



Training programme 2019

PILZ
THE SPIRIT OF SAFETY

Enhanced success through professional development

- ▶ Training courses for safety and automation
- ▶ International qualification programme
- ▶ City & Guilds and TÜV-certified training courses





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


▶ Training Programme 2019


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► Qualification Concept

We offer you a training portfolio that meets all individual requirements for supplementary qualification in companies. We have organised all the contents and structure here such 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.





Introduction Fundamental Advanced Expert

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 concept worldwide. Many of our training courses 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.

Our training experts have developed a concept 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. All this on four different levels, supplemented by a specialised level for immersion in certain topics.

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!

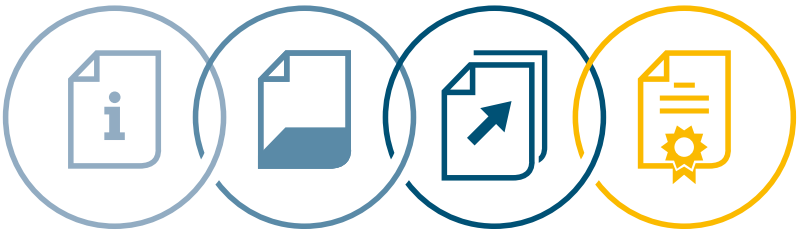


Jamie Walton, the Services Manager at Pilz UK, explains what makes our qualification concept so special:

The motivation behind the development of the qualification concept was clearly our awareness that education is not an as-is state, but rather a never ending process. Furthermore, we are currently observing the growing significance of further training and personnel development in companies. And this is precisely where our concept comes into effect. Progressive, modular and made for just one person: for you!

Our programme is characterised by its international harmonisation. The different levels and qualification paths can be found in the entire Pilz range around the world. Small organisations can thus easily bring their employees to the same state of knowledge everywhere in the world. For larger companies, this is an opportunity to implement entire further training programmes, to systematically support employees and to implement qualification standards throughout the entire company.

► Qualification Concept



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.



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.



Specialised training

In addition to the training courses at different levels we offer courses in many areas that provide a deeper insight into a specific topic. Specialist knowledge for specialists and aspiring specialists.

► Our International Network – Qualification all around the World

15 000
Participants
per year

50
Countries

4 500
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 here as national regulations. We support you anywhere in the world with an extensive offer of training courses on an internationally uniform level. Our 2 400 employees at 42 subsidiaries and 27 branches on 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.

Benefits to you

- You are trained by experienced 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.

100
Trainers around
the world

110
Training
topics around
the world

3
Certified
Expert-level
training courses

“The best basic training.
Thank you!”

“Very experienced
instructors.”

“It was presented in
a highly interesting and
competent way!”



► Tailor-Made Training Courses from Pilz UK

Training is all about improving trainees' knowledge and skills, but individuals can have diverse competences and training needs that require a bespoke solution.

While standard training courses remain extremely useful in many circumstances, companies and training managers are increasingly finding that exceptional value can be obtained from bespoke training courses.

All standard courses offered by Pilz can be tailored to meet the needs of the trainees by either customising a single standard course, or by picking and mixing topics from several standard courses. This avoids paying for training in subjects that are already well understood, plus it means that additional material can be inserted to suit the specific needs of the trainees.

Bespoke Courses

If several days' worth of training is required, it may be difficult for a Company to release personnel for the necessary duration. If so, Pilz can tailor the course so that it is delivered as a series of modules spread over a convenient timeframe. Pilz is also flexible in that courses can be run at its own Training Centre in Corby, at customers' premises or at convenient off-site locations such as hotels.

Whatever route is taken towards the delivery of a bespoke training course, customers can be confident that the quality will be to the same high standards as all of its training courses.

Contact us to discuss your individual requirements!
E: training@pilz.co.uk T: 01536 460766



Creating a focused learning environment is important to us. We are able to deliver our training programme at our own purpose built facilities or directly at your premises.

Corby Training Centre

It's easier to learn with a change of environment! The training centre at our head office in Corby, Northamptonshire is optimally equipped and offers a pleasant learning atmosphere, which allows you to concentrate fully on the contents of the training. Here we offer our full range of machinery safety courses and our dedicated product courses.

In-House Training at your premises

We can also present our training courses at your company – very convenient and without loss of time. All that's required for an in-house training course is a suitable training facility or conference room.

Get in touch - We look forward to hearing from you!

To benefit from our knowledge and expertise contact us, we are happy to help!

- Phone - 01536 460766
- E-mail - training@pilz.co.uk
- Visit - www.pilz.co.uk



Pilz House - Corby Training Centre

Our Principal Trainers:

Paul Kingston
CMSE® – Certified Machinery
Safety Expert
BEng (Hons)
Safety Consultant
Pilz Automation Technology



Matt Androsiuk
CMSE® – Certified Machinery
Safety Expert
Safety Consultant
Pilz Automation Technology



Paul Littler
Applications Engineer
Pilz Automation Technology



Pete Stewart
CMSE® – Certified Machinery
Safety Expert
Safety Consultant
Pilz Automation Technology





Machinery Safety Training



Training topic	Page	Days
Machinery Safety Training		
Introduction to Machinery Safety	14	1
Fundamentals of Machinery Safety	15	2
Basis of CE Marking	16	1
CECE - Certified Expert in CE Marking CERTIFIED	18	2
The Provision and Use of Work Equipment Regulations (PUWER) & Risk Assessment Workshop	19	2
The Provision and Use of Work Equipment Regulations (PUWER)	20	1
Risk Assessment Workshop	21	1
Safety Design Incorporating EN ISO 13849 and EN 62061 & PL + SIL Calculation using the PAScal Safety Calculator	22	2
Safety Design Incorporating EN ISO 13849 and EN 62061	23	1
PL and SIL Calculation using the PAScal Safety Calculator	24	1
Electrical Safety in Industrial Installations (EN 60204)	25	1
LoTo: Lockout Tagout	26	1
City and Guilds 4 Day Machinery Safety Course CERTIFIED	28	4
CMSE® - Certified Machinery Safety Expert CERTIFIED	30	4
CMSE® Recertification CERTIFIED	32	1

Courses are held regularly at our training headquarters in Corby, Northamptonshire.
We can also run courses at your own premises - contact training@pilz.co.uk for more information.

► 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 principle of machinery safety.

Contents

- Introduction to safety: motivation for safety, key questions on safety and on health and safety management
- International legislation
 - Application on plant and machinery
 - Advantages of compliance
- Standards for conformity assessment
- Safety management systems
- Key factors for the implementation of a safe plant
- Risk assessment
 - Dangers
 - Risk assessment
- Risk reduction

Target groups

- Commissioning engineers
- Design engineers
- Project managers
- Planners

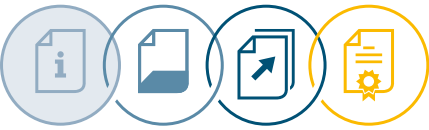
Note

The training “Fundamentals of Machinery Safety” could be of interest to you.

Benefits to you

- ➕ Good overview of machinery safety
- ➕ Better understanding of correlations
- ➕ Participation also possible without prior knowledge

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Fundamentals of Machinery Safety
- Advanced: Electrical safety in industrial plants (EN IEC 60204)
- Expert: CMSE – Certified Machinery Safety Expert

► Dates on request

Duration: **1 day**
9:00 – 17:00
Fee: **£300 +VAT per person**
Number of participants: Up to 10

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses.)
Number of participants: Up to 10 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

► Fundamentals of Machinery Safety



Fundamental

Objective

In this training, you will receive deeper knowledge 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, protection methods, safety components and the design and validation of control systems in accordance with EN ISO 13849 and EN 62061 in particular. And all of this is based on the standards and laws that promote machinery safety.

Contents

- International and local legislation and safety standards
- Machinery Directive including CE marking
 - Machinery Directive requirements
 - Relevant European legislation
 - Essential health and safety requirements
 - Important standards (harmonised with the Machinery Directive and other directives)
- Risk assessment
 - Limits of the machinery
 - Applicable standards for the risk assessment of machines
- Introduction to protection methods and systems
- Electrical safety (EN 60204): general requirements for the electrical safety of machinery
- Lockout Tagout – Control of dangerous energy sources
 - LoTo process overview
 - LoTo procedure
- Safety design
 - Safety components and protection methods
 - Standards for mechanical safeguards
- Robot safety
 - Assessment and safeguards
 - Applicable standards and laws
- Safety-related parts of controllers
- Introduction to standards for safety controllers EN ISO 13849 and EN 62061

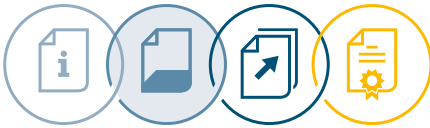
Target groups

- Design engineers
- Project managers
- Planners

Note

The training “Introduction to Machinery Safety” could be of interest to you.

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Fundamentals of Machinery Safety
- Advanced: Electrical safety in industrial plants (EN IEC 60204)
- Expert: CMSE – Certified Machinery Safety Expert

► Dates on request

Duration: **2 days**
9:00 – 17:00
Fee: **£600 +VAT per person**
Number of participants: Up to 10

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **2 days**
Fee: **£600 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses.)
Number of participants: Up to 10 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

► Basis of CE Marking



Advanced

Objective

The CE marking process describes the procedure for the certification of products in accordance with the specifications in the European Economic Area. At the end of the process, the application of the CE Mark should signify that all mandatory safety requirements in accordance with Machinery Directive 2006/42/EC are met.

Here you will be introduced to the topics concerning Machinery Directive 2006/42/EC and your requirements with regard to CE marking of machines. Which machines fall under the scope of the Machinery Directive? What are the responsibilities of machine builders (manufacturers) and machine operators (employers)? These questions that arise in conjunction with mechanical engineering or the acquisition and commissioning of new and existing machinery will be answered in this training course. Furthermore, you will get an overview of the associated standards for the design and construction of machines placed on the market and operated within the European Economic Area. The training will take you step by step through the necessary processes for CE marking of machinery.

Together with the experiences from 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

- Scope and requirements of the Machinery Directive 2006/42/EC
- Essential health and safety requirements
- Harmonised standards under the Machinery Directive 2006/42/EC
- European legislation related to plant and machinery
- The process and procedures for CE marking of machinery
- Responsibilities in the machinery life cycle
- Administration and documentation requirements, such as Declarations of Conformity, Technical File and attachment of the CE Mark

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 aimed towards people who are responsible for the topic of machinery safety in day-to-day operations, such as:

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

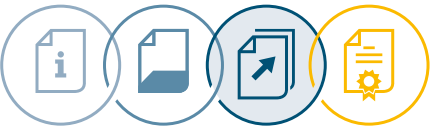
Note

This course is the ideal preparation for the certified course 'CECE – Certified Expert in CE Marking' (page 18). 'CECE' is scheduled to run on the 2 days following this course should you wish to complete both courses consecutively.

Benefits to you

- Directive-compliant CE marking
- High practical relevance through practice and application on a specimen machine

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Fundamentals of Machinery Safety
- Advanced: Basis of CE Marking**
- Expert: CECE - Certified Expert in CE Marking

Course Dates at the Pilz Training Centre:

- 20th August 2019
- 19th November 2019

Duration: **1 day**
9:00 – 17:00
Fee: **£300 + VAT per person**
Number of participants: Up to 10

In-house training

On request, we will be pleased to offer company-internal training courses too.
Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 10 (dependant on facilities)



For information and registration: visit www.pilz.co.uk

For information and registration: visit www.pilz.co.uk

CERTIFIED

► CECE – Certified Expert in CE Marking



Expert

Objective

With CECE – Certified Expert in CE Marking you reach the highest possible qualification in CE marking.

As part of this qualification program, the entire CE marking process according to Machinery Directive 2006/42/EC is explained in detail. The path – from risk assessment to the attachment of the CE mark – is explained using a virtual machine model. The model shows the differences in the procedure for partly completed and completed machinery as well as for interlinked machines.

The qualification as CECE 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

Legal situation for machinery safety in Europe:

- Directives on the topic of CE marking
- The 6 steps of CE marking
- Roles and responsibilities of importers/distributors, operators, manufacturers and authorised representatives

Legal framework:

- Machinery Directive in detail: Structure, scope, exclusions
- Additional relevant directives, e.g. EMC or ATEX Directive

Definition of the requirements:

- Establish essential requirements
- Application of standards, technical specifications, guidelines, risk assessment etc.

Procedure for conformity assessment:

- Modules for the procedure during the conformity assessment
- Use of notified bodies

Conformity validation:

- Design phase
- Production phase
- Testing

Technical documentation:

- Requesting and compiling technical documents
- Declaration of conformity and incorporation
- Positioning and use of the CE mark

Extras:

- CE marking on an assembly of machines
- Procedure in the event of substantial modification to a machine
- Authorised representatives: Requirements, commissioning and responsibilities
- Practical exercises and/or discussions at the end of each module



Target groups

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

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

Prerequisite for participating in the training course

- Participation in the training course “Basis of CE Marking” (page 16) within the last two years

Note: ‘Basis of CE Marking’ is scheduled to run on the day before this course should you wish to complete both courses consecutively.

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. Are you unsure about whether your current qualification corresponds to the required level? Feel free to get in touch with us. We offer you individual consultation and would be happy to show you possible alternatives with which you can achieve the qualification level for the CECE.

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 the participation in the practical workshops
- Achieve the highest possible qualification in the area of CE marking in just two days

In partnership with:



Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Risk Assessment Workshop
- Advanced: Basis of CE Marking
- **Expert: CECE - Certified Expert in CE Marking**

Course Dates at the Pilz Training Centre:

- 21st August 2019 - 22nd August 2019
- 20th November 2019 - 21st November 2019

Duration: **2 days**
9:00 – 17:00
Fee: **£1,200 + VAT per person¹⁾**
Number of participants: Up to 6



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

The Provision and Use of Work Equipment Regulations (PUWER) & Risk Assessment Workshop



Fundamental

Objective

Day 1: PUWER

The PUWER (Provision & Use of Work Equipment Regulations) section of the course aims to provide delegates with an overview of PUWER including parts 1-5, who is responsible, what duties are placed on them and what equipment the regulations apply to.

Day 2: Risk Assessment

The workshop equips the participants with the knowledge and skills with which to carry out the risk assessment of machinery in accordance with EN 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

Day 1: PUWER

This course covers the regulations within PUWER, and also various European standards that can be used to aid compliance.

- ▶ The background to the Regulations
- ▶ Work equipment suitability & risk assessment
- ▶ Maintenance
- ▶ Instructions & Training
- ▶ Dangerous parts of machinery & how to control the risks from them
- ▶ Controls and control systems
- ▶ Practical application and inspection of a machine in line with the current PUWER regulations

Day 2: Risk Assessment

- ▶ Directives and standards for risk assessment
- ▶ Application of the various assessment methods
 - Hazard Rating Numbers
 - Risk matrix
 - Risk graph
- ▶ Hierarchy of control
- ▶ Remediation and residual risk
- ▶ Risk assessment best practice
- ▶ Practical examples

Target groups

- ▶ Standards officers
- ▶ Design engineering managers
- ▶ Plant construction and control system design engineers
- ▶ Technical engineering managers
- ▶ Safety officers and specialists involved in workplace evaluation
- ▶ Technical purchasers (of machines and industrial plants specifically)
- ▶ Those responsible for upgrades and maintenance of plant and machinery
- ▶ Managing directors of machine engineering companies and control systems manufacturers

Benefits to you

- + Comprehensive expertise on how to tackle the risk assessment
- + Maximum practical orientation using interactive, actual case studies
- + Understand the scope of the regulations and who they affect
- + Understand what equipment is caught under the regulations
- + Outline the compliance criteria for power presses under PUWER
- + Understand a method for compliance to PUWER

Course Dates at the Pilz Training Centre:

- ▶ 20 Feb 2019 - 21 Feb 2019
- ▶ 28 May 2019 - 29 May 2019
- ▶ 23 Sep 2019 - 24 Sep 2019
- ▶ 27 Nov 2019 - 28 Nov 2019

Duration: **2 days**
9:00 – 17:00
Fee: **£600 + VAT per person**
Number of participants: Up to 8

In-house training

Duration: **2 days**
Fee: **£600 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

The Provision and Use of Work Equipment Regulations (PUWER)



Fundamental

Objective

The aim of the training course is to provide delegates with an overview of PUWER including detailing who is responsible, what duties are placed on them and what equipment the regulations apply to.

Contents

This course covers the regulations within PUWER, and also various European standards that can be used to aid compliance.

- ▶ The background to the regulations
- ▶ Work equipment suitability & risk assessment
- ▶ Maintenance
- ▶ Instructions & Training
- ▶ Dangerous parts of machinery & how to control the risks from them
- ▶ Controls and control systems
- ▶ Practical application and inspection of a machine in line with the current PUWER regulations

Target groups

- ▶ Plant and Engineering Managers
- ▶ Maintenance Engineers and Managers
- ▶ Safety Specialists
- ▶ Project Engineers

Benefits to you

- + Understand the scope of the regulations and who they affect
- + Understand what equipment is caught under the regulations
- + Outline the compliance criteria for power presses under PUWER
- + Understand a method for compliance to PUWER

Course Dates at the Pilz Training Centre:

- ▶ 7th March 2019
- ▶ 21st October 2019

Duration: **1 day**
9:00 – 17:00
Fee: **£300 + VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

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 EN 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

- ▶ Directives and standards for risk assessment
- ▶ Application of the various assessment methods
 - Hazard Rating Numbers
 - Risk matrix
 - Risk graph
- ▶ Hierarchy of control
- ▶ Remediation and residual risk
- ▶ Risk assessment best practice
- ▶ Practical examples

Target groups

- ▶ Standards officers
- ▶ Design engineering managers
- ▶ Plant construction and control system design engineers
- ▶ Technical engineering managers
- ▶ Safety officers and specialists involved in workplace evaluation

- ▶ Technical purchasers (of machines and industrial plants specifically)
- ▶ Those responsible for upgrades and maintenance of plant and machinery
- ▶ Managing directors of machine engineering companies and control systems manufacturers

Benefits to you

- + Comprehensive expertise on how to tackle the risk assessment
- + Maximum practical orientation using interactive, actual case studies

Course Dates at the Pilz Training Centre:

- ▶ 9th May 2019
- ▶ 3rd July 2019
- ▶ 22nd October 2019

Duration: 1 day
9:00 – 17:00
Fee: £300 + VAT per person
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: 1 day
Fee: £300 + VAT per person
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

Safety Design Incorporating EN ISO 13849 and EN 62061 & PL + SIL Calculation using the PAScal Safety Calculator



Advanced

Objective

Day 1: Safety Design incorporating EN ISO 13849 and EN 62061

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 addresses how EN ISO 13849-1 (standard for safety-related control systems) is applied in automation and in the design of plants. In addition, we introduce you to the requirements resulting from the EN 62061 standard.

Day 2: PL & SIL Calculation using the PAScal Safety Calculator

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

Day 1: Safety Design incorporating EN ISO 13849 and EN 62061

- ▶ Safety regulations and standards (introduction)
- ▶ Standards for safety-related control systems
 - EN ISO 13849
 - EN 62061
- ▶ Detailed overview of the design principles for safety-related control systems
- ▶ Calculation of the safety integrity level (SIL) and performance level (PL)
- ▶ Use of the PAScal Safety Calculator

Day 2: PL & SIL Calculation using the PAScal Safety Calculator

- ▶ Principles and terms of functional safety
- ▶ Brief overview of functional safety according to EN ISO 13849 and EN 62061
- ▶ Various arithmetic examples using a machine equipped with PAScal Safety Calculator software
- ▶ Individual questions

Target groups

- ▶ Developers, design engineers, safety officers 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 £200 including software licence.

Benefits to you

- + Detailed evaluations from 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
- + Specific implementation of your requirements with aid of PAScal
- + Individual advice regarding your questions

Course Dates at the Pilz Training Centre:

- ▶ 18 Feb 2019 - 19 Feb 2019
- ▶ 7 May 2019 - 8 May 2019
- ▶ 27 Aug 2019 - 28 Aug 2019
- ▶ 25 Nov 2019 - 26 Nov 2019

Duration: 2 days
9:00 – 17:00
Fee: £600 + VAT per person
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: 2 days
Fee: £600 + VAT per person
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

► Safety Design Incorporating EN ISO 13849 and EN 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 addresses how EN ISO 13849-1 (standard for safety-related control systems) is applied in automation and in the design of plants. In addition, we introduce you to the requirements resulting from the EN 62061 standard.

Contents

- Safety regulations and standards (introduction)
- Standards for safety-related control systems
 - EN ISO 13849
 - EN 62061
- Detailed overview of the design principles for safety-related control systems
- Calculation of the safety integrity level (SIL) and performance level (PL)
- Use of the PAScal Safety Calculator

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 £200 including software licence.

Benefits to you

- Detailed evaluations from 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

► Dates on request

Duration: **1 day**
9:00 – 17:00
Fee: **£300 +VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses.)

Number of participants: Up to 8 (dependant on facilities)

► 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 EN ISO 13849 and EN 62061
- Various arithmetic examples using a machine equipped with PAScal Safety Calculator software
- Individual questions

Target groups

- Developers
- Design engineers
- Planners
- Safety officers

Notes

Delegates to bring thier own laptop if possible - this will allow the free-version of the software to be downloaded and ensure full-participation in the exercises. 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 £200 including software licence.

Benefits to you

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

Course Dates at the Pilz Training Centre:

- 6th March 2019
- 2nd July 2019
- 26th September 2019

Duration: **1 day**
9:00 – 17:00
Fee: **£300 + VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)

Number of participants: Up to 8 (dependant on facilities)

► Electrical Safety in Industrial Installations (EN 60204)



Advanced

Objective

Anyone who manufactures, imports, exports or operates industrial machinery and switchgear and is responsible for its safety under local safety equipment legislation has a duty of inspection under EN 60204. The objective of the training is to put across to you the basics of electrical safety of plant and machinery. The requirements of the standard EN 60204 for the electrical safety of machinery are presented. You will learn which requirements are to be taken into account in the drafting, design or maintenance of electrical, electronic and programmable electronic equipment and systems of machinery.

Contents

- Overview of the electrical standards for the safe design of plant and machinery
- Requirements for electrical installations
- Electrical hazards/measures to protect against electric shocks
- Tried-and-tested wiring examples
- Requirements for operator interfaces with machine control functions and equipment
- Requirements for location and assembly of control units
- Validation and verification

Target groups

- Electrically skilled persons
- Competent persons
- Nominated persons in control of work equipment
- Qualified electricians
- Nominated persons in control of an electrical installation
- Design engineers

Benefits to you

- Get to know the scope of EN 60204
- Take advantage of the benefits provided by technical documentation
- Understand how to protect yourself and your staff
- Reduced assembly times based on consistent planning
- Tried-and-tested methods of electrical design in control cabinet construction

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Fundamentals of Machinery Safety
- **Advanced: Electrical safety in industrial plants (EN IEC 60204)**
- Expert: CMSE – Certified Machinery Safety Expert

► Dates on request

Duration: **1 day**
9:00 – 17:00
Fee: **£300 +VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses.)
Number of participants: Up to 8 (dependant on facilities)

► LoTo: Lockout Tagout



Fundamental

Objective

Lockout tagout is about the safe isolation of all energy sources on machinery and subsequent safe reinstatement of energy sources. In the course, you will gain a detailed understanding of the requirements and applications of the lockout tagout procedure, regardless of whether you are a manufacturer or an operating company. We will focus slightly more on operating company topics. We will deal with legal requirements as well as with practical examples and implementation situations.

Contents

In addition to the legal requirements of a LoTo procedure, we will detail all the types of energy and their specific properties.

LoTo procedure

- Safety regulations and standards for plant and machinery (International and European)
- Safety of energy sources
- Unexpected start-up
- LoTo processes:
 - Requirements and responsibilities
 - The most important methods, documents and necessary markings of the locked systems
 - LoTo methodology
 - LoTo development processes
 - LoTo tools

Software PASloto

The lockout tagout documentation software PASloto helps you to draw up work instructions for powering down in the LoTo procedure. In addition to this, you can use the software to easily document the overall system with regard to LoTo. Learn more about PASloto at www.pilz.com.

- Practical exercise examples based on a sample machine
- Description of individual methods to switch energy off and back on again
- Documentation aids
- Support with documenting the LoTo procedures
- Working with PASloto

Target groups

- Technical personnel, especially maintenance staff
- Safety 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
- All aspects of discharging of dangerous 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

► Dates on request

Duration: **1 day**
9:00 – 16:30
Fee: **£300+ VAT per person**
Number of participants: Up to 10

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300+ VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 10 (dependant on facilities)

CERTIFIED

► City & Guilds 4 Day Machinery Safety Course

Pilz has developed a course which is accredited by City & Guilds that conveys all of the expertise needed to safeguard Machinery and Plant.



Advanced



Developed by Pilz, quality approved and certified by City & Guilds

Safety begins with the Concept

Effective reduction of risk begins at the concept stage of a machine. The demands of Engineers and Operators must be determined early on in order to develop cost effective Safety Concepts. The correct application of Standards and Regulations is of particular importance in this process.

Gain a Machinery Safety Certificate with us!

Acquire the knowledge necessary to reduce risk and secure economic success. Important tips from experienced specialists are on hand to help with implementation.

By completing the course, you will gain the necessary knowledge to understand the complete Machinery Safety Lifecycle from design to modification through to decommissioning.

Certified in only 4 Days

Seven modules (see diag.) are covered with a combination of classroom sessions, practical exercises and examinations. A City & Guilds Machinery Safety Certificate will be issued on successful completion of all seven modules.

Be prepared with our Safety Compendium

We recommend that you read our Pilz Safety Compendium in preparation for the course. For further information and to download visit www.pilz.co.uk and search Safety Compendium.

For information and registration: visit www.pilz.co.uk



Course Contents

Day 1

- Introduction
- Management of Health and Safety at Work Regulations
- CE Marking requirements covering Machinery, EMC and Low-Voltage Directives
- Harmonised standards structure
- Tests on modules completed throughout the day

Day 2

- EN 60204-1 Safety of Machinery - Electrical equipment of Machinery
- EN ISO 13849-1 Safety of Machinery - Safety related parts of control systems
- Principles and aspects of machine guarding
- Tests on modules completed throughout the day

Day 3

- Practical wiring exercises to the categories of the standard for E-stop circuits including fault monitoring
- Practical wiring session on guard switches, 2 hand control systems etc, including fault indication and monitoring
- Provision and Use of Work Equipment Regulations 1998
- Tests on modules completed throughout the day

Day 4

- Risk assessments concepts and theory, including EN ISO 12100.
- Practical method of risk assessment
- Temporary safety measures

Target groups

- Electrical Engineers
- Mechanical Engineers
- Engineering Managers

Notes

A City & Guilds Certificate will be issued on successful completion of all modules

Benefits to you

- + Comprehensive knowledge covering the complete safety lifecycle of a machine or plant
- + Enhanced technological competence when preparing safety solutions
- + Highly practical approach
- + Certification in just 4 days

Your optimum qualification path:



Introduction: Introduction to Machinery Safety

Fundamental: Fundamentals of Machinery Safety

Advanced: City & Guilds 4 Day Machinery Safety Course

Expert: CMSE – Certified Machinery Safety Expert

Course Dates at the Pilz Training Centre:

- 4 Feb 2019 - 7 Feb 2019
- 18 Mar 2019 - 21 Mar 2019
- 8 Apr 2019 - 11 Apr 2019
- 20 May 2019 - 23 May 2019
- 10 Jun 2019 - 13 Jun 2019
- 15 Jul 2019 - 18 Jul 2019
- 5 Aug 2019 - 8 Aug 2019
- 9 Sep 2019 - 12 Sep 2019
- 14 Oct 2019 - 17 Oct 2019
- 11 Nov 2019 - 14 Nov 2019
- 2 Dec 2019 - 5 Dec 2019

Duration: **4 days**
Mon to Thurs : 9:00 – 17:00
Fee: **£1,400 +VAT per person¹⁾**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **4 days**
Fee: **£1,400 +VAT per person¹⁾**
(Minimum charge of 5 delegates required, plus travel expenses.)
Number of participants: Up to 8 (dependant on facilities)



¹⁾ Includes the training material and the issuing of the certificate

For information and registration: visit www.pilz.co.uk

CERTIFIED

▶ CMSE® – Certified Machinery Safety Expert



Expert



In partnership with:



Contents

Module 1: Introduction to safety

- ▶ Introduction to the relevant safety regulations
- ▶ Competence and responsibilities
- ▶ Introduction to safety management systems

Module 2: Machinery safety

- ▶ Legislation relating to the design, manufacture and maintenance of machinery and work equipment
- ▶ Conformity requirements and procedures for placing machinery on the market
- ▶ Work equipment and workplace regulations
- ▶ Taking safety at work into consideration in terms of machines, including ergonomics, noise, vibration and chemical substances

Module 3: Risk assessment

- ▶ Risk assessment according to EN ISO 12100 and its application
- ▶ Methods for risk assessment using specific examples
- ▶ Performing the risk assessment step by step
- ▶ Application and usage of further relevant machinery standards within the risk assessment process
- ▶ Brief overview of risk reduction after completion of the risk assessment

Module 4: Mechanical safeguards

- ▶ International requirements of standards in terms of mechanical safeguards
- ▶ Safeguards: definition, types and examples of applications
- ▶ Calculation of safety distances in compliance with EN ISO 13857

Safety components and technologies

- ▶ Overview of safety components, requirements and applications
- ▶ Specification and use, advantages and disadvantages (e.g. interlocking devices, light curtains, two-hand control devices)
- ▶ Technical and supplementary protective measures (e.g. safety fences, light barriers, emergency stop command devices)
- ▶ Safety relevant applications of control systems

Electrical safety requirements

- ▶ A detailed look at EN 60204-1: electrical equipment of plants and machinery
- ▶ Considerations of the electrical design, from the infeed up to the proper verification
- ▶ Safe operation and maintenance of electrically driven machinery

Module 5: Functional safety of control systems

- ▶ Detailed consideration of requirements in EN ISO 13849
- ▶ Specification, draft and validation of functional safety control systems
- ▶ Determination of Performance Level (PL) and Safety Integrity Level (SIL) with reference to safety functions
- ▶ Choice of architecture using practical examples of implementing categories
- ▶ Software lifecycle: requirements and application
- ▶ Verification and validation methods
- ▶ Introduction to EN 62061
- ▶ Practical exercises in PL and SIL validations

Functional safety of fluid engineering

- ▶ Requirements of EN ISO 4413 (hydraulic systems) and ISO 4414 (pneumatic systems)
- ▶ Required measures for the safe application of hydraulic and pneumatic systems
- ▶ Special features of hydraulic and pneumatic components
- ▶ Design of safety-related parts in fluid engineering according to EN ISO 13849-1

Target groups

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

Note

The course 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.**

Prerequisites

An application form detailing professional experience, subject knowledge and relevant qualifications must be completed to determine eligibility for this course. Are you unsure about whether your current qualification corresponds to the required level? Feel free to get in touch with us. We offer you individual consultation and would be happy to show you possible alternatives with which you can achieve the qualification level for the CMSE.

CMSE also fulfils the entry criteria for qualification as CECE – Certified Expert in CE Marking (page 18).

Benefits to you

- ✚ Use the internationally recognised TÜV NORD certificate as a benefit for your company – but also for your career
- ✚ Become a recognised machinery safety expert at your workplace
- ✚ Certification in just four days

Your optimum qualification path:



Introduction: Introduction to Machinery Safety

Fundamental: Fundamentals of Machinery Safety

Advanced: City & Guilds 4 Day Machinery Safety Course

Expert: CMSE – Certified Machinery Safety Expert

Course Dates at the Pilz Training Centre:

- ▶ 21 Jan 2019 - 24 Jan 2019
- ▶ 11 Feb 2019 - 14 Feb 2019
- ▶ 11 Mar 2019 - 14 Mar 2019
- ▶ 1 Apr 2019 - 4 Apr 2019
- ▶ 13 May 2019 - 16 May 2019
- ▶ 17 Jun 2019 - 20 Jun 2019
- ▶ 8 Jul 2019 - 11 Jul 2019
- ▶ 12 Aug 2019 - 15 Aug 2019
- ▶ 16 Sep 2019 - 19 Sep 2019
- ▶ 7 Oct 2019 - 10 Oct 2019
- ▶ 4 Nov 2019 - 7 Nov 2019
- ▶ 9 Dec 2019 - 12 Dec 2019

Duration: **4 days**
9:00 – 17:00

Fee: **£1,800 + VAT per person¹⁾**

Number of participants: Up to 10

In-house training

On request, we will be pleased to offer company-internal training courses.

Duration: **4 days**

Fee: **£1,800 + VAT per person¹⁾**
(Minimum charge of 6 delegates required, plus travel expenses)

Number of participants: Up to 10 (dependant on facilities)



For information and registration: visit www.pilz.co.uk

For information and registration: visit www.pilz.co.uk

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

CERTIFIED

► CMSE® – Recertification



Expert

Objective

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

Did you pass the CMSE exam successfully in 2015 or before? Then why not enrol for the refresher seminar now, so that you are always on top of the latest developments in the underlying standards and in current safety technology? In the practical workshops, you will enhance your application knowledge. And last but not least, this extends your membership of the CMSE online community which means that you will continue to receive free access to current news and exclusive downloads.

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.

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
- Extend your membership of the CMSE online community

Course Dates at the Pilz Training Centre:

- 4 March 2019
- 1 July 2019
- 19 August 2019
- 18 November 2019

Duration: **1 day**
9:00 – 16:30

Fee: **£450 + VAT per person¹⁾**

Number of participants: Up to 10



¹⁾ Includes the TÜV fee and the issuing of the certificate



Our safety consultants go the extra mile ...

Pilz Services for Machinery Safety are both internationally consistent and customised to local requirements. With their high-level knowledge of international and national regulations and standards, our service professionals provide global and local support for all areas of functional safety across a wide range of industry sectors.

From initial Risk Assessment to Safety Design to CE Marking, right through to Engineering and Training. We reduce risk, implement technical machinery safety and take responsibility with our certification services.

Further information about Pilz Services: www.pilz.co.uk + Webcode 181814

PILZ
THE SPIRIT OF SAFETY

DAkkS
Deutsche
Akkreditierungsstelle

DAkkS accredited independent inspection body in accordance with ISO/IEC 17020:2012 for the plant and machinery sector.



Robotics

Training topic	Page	Days
Machinery Safety Training		
Robot Safety	36	1
Safe Human Robot Collaboration	37	1
CHRE - Certified Human Robot Collaboration Expert CERTIFIED	38	3

Courses are held regularly at our training headquarters in Corby, Northamptonshire.
We can also run courses at your own premises - contact training@pilz.co.uk for more information.

▶ Robot Safety Training



Fundamental

Objective

The aim is to give participants an understanding of the basic robot safety requirements. The training course covers, amongst other things, the assessment of risks in connection with the use of robot systems as the risks here are different from those on conventional machines. We show you the typical measures for risk reduction and the use of various safety strategies. In addition, it is explained how high availability and productivity can be guaranteed while taking safety requirements into account.

Contents

- ▶ Practical application of standards, including EN ISO 10218
- ▶ Relevant standards in terms of safety integration in robot cells
- ▶ Assessment of hazards in robot cells
- ▶ Basics of robot protective measures and safety technology
- ▶ Safe entry into the robot cell
- ▶ Control of hazardous power in robot cells
- ▶ The most common safety errors when integrating robot systems
- ▶ Typical measures to reduce risks

Target groups

Technical Personnel responsible for ensuring machinery compliance including:

- ▶ Machine Designers
- ▶ Robotic System Integrators
- ▶ Maintenance Personnel
- ▶ Health and Safety Managers
- ▶ Engineering Managers
- ▶ Project Engineers in manufacturing plants

Benefits to you

- + Learn the correct application and implementation of relevant standards and directives
- + Reduce the complexity of safety solutions in order to raise productivity
- + Take account of possible risks from the design phase and set priorities accordingly
- + Assess your existing plant in terms of robot safety

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Robot Safety Training**
- Advanced: Safe Human-Robot Collaboration
- Expert: CHRE - Certified Human Robot Collaboration Expert

▶ Dates on request

Duration: **1 day**
9:00 – 17:00
Fee: **£300 +VAT per person**
Number of participants: Up to 10

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses.)
Number of participants: Up to 10 (dependant on facilities)

▶ Safe Human-Robot Collaboration



Advanced

Objective

The closer man and machine can work together, the more efficient work practices become. In this way, you can combine the capabilities of people and the advantages of robots like their strength, stamina and speed. The new type of collaborative robot – known as cobots – allow humans and robots to share the same working space at the same time. A safety fence is no longer needed. This type of collaboration increasingly requires new technologies and solutions.

What conditions need to be met to ensure injury-free interaction between man and machine? How is the CE marking conformity assessment procedure carried out? We will show you what you need to take into account when evaluating an HRC (human-robot collaboration) application and which measures you need to implement.

Contents

- ▶ Basic aspects of robot safety
- ▶ Safety solutions compliant with standards such as EN ISO 10218-2 and ISO/TS 15066
- ▶ Risk assessments and safeguarding of collaborative robot systems
- ▶ Execution of risk assessments based on a sample application
- ▶ Significance of and need for validation
- ▶ Basic information about collision measurement
- ▶ Identification of measuring points and sensor positioning
- ▶ Collision measurement in accordance with ISO/TS 15066 limit values

Target groups

- ▶ Design engineering managers, technical engineering managers, design engineers
- ▶ Robot system integrators, programmers
- ▶ Safety officers
- ▶ Project engineers in production units

Benefits to you

- + Increase the efficiency of work processes by implementing safe human-robot collaboration
- + Learn about the use of relevant standards for your projects
- + Optimise your knowledge about the procedure to be followed as part of the risk assessment of robot systems

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Robot Safety Training
- Advanced: Safe Human-Robot Collaboration**
- Expert: CHRE - Certified Human Robot Collaboration Expert

Course Dates at the Pilz Training Centre:

- ▶ 5th March 2019
- ▶ 30th May 2019
- ▶ 29th August
- ▶ 25th September

Duration: **1 day**
9:00 – 17:00
Fee: **£450 + VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£450 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8 (dependant on facilities)

CERTIFIED

► CHRE – Certified Human Robot Collaboration Expert



Expert

Objective

In cooperation with TÜV NORD, Pilz offers a three-day programme that will give you expertise in the development of safe human-robot applications. In this training course, you will first acquire a broad knowledge of the conformity assessment process in accordance with the Machinery Directive 2006/42/EC, and of the correct way to apply and implement standards and directives covering the integration of safety in robot cells. You will also acquire extensive expertise in safety solutions for HRC applications. This seminar follows a standardised worldwide format and is internationally recognised. If the test is passed, you will receive the TÜV NORD certificate “Certified Human Robot Collaboration Expert”.

Note

This training course involves a multiple choice test at the end of the third day. If the test is passed, the participants receive the globally recognised TÜV NORD certificate of “Certified Human Robot Collaboration Expert”.

Benefits to you

- In-depth knowledge of the relevant standards and directives on CE marking and also in respect of the integration of safety into robot cells
- Comprehensive knowledge of how to create safe HRC applications
- High practical relevance thanks to insightful case studies and specimen applications
- Certification in just three days

Contents

- Scope and requirements of the Machinery Directive 2006/42/EC
- Harmonised standards
- The process and procedures for CE marking of machinery
- Risk assessments in accordance with EN ISO 12100
- Practical application of standards, including EN ISO 10218
- Relevant standards in terms of safety integration in robot cells
- Assessment of hazards in robot cells as well as basics of robot protective measures and safety technology
- Typical measures to reduce risks
- Upgrade, significant modification
- Interlinking, assembly of machines
- Human-robot collaboration
- Safety solutions compliant with standards for HRC applications such as EN ISO 10218-2 and ISO/TS 15066
- Risk assessments and safeguarding of collaborative robot systems
- Significance of and need for validation
- Basic information about collision measurement

Target groups

- Commissioning engineers, design engineers, project engineers, planners system integrators

Your optimum qualification path:



- Introduction: Introduction to Machinery Safety
- Fundamental: Risk Assessment Workshop
- Advanced: Safe Human-Robot Collaboration
- **Expert: CHRE – Certified Human Robot Collaboration Expert**

Prices & dates for this course are to be confirmed.

Please visit the training section on www.pilz.co.uk or call us for the latest information.



**Safe Robot Applications ...
... we've got it covered!**



The closer man and machine are able to work together the more efficient the work becomes, at the same time however this places greater demands on safety.

Pilz is your perfect partner for the safe automation of your robot application:

- A portfolio of services that are tailored to the individual life cycle of a robot system, from process analysis to risk assessment and CE marking
- Safety solutions compliant with standards such as EN ISO 10218-2 and ISO/TS 15066
- Collision measurement in accordance with ISO/TS 15066 limit values
- Training in the requirements of robot safety
- Safe control systems and sensors
- Participation in the formulation of standards for safe human-robot collaboration
- Active cooperation with leading research centres

Further information about Pilz Solutions for Robot Applications:
www.pilz.co.uk + Webcode 10980

We've produced a White Paper and a poster about Safe Human-Robot Collaboration ...



... download them for free by visiting pilz.co.uk and entering Webcode 10980

PILZ
THE SPIRIT OF SAFETY



Product and Systems Training

Training topic	Page	Days
Machinery Safety Training		
PNOZ Multi - Basic Training	42	1
PSS 4000 Programming	43	3
PSS 4000 Service and Troubleshooting	44	1
PSS 3000 Service and Troubleshooting	44	1
Visualisation with PASvsu - Programming	45	1

Courses are held regularly at our training headquarters in Corby, Northamptonshire.
We can also run courses at your own premises - contact training@pilz.co.uk for more information.

▶ PNOZmulti – Basic Training



Fundamental

Objective

You will obtain an overview of the versatile application options and potential savings to be made using the safe configurable control systems PNOZmulti 2, PNOZmulti 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
- ▶ Speed monitoring and motion monitoring with PNOZmulti 2
- ▶ Creating programs with emergency stop, safety gates, light curtain 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

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(x)p, PNOZ mm(x)p, PNOZ m B0/B1.

Benefits to you

- ➕ Practical configuration and diagnostics exercises using training devices
- ➕ Fast configuration of complex applications

Your optimum qualification path:



Introduction: Introduction to Machinery Safety

Fundamental: PNOZmulti - Basic Training

Advanced: Basis of CE Marking

Expert: CECE - Certified Expert in CE Marking

Course Dates at the Pilz Training Centre:

- ▶ 14th January 2019

(Course can also be run on-demand at our Corby headquarters - contact us for more information.)

Duration: **1 day**
Day 1:
9:00 – 17:00
Fee: **£300 + VAT per person**
Number of participants: Up to 5

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)

Number of participants: Up to 5 (dependant on facilities)



For information and registration: visit www.pilz.co.uk

▶ PSS 4000 Programming

Objective

The objective of this course is to equip delegates with the skills required to configure and programme Pilz PSS 4000 Programmable Safety Systems including SafetyNETp controllers.

Contents

- ▶ The structure and variations of the PSS family of controllers
- ▶ Identification of correct installation methods particularly with regard to levels of safety integrity
- ▶ Use of the menu driven software functions of the PAS software, in both the ST (standard) and FS (failsafe) sections of the controller
- ▶ Correct configuration of a PSS system
- ▶ Configuration of a PSS SafetyNET p system and appreciation of the influence of cable length and number of subscribers.
- ▶ The role and importance of EN ISO 13849-1
- ▶ Correct application of a structured programme
- ▶ Correct application of the Modular Block System (MBS) of software
- ▶ Differentiation between errors reported by the operating system and errors reported by the application (MBS blocks)
- ▶ Practical exercises performed on dedicated training rigs
- ▶ Effective use of the powerful diagnostic tools which are inherent components of the PSS controller

Target groups

- ▶ Control Engineers
- ▶ Electrical Engineers
- ▶ Programmers
- ▶ Project Managers

Prerequisites

- ▶ Delegates should have a general understanding of PLC systems



Fundamental

▶ Dates on request

Duration: **3 days**
9:00 – 17:00
Fee: **£900 + VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **3 days**
Fee: **£900 + VAT per person**
A minimum charge of 5 delegates is required, plus travel expenses.
Number of participants: Up to 8 (dependant on facilities)

For information and registration: visit www.pilz.co.uk

► PSS 4000 Service & Troubleshooting

Objective

The objective of this one day course is to equip delegates with the skills to troubleshoot Pilz PSS4000 systems.



Contents

- The structure and variations of the PSS family of controllers
- Identification of correct installation methods and procedures
- Use of the menu driven software functions of the PAS software, in both the ST (standard) and FS (failsafe) sections of the controller
- Correct application of a structured programme
- Correct application of the Modular Block System (MBS) of software
- Differentiation between errors reported by the operating system and errors reported by the application (MBS blocks)
- Effective use of the powerful diagnostic tools which are inherent components of the PSS controller
- Practical exercises performed on dedicated training rigs

► PSS 3000 Service & Troubleshooting

Objective

The objective of this one day course is to equip delegates with the skills to troubleshoot Pilz PSS SafetyBUS p systems.

Contents

- The structure and variations of the PSS family of controllers
- Identification of correct installation methods and procedures
- The network principles of Safety BUS p
- Use of the menu driven software functions of the PSS software, in both the ST (standard) and FS (failsafe) sections of the controller
- Correct application of the Modular Block System (MBS) of software
- Correct application of a structured programme
- Differentiation between errors reported by the operating system and errors reported by the application (MBS blocks)
- Identification of which network device to interrogate for current errors
- Practical exercises performed on dedicated training rigs
- Effective use of the powerful diagnostic tools which are inherent components of the PSS controller

Target groups (both courses)

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

Prerequisites (both courses)

- General understanding of PLC systems

► Dates on request for both courses

Duration: **1 day**
9:00 – 17:00
Fee: **£300 + VAT per person**
Number of participants: Up to 8 for the PSS 4000 course
Up to 6 for PSS 3000 course

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8 for the PSS 4000 course
Up to 6 for PSS 3000 course

For information and registration: visit www.pilz.co.uk

► Visualisation with PASvisu – Programming

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, PSS 4000, OPC UA connection)
- PASvisu functions and modules
 - Inputs and Outputs
 - User management
 - Language switching
 - Diagnostic list and log
- PASvisu licensing
- Programming exercises

Target groups

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

Prerequisites

Basic knowledge of the configurable control system PNOZmulti 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: Introduction to Machinery Safety
- Fundamental:** Visualisation with PASvisu - Programming
- Advanced: Basis of CE Marking
- Expert: CECE - Certified Expert in CE Marking

► Dates on request

Duration: **1 day**
9:00 – 16:30
Fee: **£300 + VAT per person**
Number of participants: Up to 8

In-house training

On request, we will be pleased to offer company-internal training courses too.

Duration: **1 day**
Fee: **£300 + VAT per person**
(Minimum charge of 5 delegates required, plus travel expenses)
Number of participants: Up to 8



Fundamental

For information and registration: visit www.pilz.co.uk



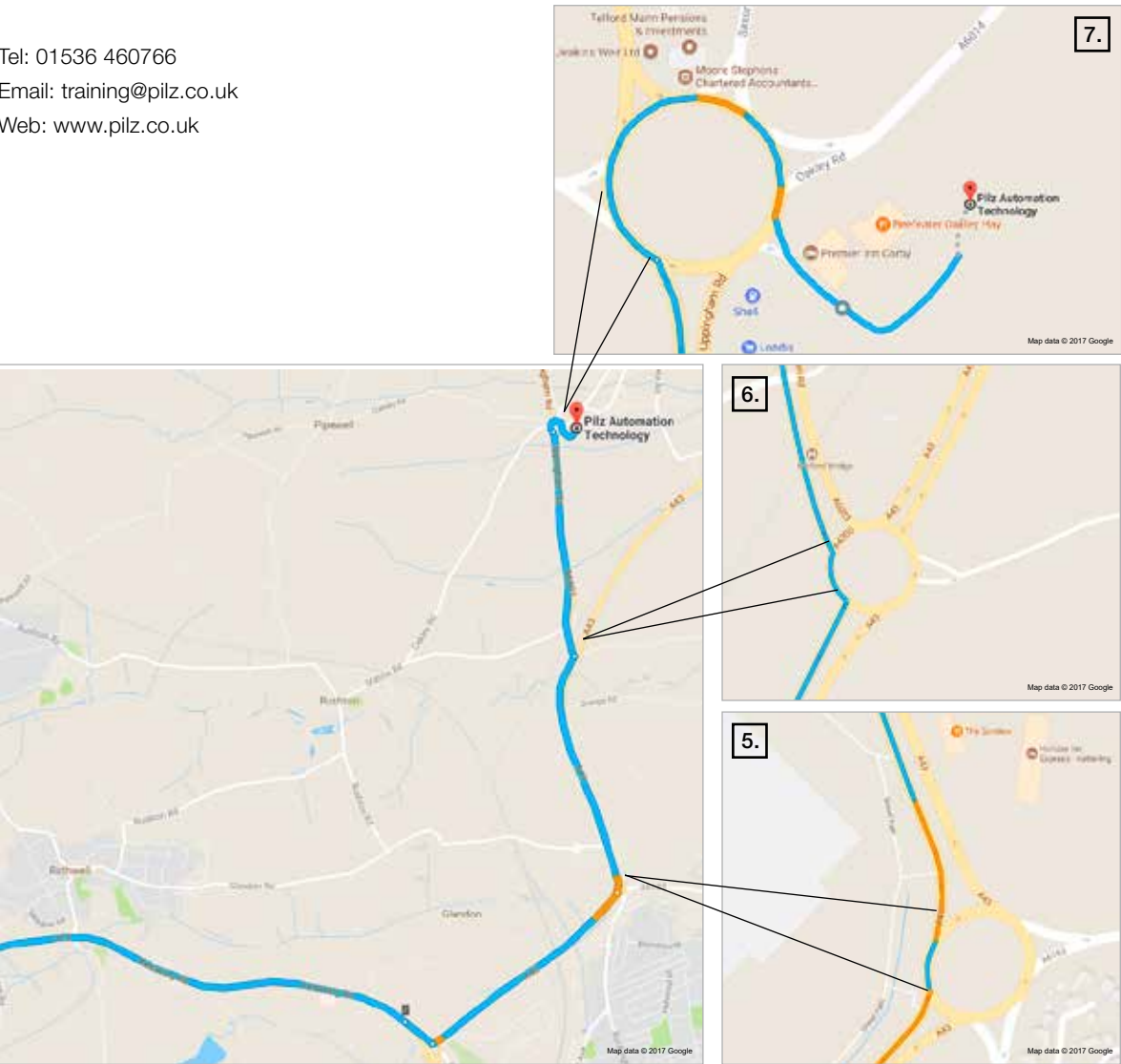
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► Training Location and Getting Here

Pilz Automation Technology
Pilz House, Little Colliers Field
Corby, Northamptonshire, NN18 8TJ

Tel: 01536 460766
Email: training@pilz.co.uk
Web: www.pilz.co.uk



Directions from the M6/M1

1. Take the A14/M1 (N) exit toward Felixstowe/Corby/Kettering
2. Turn right to stay onto A14
3. At Junction 7 of the A14, take the A43 exit to Stamford/Corby/Kettering
4. At the roundabout take the 1st exit onto the A43
5. At the roundabout take the 1st exit to continue on the A43 towards Corby
6. At the roundabout take the 1st exit onto Rockingham Rd/A6003/Corby West (continue to follow A6003)
7. At the roundabout, take the 5th exit onto Little Colliers Field
8. Turn left at the junction, Pilz House will be ahead

By Rail

Kettering & Corby rail station are approximately a 10 minute drive away

By Air

Birmingham, East Midlands, Luton & Coventry Airports are all approximately a 60 minute drive away

► Recommended Overnight Accommodation

Please make your own accommodation reservation by contacting the hotel directly.

Recommended overnight accommodation		
Hotel/Guest-House	Distance to Pilz	Special features
Premier Inn Corby Little Colliers Field Corby, Northants, NN18 8TJ Telephone: 08715 278264 www.premierinn.com	0 miles, 1 min 0 miles, 1 min (Next door to Pilz Office)	Low-cost accommodation option, with on-site grill restaurant. All rooms are en-suite with Freeview TV, tea & coffee making facilities and free parking at the hotel. The hotel is situated opposite the Pilz training centre, and is 10 minutes from Corby town centre.
Holiday Inn Express Kettering Rockingham Road Kettering, Northants, NN14 1UD Telephone: 01536 210210 Fax: 01536 210211 E-Mail: reception@exhikettering.co.uk www.ihg.com/holidayinnexpress	2.8 miles, 5 min	Low-cost accommodation option. Air-conditioned throughout, en-suite rooms with Freeview TV, Free WiFi, tea & coffee making facilities and free parking at the hotel. Grill restaurant within walking distance from hotel and is 5 minutes from Kettering town centre.
Hampton by Hilton Corby Rockingham Leisure Park, Princewood Road Corby, Northants, NN17 4AP Telephone: 01536 211001 Fax: 01536 211002 www.hamptoninn3.hilton.com	4.6 miles, 8 min	Modern Hotel with en suite rooms, Freeview TV, coffee maker, free WiFi and breakfast. The hotel also offers a fitness centre, restaurant and bar. The Rockingham Leisure Park offers additional dining options near by and is 10 minutes from Corby Town centre.
Holiday Inn Corby/Kettering Geddington Road Corby, Northants, NN18 8ET Telephone: 01536 401020 Fax: 01536 400767 E-Mail: reservations@hicolorby.com www.ihg.com/holidayinn	4 miles, 9 min	Hotel equipped with en-suite rooms with Freeview TV, tea & coffee making facilities and free parking at the hotel., Hotel has an on-site restaurant and a health club with a pool and spa.
The White Horse Inn (Public House) 1 Harborough Road, Stoke Albany, Market Harborough, Leicestershire, LE16 8PY Telephone: 01858 535268 E-Mail: infomkpubs@gmail.com www.whitehorsestokealbany.co.uk	7.2 miles, 10 min	5 rooms all en-suite, 1 room with disabled facilities, flat screen digital TVs, Tea and Coffee making facilities and wireless broadband. A la Carte and pub fare menus.
Old White Hart 51 Main Street, Lyddington Rutland, LE15 9LR Telephone: 01572 821703 www.oldwhitehart.co.uk	8.4 miles, 15 min	17th Century Inn, 9 rooms all are en-suite with tea and coffee making facilities. A la carte restaurant and real ales.
Nevill Arms Inn & Restaurant 12 Waterfall Way, Medbourne Leicestershire, LE16 8EE Telephone: 01858 565288 www.thenevillarms.net	11 miles, 18 min	11 bedrooms all en-suite, flat screen digital TVs, Tea and Coffee making facilities and wireless broadband. A la Carte and pub fare menus.
Kettering Park Hotel & Spa Kettering Parkway, Kettering Northants, NN15 6XT Telephone: 01536 416666 Fax: 01536 416171 E-Mail: kpark@shirehotels.com www.ketteringparkhotel.com	7.8 miles, 20 min	4 star hotel with spa facilities, 119 rooms all are en-suite with tea and coffee making facilities, internet access and satellite tv. On-site restaurant, pool, gym and spa facilities. Odeon cinema and several other restaurants short walk away.

For information and registration: visit www.pilz.co.uk

For information and registration: visit www.pilz.co.uk

► Registration, Terms & Conditions, Contacts

Registration

There are several ways to book a place on a Pilz Training Course:

Web

- Visit www.pilz.co.uk to book on to a course or for more information

Email

- Email training@pilz.co.uk with your details and the course title you are interested in.

Post

- Post your contact details and the course title you are interested in to Pilz Automation Technology, Pilz House, Little Colliers Field, Corby, Northants NN18 8TJ



Course Prerequisites

Please note the prerequisites and target groups stated for each course. This will ensure that delegates participate in the course that gives the required knowledge.

Confirmation

On receipt of the order, confirmation and course information will be sent including details of accommodation (if required) and venue directions, etc.

Fees

Fees may be subject to alteration and should be confirmed at the time of booking. Fees are per delegate and include all tuition and documentation but exclude VAT.

Fees for In-House Training courses are subject to a minimum fee per course plus expenses. Where a fee is not stated, please contact us for a quotation.

The fees do not include delegate accommodation; and it is the responsibility of the delegate to book with a hotel if required.

For courses at Pilz Training Centre, fees include light refreshments and buffet lunch. For all other courses, organisation and cost of refreshments, i.e. tea/coffee and lunch, will be the responsibility of the company booking the course.

All fees are due 14 days prior to the course commencement date.

Cancellation/ Rescheduling/Substitution

Delegates may be substituted at any time up to course commencement with no extra charge.

Any cancellations or rescheduling of attendance to an alternative course date that are notified less than 2 weeks prior to the course start date are subject to a 50% charge.

For cancellations/reschedulings received less than a week prior to the course start date, the full fee is payable.

Please note: The above terms do not apply to TÜV Accredited Courses (CMSE/CECE/CHRE). For these, applications for substitution may only be made at least 2 weeks prior to the course start date. The substitute may only join the course if they successfully complete the application process and receive confirmation of acceptance. Cancellations/reschedulings made less than 2 weeks prior to the course start date are subject to a 100% charge.

Pilz Automation Technology reserve the right to alter or cancel dates or venues and the full fee will be refunded in these cases.

Certification

All delegates will receive a Pilz Certificate of Attendance on completion of courses.

Delegates attending accredited courses will be awarded independent certification from the accreditation body if successful in attaining the required pass level.

Course Content

Pilz Automation Technology reserves the right to adjust the content of any course to reflect any new developments that may occur.

All course materials etc. are copyright of Pilz Automation Technology and may not be reproduced in any form or media without the express written permission of Pilz Automation Technology.

Liability

Pilz Automation Technology will to the best of their ability endeavour to provide accurate course content and materials.

However, due to the changing nature of the regulations and standards, they shall have no liability whatsoever in contract, tort, including negligence, breach of statutory rights or otherwise for any loss or damage suffered.

No liability will be accepted for misinterpretation of course content and/or material.

Safety

Course attendees should observe all safety guidelines issued by Pilz Automation Technology on arrival at the Corby premises. For on site courses at customers premises the safety responsibilities lie with the customer.

Governing Law

These terms and conditions shall be governed by and construed in all respects in accordance with English law.

Contact Details

For Course Bookings & Information

Kerry Parkes

Tel: 01536 460766

E-Mail: training@pilz.co.uk

► Services: Consulting, engineering and training

As a solution supplier, Pilz can help you in the global application of optimum safety strategies that comply with specifications. Our services ensure the highest safety for man and machine worldwide.



Training

Pilz supports you with a comprehensive range of training courses on all topics of machinery safety and automation.



And to progress to the expert level in machinery safety we offer the qualification of CMSE® – Certified Machinery Safety Expert.



Machinery safety

Risk Assessment

We review your machinery in accordance with the applicable standards and directives and assess the existing hazards.

Safety Concept

We develop detailed technical solutions for the safety of your plant and machinery through mechanical, electronic and organisational measures.

Safety Design

The aim of the safety design is to reduce or eliminate danger points through detailed planning of the necessary protective measures.

System Implementation

The results of the risk analysis and safety design are implemented to suit the particular requirements through selected safety measures.

Validation

In the validation, the risk assessment and safety concept are mirrored and inspected by competent, specialist staff.

And we perform collision measurement for human-robot applications in accordance with the limit values from ISO/TS 15066.



International compliance

CE Marking

We control all activities and processes for the necessary conformity assessment procedure, including the technical documentation that is required.

NR-12

As a complete supplier we can provide support from risk assessment to validation, technical documentation at the manufacturer's and final acceptance at the operator's in Brazil.



Workplace safety

Plant Assessment

We will prepare an overview of your entire plant in the shortest possible time. With an on-site inspection we will expose risks and calculate the cost of optimising your safeguards.

Provision & Use of Work Equipment Regulations (PUWER) Inspection

A comprehensive inspection of your machinery and work equipment against PUWER. We work in partnership with you to identify any potential non-conformances/hazards and provide a suggested risk reduction method to help you achieve compliance and a safe working environment.

Lockout Tagout System

Our customised lockout tagout (LoTo) measures guarantee that staff can safely control potentially hazardous energies during maintenance and repair.

Inspection of Safeguarding Devices

With our independent, ISO 17020-compliant inspection body, which is accredited by the German Accreditation Body (DAkkS), we can guarantee objectivity and high availability of your machines.



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



Pilz automation solutions

- ▶ Simple configuration, programming and visualisation through innovative software solutions
- ▶ High flexibility due to individually expandable solutions
- ▶ Openness of communication
- ▶ High availability thanks to extensive diagnostic options
- ▶ One system for safety and automation

Pilz automation solutions

Pilz offers everything that you need for the automation of your plant and machinery: Innovative components and systems in which safety and automation are merged within hardware and software.

From sensor and control technology to drive technology, the ease of commissioning, operation and diagnostics plays an important role for all components and systems from Pilz.

You benefit from flexible solutions for machines with an elementary function range through to large interlinked plants. With us you can standardise your safety, implement safety and automation in one periphery or find solutions for complete automation.

Pilz solutions are embedded into the relevant system environment – whether a new structure or a retrofit – and are open for a variety of interfaces and functionalities.

The perfect combination:

Control technology from Pilz offers numerous application options, including monitoring of electrical and functional safety, through to complete machine control.

Safe sensors and decentralised modules from Pilz guarantee the efficient, compliant use of plant and machinery in combination with various control systems.

Our turnkey systems and universally compatible solutions offer a high savings potential.

Drive technology from Pilz is characterised by drive-integrated safety functions, safe logic functions and the connection of visualisation, sensor and actuator technology.

Operator and visualisation systems from Pilz complete your plant and machinery.

Automation software from Pilz allows you to quickly and easily implement your planning, programming, configuration, commissioning, diagnostics and visualisation.

Pilz offers you automation solutions for the safety of man, machine and the environment.

Support

Technical support is available from Pilz round the clock.

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Scandinavia

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international hotline on:**

+49 711 3409-444
support@pilz.com

Pilz develops environmentally-friendly products using ecological materials and energy-saving technologies. Offices and production facilities are ecologically designed, environmentally-aware and energy-saving. So Pilz offers sustainability, plus the security of using energy-efficient products and environmentally-friendly solutions.



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