  - Motivation for safety
  - Key safety questions
  - Behaviour-based safety
  - Health and safety management system
- International legislation
  - Application on plant and machinery
  - Advantages of compliance
- CE marking
  - Relevant legislation
  - Machinery Directive requirements
- Safety standards and their application
  - Key machine safety standards
  - Case examples
- Risk assessment
  - Hazards
  - Methods of risk assessment
- Risk reduction
- Safety components
- Validation

Target groups

The target group for this training is personnel who require an awareness and understanding of the basics of safety in their company. Personnel should possess a basic understanding of safety within an industrial environment. While experience in working with machinery is a distinct advantage, it is not mandatory for this training:

- Management
- Project managers
- Project heads
- Design engineers
- Commissioning engineers
- Purchasing
- Health and safety
- Designers

Benefits to you

- Overview of machinery safety
- Introduction to the key standards and directives
- Understanding standards and their application on plant and machinery
- Learning risk assessment up to safety validation step by step
- Participation possible without prior knowledge

Your optimum qualification path:

Introduction: Introduction to Machinery Safety
Fundamental: Fundamentals of Machinery Safety
Advanced: Electrical Safety in Industrial Installations – IEC 60204
Expert: CMSE – Certified Machinery Safety Expert

or

Advanced: Design of Safety Control Systems according to ISO 13849 and IEC 62061
Expert: CEFS – Certified Expert in Functional Safety

Training (1T000013)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

- Dates on request

Individual training (1T000015)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Fundamentals of Machinery Safety

Fundamental

Objective

In this training, you will receive a deeper insight into the basics of technical safety in industry. You can improve your competence in the key areas particularly relevant for machinery safety. The focus here is on the topics CE marking, risk assessment, safety components and the design and validation of control systems in accordance with ISO 13849 and IEC 60261 in particular. And all of this is based on the standards and laws that enhance machinery safety.

Target groups

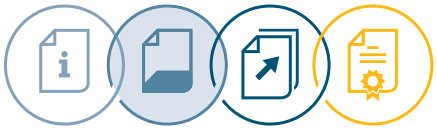
The target group for this training are people who already have a good understanding of the basic requirements of machine safety legislation or have completed the basic level training.

- Design engineers and developers
- Project managers and team leaders
- Maintenance technicians
- Health and safety personnel

Contents

- Review of introduction level
  - International and local legislation
  - Safety standards
- CE marking
  - Introduction to CE marking
  - Machinery Directive
  - Validation of EHSR (Essential Health and Safety Requirements)
- Risk evaluation
  - Introduction to risk assessment
  - Standards and directives
  - Methods and systems
  - Introduction to risk reduction measures
- Introduction to safeguarding methods and systems
  - Standards related to mechanical guarding
- Electrical safety IEC 60204/NFPA 79
  - General requirements for the electrical safety of machinery
- Lockout tagout – control of hazardous energy
  - LoTo process overview, procedures and tools
- Introduction to safety control systems
  - Application range of ISO 13849
- Robot safety
  - Applicable standards and laws
  - Assessments and protective measures

Your optimum qualification path:



Introduction: Introduction to Machinery Safety

Fundamental: Fundamentals of Machinery Safety

Advanced: Electrical Safety in Industrial Installations – IEC 60204

Expert: CMSE – Certified Machinery Safety Expert

or

Advanced: Design of Safety Control Systems according to ISO 13849 and IEC 62061

Expert: CEFS – Certified Expert in Functional Safety

Training (1T000158)

Duration:	**2 days** 9:00 – 16:30
Fee:	**EUR 990 per person**
Number of participants:	Up to 30
14-15/03/2023	Ostfildern
28-29/11/2023	Ostfildern

Online training (1T000189)

Duration:	**4 modules of 3.5 hours**
Fee:	**EUR 990 per person**
Number of participants:	Up to 15
15-18/05/2023	Online training

Individual training (1T000039)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 5 250 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Safety Requirements and Approval Procedures for Machines in North America

Fundamental

Objective

The various market access requirements for industrial equipment, plants and machinery for selected export countries are explained on this training course. The clear focus is on the important North American market for German mechanical engineering companies – specifically the USA and Canada.

The most important national legal bases for market access to the USA and Canada are explained and compared with the European Machinery Directive.
The national approval and acceptance procedures are presented, and the special features of current national product standardisation are considered. An overview of other important trading regions worldwide is also provided.

Contents

- Framework conditions for legally compliant access to the North American machinery market
- Acceptance of European directives and harmonised standards in the USA and Canada
- Market supervisory authorities and accredited testing and supervisory bodies
- Approval and acceptance requirements as well as relevant product standardisation in the USA and Canada
- Differences between and common features of national product standardisation and IEC, ISO and EN machinery standards
- Special features of electrical and mechanical machinery safety in the USA and Canada
- Special requirements of machine labelling and technical documentation in the USA and Canada
- Overview of the approval and safety requirements for machinery in Eastern Europe, South America and Asia

Target groups

- Project managers
- Quality assurance managers
- Officers for the approval of and compliance with product regulations
- Development engineers and technicians
- Engineers and technicians for mechanical and electrical design
- Design engineers
- Sales managers and sales staff

Benefit to you

- \+ Establishment of sound basic knowledge of machinery safety and compliance with regulations in North America

For information and registration: visit www.pilz.com

Training (1T000111)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

- Dates on request

PL and SIL Calculation using the PAScal Safety Calculator

Advanced

Objective

The Safety Calculator calculates and verifies the key safety parameters for safety functions on plant and machinery, such as Performance Level (PL) and Safety Integrity Level (SIL), based on graphic representations of your own circuit structures.
The result is compared with the required safety parameters and illustrated in graphic form.
This Pilz tool makes it considerably easier for you to proceed systematically in compliance with the standards without having to study the mathematics underpinning the standards.

Contents

- Principles and terms of functional safety
- Brief overview of functional safety according to ISO 13849 and IEC 62061
- Various arithmetic examples using a machine equipped with the PAScal Safety Calculator or SISTEMA
- Individual questions

Target groups

- Developers
- Design engineers
- Designers
- Safety officers

Notes

You can use your own laptop with pre-installed PAScal software for the training course. Download PAScal for free at www.pilz.com using the webcode: web150431.

Participants in this training course can purchase the full version of the PAScal Safety Calculator from us at the discount price of EUR 100 incl. software licence. You save over EUR 200. Just talk to us.

Benefits to you

- Specific implementation of your requirements with aid of PAScal
- Individual advice regarding your questions

Training (1T000044)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

29/06/2023	Ostfildern

Online training (1T000227)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 470 per person**
Number of participants:	Up to 15

Individual training (1T000148)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2 750 per event**
Number of participants:	Up to 12

For information and registration: visit www.pilz.com

Complete CE Process in accordance with the MD

Advanced

Objective

Compliance with the requirements of the Machinery Directive 2006/42/EC in respect of CE marking can be achieved with the right preparation. Where this is incorporated into the design process, the outlay can be amortised even with the first project. In the “Complete CE Process in accordance with the Machinery Directive” training course, you will learn the step-by-step conformity assessment process which complies with the Machinery Directive. The complete CE process is considered in detail and developed using a machine model as an example.

Contents

- Conformity assessment according to the Machinery Directive using concrete examples
- Relationship between Machinery Directive and harmonised standards
- Risk assessment in accordance with ISO 12100 and risk reduction measures
- Discussion of important standards for risk reduction
- Application of ISO 13849 (standard for safety-related control systems)
- Practical implementation of the knowledge gained on a machine model
- What should be considered when converting machines (substantial modification)?
- When is an “assembly of machines” achieved as defined by the Machinery Directive?

Target groups

- Plant construction and control system design engineers
- Plant designers
- Occupational safety officers and safety specialists
- Technical purchasers (of machines and industrial plant specifically)
- Those responsible for upgrades and maintenance of plant and machinery

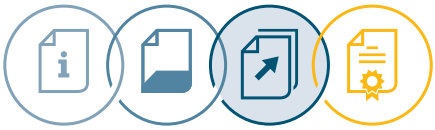
Notes

- The training course contents are aimed especially at all persons participating in the CE process.
- This training also serves as an admission requirement for qualification as CECE – Certified Expert in CE Marking.

Benefits to you

- Save time and costs with more effective implementation of CE marking
- High practical relevance through exercises on a machine model

Your optimum qualification path:



- Introduction: E-learning: Machinery Safety – Introduction and Best Practice
- Fundamental: Risk Assessment Workshop
- **Advanced:** Complete CE Process in accordance with the MD
- Expert: CECE – Certified Expert in CE Marking

or

- Introduction: E-learning: Machinery Safety – Introduction and Best Practice
- Fundamental:
  - PNOZmulti – Programming and Service
  - Visualisation with PASvisu – Programming
- **Advanced:** Complete CE Process in accordance with the MD

Training (1T000042)

Duration:	**2 days**
	9:00 – 16:30
Fee:	**EUR 990 per person**
Number of participants:	Up to 30

28/02-01/03/2023	Ostfildern
14-15/11/2023	Ostfildern

Individual training (1T000039)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 5 250 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

“Finally, a company has addressed the complexity of the EC Machinery Directive and highlighted its limitations as well as provided a practical system for generating a reliable EC declaration of conformity.”
Wolfgang Gutbrod, BMW AG, Munich

Safely.

Pilz offers everything you need for your plant- and machine automation: innovative components and systems, in which safety and automation are merged in hardware and software.

Automation solutions for the safety of man, machine and the environment.

Find out more:

www.pilz.com

PILZ

THE SPIRIT OF SAFETY

CMSE® – Certified Machinery Safety Expert

Expert

The requirements for machinery have changed considerably in recent years with the increasing use of automation and robot systems. This has increased the need for intelligent strategies for machinery safety. The changing requirements for legislation also play a role in the use, maintenance and operation of machinery. Because machinery must be designed, modified and modernised, companies require personnel that have the necessary knowledge to make informed decisions about machinery safety. CMSE was developed specifically to offer the market expert training in the field of machinery safety and enable the graduates to prove their skills with an independent certification.

They gain comprehensive knowledge and a practical understanding of the machine lifecycle from the risk assessment to the creation of safety concepts, all the way to the application of the principles of functional safety. CMSE is a qualification that is recognised worldwide and enables comprehensive consideration of machinery safety.

In cooperation with TÜV NORD, Pilz offers the qualification to become a CMSE – Certified Machinery Safety Expert. The four-day course gives an overall view of the subject of machinery safety and is divided into five modules. The CMSE modules are standardised worldwide and are of a uniform level. The concluding TÜV NORD certificate has international validity.

In partnership with:

TÜV NORD

Contents

Module 1: Introduction to safety
- Basics of safety
- Introduction to safety legislation and standards

Module 2: Machinery safety
- European directives – history and framework
- Devices and Workplaces Ordinance
- CE marking and Machinery Directive
- Occupational health and safety

Module 3: Risk assessment
- Risk evaluation
- Workshop on risk evaluation

Module 4: Mechanical safeguards
- Mechanical safeguard
- Safety components
- Electrical safety

Module 5: Functional safety of control systems
- Functional safety of control systems
- Functional safety of pneumatic and hydraulic systems

Target groups
- Mechanical designers
- Control engineers
- System integrators
- Control system designers and machine builders
- Companies that operate plant and machinery
- Craftsmen, technicians, engineers

Notes

The seminar includes a multiple choice test.
If the test is passed, the participants receive the internationally recognised TÜV NORD certificate of “CMSE – Certified Machinery Safety Expert”, which is valid for four years.
The one-day recertification extends the validity by an additional four years in each case. Further information on the following pages. Detailed information, conditions for taking part and registering can be seen at **www.cmse.com. There you will find all the information about the CMSE and you can test your knowledge in the CMSE quiz.**

We can also offer the test in other languages, if needed. Please inform us of this accordingly when registering.

Prerequisites

To be able to successfully take part in the expert training, you must prove that you have sufficient knowledge in the area of machinery safety. At least one of the following criteria must be met:

At least five years of experience in the field of machinery safety

Several years of professional experience and training in one or more areas relating to machinery safety, e.g. technology, safety-related construction, safety-related maintenance and servicing.

Qualification and more than 1 year of experience in the field of machinery safety

Formal qualification in the fields of general science, engineering, technology, construction and design or maintenance and repair of machinery from a university/technical college with a training period of at least two years and at least one year of practical experience in one or more fields that are related to machinery safety, e.g. technology, safety-related construction and design or safety-related maintenance and repair.

Are you unsure about whether your current qualification corresponds to the required level? Please contact us. We can provide you with an individual consultation and would be happy to point out any possible alternatives with which you can reach the qualification level for the CMSE.

Benefits to you

- Understand the requirements of the European ordinances and standards relating to machinery
- Discover how these can be applied to the design, construction, maintenance and operation of machinery in the European Economic Area
- Recognise and identify obligations that must be met in the specification, design or commissioning of a machine
- Improve your skills in the design of safety systems
- Qualification as CMSE – Certified Machinery Safety Expert (after successful completion of the test)

Your optimum qualification path:

- Introduction: Introduction to Machinery Safety
- Fundamental: Fundamentals of Machinery Safety
- Advanced: Electrical Safety in Industrial Installations – IEC 60204
- **Expert:** CMSE – Certified Machinery Safety Expert

Training (1T000047)

Duration:	**4 days** Day 1 to Day 3: 9:00 – 17:00 Day 4: 9:00 – 16:00
Fee:	**EUR 2 450 per person** [1]
Number of participants:	Up to 30

▸ 23-26/01/2023	Ostfildern
▸ 27-30/03/2023	Ostfildern
▸ 03-06/07/2023	Ostfildern
▸ 06-09/11/2023	Ostfildern

Online training (1T000199)

Duration:	**7 modules of 4.5 hours** **8th module: test, 1 hour**
Fee:	**EUR 2 450 per person** [1]
Number of participants:	Up to 15

▸ 21-24/03/2023	Online training

Individual training (1T000030)

Upon request, we offer customised training courses, internally or online.

Duration:	**4 days**
Fee:	**Price on request**
Number of participants:	Up to 15

Test required

[1] Includes the TÜV examination fee and the issuing of the certificate

CMSE – Recertification

Page 30

For information and registration: visit www.pilz.com

CMSE® – Recertification

Expert

Objective

To keep you up-to-date, you need to renew your CMSE – Certified Machinery Safety Expert certificate every four years.

In partnership with:

TÜV NORD

The various laws and standards in connection with machinery safety are constantly developing further or being revised in order to keep up with the emergence of new best practices, techniques and technologies. To ensure that you are up-to-date with regard to the critical requirements for machinery safety and are still permitted to use the title of CMSE, you must renew your CMSE – Certified Machinery Safety Expert certificate every four years. This course informs you about the status of standards and laws with regard to machinery safety as well as critical changes and also provides guidance on upcoming potential changes.

Contents

- Current standards and legal practice
- Safety trends
- Risk assessment – Workshop I
- Safeguards – Technical considerations
- Functional safety – Workshop II

Target group

- CMSE – Certified Machinery Safety Experts

Notes

In the course of the seminar, you will be able to keep testing the knowledge that you have refreshed using small self tests.

After taking part in the one-day seminar, you will receive a TÜV NORD certificate that confirms your certification as a CMSE for another four years.

For information and registration: visit www.pilz.com

Prerequisite

- Passing the CMSE examination

Benefits to you

- Extend your internationally valid certificate by another four years
- Stay a part of the global community of experts

Training (1T000084)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 680 per person** [1]
Number of participants:	Up to 30
21/09/2023	Ostfildern

Online training (1T000200)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 680 per person** [1]
Number of participants:	Up to 15
09-10/05/2023	Online training

Individual training (1T000159)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**Price on request**
Number of participants:	Up to 15

[1] Includes issuing of the certificate

Machinery Safety Workshop for Apprentices and Trainee Technicians

Objective

One day on all aspects of machinery safety specifically tailored to the needs of young people in training. Learn all the basics in the practical training course at the Pilz Training Centre in Ostfildern or in your own training institution.

Contents

- Standards and directives, in particular Machinery Directive 2006/42/EC
- Risk assessment in accordance with ISO 12100
- Overview and deployment options of relevant products
- Functional safety in accordance with ISO 13849
- Examples of applications with EPLAN
- Wiring of safety functions, e.g. emergency stop, two-hand switch and safety gate switch

Target groups

- **Second-year trainees** that are learning to be mechatronics engineers and electronics engineers in automation
- **Trainee technicians** in the fields of mechatronics, electronics and information technology

Note

We recommend the following training courses as basic courses for specialists and people returning to the field:

- Introduction to Machinery Safety or
- Fundamentals of Machinery Safety

Benefits to you

- Practical training
- Structure of course content will appeal especially to a younger audience

Introduction

Training (1T000125)

Duration:	**1 day**
	8:30 – 17:00
Fee:	**EUR 70 per person** [1]
Number of participants:	Up to 12

15/02/2023	Ostfildern
28/09/2023	Ostfildern

Individual training (1T000108)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 840 per event**
Number of participants:	Up to 15

Test optional

For information and registration: visit www.pilz.com

"I particularly liked the practical training. Our apprentices were able to solve a practical task on their own initiative using the Pilz Education Systems. We are delighted that Pilz will be coming to us again next year to repeat the Machinery Safety workshop."
Carsten Irmer, automation technology teacher at the Carl-Miele vocational college, Gütersloh

[1] Share of costs of workshop documents and catering

Train the Trainer – Machinery Safety Workshop

Fundamental

Objective

The tried and tested practical training concept that has been specifically developed for trainees will be presented in our two-day workshop.
You will receive practical tips and tricks on how to implement the topic in your training sessions. After this training course, you will be in a position to use the teaching programme that has already been didactically prepared – and consists of a trainee and teacher manual and training models – to pass on your knowledge to your trainees and to implement the training concept in your own classes.

The main focus is on developing a feel for recognising risks at machines in good time and avoiding them and for implementing the field of safety technology into the curriculum.

Contents

- Presentation of the “Machinery Safety Workshop” overall training concept
- Didactic background/methodology
- Overview of the overall CE process according to Machinery Directive 2006/42/EC
- European standards situation
- Ordinance on Industrial Safety and Health
- Risk assessment in accordance with ISO 12100
- Functional safety in accordance with ISO 13849
- Application examples using EPLAN – hands-on
- Wiring exercises using Pilz Education Systems (emergency stop, safety gate switch, light barrier) – hands-on

Target groups

- Trainers
- Teachers at vocational/technical schools

Note

We will be glad to carry out the “Machinery Safety Workshop for Apprentices and Trainee Technicians” on your premises or at the Pilz Training Centre.
All the information you need is on page 31.

Benefits to you

- Optimising knowledge in the field of machinery safety
- Transferring the methodology of this knowledge to trainees
- Instruction geared to practical applications by means of a didactically prepared programme of instruction and optimised teaching systems

Training (1T000124)

Duration:	**1.5 days**
	Day 1: 9:00 – 16:30
	Day 2: 9:00 – 13:00
Fee:	**EUR 70 per person** [1)]
Number of participants:	Up to 12

- Dates on request

[1)] Share of costs of workshop documents and catering

For information and registration: visit www.pilz.com

Design of Safety Control Systems according to ISO 13849 and IEC 62061

Advanced

Objective

The objective of the training is to put across to you the processes and standards that are important in the design and evaluation of safety-related control systems. This training course addresses how ISO 13849-1 (the safety-related control systems standard) is applied in automation and equipment design. In addition, we introduce you to the requirements resulting from the IEC 62061 standard.

Contents

- Basics of functional safety and principles of ISO 13849-1
- Safety functions
  - Required performance level
- Subsystem design
  - Performance level of the subsystem
  - Categories
  - Diagnostic coverage
  - Common cause failure
  - Safety-related software
  - Systematic failures
- PL of the safety function
  - Incorporation of subsystems
  - Addition of PFHD
- Validation and documentation according to IEC 62061
  - Required SIL of IEC 62061
  - Design of the subsystem
  - SIL of the safety function
- Software tools

Target groups

Developers, design engineers and planners in plant and machine engineering and control and automation technology

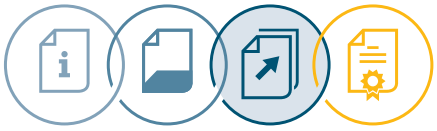
Note

Participants in this training course can purchase the full version of the PAScal Safety Calculator from us at the discount price of EUR 100 including software licence. You save over EUR 200. Just talk to us!

Benefits to you

- Detailed calculation of the required performance level and evaluation of the achieved level from the safety design
- Main architectures and alternatives in the design of safety-related control systems, including practical examples
- Advantages of a structured concept for the design of safety systems
- Tried-and-tested methods for your machine design

Your optimum qualification path:



Introduction: Introduction to Machinery Safety

Fundamental: Fundamentals of Machinery Safety

Advanced: Design of Safety Control Systems according to ISO 13849 and IEC 62061

Expert: CEFS – Certified Expert in Functional Safety

Training (1T000043)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30
▸ 14/02/2023	Hanover

Online training (1T000194)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 550 per person**
Number of participants:	Up to 15
▸ 19-20/09/2023	Online training

Individual training (1T000147)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Risk Assessment Workshop

Fundamental

Objective

The workshop equips the participants with the knowledge and skills with which to carry out the risk assessment of machinery in accordance with ISO 12100. The risk assessment is necessary and a fundamental aspect of machinery safety, as well as the first step towards complying with the legal regulations (Machinery Directive 2006/42/EC) and standards. This workshop uses images and videos to guide you through the risk assessment process on machinery – it's always interactive and practically based. The objective is to identify hazards and perform risk evaluations (degree of harm and probability of occurrence). This course also covers how to apply appropriate risk reduction measures and determine the residual risk.

Contents

- Risk analysis process – theory
  - Risk assessment legislation and standards
  - Competence in risk assessment
  - Risk assessment process according to ISO 12100
  - Risk estimation tools – risk matrix, risk graph and HRN
- Risk analysis process – practice
  - Identification of the limits of machinery
  - Identification of the hazards present
  - Risk estimation and risk evaluation
  - Risk evaluation process
  - Workshop – findings
- Risk reduction measures – theory
  - Hierarchy of control
  - Inherently safe design
  - Safeguarding controls
  - Safeguarding
  - Common standards
  - Safety control systems
- Risk reduction measures – practice
  - Identification of potential risk reduction measures
  - Re-estimating the risk based on risk reduction measures

Target groups

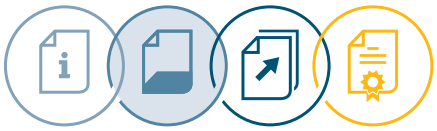
The training has been developed to respond to the requirements among technical personnel responsible for a more practical approach to ensuring risk identification and risk reduction in machinery and for ensuring overall compliance with the regulations, including:

- Standards officers
- Design engineering managers
- Plant construction and control system design engineers
- Technical engineering managers
- Safety officers and specialists involved in workplace evaluation
- Personnel responsible for acquiring machinery or putting it into service, including purchasing personnel, project engineers and production managers
- Those responsible for retrofitting and maintenance of plant and machinery
- Managing directors of machine engineering companies and control systems manufacturers

Benefits to you

- Comprehensive understanding of how to approach the risk assessment process using the relevant standards and knowing the required steps for performing a risk assessment on a machine
- Knowledge to evaluate the risk associated with specific hazards, to determine the required risk reduction and to identify residual risk
- Maximum practical orientation using interactive, actual case studies

Your optimum qualification path:



Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental: Risk Assessment Workshop

Advanced: Basis of CE Marking

Expert: CECE – Certified Expert in CE Marking

Training (1T000107)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

16/02/2023	Ostfildern
19/10/2023	Ostfildern

Online training (1T000190)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 550 per person**
Number of participants:	Up to 15

Individual training (1T000144)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

EMC – Electromagnetic Compatibility in the Industrial Environment

Fundamental

Objective

The electromagnetic compatibility of electronics is an important quality feature. The purpose is to avoid unintentional electrical or electromagnetic effects between different devices. In this training course we show you how devices and machinery in the industrial environment influence each other. And we show you how you can rectify individual EMC effects. This training course teaches knowledge of the statutory requirements, including as laid down in the relevant standard IEC 60204. We explain to you the different coupling mechanisms in EMC and EMC measurement technology. You will also learn which EMC regulations exist and how you need to apply these for your area.

Contents

- Laws and standards for manufacturers and operators of industrial plants and machinery
- Fundamentals of EMC (calculations, filters, antennas)
- Harmonics on frequency converters and the effects
- Installation techniques for control cabinets, plants and machinery
- Free-field measurement options (machine in its installation environment)
- Examples and presentation of measurements and filter options

Target groups

- Electricians
- Maintenance engineers
- Design engineers
- Designers
- System integrators

Benefits to you

- Identifying EMC issues in the industrial environment
- Evaluating the legal situation
- Rectifying EMC errors

Training (1T000112)

Duration:	**1.5 days**
	Day 1: 9:00 – 16:30
	Day 2: 9:00 – 13:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 30

- Dates on request

Individual training (1T000153)

Upon request, we offer customised training courses, internally or online.

Duration:	**1.5 days**
Fee:	**EUR 4 050 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Safe Electrical and Pneumatic Design for Plant and Machinery

Advanced

Objective

The requirements for the safety of plant and machinery are defined in European directives and standards. Regardless of whether for control elements, circuit technology or drives – there is always a multitude of regulations to be observed. In practice, pneumatic and electrical systems can hardly be separated from each other; it therefore makes sense to treat these together. For this reason, a training course was developed that unites the core competences of both experts (Pilz GmbH & Co. KG and Festo Didactic GmbH & Co. KG). In this seminar, you will familiarise yourself with both aspects and learn how to coordinate interaction between them to the best possible effect.

You will get to know about the function of various protective measures as well as the behaviour of electrical safety components and pneumatic drives. You will be able to select them for your applications, understand the interaction of the components and read the wiring diagram.

Contents

Introduction, directives and standards

- Implementing the law, directives and Machinery Directive
- Safe control technology in accordance with ISO 13849-1

Safety-related electrics (day 1)

- Risk assessment and risk reduction in accordance with ISO 12100
- Safety-related design of controls in compliance with ISO 13849-1
- Safe drives, vertical axes
- Safe guard locking devices, fitting of safety light curtains, scanners, two-hand units
- Emergency stop ratings, stop categories and operating modes
- Software, safety requirements

Safety-related pneumatics (day 2)

- Basic and well-tried pneumatic principles in accordance with ISO 13849-2
- Validation and fault considerations
- Various control categories in one safety chain
- Selection and behaviour of safety-related pneumatic drives (stopping/blocking, venting, reversing, stopping)
- Reading electrical and pneumatic circuit diagrams

Target groups

- Design engineers and planners from the fields of mechanics, electrics, control systems and mechanical engineering
- Control engineers
- System integrators
- Maintenance engineers

Note

- The training course can be a two-day seminar or on single seminar days.
  - Day 1: safety-related electrical design
  - Day 2: safety-related pneumatic design

In partnership with:

FESTO

Benefits to you

- Benefit from the concise expert knowledge of Festo Didactic and Pilz
- Understand the requirements for safe electrical and pneumatic operations
- Put the knowledge you have acquired into practice, suited to the options of safe electrics and pneumatics

Training (1T000049)

Duration:	**2 days** Day 1: 9:00 – 16:30 Day 2: 8:00 – 16:00
Fee:	**EUR 1 050 per person**
Number of participants:	Up to 30

07-08/03/2023	Ostfildern
26-27/09/2023	Ostfildern

Individual training (1T000149)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 5 250 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Safety Requirements for Software in accordance with ISO 13849

Advanced

Objective

The ISO 13849-1 standard places explicit demands on safety-related control software. It is becoming increasingly common for the logic of safety functions to be programmed on a dedicated control device. The main requirement that ISO 13849-1 makes of the corresponding application or SRASW software is that it should be developed according to a V model.
However, within the scope of mechanical engineering, interpreting the standards in detail is often a complex job for software developers. In this training course, we will deal with the standardisation requirements that must be complied with so that high-quality safe application software (SRASW) can be created in line with ISO 13849.

Contents

- The demands that ISO 13849 makes of the programming of safety-related application software (SRASW)
- How can it be implemented practically and safely?
- Overview of the main steps according to the V model
- Coding
- Coding rules
- Software specifications (cause-and-effect matrix)
- Defensive programming (structured programming)
- Documentation management/change management

Target groups

- Commissioning engineers
- System integrators
- Programmers

For information and registration: visit www.pilz.com

Training (1T000106)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

09/05/2023	Ostfildern
05/10/2023	Ostfildern

Individual training (1T000143)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

Electrical Safety in Industrial Installations – IEC 60204

Advanced

Objective

The standard IEC 60204-1 Safety of machinery: Electrical equipment of machines and similar standards including NFPA-79 set out the requirement for electrical equipment of machines to ensure that people using the machine are safe, control responses of the machine are consistent and that the electrical equipment may be easily maintained throughout its lifetime.

The objective of the training is to explain the basics of electrical safety of plant and machinery. The requirements of the standard IEC 60204 for the electrical safety of machinery are presented so that the participants understand its requirements when designing, constructing, installing, verifying or maintaining the electrical equipment of the machinery and industrial applications.

Contents

- Introduction to legislation
  - European legislation
  - Key directives
  - Overview of CE marking
  - Other national regulations
- Electrical machine safety in industrial installations
  - Introduction and scope of IEC 60204-1
  - Related standards
  - Definitions
- General requirements
  - Incoming supply
  - Protection against electric shocks
  - Protection of equipment
  - Equipotential bonding
  - Control circuits and functions
  - Operator interface
  - Control devices
  - Conductors and cables
  - Wiring practices
  - Electric motors
  - Accessories and lighting
  - Marking warning signs
- Compilation and check of the technical documentation
- Verification

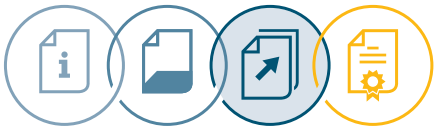
Target groups

- Electrically skilled persons
- Competent persons
- Nominated persons in control of a work activity
- Responsible qualified electricians
- Nominated persons in control of an electrical installation
- Design engineers

Benefits to you

- Get to understand the scope and the relevant electrical equipment
- Learn and understand the standard requirements for human and machine
- Understand the specific requirements to prevent inadvertent operation
- Know the test and technical documentation requirements to verify that the machine or assembly of machines complies with the standard

Your optimum qualification path:



Introduction: Introduction to Machinery Safety
Fundamental: Fundamentals of Machinery Safety
Advanced: Electrical Safety in Industrial Installations – IEC 60204
Expert: CMSE – Certified Machinery Safety Expert

Training (1T000058)

Duration:	**1.5 days**
	Day 1: 9:00 – 16:30
	Day 2: 9:00 – 13:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 30
16–17/05/2023	Ostfildern

Individual training (1T000036)
Upon request, we offer customised training courses, internally or online.

Duration:	**1.5 days**
Fee:	**EUR 4 050 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

FSM – Functional Safety Management in accordance with ISO 13849

Advanced

Objective

Do you implement engineering projects for software, hardware or systems? Are you familiar with the demanding requirements that are made by ISO 13849 of functional safety?

Implementing safety functions correctly can be guaranteed by specifying and defining strategies to achieve functional safety. Using the Pilz engineering process, we will show you how you can proceed. This process comprises all phases, from specification to validation, and also takes into account what must be done to verify and test the functional safety of a plant. In this one-day seminar, the participants will get a good overview of what is described and required by the standards and how IEC 61508 supports ISO 13849.

Contents

- Aspects of FSM planning
- Strategy for attaining functional safety according to ISO 13849
- Validation planning (test criteria and objectives)
- Roles and responsibilities
- Implementation (installation and parametrisation)
- Validation (functional testing, checking of all the documents and project files)
- Documentation management

Target groups

- Project engineers
- Design engineers
- System integrators
- Designers

For information and registration: visit www.pilz.com

Training (1T000129)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

20/03/2023	Ostfildern
16/11/2023	Ostfildern

Individual training (1T000113)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

Tough by design – the safety solution that goes the distance.

Shocks, vibrations and collisions can't always be avoided, even in a state-of-the-art production facility. Temperature fluctuations and dust are also just some of the typical challenges. So it's a good thing that Pilz light curtains can take some punishment. Because the new PSENopt II range has been developed to guarantee machine availability even under demanding conditions. Having started with finger and hand protection, the robust system is no less convincing when it comes to body protection – as the world's first Type 3 light curtain for use up to the highest category (PL e). In conjunction with the Pilz configurable safe small controllers PNOZmulti 2 you can be sure you have a safety solution that goes the distance.

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Further information on
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www.pilz.com + webcode web150418

PILZ
THE SPIRIT OF SAFETY

CEFS – Certified Expert in Functional Safety

Expert

In partnership with:

TÜV NORD

Objective

Functional safety is the part of the overall safety of a system or piece of equipment that depends on automatic protection operating in a predictable manner in response to inputs or failure (fail-safe). The automatic protection system should be designed to properly handle likely human errors, systematic errors, hardware failures and operational/ environmental stress.

Certified by TÜV NORD, the internationally recognised CEFS – Certified Expert in Functional Safety training course explores the standard and technical requirements to design, verify and implement a functional safety system. The training provides a thorough understanding of the applicable standards and a practical approach to designing complex safety systems. Participants are guided through the process, from the fundamental understanding of the standards required, through to safety requirements specifications and on to the design of a safety control system and validation.

The qualification offers you comprehensive expertise on the corresponding standards as well as practical consideration of the creation of complex safety systems. After passing the test, you are issued an independent certificate from TÜV NORD. The certificate is recognised worldwide and entitles you to use the designation “CEFS – Certified Expert in Functional Safety”.

Contents

- Basics of safety control systems
- Safety requirements specification
- Design of a safety system
- Workshop to define the maximum achievable performance level
- Validation
- Software tools
- Workshop on the use of software tools
- Special cases
- Exercises
- Management of functional safety

Target groups

CEFS is aimed at machine manufacturers, design engineers and integrators with special responsibility with regard to safe control systems. Furthermore, CEFS is specially intended for people who are responsible for machinery safety of new and existing machines in day-to-day operations, such as:

- Design engineers (electrical systems and fluid technology)
- Technical engineering managers
- Safety engineers
- Programmers of safe control systems
- Project engineers
- System integrators
- Test engineers who are responsible for the validation of machinery

Prerequisites

To be able to successfully participate in the two-day expert training, you must verify that you have sufficient knowledge in the field of functional safety. This includes the following:

- Prior knowledge on the topic of functional safety **or**
- Participation in a one-day Pilz training or in a different suitable training course on the topic of functional safety, e.g. “Design of Safety Control Systems according to ISO 13849 and IEC 62061” **or**
- You already have the qualification CMSE – Certified Machinery Safety Expert.

Are you unsure about whether your current qualification corresponds to the required level? Feel free to get in touch with us.

Note

A laptop is required for participation in the training. CEFS includes an online exam which takes place on a fixed day after the end of the training. If the test is passed, you receive the globally recognised TÜV NORD certificate of “CEFS – Certified Expert in Functional Safety”. The certificate is valid for four years and then can be extended for another four years by taking part in a recertification.

Benefits to you

- Design and manage functional safety systems that are in accordance with ISO 13849-1 and IEC 62061
- Learn how to successfully validate systems for functional safety in compliance with current standards
- Understand the details about the effects of engineering decisions on the reliability and availability of the control system
- Learn how to select the most effective and cost-efficient control system that is ideally suited to your requirements
- A virtual machine model is used during the training as part of the workshop. This guarantees practical learning

Your optimum qualification path:

- Introduction: Introduction to Machinery Safety
- Fundamental: Fundamentals of Machinery Safety
- Advanced: Design of Safety Control Systems according to ISO 13849 and IEC 62061
- **Expert:** CEFS – Certified Expert in Functional Safety

Training (1T000184)

Duration:	**2.5 days** Day 1 and Day 2: 8:30 – 16:30 Day 3: test
Fee:	**EUR 1800 per person** [1]
Number of participants:	Up to 30
01-03/03/2023	Ostfildern
17-19/10/2023	Ostfildern

Individual training (1T000185)

Upon request, we offer customised training courses, internally or online.

Duration:	**2.5 days**
Fee:	**EUR 5 850 per event**
Number of participants:	Up to 15

Test required

For information and registration: visit www.pilz.com

[1] Includes the TÜV examination fee and the issuing of the certificate

CESA – Certified Expert for Security in Automation

Expert

In partnership with:

TÜV NORD

Objective

Threats in the form of cyber attacks on the industrial environment of businesses are constantly on the rise, presenting a challenge for what is known as OT (operational technology) security. It is becoming more and more important to not only take into account the safety but also the security of plants and machinery.
It was specifically for these challenges that we designed the “CESA – Certified Expert for Security in Automation” qualification. Certified by TÜV NORD, the expert course teaches comprehensive knowledge of normative requirements, the basics of risk assessment and technical and organisational security measures in the industrial environment.

Appropriate application of the IEC 62443 standard enables operators, integrators and manufacturers to demonstrate that their industrial automation systems conform to the standards of modern cyber security. What specific requirements must be met, and what needs to be considered in the implementation process? This seminar is tailored specifically to IEC 62443 and will provide you with the corresponding specialist knowledge.

Contents

- Introduction
  - Motivation for cyber security in industrial automation
  - Safety and security
  - Difference between IT and OT
- Foundations of cyber security for networked industrial plants
  - Analysis of different attack targets
  - Possible threat scenarios
  - Structure of cyber security (defence in depth)
- Legislation and normative requirements
  - IT security laws
  - Machinery Directive
  - Overview of standards
  - Foundations of IEC 62443
  - Roles in security
  - Information Security Management System (ISMS)
  - Security level und security requirements
- Risk analysis
  - Basic procedure
  - Risk analyses according to IEC 62443-3-2
  - Documentation of the risk analysis
- Security process
  - Technical measures
  - Security level
  - Organisational safety measures
  - Maturity level
  - Security program rating

Target groups

This training is aimed in particular at manufacturers, integrators and users of industrial automation systems and at:

- Plant engineers
- Information Security Officers (ISO)
- Project engineers

Prerequisites

Registration for “CESA – Certified Expert for Security in Automation” requires professional experience in and a basic knowledge of the field. Are you unsure about whether your current qualification corresponds to the required level? Feel free to get in touch with us. We will provide individual advice and suggest any alternatives that may be possible.

Note

The seminar includes a multiple choice test.
If the test is passed, you will receive the globally recognised TÜV NORD certificate of “CESA – Certified Expert for Security in Automation”. The certificate is valid for four years and then can be extended for another four years by taking part in a recertification.

Benefits to you

- Manage the risk that arises through the networking and application of IT and OT in the production building
- Assess and optimise your existing systems in terms of cyber security
- Learn the correct use and implementation of the IEC 62443 standard with regard to cyber security standards

Training (1T000201)

Duration:	**2 days**
	9:00 – 16:30
Fee:	**EUR 1 400 per person** [1]
Number of participants:	Up to 30

25-26/04/2023	Ostfildern
21-22/11/2023	Ostfildern

Online training (1T000216)

Duration:	**4 modules of 3.5 hours**
Fee:	**EUR 1 400 per person** [1]
Number of participants:	Up to 15

Individual training (1T000202)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 5 250 per event**
Number of participants:	Up to 15

Test required

For information and registration: visit www.pilz.com

[1] Includes the TÜV examination fee and the issuing of the certificate

Basis of CE Marking

Advanced

Objective

The “Basis of CE Marking” training is designed to provide the fundamental steps, technical understanding and considerations to be taken in the CE marking of machinery following the 6-step process for CE marking. The training can provide the foundation to becoming a Certified Expert in CE Marking. The knowledge acquired during this training will allow attendees to understand the process in detail and can be built upon progressively through on-site experience and further training.

Thanks to the practical exercises on a 3D machine model, after the training you will be even better at assessing the status of your machines and ensuring their conformity.

Contents

- European directives
  - Introduction to European directives
  - CE marking: purpose and requirements
  - CE marking directives
  - Product versus workplace directives
- CE marking process
  - 6-step process for CE marking of machinery
  - European legislation for plant and machinery
- Legal framework
  - Machines according to MD 2006/42/EC
  - Other directives
- Define requirements
  - Essential requirements (ESR) from legislation
  - Risk assessment in accordance with ISO 12100
  - A, B and C type standards
- Conformity procedure
  - Selection of correct conformity procedure
  - Involvement of notified bodies
- Validation of the conformity
  - Use of standards in the validation phase
- Technical file & CE mark
  - Contents and compilation of the TF
  - Affixing the CE mark
- Enforcement
  - Legal cases

Target groups

This training is particularly oriented towards machine manufacturers, machine importers and machine integrators with special responsibility in the area of CE marking. Furthermore, it is designed for people who are responsible for machinery safety in day-to-day operations, such as:

- Commissioning engineers
- Design engineers
- Project managers
- Designers
- System integrators
- Safety officers
- Production managers and officers
- Those responsible for upgrades and maintenance of plant and machinery
- Technical purchasers

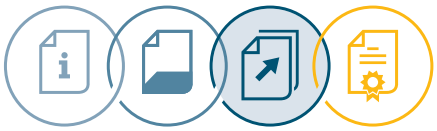
Note

This training is the ideal preparation for qualification as CECE – Certified Expert in CE Marking. Both courses can generally be completed in direct succession.

Benefits to you

- Gain an overview of European directives that relate to machinery, including the legislative framework within the EU
- Understand the role of manufacturers, importers, designers and end users with regards to CE marking
- Learn the fundamental aspects of the CE marking process for machinery – from determination of applicable legislation to affixing the CE mark
- Understand the different types of standards (A, B and C type) and the how harmonised standards can be used in the CE marking process
- Practical relevance through practice and application on a specimen machine

Your optimum qualification path:



Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental: Risk Assessment Workshop

Advanced: Basis of CE Marking

Expert: CECE – Certified Expert in CE Marking

or

Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental:
- PNOZmulti – Programming and Service
- Visualisation with PASvisu – Programming

Advanced: Basis of CE Marking

Training (1T000041)

Duration:	**1 day** 9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

02/05/2023	Ostfildern
24/10/2023	Ostfildern

Online training (1T000193)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 550 per person**
Number of participants:	Up to 15

Individual training (1T000035)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

CECE® – Certified Expert in CE Marking

Expert

In partnership with:

TÜV NORD

Objective

With CECE – Certified Expert in CE Marking you achieve the highest possible qualification in the area of CE marking. As part of this qualification programme, the complete CE marking process in accordance with the Machinery Directive 2006/42/EC is explained using a virtual machine model: from the risk assessment to the attachment of the CE mark. The model shows the differences in the procedure for partly completed and completed machinery as well as beyond this for interlinked machines. The CECE qualification is certified by TÜV NORD. After the test is passed you will receive a TÜV NORD certificate recognised worldwide and the title “CECE – Certified Expert in CE Marking”.

Contents

- European safety legislation
- Legal framework workshop
  - Definition of requirements
- Determining requirements workshop
  - Conformity assessment procedure
- Conformity assessment procedure workshop
  - Validation of the conformity
- Conformity validation workshop
  - Technical documentation
- Technical documentation workshop
  - Machinery Directive – other considerations
  - Authorised representative

Target groups

Manufacturers, machine importers and integrators with special responsibility for CE marking. Furthermore, the training is designed for people who are responsible for machinery safety in day-to-day operations, such as:

- Design engineers
- Project engineers
- Designers
- System integrators
- Safety officers
- Everyone involved in the CE process
- Occupational safety officers

Prerequisites

- Participation in the training course “Basis of CE Marking” (page 46) **or**
- Participation in the training course “Complete CE Process in accordance with the Machinery Directive” (page 26) within the last two years **or**
- You already have the qualification ZMSE – Certified Machinery Safety Expert/National (Germany) **or**
- You already have the qualification CMSE – Certified Machinery Safety Expert.

As an alternative, comprehensive professional experience on the topic may also be sufficient for taking part in the qualification.

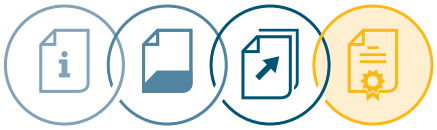
Note

The training contents are specially set up for people who are directly or indirectly responsible for CE processes. This training course involves a multiple-choice test at the end of the second day. If the test is passed, you receive the globally recognised TÜV NORD certificate of “CECE – Certified Expert in CE Marking”. The certificate is valid for four years and then can be extended for another four years by taking part in a recertification.

Benefits to you

- Comprehensive knowledge of the conformity assessment process which complies with the Machinery Directive, up to application of the CE mark
- Benefit from our experts’ experience. Following this qualification, you can directly implement the knowledge you have gained in practice – thanks to the detailed application examples and participation in the practical workshops
- Achieve the highest possible qualification in the area of CE marking in just two days

Your optimum qualification path:



- Introduction: E-learning: Machinery Safety – Introduction and Best Practice
- Fundamental: Risk Assessment Workshop
- Advanced: Basis of CE Marking
- **Expert:** CECE – Certified Expert in CE Marking

Training (1T000127)

Duration:	**2 days**
	9:00 – 16:30
Fee:	**EUR 1 400 per person** [1)]
Number of participants:	Up to 30

03-04/05/2023	Ostfildern
25-26/10/2023	Ostfildern

Individual training (1T000110)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 5 250 per event**
Number of participants:	Up to 15

Test required

For information and registration: visit www.pilz.com

[1)] Includes the TÜV examination fee and the issuing of the certificate

CECE® – Recertification

Expert

Objective

CECE – Certified Experts in CE Marking have obtained the knowledge and technical understanding of the practical aspects of performing CE marking for compliance with relevant legislation and standards. Holders of the certification are required to attend recertification training every 4 years. This course, CECE – Recertification, offers these experts the opportunity to enhance their knowledge by updating them on changes to legislation since their certification as a CECE and to thereby maintain their CECE status.

Contents

- Overview of European legislation
- Transition – Machinery Directive to Machinery Regulation
- Economic operators
- Presumption of Conformity
- Essential health and safety requirements

In partnership with:

TÜV NORD

Methods

Trainer suggestions, brief presentations, group/solitary exercises, case examples, practical exercises, discussions, experience sharing

Target group

Previously certified CECE – Certified Expert in CE Marking

Note

Each CECE renewing their certificate must do so within the required timeframe of four years after receiving initial certification.
After taking part in the 4-hour training, you will receive a TÜV NORD certificate that confirms your certification as a CECE for another four years.

Benefits to you

- Extend your internationally recognised certificate by another four years
- Ensure you are updated with the latest developments in the area of CE marking of machinery

Training (1T000210)

Duration:	**0.5 days**
	8:30 – 12:30
Fee:	**EUR 350 per person** [1]
Number of participants:	Up to 30

Online training (1T000211)

Duration:	**1 module of 4 hours**
Fee:	**EUR 350 per person** [1]
Number of participants:	Up to 15

17/10/2023	Online training

Individual training (1T000209)

Upon request, we offer customised training courses, internally or online.

Duration:	**0.5 days**
Fee:	**Price on request**
Number of participants:	Up to 15

[1] Includes issuing of the certificate

For information and registration: visit www.pilz.com

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PILZ
THE SPIRIT OF SAFETY

ZMSE – Certified Machinery Safety Expert/Natio

Expert

Plant and machinery are becoming ever more complex but at the same time are supposed to be easy for users to operate. Machinery safety is becoming an increasingly important part of the equation. Avoiding accidents already starts at the concept design stage of a machine. The requirements of design engineers and operating companies need to be coordinated at an early stage to be able to develop cost-effective safety concepts. Special significance is given to the correct application of standards and directives. These are complex and constantly changing and as a result they are difficult to master. What's more, the technologies that are used continue to develop rapidly.

In collaboration with TÜV NORD and external lecturers from the respective specialist area, Pilz has put together a programme which provides you with the expertise to safeguard plant and machinery. You gain comprehensive knowledge spanning everything from risk assessment, through the creation of safety concepts, up to the correct commissioning of plant and machinery. The training course covers safety-relevant subjects that you must observe when operating and upgrading plant and machinery. If the test is passed, you receive the certificate "ZMSE – Zertifizierter Maschinensicherheitsexperte" (German certified machinery safety expert).

In partnership with:

TÜV NORD
FESTO

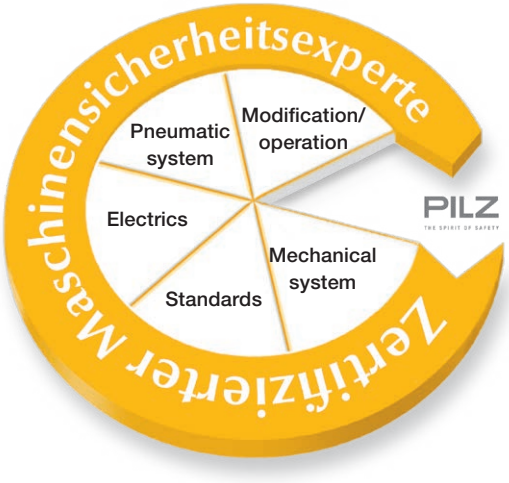
Contents

Day 1:

- Introduction to directives and standards
- Technical risks and their assessment
- Systematic and targeted searching, identification and highlighting of mechanical hazards
- Ergonomic safety-related protective measures
- Design measures for controlling risk
- Legal provisions and possible consequences of accidents

Day 2:

- Risk assessment according to ISO 12100 and its implementation
- introduction to cyber security in industrial automation
- Exercise on risk assessment using an animated 3D machine model
- Introduction to functional safety management
- Safety design of control systems in compliance with ISO 13849-1
- Requirements for the design of safety software
- Validation in accordance with ISO 13849-2 to confirm compliance with the requirements



Day 3:

- Safety technology components such as switches, safety light curtains, two-hand control, drives, brakes and their application
- Emergency stop function in accordance with ISO 13850
- Safe drives, vertical axes
- Electrical equipment of plant and machinery in accordance with IEC 60204-1
- Electromagnetic compatibility in the industrial environment

nal (Germany)

Day 4:
- Basic and well-tried pneumatic safety principles in accordance with ISO 13849-2
- Selection and behaviour of safety-related pneumatic systems
- Various control categories and protective measures in pneumatic systems
- Fault consideration and peculiarities of the pneumatic system

Day 5:
- Summary of the CE process according to the Machinery Directive
- Requirements for the safe use of work equipment according to the Industrial Safety and Health Ordinance
- Risk assessment as a central element in industrial health and safety
- Application of technical rules in accordance with operational safety
- Reasons for the manipulation of machinery and what you can do to prevent it
- Upgrade of plant and machinery (including essential change)
- Assembly of machines in accordance with the interpretation paper from the German Federal Ministry of Labour and Social Affairs

Target groups
- Design engineers
- Control system designers and machine builders
- System integrators
- Plant designers
- Companies that operate plant and machinery
- Maintenance engineers
- Safety officers

Notes
In contrast to CMSE, this qualification programme is only available in the German language and has a somewhat stronger national/European orientation.

The seminar includes a multiple choice test. If the test is passed, the participants receive the nationally recognised TÜV NORD certificate of "ZMSE – Zertifizierte Maschinen-sicherheitsexperten", which is valid for four years.
The one-day recertification extends the validity by an additional four years in each case.

The course fee includes the cost of the exam and the TÜV NORD certificate.

ZMSE also serves as an admission requirement for qualification as CECE – Certified Expert in CE Marking.

Prerequisites
To take part in ZMSE, you should have already worked in the field of machinery safety or already be familiar with the subject.

Benefits to you
- Cross-technology expertise in the creation of safety solutions
- Efficient, safety-related design
- Excellent practical relevance
- Experienced specialists from various companies
- Certified in just five days

Training (1T000017)

Duration:	**5 days** Day 1: 9:00 – 17:00 Day 2 to Day 4: 8:30 – 17:00 Day 5: 8:30 – 15:00
Fee:	**EUR 2 750 per person** [1]
Number of participants:	Up to 30

06-10/02/2023	Ostfildern
22-26/05/2023	Ostfildern
11-15/09/2023	Ostfildern
09-13/10/2023	Ostfildern
04-08/12/2023	Ostfildern

Test required

[1] Includes the TÜV examination fee and the issuing of the certificate

ZMSE – Refresher
Page 54

For information and registration: visit www.pilz.com

ZMSE – Refresher

Expert

Objective

Did you pass the tests for “Zertifizierter Maschinensicherheitsexperte” (ZMSE – German certified machinery safety expert), showing that you are competent in safeguarding plants and machinery, but the training course took place some time ago?

Or do you just want a round-up of the current state of machinery safety in compact form to refresh your knowledge? What has changed in the field of the Machinery Directive 2006/42/EC and the standards? How should safety concepts be adapted to the new technical conditions? You will find the answers in this seminar. We will update your knowledge in the area of machinery safety and use practical examples to show where you need to pay attention in your everyday work and how you can implement solutions.

We recommend refreshing your knowledge after three years at the latest.

Contents

- Machinery Directive 2006/42/EC
- Current status of European standards
- Ordinance on Industrial Safety and Health
- Upgrade of plant and machinery and the material changes
- Interpretation paper on the subject “Assembly of Machines”
- Answers to frequently asked questions

Target group

- ZMSE – Zertifizierte Maschinensicherheitsexperten (German certified machinery safety experts)

Benefits to you

- Benefit from current practice know-how and deepen your knowledge
- Acquire cross-technology expertise for safety solutions
- Utilise our didactic methods with informative case studies to refresh your qualification

For information and registration: visit www.pilz.com

Training (1T000046)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person** [1]
Number of participants:	Up to 30
21/02/2023	Ostfildern
04/10/2023	Ostfildern

[1] Includes issuing of the certificate

Don’t rack your brains over it any longer!

PL and SIL Calculation using the PAScal Safety Calculator

- Import and export of components from manufacturer libraries (VDMA 66413, Sistema, Excel and PAScal formats)
- Editor for generating your own component libraries
- Option for accepting data from risk assessment tools
- Calculations certified by TÜV SÜD

Keep up-to-date on Safety Calculator PAScal:

Webcode: web150431

Online information at www.pilz.com

Management of Risk in Machinery Procurement

Fundamental

Objective

The procurement of machinery is a complex issue with many factors to consider such as technical specifications, acceptance tests, relevant certification etc. The legal and financial risks companies potentially face if they purchase non-compliant or unsafe machinery necessitates a rigorous process, and the managers must be aware of these risks during the procurement of machinery. All relevant parties must be aware of their role in that process to ensure the best protection for a company and its employees.

The emphasis of the training programme is on the safety aspects associated with the procurement of machinery throughout its entire lifecycle from identifying the need for machinery investment to its decommissioning and disposal.

The programme will also include any specific safety aspects for procuring machinery in one location and moving it to its final location, especially between countries which may have different machine-specific regulations. The training covers all aspects of procuring machinery, from putting in place the relevant stakeholders, specifying the machine, identifying suitable suppliers and understanding a machine purchase contract to putting in place an effective machine acceptance procedure.

Contents

- Process of procuring machinery
  - Risk management and associated costs with example machine
  - Machine lifecycle
  - Roles and responsibilities
- Procurement strategy
  - Due-diligence check of suppliers
- Purchase contract process
  - Pre-contract and contractual provisions
  - Process for the delivery/acceptance of machinery
  - Purchasing used equipment
- Cross border movement of machinery
- Cost-benefit analysis model

Target groups

The programme has been developed to respond to a requirement among machinery-related professionals such as plant managers, engineers, technicians and other technical personnel to be aware of all the aspects surrounding the procurement of machinery.
The programme also will be of benefit to H&S and procurement personnel who may not be aware of the specific safety requirements and standards that need to be considered when purchasing machinery.

- Works managers
- Technical engineering managers
- Maintenance managers/supervisors
- Health & safety managers/officers
- Group/regional procurement
- CAPEX/OPEX buyers
- System integrators

Benefits to you

- Benefit from current practical expertise on the demand-led procurement of machinery
- Receive recommendations for legally protecting yourself and your company against faulty machines
- Learn to take into account all relevant aspects of the procurement process

Training (1T000054)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

- Dates on request

Individual training (1T000145)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Qualification as Individual with Electrical Engineering Instruction

Fundamental

Objective

This seminar aims at preventing accidents caused by inexpert handling of electrical equipment. It is aimed at people who are to work on electrotechnical plants or move around/stay in electrical operation areas/premises during their work. You learn everything necessary about the dangers associated with this work, about the safety measures to be taken and the protective equipment. In addition, basic electrical knowledge is imparted and the hazards of electrical power explained.

Contents

- Basic knowledge of electrical engineering
- Legal principles
- Dangers of electrical power
- Protective measures against electric shocks
- Types of mains
- Fields of activity of persons instructed in electrical matters

Target groups

- Persons without electrical training
  - who move around/stay in electrical operation areas/rooms
  - who work on electronic equipment under direction and supervision

Notes

The seminar corresponds to the guidelines on accident prevention from the Verein Deutscher Elektrotechniker (Association of German Electrical Engineers) (DIN VDE 0100 and DIN VDE 0105) and the regulations of the employers' liability insurance associations.

We will send you the necessary confirmation of the qualification. To obtain this, you must have passed the multiple choice test.

Training (1T000059)

Duration:	**1.5 days**
	Day 1: 9:00 – 16:30
	Day 2: 9:00 – 13:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 30

- Dates on request

Individual training (1T000104)

Upon request, we offer customised training courses, internally or online.

Duration:	**1.5 days**
Fee:	**EUR 4 050 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Safe Electrical and Mechanical Upgrading for Maintenance Personnel

Fundamental

Objective

The requirements for the safety of plant and machinery are defined in European directives and standards. If machines are upgraded, repaired or extended, this can give rise to new hazard sources. The training course will show you the impact of major changes to machinery, the creation of risk assessments and the implementation of risk reduction by mechanical means and by using control technology.

This training course is directed especially at maintenance personnel, service staff or plant constructors whose task is to repair or upgrade plants.

Questions are repeatedly asked about when an upgrade is to be made in compliance with the regulations.
This training course is intended to help the participants answer them.

Contents

- Introduction, directives and standards
- The Machinery Directive and its implementation
- Risk assessment, guards, safety-related mechanisms
- Safety-related electrics
- Safe guard locking devices, fitting of safety light curtains, emergency stop ratings
- Important changes to machinery
- Safe drive, vertical axes
- Verification in accordance with ISO 13849-1
- Special features of machinery

Target groups

- Maintenance engineers
- Mechatronics engineers
- Mechanical and electrical design engineers
- Electrical and control system design engineers and control engineers
- Machine builders

Benefits to you

- Learn to apply and implement the relevant standards in practice for your projects.
- Understand the risks at the machine.
- Develop customised solutions for your requirements.

Training (1T000055)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30
14/06/2023	Ostfildern

Individual training (1T000103)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

LOTO and Other Means of Energy Control

Fundamental

Objective

Lockout tagout is a process by which a lock and tag are attached to a machine in order to safeguard employees from the unexpected energisation or start-up of plant and machinery or the release of hazardous energy during service or maintenance activities. It is best practice to implement a policy, procedures and training to ensure that lockout tagout is implemented practically, complied with and fully understood within a company. The aim of the training is to enable participants to develop a detailed understanding of the requirements of lockout tagout in relation to machinery safety.

Contents

- Introduction, purpose and goal of LoTo, including definitions
- Applicable legislation and standards requirements: Europe, North America and other regions
- Review and explanation of all potential energy source types and potential hazards arising from each source: electrical, pneumatic, hydraulic, mechanical, chemical, thermal
- Unexpected start-up as well as requirements and alignment of LoTo with alternative measures
- LoTo programme – LoTo policy and LoTo procedure
- Development of a LoTo policy
  - Responsibilities of key personnel
  - Risk assessment to identify hazardous energy sources and isolation points
  - Proposals for risk reduction for machinery and possible tasks
  - Contents and considerations for LoTo procedures
  - Internal training program
  - Periodic monitoring and measurement of the system
  - Step-by-step example of a LoTo procedure
- LoTo tools and their requirements
  - Isolation devices and their requirements
  - Location requirements
- LoTo implementation within a company
  - LoTo procedure, requirements and examples
  - Introduction of PASloto and SLS

Target groups

The training is aimed in particular at personnel responsible for safe maintenance of plant and machinery:

- Technicians, especially maintenance technicians
- Plant engineering personnel
- Health & safety managers, engineers and officers
- Designers, electrical engineers and production managers

Note

To make the seminar even more practical, you can bring your own laptop with you for the practical exercises.

Benefits to you

- \+ Effective development and maintenance of LoTo processes
- \+ Covers all aspects of the discharge of hazardous energy to ensure the safety of your staff members and for maintaining your equipment
- \+ Benefit from recurring processes in the implementation of LoTo for all equipment
- \+ Benefit from the advantages of the new LoTo software PASloto

Training (1T000056)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

- Dates on request

Online training (1T000191)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 550 per person**
Number of participants:	Up to 15

Individual training (1T000037)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Safe Use of Machinery in accordance with BetrSichV

Fundamental

Objective

The operation of machinery in Germany is regulated by industrial safety regulations (BetrSichV) which are substantiated by technical regulations.
The aim of the regulations is to ensure and improve the health and safety protection of those employed using occupational protection measures.

This training course focuses on section 1 “Scope and Definitions” and on section 2 “Hazard Assessment and Protective Measures” of the industrial safety regulations.

Contents

- Summary of operating plant and machinery in accordance with industrial safety regulations
- Repeat testing – legal requirements
- Support by checklists/inspection lists
- Hazard assessment
- Legal basis of the BetrSichV
- Liability
- Upgrade of plant and machinery and the essential changes
- Assembly of machines

Target groups

- Operators/employers
- Works managers
- Heads of engineering departments
- Safety specialists
- Purchasers
- Upgraders

Benefits to you

- Competence in dealing with your equipment pool
- Safe use of your machines

Training (1T000053)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

- Dates on request

Individual training (1T000151)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Press Setters for Mechanical and Hydraulic Presses

Fundamental

Objective

Depending on their size, presses are equipped with all kinds of tools and therefore used for various different forming processes. Even if a press is properly designed and all the necessary safeguards are present, safety depends on the setter and the control person who enables it. These two groups of individuals bear responsibility for setting the press properly every time it has been retooled, and for ensuring the safeguards present are set correctly and effective. After the training course, the participants will be in a position to identify hazards on presses swiftly and to take the necessary measures to eliminate or reduce hazards in accordance with the relevant health and safety regulations, and independently to check the effectiveness of these measures.

Contents

- What different types of presses are there?
- Hazards
- Responsibilities and legal consequences
- Specialist regulations
- Safety-related components
- Protective measures and safeguards
- Personal protective equipment
- Practical exercises
- Setting up and enabling for production

Target groups

- Setters for mechanical and hydraulic presses
- Specially trained setters in accordance with DGUV 100-500 BGR Chapter 2.3 Para. 3.5
- Toolmakers

Notes

- You will receive proof of your qualification as a trained press setter from us. To obtain this, you must have passed the multiple choice test.
- Please also note that the DGUV Regulation 100-500 Chapter 2.3 Section 3.5.3 for operators of presses must be complied with when carrying out the duties of a press setter.

Training (1T000130)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30
11/07/2023	Ostfildern

Individual training (1T000115)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Retrofitting Old Presses

Advanced

Objective

Is your press in good mechanical condition and able to give you many more years of good service? But is the press control system causing you increasing problems and no longer meets the latest safety requirements? The control technology of presses in particular has to be modified and upgraded frequently. That demands a high level of specialist knowledge of standards and regulations.

To ensure that you are well equipped to retrofit your press, our training course offers theoretical and practical elements and tells you everything you need to know. This training course contains the basic properties of mechanical and hydraulic presses, servo presses and, on request, pneumatic presses as well as a detailed analysis of them.

Contents

- Analysis and assessment of existing presses
- Presentation of possibilities and scope of retrofit measures
- Retrofitting using a specific example
- Retrofit proposals for existing presses

Target groups

- Operators/employers
- Design engineers and planners
- System integrators
- Maintenance engineers
- Safety officers

Benefits to you

- Reduce your maintenance and servicing costs.
- Increase and secure the availability of your machine.
- Raise and stabilise machine output.
- Create flexible capacities.
- Improve processes and functions.
- Simplify operability.
- Increase the efficiency of your staff through ergonomic operation.
- Plan and lower costs.

Training (1T000057)

Duration:	**1.5 days**
	Day 1: 9:00 – 16:30
	Day 2: 9:00 – 13:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 30

09-10/05/2023	Ostfildern
07-08/09/2023	Ostfildern

Individual training (1T000150)

Upon request, we offer customised training courses, internally or online.

Duration:	**1.5 days**
Fee:	**EUR 4 050 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Inspection of Optoelectronic Protective Devices

Advanced

Objective

An overview is provided of the functions and areas of application of safety light curtains and is illustrated using practical examples. You will learn about selecting and installing optoelectronic protective devices giving due regard to current regulations and standards.
In this seminar you will also learn the basic procedures to use to inspect optoelectronic protective devices. The practical part of the seminar is conducted on a press brake at our premises.

Contents

- Legal principles
- Applicable standards and regulations (incl. ISO 13857, ISO 13855, ISO 13849-1/-2, IEC 61496)
- Initial and regular inspections
- Calculating safety distances
- Installation with due regard to safety distances
- Proper integration into machine control system
- Possible procedure during the inspection
- Overrun measurement of the press/plant (if possible)
- Design and operating principles
- Options for connecting evaluation devices
- Particular aspects of functionality

Target groups

- Plant and machinery manufacturers
- Design engineers
- Commissioning engineers
- Safety specialists
- Maintenance staff
- Maintenance engineers

Prerequisites

- Basic knowledge of electrical engineering
- A prior knowledge of handling optoelectronic protection equipment is an advantage

Note

We will also be happy to perform approvals for safety light curtains at your premises as an additional service.

DAkkS Deutsche Akkreditierungsstelle D-IS-12033-01-00

Pilz GmbH & Co. KG, Ostfildern operates an inspection body for plant and machinery, accredited by DAkkS.

Benefits to you

- Expertise in legal principles
- Save time with a structured procedure for your inspections

Training (1T000060)

Duration:	**1.5 days**
	Day 1: 9:00 – 16:30
	Day 2: 9:00 – 13:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 30

14-15/03/2023	Ostfildern
17-18/10/2023	Ostfildern

Individual training (1T000154)
Upon request, we offer customised training courses, internally or online.

Duration:	**1.5 days**
Fee:	**EUR 4 050 per event**
Number of participants:	Up to 15

Test optional

For information and registration: visit www.pilz.com

Robotics

Training topic	Page	Operator	Manufacturer	Dates
Robotics				
Robot Safety and Integration	66	◆		▸ 28/06/2023
Workshop on the Collision Measurement set PRMS for standard-compliant Human-Robot Collaboration (HRC)	68	◆		Dates on request
Safety Requirements and Integration of AGVs	70	◆	◆	Dates on request

Unless stated otherwise, training courses are held at the Pilz Training Centre at Ostfildern, near Stuttgart.

[1] Hanover training location
[2] Dresden training location
[3] Nördlingen training location
[4] Munich training location

Robot Safety and Integration

Advanced

Objective

As they are both affordable and easily teachable, robots are increasingly being integrated with machinery and automated production lines. They are used to achieve repeatability with high productivity. Robots are also used to perform hazardous tasks in many different fields such as material handling, assembly, welding, machine tool loading and unloading, painting, spraying, and so forth. Safety is critical in the integration of robots in manufacturing operations. Studies indicate that many robot accidents occur during non-routine operating conditions, such as programming, maintenance, testing, setup or adjustment. During many of these operations the worker may temporarily be within the robot's working envelope where unintended operations could result in injuries.

The aim of this training is to provide those who integrate robot applications an understanding of the essential requirements of robot and collaborative application safety. This includes a review of the scope of the international standards ISO 10218-1 & 2 in relation to robots and robot integration. The training course covers, amongst other things, robot classification, cyber security, risk assessment and risk reduction requirements, safety function performance level and validation/verification requirements for robot applications.

We show you the measures for designing risk reduction and the use of integrated control strategies. In addition, it is explained how high availability and productivity can be achieved while taking safety requirements into account.

Contents

- Robot safety
  - Robot class
  - Robot space
  - Zones and limiting devices
- Applicable legislation and standards relevant to robot safety
  - ANSI standards
  - ISO standards 10218-1 and 2
  - Correlations between the standards
- Assessment of risk in robot systems
  - Risk assessment requirements from the standards specific to robots and robot integration
  - Design risk reduction requirements
- Safety requirements for collaborative applications
  - Protective measures
  - Control functions and cyber security
  - Functional safety
  - End effectors
  - Load/unload stations
  - Energy isolation in robot applications
  - Teaching and validation requirements
- A practical example of safe robot integration

Target groups

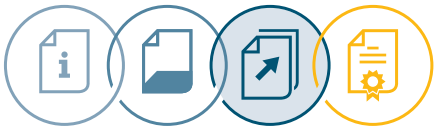
The training is aimed in particular at personnel responsible for ensuring robot system compliance and safety including:

- Technical personnel who are responsible for maintaining the conformity of robot systems, including machine designers
- Robot system integrators
- Project engineers
- Plant engineering and maintenance engineers
- Health and safety engineers

Benefits to you

- Knowledge of the relevant standards and best engineering practise relating to integration of safety in robot applications
- Detailed risk assessment process in relation to robot system integration
- Knowledge of design safety measures to reduce risk
- Understanding requirements for validation and verification of the robot system

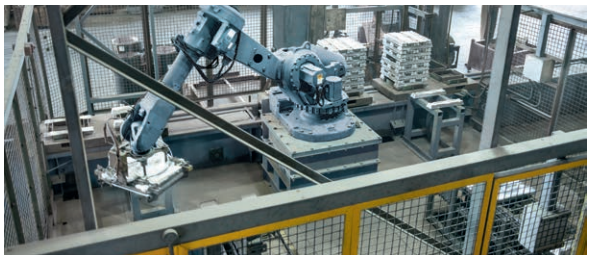
Your optimum qualification path:



Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental: Risk Assessment Workshop

Advanced:
Robot Safety and Integration



Training (1T000220)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

28/06/2023	Ostfildern

Online training (1T000221)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 550 per person**
Number of participants:	Up to 15

Individual training (1T000219)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Workshop on the Collision Measurement Set PRMS for standard-compliant Human-Robot Collaboration (HRC)

Advanced

Objective

Technical specification ISO/TS 15066 defines biomechanical limit values for every region of the body to serve as a benchmark of a non-dangerous collision. In applications with human-robot collaborations (HRC) that observe the performance principle of force, it is necessary to use collision measurement in the validation phase to check whether these limit values are genuinely adhered to.
The aim of the workshop is to perform force and pressure measurement and to interpret the measurement results correctly. This will enable you to carry out collision measurements independently in your own application.

Contents

- Functions and operation of the HRC collision measurement set
- Force and pressure measurement
- Evaluation and interpretation of measurement results
- Measuring method
- Identifying measuring points
- Sensor positioning – correct attachment of the measuring instrument in the application
- Determining alternative positions
- Collision measurement in accordance with ISO/TS 15066 limit values

Robotics by Pilz

Target groups

- Electricians
- Maintenance engineers
- Commissioning engineers
- Design engineers
- Project engineers
- Programmers
- Designers
- Plant support engineers
- System integrators

Benefits to you

- Benefit from experience gained in several thousand HRC measurements
- Learn how to handle the HRC collision measurement set and apply this directly in practice

For information and registration: visit www.pilz.com

HRC collision measuring device

Training (1T000119)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**Price on request**
Number of participants:	Up to 15

- Date on request

Test optional

Collision Measurement set PRMS for standard-compliant Human-Robot Collaboration (HRC)

The Pilz Robot Measurement System (PRMS) is used in the context of validating human-robot collaborations (HRC) and serves to measure force and pressure.
According to ISO/TS 15066, in an HRC application – without safety fences – limit values in a possible collision must be taken into consideration. The relevant measurements are therefore required in every HRC application. The force measurement device equipped with springs and corresponding sensors measures the forces acting on the human body, as well as the local pressure gauged using pressure indicating films, and compares these to the specified limit values. Pressure indicating films are used to measure the local pressure and compare it with the limit values specified in the standard. A convenient software tool is available for validating and digitising force measurements and for generating test reports.

The HRC collision measurement set PRMS is available to buy or rent.

Services

- Comprehensive use of the HRC collision measurement set
- Optional one-day training course (information and registration on p. 68)

Benefits to you

- Purchase or rent – to suit your individual needs
- Standard-compliant measurement of force and pressure
- Standardised measurement method
- Realistic evaluation of workstations
- Precise validation and practical application
- Cutting-edge product through regular calibration and updates
- Easy to use thanks to convenient measuring elements
- Software with protocol tools – for straightforward evaluation, visualisation and documentation
- Long service life due to robust workmanship and high quality components
- Flexible adjustment to the most varied measurement tasks, e.g. through easily exchangeable springs

Robotics by Pilz

Safety Requirements and Integration of AGVs

Advanced

Objective

An automatic guided vehicle system (AGV system) consists of one or more computer-controlled, wheel-based load carriers (normally battery powered) that runs on the plant or warehouse floor (or if outdoors on a paved area) without the need for an onboard operator or driver.

The training offers a comprehensive insight into the correct operation of AGV trucks and systems at the workplace. You will receive all the information you need to know about the key requirements on the safety of AGV. As part of the course, you will also receive a detailed overview with regard to the functionality of AGV trucks and systems and AMR as well as of the risk that results when one or more AGV trucks or AMR are integrated into an existing system. The risks relating to this type of system differ from those of conventional machinery, primarily due to their mobile characteristics and the increased use of artificial intelligence (AI) systems. The training course will therefore also teach you the typical measures for risk reduction as well as the use of various safety strategies.

Robotics by Pilz

Contents

- Introduction to AGV and AGV system safety
- Applicable legislation and standards relevant to AGV system safety including the following:
  - ISO 12100 and ISO 13849-1
  - ISO 3691-4 and EN 1175
  - Correlations between the standards
- AGV system overview
- Classifications and definitions relating to AGV systems
- Significant hazards of AGV systems including associated requirements from the standards specific to AGV systems, including:
  - Intended use of the AGV system
  - Navigation control and collision prevention of the AGV system
  - AGV motion system
  - Safety-related parts of the control system
  - Electrical safety
  - Other specific hazards for AGV systems
- Safety requirements for AGV for control of motion and load handling hazards
- Introduction to safety requirements to reduce AGV system hazards
  - Protective devices and functions
  - Control functions
  - Laser scanners for AGV system applications
  - Other devices for people/obstacle detection and how they work
  - Verification requirements

- Risk reduction for AGV systems
  - AGV system zones
  - Operational zones
  - Operational hazard zone
  - Restricted zone
  - Personnel that require protection from AGV system hazards
  - Persons working in the vicinity of the AGV system
  - Personnel using vehicles in the vicinity
  - Maintenance staff
  - Integration and installation of the AGV system
  - Load transfer points
  - Associated machinery and equipment
  - Use and maintenance of the AGV system
- Practical examples of AGV system safety requirements

Target groups

This training is aimed in particular at AGV system manufacturers, integrators and users with special responsibility when using AGV systems. The course is also specifically oriented toward persons who are responsible for machinery safety on new and existing AGV systems in day-to-day operations, such as:

- Plant engineers
- Health and safety officers
- Project engineers
- Maintenance staff
- Technical engineering managers

Benefits to you

- Learn how to correctly apply and implement relevant standards and directives and the proven technical methods for integrating AGV systems in an industrial environment
- Control of the risk that arises through the installation and application of AGV systems
- Create competitive advantages when using AGV systems by using and implementing the correct safety technologies
- Assess and evaluate your existing plants with regard to the safety of AGV systems

Training (1T000197)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

- Dates on request

Online training (1T000208)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 550 per person**
Number of participants:	Up to 15

Individual training (1T000198)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 3 200 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Products and Technologies

Training topic	Page	Operator	Manufacturer	Dates
Control Technology and Networks				
Configurable, Safe Small Controllers PNOZmulti PNOZmulti – Programming and Service	74	◆	◆	▸ 08-10/02/2023 ▸ 08-10/03/2023 ▸ 19-21/04/2023 [1] ▸ 03-05/05/2023 ▸ 12-14/07/2023 [4] ▸ 20-22/09/2023 ▸ 18-20/10/2023 [3] ▸ 15-17/11/2023 ▸ 13-15/12/2023
PNOZmulti – Service	76		◆	Dates on request
PNOZmulti – Programming and Service for Presses	77	◆	◆	Dates on request
Automation System PSS 4000 Automation System PSS 4000 with PSSu PLC – Programming and Service	78	◆	◆	▸ 21-24/03/2023 ▸ 27-30/06/2023 ▸ 28/11-01/12/2023
Automation System PSS 4000 with PSSu PLC – Service	79		◆	Dates on request
Automation System PSS 4000 with PSSu PLC – Programming Structured Text Language	80	◆		Dates on request
Automation System PSS 4000 with PSSu PLC – Programming Safe Electronic Rotary Cam Arrangement	81	◆		Dates on request
Automation System PSS 4000 with PSSu PLC – Programming Railway Modules	82	◆		Dates on request
Automation System PSS 4000 with PSSu PLC – Switching from PSS 3000 to PSS 4000	84	◆	◆	Dates on request
PSS 3000 – Service and Maintenance Refresher Course	85		◆	Dates on request
Visualisation Software Visualisation with PASvisu – Programming	86	◆		Dates on request
Network Network Planning with Ethernet and SafetyNET p in Industry	87	◆		▸ 28/03/2023
Sensor Technology				
Optoelectronic Protective Equipment PSENopt – Configuration and Commissioning	88	◆		Dates on request
Safety Laser Scanner PSENscan – Configuration and Commissioning	89	◆	◆	▸ 12/07/2023
Safe Radar System PSENradar – Configuration and Commissioning	90	◆	◆	▸ 13/07/2023
Drive Technology				
PMC – Quickstart	91	◆		Dates on request
Technologies for the Future				
Revolution PI – Configuration and Commissioning	92	◆		Dates on request
Starting Successfully in Industrial Security	93	◆		▸ 29/03/2023 ▸ 20/11/2023

Unless stated otherwise, training courses are held at the Pilz Training Centre at Ostfildern, near Stuttgart.

[1] Hanover training location
[2] Dresden training location
[3] Nördlingen training location
[4] Munich training location

PNOZmulti – Programming and Service

Fundamental

Objective

You will obtain an overview of the versatile application options and potential savings to be made using the configurable, safe small controllers PNOZmulti 2, PNOZmulti Classic and PNOZmulti Mini. Using practical exercises and examples of applications from the field of safety technology, we demonstrate how configuration is made simple and versatile with the PNOZmulti Configurator.

Contents

- Introduction to state-of-the-art safety technology
- Handling the software tool PNOZmulti Configurator
- Practical exercises using the PNOZmulti Configurator
- Creating programs with emergency stop, safety gates, safety light curtains and speed monitoring
- Practical exercises on the training system
- Diagnostics and practical troubleshooting on the training system supported by the PNOZmulti Configurator
- Diagnostics with PVIS or the web-based visualisation software PASvisu
- Speed monitoring and motion monitoring with PNOZmulti Classic and PNOZmulti 2

Target groups

- Electricians
- Maintenance engineers
- Commissioning engineers
- Electrical design engineers
- Project engineers

Prerequisites

- Basic PC aptitude
- Basic knowledge of electrical engineering

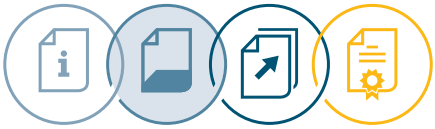
Note

The course content refers to the following hardware:
PNOZ m C0/B0.1/B0/B1, PNOZ m (x)p, PNOZ mm(x)p

Benefits to you

- Practical configuration and diagnostics exercises using practice equipment
- Fast configuration of complex applications

Your optimum qualification path:



Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental: PNOZmulti – Programming and Service

Advanced:
- Automation System PSS 4000 with PSSu PLC – Programming and Service
- Basis of CE Marking

Training (1T000061)

Duration:	**2.5 days** Day 1 and Day 2: 9:00 – 16:30 Day 3: 9:00 – 13:00
Fee:	**EUR 950 per person**
Number of participants:	Up to 12

08-10/02/2023	Ostfildern
08-10/03/2023	Ostfildern
19-21/04/2023	Hanover
03-05/05/2023	Ostfildern
12-14/07/2023	Munich
20-22/09/2023	Ostfildern
18-20/10/2023	Nördlingen
15-17/11/2023	Ostfildern
13-15/12/2023	Ostfildern

Individual training (1T000023)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 4 850 per event**
Number of participants:	Up to 8

Test optional

For information and registration: visit www.pilz.com

Protection zone monitoring under rugged application conditions

Are you facing the challenge of safely monitoring an area where there is dirt, dust, rain, steam, light or flying sparks? Play it safe with the **radar system PSENradar** and the **configurable safe small controller PNOZmulti 2** – the safe complete solution for protection zone monitoring under rugged application conditions. It is particularly suitable for outdoor and robotics applications up to **PL d (EN ISO 13849)/Cat. 3.** If required, our complete solution offer can also include conformity assessment of the machine. A one-stop shop!

Further information on the safe radar solution

PILZ

THE SPIRIT OF SAFETY

PNOZmulti – Service

Fundamental

Objective

Using practical exercises, we use the PNOZmulti Configurator to demonstrate the simplicity and flexibility of troubleshooting, along with the diagnostic options on the configurable, safe small controllers PNOZmulti 2, PNOZmulti Classic and PNOZmulti Mini.

Contents

- Brief introduction to the current state-of-the-art safety technology
- Handling the software tool PNOZmulti Configurator
- Practical troubleshooting on the training system supported by the PNOZmulti Configurator
- You will learn about the various diagnostics options

Target groups

- Electricians
- Maintenance engineers

Prerequisites

- Basic PC aptitude
- Basic knowledge of electrical engineering

Note

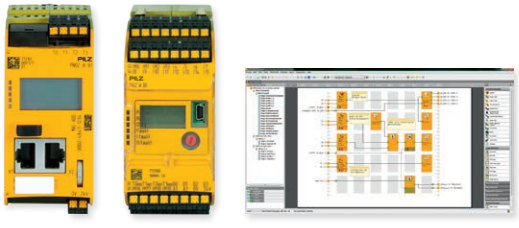
The course content refers to the following hardware:
PNOZ m C0/B0.1/B0/B1, PNOZ m (x)p, PNOZ mm(x)p

Benefits to you

- PNOZmulti – the programmable safety system for many functions – benefit from great savings potential through simple, intuitive operation
- Simple, user-friendly diagnostics mean short downtimes and high plant availability

> "It's a very good service course that I can always recommend."
> **Engelbert Horner, Wacker Chemie AG, Burghausen**

For information and registration: visit www.pilz.com



Configurable, safe small controllers
PNOZmulti 2 with PNOZmulti Configurator

Training (1T000062)

Duration:	**1 day**
	9:00 – 17:00
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

- Dates on request

Individual training (1T000086)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

PNOZmulti – Programming and Service for Presses

Fundamental

Objective

Familiarise yourself with the many and varied options provided by configurable, safe small controllers PNOZmulti 2 specially designed for presses!
For example, the PNOZmulti 2 provides for versatile control and monitoring of all safety and automation functions. PNOZmulti 2 can also be used as an easy way to upgrade presses.

You will learn how to configure the PNOZmulti 2 for the control and monitoring of presses and for the upgrading of presses. The training in configuration is based on practical exercises and examples of applications used in press safety technology.

Contents

- Introduction to current state-of-the-art press safety technology
- Comparison of the configurable, safe small controllers PNOZmulti 2 for presses with conventional safety technology
- Areas of application of the PNOZmulti 2 for presses
- Handling the software tool PNOZmulti Configurator
- Practical exercises using the PNOZmulti Configurator
- Bus connection and other modules, e.g. speed monitoring
- Diagnostics options and troubleshooting

Target groups

- Project engineers
- Design engineers
- Commissioning engineers
- Maintenance engineers

Prerequisites

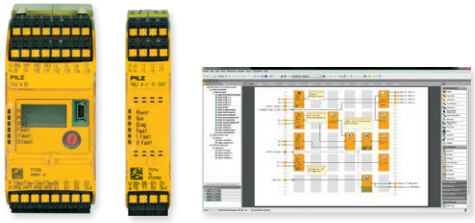
- Basic PC aptitude
- Basic knowledge of electrical engineering
- Basic knowledge of press safety

Note

The course content refers to the following hardware: PNOZ m B0/ B1 in conjunction with the safe dual-pole semiconductor output module PNOZ m EF 8DI2DOT, PNOZ m2p

Benefits to you

- \+ Practical configuration and diagnostics exercises using practice equipment
- \+ Use of ready-made blocks for press automation



Configurable, safe small controllers
PNOZmulti 2 with PNOZmulti Configurator

Training (1T000063)

Duration:	**1 day**
	9:00 – 17:00
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

- Dates on request

Individual training (1T000087)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2 750 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com

Automation System PSS 4000 with PSSu PLC – Programming and Service

Advanced

Objective

In this training course on the automation system PSS 4000 you will learn about the benefits of component-based programming. In addition, information will be provided about the control of functions from the PSSuniversal system using I/O modules and options for communication via SafetyNET p.
Simple and versatile configuration even of distributed control systems is illustrated using the software platform PAS4000. Furthermore, sample exercises for the training system are created and tested. The course also covers the use of the troubleshooting function.

Contents

- Basics of IEC 61131-3 programming and the various programming languages, e.g. SFC
- Introduction to state-of-the-art safety technology
- Physical design: devices, connectors and cables
- System architecture and networking
- Safety-related communications, SafetyNET p network configuration
- Communication between safety and automation
- Familiarisation with Pilz Automation Suite (PAS4000)
- Basics of PASmulti program editor
- Exercises for component-based programming
- Basics of SafetyNET p; RTFN and RTFL protocols
- The basics of Ethernet, physical properties: topologies, extension of networks
- Diagnostics options and simple troubleshooting
- Connection to various communication systems
- Data backup and firmware update

Target groups

Project engineers, design engineers, programmers, commissioning engineers, maintenance engineers

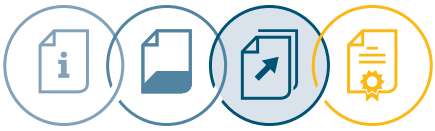
Prerequisites

- Basic knowledge of electrical engineering
- Basic knowledge of mechanical engineering

Note

The course content considers the controller PSSuniversal PLC as part of the automation system PSS 4000.

Your optimum qualification path:



Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental:
- PNOZmulti – Programming and Service
- Visualisation with PASvisu – Programming

Advanced: Automation System PSS 4000 with PSSu PLC – Programming and Service

Training (1T000066)

Duration:	**4 days**
	9:00 – 16:30
Fee:	**EUR 1 475 per person**
Number of participants:	Up to 10

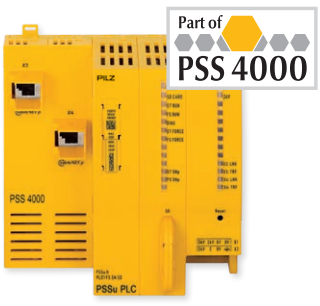
21-24/03/2023	Ostfildern
27-30/06/2023	Ostfildern
28/11-01/12/2023	Ostfildern

Individual training (1T000091)
Upon request, we offer customised training courses, internally or online.

Duration:	**4 days**
Fee:	**EUR 8 990 per event**
Number of participants:	Up to 8

Test optional

For information and registration: visit www.pilz.com



Controller PSSuniversal PLC in automation system PSS 4000

Automation System PSS 4000 with PSSu PLC – Service

Fundamental

Objective

The focus of this training course is primarily on tasks to be performed by maintenance personnel or operating staff who also do the servicing. The emphasis is on diagnostics, troubleshooting and fault rectification. We show how faults with the control system PSSuniversal PLC can be rectified. With the help of a training system, application-specific errors are simulated and their solutions found. Further points of emphasis are on the hardware structure and replacement of PSSuniversal modules, localisation, recognition and elimination of hardware and wiring faults.

Prerequisites

- Basic PC aptitude
- Basic knowledge of electrical engineering

Note

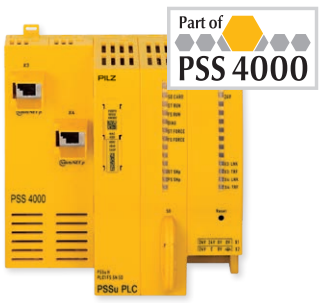
The course content considers the controller PSSuniversal PLC as part of the automation system PSS 4000.

Contents

- Brief introduction to the current state-of-the-art safety technology
- Physical design
- System architecture and networking
- Familiarisation with Pilz Automation Suite (PAS4000)
- Diagnostic options
- Troubleshooting
- Practical exercises
- Data backup
- Process diagnostics (PVIS)
- Firmware update

Target groups

- Programmers
- Commissioning engineers
- Maintenance engineers



Controller PSSuniversal PLC
in automation system PSS 4000

Training (1T000067)

Duration:	**2 days**
	Day 1: 9:00 – 17:00
	Day 2: 9:00 – 16:00
Fee:	**EUR 950 per person**
Number of participants:	Up to 12

- Dates on request

Individual training (1T000092)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 4 850 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com

Automation System PSS 4000 with PSSu PLC – Programming Structured Text Language

Advanced

Objective

The PAS STL (Structured Text Language) programming language is explained within the framework of this training course.
The control system PSSuniversal PLC can be programmed in the STL language with the help of the PAS4000 tool. To exploit the advantages of this language to the full, the scope and the options are explained in this training course.

Contents

- Introduction to the programming language, i.e. general syntax, STL instructions and introductory examples of programs
- Programming tasks and examples

Target groups

- Programmers
- Commissioning engineers

Prerequisites

- Basic knowledge of electrical engineering
- **Obligatory prerequisite for this course is the four-day course "Automation System PSS 4000 with PSSu PLC – Programming and Service"**

Note

The course content considers the controller PSSuniversal PLC as part of the automation system PSS 4000.

Benefits to you

- Rapid and effective programming with STL
- Take advantage of the benefits compared with conventional programming methods

Training (1T000068)

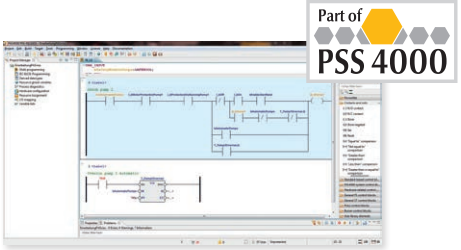
Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000093)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com



Software platform PAS4000

Automation System PSS 4000 with PSSu PLC – Programming Safe Electronic Rotary Cam Arrangement

Advanced

Objective

This training course shows participants how to program a safe Pilz electronic rotary cam arrangement. The Safe Electronic Rotary Cam Arrangement replaces conventional mechanical rotary cam arrangements. The differences between them and the conversion to the safe electronic rotary cam arrangement are explained in the training course and implemented in several practical examples.

Contents

- Introduction to the function of the electronic rotary cam arrangement
- Getting to know the corresponding standards and directives (implementation conforming to EN 692)
- Description of the various components such as PSSuniversal PLC, press building blocks, cam controller building block and rotary encoder
- Implementation of a safe cam for running up and running down with dynamisation
- Continuous run down path measurement and description of the warning and alarm limits
- Implementation of the stroke length adjustment by adopting the electrical angle
- Various application examples

Target groups

- Project engineers
- Design engineers
- Programmers

Prerequisites

- Basic knowledge of electrical engineering
- Programming experience in the area of presses
- **Obligatory prerequisite for this course is the four-day course “Automation System PSS 4000 with PSSu PLC – Programming and Service”**

Note

The course content considers the controller PSSuniversal PLC as part of the automation system PSS 4000.

Benefits to you

- Practical exercises in programming and commissioning an electronic rotary cam arrangement
- Learn rapid and effective diagnostics and troubleshooting hands-on

Training (1T000069)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000094)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2 750 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com

Automation System PSS 4000 with PSSu PLC – Programming Railway Modules

Advanced

Objective

The use of PSS 4000-R modules is explained to the participants within the framework of this course.
Pilz components are often used in a railway environment. With PSS 4000-R railway modules, the essential approvals have already been fulfilled as a property of the products; the effort required in the application is therefore minimised.

Contents

- Introduction to the current status of railway technology (CENELEC)
- Familiarisation with the differences between the standard, T and R version
- Railway-specific “R” (railway) modules
- Various architectures and special features such as dual-infeed supply, separate supply groups and dual-output modules
- Examples of functional basic elements, e.g. at railway crossings
- Various application examples

Target groups

- Signal technology and points technology manufacturers
- Railway operating companies
- Programmers
- Project engineers

Prerequisite

Obligatory prerequisite for this course is the four-day course “Automation System PSS 4000 with PSSu PLC – Programming and Service”

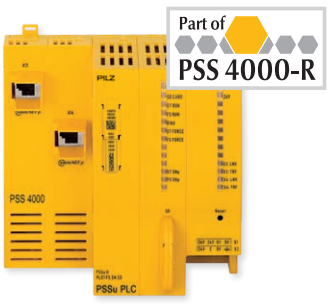
Note

The training course content considers the controller PSSuniversal PLC as a part of the automation system PSS 4000 and relates to the following hardware: PSSu H PLC1 FS SN SD-R.

Benefits to you

- Effective implementation of railway-specific applications
- Safe programming for compliant implementation of specified standards

For information and registration: visit www.pilz.com



Controller PSSuniversal PLC in automation system PSS 4000

Training (1T000070)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000095)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

Railway
Solutions by Pilz

Get on track for Rail 4.0

Pioneering. Trailblazing. – What else do we do, other than automation? Deliver ‚First Class' safety! As a safety expert, digitiser and solution provider, we will guide you on the route toward digital railways, accompanying you with our consultation and engineering. You are on the right track with our safe control technology.

www.pilz.com/railway

PILZ
THE SPIRIT OF SAFETY

Automation System PSS 4000 with PSSu PLC – Switching from PSS 3000 to PSS 4000

Fundamental

Objective

The upgrade training has been specially designed to indicate the differences between PSS 3000 and PSS 4000. In the training course, the various control systems are shown. In addition, you learn where the special features and differences in the inputs and outputs lie, which functions are possible with PSS 4000 compared to PSS 3000 and what the differences in programming are. You also learn how a PSS 3000 application can be implemented using PSS 4000.

Contents

- Differences in the control systems
- Special inputs and outputs
- Which functions replace the previous ones in PSS 3000; where are the differences to be found?
- Differences in programming and programming language
- System architecture and networking
- Overall automation with PSS 4000
- Case studies for various control system types
- Example of a project implementation
- Special features during changeover

Target groups

- Project engineers
- Design engineers
- Programmers
- Commissioning engineers
- Maintenance engineers

Prerequisites

- Basic knowledge of electrical engineering
- Basic knowledge of mechanical engineering
- Experience in using PSS 3000 and PSS 4000
- **Obligatory prerequisite for this course is the four-day course “Automation System PSS 4000 with PSSu PLC – Programming and Service”**

Notes

- The course content considers the controller PSSuniversal PLC as part of the automation system PSS 4000.
- The upgrade course is relevant for you if you are currently using the following hardware:
  - PSS (SB) CPU (x), e.g. PSS SB CPU 3
  - PSS1 (SB) CPU (x), e.g. PSS1 SB CPU 3
  - PSS (SB) 30xx-(x) (xxx), e.g. PSS SB 3006-3 ETH2 DP-S, PSS 3047-3 AI Ip-R

For information and registration: visit www.pilz.com

Programmable controller PSS 3000 and controller PSSuniversal PLC in automation system PSS 4000

Training (1T000071)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000096)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

PSS 3000 – Service and Maintenance Refresher Course

Fundamental

Objective

If you use the safety controller PSS 3000 in your plant and machinery, this training course will provide you with the latest information on the technical state and on how to handle the various PSS 3000 controllers that communicate with one another via SafetyBUS p. This way, you always keep up-to-date on all aspects of the support of your plant in operation. You will also learn how to implement hardware and software changes with the controller and how to quickly locate and, above all, rectify errors.

Using practical exercises, we will show you the helpful diagnostic options of the programmable control system PSS.

Contents

- Overview of the PSS 3000 range
- Exercises using configuration software PSS WIN-PRO
- Diagnostics
- Read out and interpret error memory
- Troubleshooting with practical exercises

Target groups

- Commissioning engineers
- Maintenance engineers
- Service staff

Prerequisite

Basic knowledge of the programming of programmable controllers

Benefits to you

- Simple introduction to using the PSS 3000 controller
- Refresher for employees who already have experience with the PSS 3000
- Possibility for practice on training systems or even on your plant

Training (1T000064)

Duration:	**3 days** Day 1 and Day 2: 9:00 – 16:30 Day 3: 9:00 – 15:30
Fee:	**EUR 1 225 per person**
Number of participants:	Up to 12

- Dates on request

Individual training (1T000065)

Upon request, we offer customised training courses, internally or online.

Duration:	**3 days**
Fee:	**EUR 7 250 per event**
Number of participants:	Up to 8

Test optional

For information and registration: visit www.pilz.com

Programmable controller PSS 3000

Visualisation with PASvisu – Programming

Fundamental

Objective

The PASvisu Web-based visualisation software allows machine manufacturers to carry out easy configuration and users to use simple operating and monitoring functions. The aim of this training course is to familiarise participants with PASvisu's many different uses and train them to use them. The areas for use are demonstrated using practical exercises and examples of applications. Participants create and test a visualisation independently.

Contents

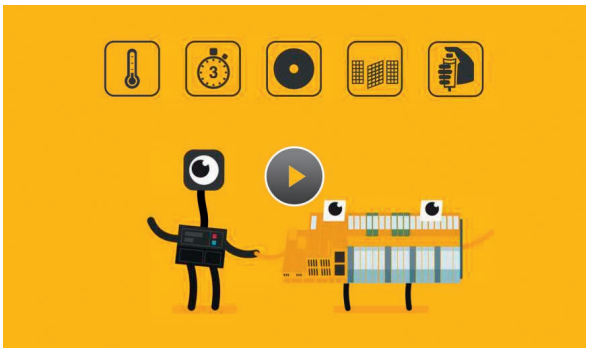
- Project configuration of visualisation with the PASvisu Builder
- Hardware and database connections (PNOZmulti 2, PSS 4000)
- PASvisu functions and modules
  - Inputs and outputs
  - User management
  - Language switching
  - Diagnostic list and log
- PASvisu licensing
- Programming exercises

Target groups

- Designers
- Programmers
- System integrators
- Plant and machinery support engineers

Prerequisites

Basic knowledge of the configurable control system PNOZmulti 2 or basic knowledge of the automation system PSS 4000



Just use your smartphone to scan in the QR code and find out what a perfect symbiosis of control and visualisation looks like. PASvisu supports you at every stage of the machine's life cycle.

Your optimum qualification path:

Introduction: E-learning: Machinery Safety – Introduction and Best Practice

Fundamental: Visualisation with PASvisu – Programming

Advanced:
- Automation System PSS 4000 with PSSu PLC – Programming and Service
- Basis of CE Marking

Training (1T000016)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000029)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com

Network Planning with Ethernet and SafetyNET p in Industry

Fundamental

Objective

The basics of planning, dimensioning and testing generic and profile-specific networks in an industrial environment are taught. The basic operating principle of real-time Ethernet protocols such as SafetyNET p is presented. In addition, participants will learn everything that they need to know about the basics of the real-time and availability requirements for the network. An optimum basis for the dimensioning and verification of networks.

Contents

- Network basics
- Basic processes of industrial communication
- Differences between standard Ethernet and SafetyNET p (or generic real-time Ethernet) applications
- Basic, distinguishing parameters of the network for industrial communication
- Scope of infrastructure components
- Measures for segmenting the network
- Measures for increasing the reliability of the network
- Diagnostics and verification options of the network (using the Wireshark tool)
- Troubleshooting in industrial networks (using Wireshark)

Target groups

- Installation engineers
- Planners, technicians
- Commissioning engineers
- Maintenance engineers
- Persons who have to address the topics of planning and setting up IT infrastructure in the industrial environment

Prerequisites

Basic knowledge in the Ethernet and TCP/IP areas

Training (1T000080)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 30

28/03/2023	Ostfildern

Individual training (1T000102)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2 750 per event**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Optoelectronic Protective Equipment PSENopt – Configuration and Commissioning

Fundamental

Objective

This product course provides you with an overview of the functions and areas of application of safety light curtains PSENopt. Other points covered include selecting safety light curtains with due regard to current regulations and standards. You will learn how to install and commission the products quickly and efficiently and how to perform servicing and diagnostics.

Contents

- Design and functions of devices
- Applicable standards and regulations
- Installation with due regard to safety distances
- Set-up of various modules
- Mechanical integration into machines
- Practical fault diagnostics and rectification
- Test cycles
- Applications
- Products: PSENopt, PSENopt II, PSENopt Advanced, PSENopt slim
- Configuration with PSENopt Configurator

Target groups

- Maintenance engineers
- Commissioning engineers
- Designers
- Design engineers

Note

We will also be happy to perform approvals for safety light curtains at your premises as an additional service. Please contact us for further details.

Benefit to you

- Familiarisation with function range and fitting methods of various Pilz safety light curtains

For information and registration: visit www.pilz.com

Safety light curtains PSENopt II

Training (1T000077)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000027)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

Safety Laser Scanner PSENscan – Configuration and Commissioning

Fundamental

Objective

Safety laser scanners are used in all areas of personal safety. Thanks to their freely defined, individual protected fields and compact design, their setup location is very flexible and they can also be used in mobile applications. This course is designed as a concise introduction for entry level participants with little or no prior knowledge of the installation, configuration and commissioning of the laser scanner PSENscan. The participants learn how to configure the danger points of plants and machinery with the aid of the user-friendly PSENscan Configurator and how to commission the laser scanner.

Contents

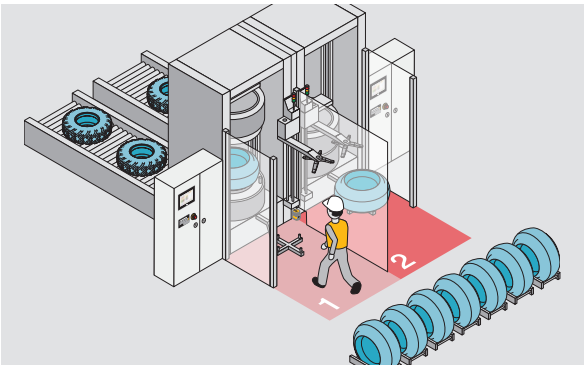
- Important standards governing the handling of laser scanners
- Basics and operating principle of the laser scanner PSENscan
- Sizes and limits of zones to be monitored
- Conception and planning of protection of danger zones
- Assembly and installation of the laser scanner PSENscan
- Configuration with the PSENscan Configurator
- Commissioning a simple application
- Conducting regular checks on the laser scanner PSENscan

Target groups

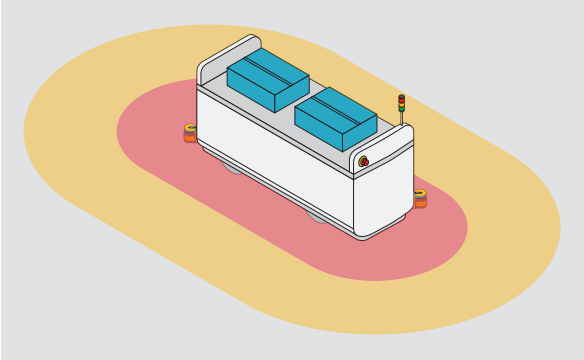
- Electricians
- Maintenance engineers
- Commissioning engineers
- Design engineers
- Programmers
- System integrators

Safety laser scanner PSENscan

Flexible protection of danger zones with PSENscan



Stationary safeguarding of danger zones with simultaneous monitoring of up to 3 safety zones



Safeguarding of automated guided vehicle systems

Training (1T000118)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 8

▸ 12/07/2023	Ostfildern

Individual training (1T000123)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2 750 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com

Safe Radar System PSENradar – Configuration and Commissioning

Fundamental

Objective

In this course you will get to know the world's first safe complete solution for protection zone monitoring, based on radar technology. It consists of the safe radar system PSENradar and the configurable small controller PNOZmulti 2. This complete solution enables complex applications in rugged environments to be monitored safely, even outdoors or in heavy industry or woodworking. The robust radar technology ensures high availability even where there are external influences such as dust, dirt, rain, light, sparks or vibrations. They can therefore be used anywhere that optical sensors reach their limits. Depending on the application, the safe radar solution includes up to six radar sensors, one control unit and the configurable, safe small controller PNOZmulti 2.

In addition to the fundamentals and application possibilities of a radar-supported system, the course also provides knowledge about the configuration and commissioning. Practical examples are used here to perfectly enhance the theoretical specialist knowledge. Furthermore, the differences compared to a visually supported system are explained and the correct applications are demonstrated.

Contents

- Principles of safety technology
- Introduction to radar technology
- Typical application possibilities of a radar-supported system
- Configuration, taking into account the different application cases
- Commissioning of one or more interlinked systems
- Troubleshooting
- Practical implementation

Target groups

- Electricians
- Maintenance engineers
- Commissioning engineers
- Design engineers
- Programmers
- System integrators

Benefits to you

- Learn how to install a complete solution for safe protection zone monitoring in rugged environments, e.g. also in combination with PNOZmulti 2.
- Learn the ideal setup of a protection zone using the configurator.

For information and registration: visit www.pilz.com

Safe radar system PSENradar and configurable, safe small controller PNOZmulti 2

Training (1T000186)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 8

13/07/2023	Ostfildern

Individual training (1T000187)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2750 per event**
Number of participants:	Up to 8

PMC – Quickstart

Objective

This training course is aimed at experienced product-switchers who already have knowledge of other-make drives. With reference to a basic project, the participants can very swiftly commission an axis and learn how to apply the basic project for their own applications. Insights into the program structures facilitate handling the motion control system.

Contents

- Quick start – fast commissioning of an axis
  - Hardware wiring
  - Firmware update
  - Library administration
- PASmotion (setting parameters, motor database, motor selection)
- Basic application with CoDeSys 3.5
- Programming with real examples

Target groups

- Commissioning engineers
- Project engineers
- Programmers
- System integrators

Benefits to you

- Instructions for “quick commissioning”
- Create your own projects quickly

Fundamental

Motion control system PMCprimo DriveP and servo motor PMCtendo SZ

Training (1T000117)

Duration:	**2 days**
	9:00 – 16:30
Fee:	**EUR 950 per person**
Number of participants:	Up to 10

- Dates on request

Individual training (1T000122)

Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 4 850 per event**
Number of participants:	Up to 8

For information and registration: visit www.pilz.com

Revolution Pi – Configuration and Commissioning

Fundamental

Objective

In this training you will gain an insight into the versatile application possibilities of the Revolution Pi Core module. Starting with commissioning, you will learn how to process and switch I/O data by means of practical exercises. We will show you the advantages of the open Revolution Pi architecture, which, together with the industrial hardware, enables new, unconventional paths and approaches in industrial communication.

Benefits to you

- Industrie 4.0 applications implemented easily
- Use of the advantages of open source in an industrial environment

Contents

- Commissioning Revolution Pi Connect
- Commissioning I/O module
- Read inputs and switch outputs
- Introduction to the programming language Python
- Control of digital I/O with Python

In partnership with:

KUNBUS industrial communication

Target groups

- Maintenance engineers
- Commissioning engineers
- Design engineers
- Programmers
- Project engineers

Prerequisites

- Basic PC aptitude
- Basic knowledge of electrical engineering

Note

The training is carried out together with our partner KUNBUS.

Training (1T000120)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

- Dates on request

Individual training (1T000225)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**Price on request**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Revolution Pi RevPi Connect

Starting Successfully in Industrial Security

Objective

Protection against attacks on industrial networks is becoming ever more important. It is essential for planners and design engineers in automation engineering to address this topic. Possible threats already have to be considered during the planning phase. Meticulous planning is of elemental importance for the reliable operation of an Ethernet network in the industrial environment.

This training course provides all essential information on the topic of network security. It also explains how hazards and risks can be minimised.

Contents

- Security aspects
- Authentication
- Authorisation
- Encryption
- Integrity
- Certificates
- Infrastructure
- Topology
- Remote maintenance
- Connecting to Office networks

Fundamental

Target groups

- Installation engineers
- Designers
- Commissioning engineers
- Maintenance engineers
- Persons dealing with the subjects of planning, and setting up of IT infrastructure cabling in the industrial environment
- Persons who want to familiarise themselves with the subject of IT security

Prerequisites

Basic knowledge in the Ethernet and TCP/IP areas

Benefits to you

- \+ Enhance awareness of the issue of industrial security
- \+ Identify weaknesses and possible vulnerabilities in the industrial environment
- \+ Learn optimum countermeasures

Training (1T000101)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 550 per person**
Number of participants:	Up to 30

29/03/2023	Ostfildern
20/11/2023	Ostfildern

Individual training (1T000226)

Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**Price on request**
Number of participants:	Up to 15

For information and registration: visit www.pilz.com

Firewall SecurityBridge

Professional Development

Training topic	Page	Target groups	Dates
Professional Development			
The Successful Presentation – Delivered Confidently and Convincingly	96	Skilled staff and managers, employees who present project results	▸ 21-22/03/2023 ▸ 15-16/08/2023
Virtual Customer Visits	97	Skilled staff and managers	▸ 03/05 + 10/05/2023 [5] ▸ 11/10 + 18/10/2023 [5]
Presenting Technique Online	98	Skilled staff and managers	▸ 16/05 + 23/05/2023 [5] ▸ 07/11 + 14/11/2023 [5]
Design and Deliver Virtual Meetings	99	Skilled staff and managers	▸ 07/03 + 14/03/2023 [5] ▸ 29/08 + 05/09/2023 [5]
Introduce and Perform Projects using Agile Methods	100	Skilled staff and managers	▸ 30-31/03/2023 ▸ 29-30/06/2023
Business Soft Skills – Discover your Potential	101	Skilled staff and managers	▸ 15/06/2023 ▸ 07/12/2023
Train the Trainer – Running Training Courses Successfully Workshop	102	Trainers	▸ 07-08/02/2023 ▸ 04-05/07/2023

Unless stated otherwise, training courses are held at the Pilz Training Centre at Ostfildern, near Stuttgart.

[1] Hanover training location
[2] Dresden training location
[3] Nördlingen training location
[4] Munich training location
[5] Online training

The Successful Presentation – Delivered Confidently and Convincingly

Fundamental

Objective

Whoever wants to impress with their presentation needs to “connect” and inspire their audience. In addition to specialist expertise, that includes a clearly organised, exciting structure, personal presence and the ability to handle difficult situations confidently.
In this training course you will learn how to give presentations a coherent structure and will rehearse a target-group-led presentation style. You will also learn how to use various presentation media effectively.

Contents

- The successful presentation:
  - Importance and benefits
  - Objective and core messages
- Personal impact:
  - Voice, speech and body language
  - Tackling the fear of speaking and stage fright
- Visualisation:
  - Techniques and rules
  - PowerPoint, projector, laptop, flip chart
- Audience:
  - Audience-based structure
  - Involving the audience
  - Dealing with questions and objections

Target groups

People who give talks or presentations

- Skilled staff and managers
- Employees who present project results

Note

The content is compiled from both a theory and practical angle. The participants bring along a presentation from their day-to-day work. Their own presentation style and its effect are assessed with the help of video recordings and feedback. This enables the participants to identify and try out possible improvements.

Manja Conrad

As a certified trainer and business coach in the area of Training and Education, Manja Conrad’s profound knowledge of the requirements of successful training courses and presentations will help you to be even more confident in your next presentation.

Training (1T000140)

Duration:	**2 days**
	9:00 – 16:30
Fee:	**EUR 780 per person**
Number of participants:	Up to 12
21-22/03/2023	Ostfildern
15-16/08/2023	Ostfildern

For information and registration: visit www.pilz.com

Virtual Customer Visits

Fundamental

Objective

Digitalisation has changed a lot of things in the sales environment over recent years. Many companies have moved over to meeting their customers online as well. Although face-to-face contact remains immensely important, a virtual customer visit is now part and parcel of sales activities. The advantages are not only in the travel time and hence costs that are saved, but also in the contemporary use of virtual options in the sales world.
In this live online seminar, you will find out how to motivate and invite your customers to make a virtual visit and how to steer conversations to a successful outcome. You will also learn how to present your products or ideas in the best and most appropriate way.
The seminar consists of two modules with a little time between them. You can use this time to apply and reflect on what you have already learnt. In the second module you can then discuss your experience in the group and ask the trainer any questions that have arisen. This ensures the optimum transition from theory into your everyday working practice.

Contents

- Virtual meetings – pros and cons
- Hardware: technical equipment, background, clothing
- Optimum use of presentations: PowerPoint, products, innovations, ideas, etc.
- Get talking to the customer and engage them
- Soft skills: language and body language in the virtual room
- Install and use tools and functions of Microsoft Teams appropriately (screensharing, chats, whiteboard, forms)

Target groups

This seminar is particularly aimed at sales staff who are in daily contact with customers:

- Field sales
- Back office
- Project support

Notes

To participate in the training you will need the following technical equipment:

- Laptop with integrated webcam or PC with webcam
- Microphone/speaker or headset
- Stable internet connection
- Microsoft Teams (other software on request, e.g. Zoom, Go-to-Webinar etc.)

Benefits to you

- You will learn methods for steering virtual customer visits professionally to a successful outcome
- Small groups for ideal transfer of knowledge Optimum combination of theory and practice
- Between the two modules you can apply what you have already learnt and share experience in the group and with the trainer
- You will receive documents and checklists for day-to-day use

Manja Conrad
As a certified trainer and business coach in the area of Training and Education, Manja Conrad shows you how to attract customers, keep them close and have successful sales discussions in a virtual world.

Online training (1T000203)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

03/05 + 10/05/2023	Online training
11/10 + 18/10/2023	Online training

For information and registration: visit www.pilz.com

Presenting Technique Online

Fundamental

Objective

Digitalisation and recent history pose a particular challenge when it comes to presenting technical content. While we are in principle accustomed to having technical content explained live on “real” devices, in future it will become increasingly common to exploit the possibilities of the virtual world for efficient knowledge transfer. This live online seminar tells you how this can work, what the advantages are and also what the limits are.
The seminar consists of two modules with a little time between them. You can use this time to apply and reflect on what you have already learnt. In the second module you can then discuss your experience in the group and ask the trainer any questions that have arisen. This ensures the optimum transition from theory into your everyday working practice.

Contents

- Presenting online – opportunities and limits
- Hardware: technical equipment
- Implementation: Idea – Goal – Use of technology
- Tools and functions of Microsoft Teams
- Practical examples

Target group

This training is particularly aimed at staff who present technical content.

Notes

To participate in the training you will need the following technical equipment:

- Laptop with integrated webcam or PC with webcam (separate webcam recommended)
- Microphone/speaker or headset
- Stable internet connection
- Microsoft Teams

Benefits to you

- You will learn methods for presenting complex technical content persuasively and professionally online
- We will show you how to prepare content so that your participants stay on the ball online as well
- Small groups for ideal transfer of knowledge
  Optimum combination of theory and practice.
- Between the two modules you can apply what you have already learnt and share experience in the group and with the trainer

Manja Conrad

As a certified trainer and business coach in the area of Training and Education, Manja Conrad will show you how to master the challenge of presenting complex technical material online.

For information and registration: visit www.pilz.com

Online training (1T000204)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

16/05 + 23/05/2023	Online training
07/11 + 14/11/2023	Online training

Design and Deliver Virtual Meetings

Fundamental

Objective

Virtual meetings have rapidly become a central element within businesses. They are a resource-saving way of driving issues and projects forward regardless of location. At the same time, though, virtual meetings present particular challenges for the meeting leader, executive staff, project managers and moderators. In this live online seminar you will learn the unique features of digital cooperation and get recommendations on preparation, delivery and conclusion. In addition to professional communication in a virtual environment, group processes, visualisation options and moderation techniques will also be presented.

The seminar consists of two modules with a little time between them. You can use this time to apply and reflect on what you have already learnt. In the second module you can then discuss your experience in the group and ask the trainer any questions that have arisen. This ensures the optimum transition from theory into your everyday working practice.

Contents

- Virtual meetings: unique features and differences from in-person meetings
- Optimum technology/hardware and how they can be used
- Preparation: planning, agenda, goals, participants, questions
- Delivery: moderation, collaboration, targeted use of technology
- Conclusion and follow-up: record, feedback, reflection
- Communication and group processes in the virtual context

Target groups

- Moderators of online meetings
- Project managers
- Executive staff
- Specialist or line managers
- Active participants/employees in online meetings

Notes:

To participate in the training you will need the following technical equipment:

- Laptop with integrated webcam or PC with webcam
- Microphone/speaker or headset
- Stable internet connection
- Microsoft Teams

Benefits to you

- \+ Small groups for ideal transfer of knowledge
- \+ Optimum combination of theory and practice. Between the two modules you can apply what you have already learnt and share experience in the group and with the trainer
- \+ You will receive documents and checklists for day-to-day use

Manja Conrad

As a certified trainer and business coach in the area of Training and Education, Manja Conrad will tell you how to get the best out of virtual meetings and get your participants optimally involved.

Online training (1T000205)

Duration:	**2 modules of 3.5 hours**
Fee:	**EUR 470 per person**
Number of participants:	Up to 12

- 07/03 + 14/03/2023 Online training
- 29/08 + 05/09/2023 Online training

For information and registration: visit www.pilz.com

Introduce and Perform Projects using Agile Methods

Fundamental

Objective

The so-called scrum framework derived from software development has also become an established tool for projects outside the IT or software field. Agile processes are now finding their way into project management, not only in the hardware development segment but also for marketing, purchasing or organisational development projects. Scrum thus offers businesses the opportunity to restructure their own project organisation to make it more efficient.

The training provides a comprehensive insight into the scrum environment and how agile methods can be introduced in your company – even in the context of non-software projects. In a nutshell: this seminar gives you the tools you need to embark on your own agile journey.

On the 2-day course, trainer suggestions, brief presentations, practical group and solitary exercises, case examples and experience sharing between the participants will provide a sound basis for ensuring that agile scrum methods are introduced at the right place in your business and driven forward efficiently.

Contents

Part 1

- The basics
- Pros and cons
- What will change for the people in my company?
- The tool – Part 1
- How do I get started?

Part 2

- The tool – Part 2
- Scrum master or agile coach?
- Challenges for introduction
- Essential error culture
- Defining success

Target group

Skilled staff and managers of small and medium-sized enterprises who want to discover and realise the effectiveness of agile project management.

Benefits to you

- Build up your methodological and specialist knowledge of agile methods and put it into profitable practice for you and your company.
- Practical exercises and a dynamic training environment will ensure maximum real-life relevance.

Judith Kneiding and **Dr. Rüdiger Fortanier** (not pictured)
As certified trainers in adult education and as scrum masters and agile coaches, your trainers will use practical scenarios to show you interactively how to deliver your projects even more effectively in the future.

Training (1T000206)

Duration:	**2 days**
	9:00 – 16:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 12
▸ 30-31/03/2023	Ostfildern
▸ 29-30/06/2023	Ostfildern

For information and registration: visit www.pilz.com

Business Soft Skills – Discover your Potential

Fundamental

Objective

In today's working world, soft skills are a key success factor. More and more emphasis has been placed on "soft" skills for years. It is important to appear socially competent – to be open, tolerant, self-controlled, communicative and a team player. Soft skills not only complement the so-called hard skills. They contain interdisciplinary key competencies in dealing with other people and with oneself.
But which soft skills are important? And how do I use them? In this seminar we will show you what is important. We have compiled a list of the most important business skills, including tips on how you can implement them.

Contents

- What are soft skills and why are they relevant?
- The three categories of soft skills
- Combining soft and hard skills
- The most important business skills
- Training soft skills – how it works

Methods

Trainer suggestions, brief presentations, group/solitary exercises, case examples, practical exercises, discussions, experience sharing

Target group

Employees who want to learn more about key competencies and how to use them with confidence

Benefits to you

- Soft skills enhance your key competencies
- They help you in your professional and private life
- You learn to understand yourself and others better and to fully exploit existing potential
- You achieve your goals more quickly

Judith Kneiding
As a certified trainer in adult education, Judith Kneiding shows you how to expand and improve your business soft skills in order to meet your professional goals faster.

Training (1T000224)

Duration:	**1 day**
	9:00 – 16:30
Fee:	**EUR 780 per person**
Number of participants:	Up to 12

15/06/2023	Ostfildern
07/12/2023	Ostfildern

Individual training (1T000223)
Upon request, we offer customised training courses, internally or online.

Duration:	**1 day**
Fee:	**EUR 2 850 per event**
Number of participants:	Up to 12

For information and registration: visit www.pilz.com

Train the Trainer – Running Training Courses Successfully Workshop

Advanced

Objective

In this workshop you will learn to hold effective, successful and stimulating training courses. Build on your profound specialist knowledge with the ability to communicate knowledge effectively. Prepare training content creatively and in a way that is tailored to your target audience. We also show you how you can create a convincing impression and motivate others to learn.

Contents

Basics and methodology

- Effective communication
- Understanding and deliberately steering learning processes
- Training methods and how to implement them

Training design

- Creating stimulating training concepts that reflect learning goals and study content
- Planning, implementation and optimisation
- Using various media for effective communication

Personality

- Convincing through speech, body language and rhetoric
- Getting fear of speaking and stage fright under control

Interaction in the group

- The trainer's behavioural role
- Leading and motivating a group
- Mastering difficult situations

Target group

- Trainers
- Technical trainers
- People who create content for training courses
- People who impart and teach knowledge

Benefits to you

- Build on your specialist knowledge with methodology in how to communicate knowledge efficiently
- Learn how to develop informative and stimulating learning concepts that reflect the learning goal and target group
- Use your personality skilfully in helping course participants to achieve lasting specialist and personal development
- Professional feedback using video recordings gives you access to insight into your impact on others, your own strengths and areas for development

Manja Conrad
As a certified trainer and business coach in the area of Training and Education, Manja Conrad will use her methodical and didactic skills to show you the way to communicate knowledge efficiently.

Training (1T000126)

Duration:	**2 days**
	Day 1: 9:00 – 17:00
	Day 2: 9:00 – 16:00
Fee:	**EUR 780 per person**
Number of participants:	Up to 12

07-08/02/2023	Ostfildern
04-05/07/2023	Ostfildern

Individual training (1T000078)
Upon request, we offer customised training courses, internally or online.

Duration:	**2 days**
Fee:	**EUR 2 850 per event**
Number of participants:	Up to 12

For information and registration: visit www.pilz.com

General Information

Our Trainers

Benefit from the knowledge of our trainers. They are all experienced specialists in their area and provide you with practical, proven specialist knowledge.

Holger Bode is responsible for international project planning for press upgrades and new installations in the Presses working group at Pilz GmbH & Co. KG. Responsibilities include the development of full conversion measures and the production of control concepts, hazard assessments and safety concepts. He is also a management member and acts as Quality Manager of the accredited inspection body of Pilz GmbH & Co. KG. Mr Bode has been a trainer in the field of mechanical design, press technology and inspection for many years. He can incorporate much of his practical experience into his training courses.

Manja Conrad is a certified trainer and business coach in the area of Training and Education at Pilz GmbH & Co. KG. She worked in International Sales for many years, where she headed a number of international projects. She combines her intercultural experience with her knowledge of the requirements of product-related training courses in her seminars with a methodical and didactic ability. She especially enjoys communicating practice-oriented, versatile knowledge to those attending her seminars.

Harald Elsäßer is a trainer at the Pilz Academy for the Machinery Directive and Standards series of seminars. He also trains participants to become Certified Machinery Safety Experts. During his own training as a state-approved electrical engineer and industrial management expert and his activities as a consultant in Customer Support, he has been able to gain considerable practical experience in the customised realisation of customer projects in particular. He is concerned with teaching participants how to apply safety-related directives and standards correctly so that users are protected from accidents and companies can operate efficiently.

Lucas Fischer has the specific responsibility of training pupils, apprentices and career beginners on the basics of machinery safety. He himself completed his training at Pilz GmbH & Co. KG as a device/systems engineer. He then completed his dual course of study in electrical engineering with a focus on automation technology. Lucas Fischer now works as a trainer at Pilz himself and helps trainees and students gain practical knowledge. He is particularly interested in passing on knowledge in a manner that is tailored to the target group and easily understandable. For this reason, he focusses on a constant exchange with the participants.

not pictured

Dr. Rüdiger Fortanier is a scrum master and agile coach at Pilz GmbH & Co. KG. He has many years of experience in the complex requirements of product development and has a passion for innovative methods and techniques that enable people to unleash their potential. He builds on sound foundational values to help you discover and explore the right path for you.

Johannes Geiger took over as head of the training department at Festo Didactic SE in 2019. As a technical trainer, he has been offering training courses in various industry sectors directly at the customer's premises for many years – for maximum practical relevance. His focus is on the fields of pneumatics, solenoid valve technology, valve terminals and safety technology. Together with Pilz, Mr Geiger delivers the course for qualification as a Certified Machinery Safety Expert. His comprehensive didactic experience comes to play in the topics of safe pneumatic design in particular here.

Udo Jensel is a state-examined precision engineering specialist. At Pilz GmbH & Co. KG, he has already acquired many years of experience as an application engineer in the area of hardware design and the programming of safety controllers. He was also instrumental in setting up the Consulting Division and can bring extensive knowledge of hazard assessment, risk analyses and safety concepts to the table. By virtue of his long-time experience as a commissioning engineer both in Germany and internationally, he is eager to pass on his knowledge of these complex topics to the course participants in as comprehensible and practical a way as possible. This is why he also works as a trainer for machinery safety at Pilz in addition to his job in Sales.

Judith Kneiding works in Advanced Development at Pilz GmbH & Co. KG. She has been leading seminars and workshops and giving presentations for over 15 years. Judith Kneiding is an agile coach and scrum master. Her areas of specialism include agile, creative and team-building methods as well as soft skills, which she passes on in a practical, interactive and varied way. The approach she takes to her work is characterised by a diverse mix of the tried-and-tested, the new and the agile.

Our Trainers

Ken de Leon completed his training as a communications electronics specialist at Pilz GmbH & Co. KG. He then attended technical college and qualified as a state-approved electrical engineer. Since then, he has worked for Pilz Academy, focusing on product training. He instructs in programmable controllers such as PNOZmulti 2, the automation system PSS 4000 and the visualisation system PASvisu. During training, he is happy to pass on his knowledge to others and to be able to exchange views with the seminar participants.

Peter Mautner is state-approved electrical engineer and has been working at the Pilz Academy for many years. The main focus of his training activities are configurable safety controllers, programmable controllers and the principles of safety technology. As a project manager, programmer and commissioning engineer for various control systems, Peter Mautner continued to build on his experience and is now a full-time trainer at the Pilz Academy. He sees it as his personal duty to protect people from injury through sound knowledge of safety technology.

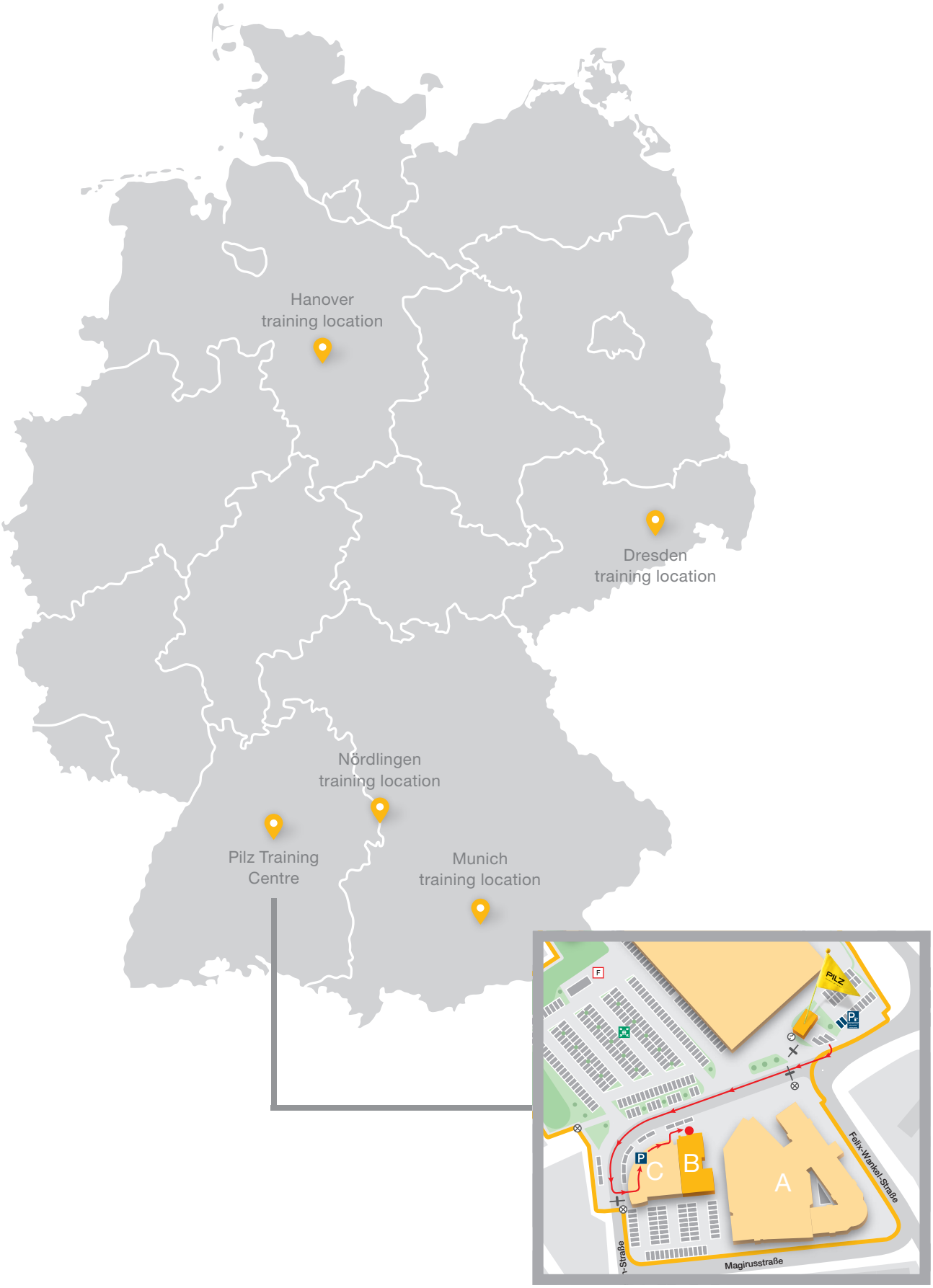
Ulrich Merkel works for Pilz GmbH & Co. KG in the Technical Office in the Project Services area. He is a competent contact partner in the areas of presses and electrical engineering and for questions concerning EMC. Mr Merkel has comprehensive knowledge in the field of press retrofits for various press types. He is also an expert on the topic of the electrical equipment of plant and machinery. Thanks to his experience as head of Electrical Design, he can fall back on a wide range of practical knowledge. Through his active participation in various committees, he establishes a link between knowledge of standards and technology. The transfer of knowledge is a special concern for him.

Michael Moog is the Standardisation Specialist at Pilz GmbH & Co. KG and in this role is responsible for coordination of international work on standards. He is a member of various standards committees and combines theoretical work with practical interpretation of standards. Among other things, he is a specialist for approval procedures for plant and machinery in North America.

Torsten Pusch is a consultant for machinery safety at Pilz GmbH & Co. KG and gained a lot of experience as an application engineer in the programming of safety controllers and human-machine interface systems. His activities in the Customer Support department are predominantly to do with consultancy. He provides support in all processes involved in assessing conformity with the Machinery Directive. He teaches the participants in his training courses how innovative safety technology can be optimally used to prevent accidents.

Jochen Vetter is a team leader in Consulting for machinery safety and has been involved with the topic of safe human-robot collaboration and robotic services at Pilz right from the start. At the Academy he is an expert on all robot-related topics. He is also active in the field of HRC at the BGHM and DGUV in various working groups. The training courses on safe human-robot collaboration are based on his expertise in CE marking and validation of HRC applications. Special emphasis is placed on collision investigations in applications – HRC method 4 – according to ISO/TS 15066.

Training Locations and Getting There



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DAkkS Deutsche Akkreditierungsstelle D-IS-12033-01-00

Pilz GmbH & Co. KG, Ostfildern, operates an inspection body for plant and machinery, accredited by DAkkS.

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