Training Center Robotics
Training for ABB robots and application engineering

This document contains the current training programme 2014, and other useful information.
As much theory as necessary – as much practice as possible!

Highly qualified specialists are vital for the success of a company. Our training programme is designed to give your personnel as much theory as necessary and as much practice as possible in the fields of robotics systems and simulation. Training your specialists is one of the most effective means of remaining competitive in the future.

Development plays a key role at ABB. In addition to the further education and qualification of our trainers, we have invested considerable energy in new training concepts. These complement the existing programme in the areas of Machine Safety, Energy Efficiency and Plant Control Interface. Furthermore, it is always possible to adapt our courses to suit your particular requirements. It is important for us that you and your personnel find the best suited training programme and we are available to assist you in your selection as best we can.

Ideally, training and education should not simply be rescheduled measure for measure. It should rather be a comprehensive training programme with a view to ensuring long-term and continuous development. Our training plans attempt to make it easier for you to define and create such a long-term programme. We would be most happy to advise you in person.

We look forward to meeting you!
## Overview

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Industrial robot IRC5
Plant operator training plan

Training plan blocks are linked to the associated course descriptions. Click on "Overview of training plan" to go back.
IRC5 BE: Operation

Target group
Plant operators, mechanical service personnel, application engineers

Course goals
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)

Contents
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report

Prerequisites
None

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,250 EUR/participant

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Overview of training plan
1. IRC5 BE: Operation
2. Individual refresher course / advanced course
**IRC5 BE-S: Operation Shielded Arc Welding**

**Target group**
Plant operators, mechanical service personnel, application engineers

**Course goals**
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)
- Making weld seams

**Contents**
- Occupational health and safety, robots and application
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Backup
- Error messages and status report
- Getting to know and applying application related instructions and software commands
- Programming weld seams with predefined welding data
- Correcting weld seams

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR/participant

**Contact**
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**Overview of training plan**
1. IRC5 BE-S: Operation Shielded Arc Welding
2. Individual refresher course / advanced course
Industrial robot IRC5
Plant manager training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.
IRC5 PG1: Programming basics 1

**Target group**
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course / advanced course
IRC5 PS-A: Plant operation

Target group
Plant managers who configure, adapt or optimise programmes in existing systems

Course goals
- Understand programme execution, functionality and RAPID solution
- Measure cycle time and motion as well as optimise I/O monitoring
- Configure the system in RobotStudio in order to conduct offline tests and optimisation

Contents
- Occupational health and safety
- Backup
- RobotStudio used with own applications
- Increasing programming knowledge (RAPID declaration)
- Functional monitoring: robots and coordinate systems
- Basics of motion optimisation: measure cycle time, ergonomic movement type and setting
- Motion and I/O control: Save cycle time with triggering
- Configurations: examples of parameter adjustments
- Programme structure: modularity, local declarations, model management

Prerequisites
- Participation in the PG1 basic course for the respective control generation
- Advanced computer skills
- If possible, bring your own computer and your own system backup

Information
Course duration: 4 days
Number of participants: 3 – 6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Quotation via Email

Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course / advanced course
IRC5 APT-F: Milling

**Target group**
Programmers, plant managers

**Course goals**
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Training on a milling station
- Producing your own data relevant to the milling process
- Writing and testing application program
- Adjusting and improving milling processes

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration**: 2 days
**Number of participants**: 3 persons
**Maximum**: 3 persons per training robot
**Dates**: Subject to agreement
**Venue**: Training Center in Friedberg/Hessen
**Price**: 1,300 EUR/participant

**Contact**
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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 APT-KS: Adhesion Sealing

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- Independently developing, implementing, testing, optimising and documenting simple adhesion and seam sealing programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Teaching the application software DispenseWare
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Programming adhesive seams
- Evaluating seam results

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 2 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 APT-KS-IDFP: Adhesion and sealing – Integrated Dispensing Function Pac

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Course goals**
- Using the IDFP system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Independently developing, implementing, testing, optimising and documenting simple application programs
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functioning of the application “Integrated Dispensing Function Pac”
- Getting to know and applying application related data types, instructions and software commands
- Programming adhesive seams
- Evaluating and optimising seam results
- Architecture of the “IntegratedProzessSystem”
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Backup and diagnosis
- Restoring defective systems
- Performing an IPS software update

**Information**
- **Course duration:** 4 days
- **Number of participants:** 4 persons
- **Maximum:** 4 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course

**Quotation via Email**
IRC5 APT-P: Spot welding

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated spot welding tongs
- Setting up spot welding tongs on the IRB
- Teaching basic skills on the structure and process in a spot welding plant
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- Teaching the application software SpotWare
- Connecting the welding controls to the controls of the robot system
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Adjusting application related system parameters
- Tong measurement
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 2 days  
Number of participants: 3 persons  
Maximum: 3 persons per training robot  
Dates: Subject to agreement  
Venue: Training Center in Friedberg / Hessen  
Price: 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1  
2. IRC5 PS-A: Plant operation  
3. Application engineering courses as required  
4. Special programming as required  
5. Safety  
6. Individual refresher course/advanced course
IRC5 APT-RB: Roller beading

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated roller beading tool
- Setting up a roll beading tool on the IRB
- Teaching basic skills on the structure and process in a roll beading application
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- How the system works
- Adjusting application related system parameters
- Getting to know and applying application related instructions and software commands
- Discussing RH system modules
- Performing RH calibration
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. **Application engineering courses as required**
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 APT-S1: Shielded arc welding 1

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- Making changes to the application
- Making weld seams

**Contents**
- Occupational health and safety in dealing with the application
- Teaching the application software ArcWare
- Using the ABB-Production-Manager
- Getting to know and applying application related instructions and software commands
- Programming weld seams with predefined welding data
- Correcting weld seams

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 APT-S2: Shielded arc welding 2

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- The independent programming of a welding plant
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Safety with robot welding plants
- Occupational health and safety of inert gas welding
- Adjusting application related system parameters
- Systematic structure of a welding program with observation of the programming guidelines
- Definition of seam, pendulum and welding data
- Programming weld seams
- Programming with external axes
- Troubleshooting the welding program
- Error diagnostics in the welding program
- Automatic TCP measurement and monitoring
- Basics of the different types of arcs
- Welding with different material strengths
- Documenting the welding routines

**Prerequisites**
- Participation in the application course on Inert gas welding 1
- Arc welding skills
- Basic computer skills

**Information**
**Course duration:** 5 days
**Number of participants:** 3 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course / advanced course
### IRC5 PS-C: Conveyor tracking

**Target group**
Project managers, programmers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Connecting material handling technology to the robot system
- The programming of manufacturing processes with material handling synchronisation
- Individual course goals can be agreed together with the participants

**Contents**
- Occupational health and safety
- Installation of the additional hardware components such as encoder module, encoder and start signal system
- Determining the corresponding parameters
- Functional testing
- Programming the material handling synchronisation

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. **Special programming as required**
5. Safety
6. Individual refresher course/advanced course
IRC5 PS-EE: Energy Efficiency

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Utilisation of the energy saving features incorporated in RobotStudio
- Reducing energy consumption and wear
- Achieve gains in productivity

Contents
- Occupational health and safety
- Monitoring energy, temperature and performance at the robot as well as in the virtual system
- Data analysis and processing
- Motion optimisation: paths, velocities, acceleration
- Analysis of waiting time in a program
- Energy related RAPID-commands and system parameters

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 2.5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 1,500 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 PS-EPS: Electronic Position Switches

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the EPS card
- Creating the system prerequisites for the operation of EPS
- Configuration of the EPS card

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS: Card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 2 days
- **Number of participants:** 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg/Hessen
- **Price:** 1,300 EUR/participant

**Contact**
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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. **Special programming as required**
5. Safety
6. Individual refresher course/advanced course
IRC5 PS-EPS+S: Electronic Position Switches and SafeMove

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the EPS and SafeMove cards
- Creating the system prerequisites for the operation of EPS and SafeMove
- Configuration of the EPS and SafeMove cards

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Mechanical installation and electrical integration of the SafeMove card
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

**Contact**
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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. **Special programming as required**
5. Safety
6. Individual refresher course/advanced course
IRC5 PS-HPR: HomePosRunning

**Target group**
Planners, start-up engineers, programmers

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Course goals**
- Understanding and setting up the HomePosRunning option
- Definition and secure storage of the machined parts with the HomePosRunning functionality

**Contents**
- Occupational health and safety
- Producing a system with the HomePosRunning option
- Functionality and operation of HomePosRunning
- Writing a program whilst taking into account the HomePosRunning functionality
- Getting to know and applying application relating instructions and functions
- Final functional testing

**Information**
Course duration: 3 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 PS-FCM: Force Control for Machining

Target group
Planners, start-up engineers, programmers

Course goals
– Understanding and setting up the Force Control for Machining option
– Getting to know the functionality of the force-controlled process regulation on the machined part

Contents
– Occupational health and safety
– Producing a system with the Force Control for Machining option with the help of the Graphical User Interface (GUI)
– Getting to know and using the graphical user interface
– Aligning the machined part with the force-controlled process regulation
– Getting to know and applying application relating instructions and functions
– Programming the application processes – force-controlled process and speed-controlled process
– Assembly basics

Prerequisites
– Basic course PG1 of the corresponding control generation
– Basic computer skills

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
Target group
Programmers, startup engineers, plant managers, Electrical equipment service personnel, employees of companies with material handling robots

Course goals
– Integration of RobotWare Machine Tending in an automated material handling system

Contents
– Configuration of the User-Interface
– Homepos Running
– Knowledge of datatypes, instructions / functions
– Programming guidelines
– Event handling
– Operation and remote control with signal interface
– RobotWare Machine Tending Powerpack

Prerequisites
– Basic course PG1 of the corresponding control generation
– Knowledge of working with RobotStudio
– Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course / advanced course
IRC5 PS-S: SafeMove

**Target group**
Planners, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the SafeMove card
- Creating the system prerequisites for the operation of SafeMove
- Configuration of the SafeMove card

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the SafeMove card
- Connecting an initiator
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 3 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 PS-M: Multitasking

**Target group**
Project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Getting to know and programming the functionality of controls when applying the option of Multitasking

**Contents**
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course

**Quotation via Email**
IRC5 PS-MMV: MultiMove

**Target group**
Start-up engineers, programmers, plant manager, electrical equipment service personnel, project managers, planners

**Course goals**
- Understanding MultiMove
- Commissioning and programming MultiMove systems
- Measuring and monitoring the associated coordinate systems
- Writing movement programs (independent, synchronous, coordinated)
- Mastering Special MMV declarations and instructions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

**Information**
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR / participant
Notes: Exercises on robots are performed on the systems and types of robots that are available at the Training Center for Robots

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course / advanced course
IRC5 PS-PM: PickMaster 3

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out the electrical and mechanical commissioning of the robot system
- Knowing the basic functions of PickMaster
- Connecting material handling technology to the robot system
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 persons per company
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 9,600 EUR / course with a maximum of 3 persons per company

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course / advanced course
IRC5 PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation and licencing issues
- Work surface functions
- Creating virtual systems
- Integration of geometric data and libraries
- Creation and measurement of tools and work objects
- Establishment of points and paths on CAD objects
- Automatic path generation along body curves
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Simulation capabilities
- Signal analysis
- Collision checking and position accessibility
- Using external axis
- Programming a Multimove station
- Creating an application with “Smart Components”
- Fundamentals for the creation of user interfaces on the FlexPendant

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
*Course duration:* 5 days  
*Number of participants:* 3 – 6 persons  
*Dates:* Subject to agreement  
*Venue:* Training Center in Friedberg / Hessen  
*Price:* 2,100 EUR/participant

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1. IRC5 PG1: Programming basics 1  
2. IRC5 PS-A: Plant operation  
3. Application engineering courses as required  
4. Special programming as required  
5. Safety  
6. Individual refresher course/advanced course
IRC5 PS-XP: Programming external axes

Target group
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

Course goals
- Getting to know the control functions
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Individual course goals can be agreed together with the participants

Contents
- Occupational health and safety
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course

Quotation via Email
IRC5 PS-X: Programming and configuring external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Commissioning an external axis
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 5 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

**Contents**
- Occupational health and safety
- Circuit diagrams, connection variants
- Booting for external axes
- Rectifiers, driver stages, motor units for external axes
- Carrying out configurations and system parameters based on defined specifications
- Fine-tuning the server control by recording its regular behaviour
- Special features such as external transmissions, IndependentMove
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

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4. Special programming as required
5. Safety
6. Individual refresher course/advanced course

**Quotation via Email**
IRC5 PS-ProfiNet

Target group
Start-up engineers, service personnel, programmers

Course goals
- Logging I/O Unit onto ProfiNet Bus System via IRC5 serial interface
- Configuration of the serial interface
- Dealing with faults

Contents
- ProfiNet Basics
- Creating ProfiNet Topology
- Configuration of the serial interface
- Creating and managing a new project
  (saving, compiling, loading, testing and archiving)
- Analysing and rectifying faults
- Component replacement

Prerequisites
- Basic course PG1 of the corresponding control generation
- Knowledge concerning Siemens STEP7

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
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3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
IRC5 Machine Safety

Target group
Plant managers, maintenance personnel, safety officials, designers, planners

Course goals
Insight into Machine Safety requirements of robotic workstations

Contents
– Overview and classification
– In context: Machinery Directives 2006/42/EC – Product Safety Act
– Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  a) Basic health and safety requirements
  b) Explanation: Machinery – incomplete machinery
  c) EC – Declaration of Conformity – Installation Instructions
  d) Commissioning and start-up of a machine
  e) Applying directives and harmonized standards
  f) Approach to risk assessment
  g) Risk appraisal
  h) Risk evaluation
– Case Study: Robot safety of the latest generation

Prerequisites
Basic computer skills

Information
Course duration: 3 days
Number of participants: 3–6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. Safety
6. Individual refresher course/advanced course
Industrial robot IRC5
Programmer training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.
IRC5 PG1: Programming basics 1

**Target group**
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel

**Prerequisites**
Basic computer skills

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 Upgrade Workshop: Robot specialists

Target group
- Robot specialists

Course goals
- Advanced programming skills
- Gaining the prerequisites to attend IRC5 PG3

Contents
- Occupational health and safety
- Main topics from basic courses IRC5 PG1 and PG2
- Prioritization of topics at the start of training
- Perform contents individually
- Consideration and deeper examination of know issues in-and-around IRC5

Prerequisites
- Robot controller expert
- Several years of experience in robotic installation, commissioning and programming
- Sound computer skills

Information
Course duration: 5 days
Number of participants: 3 – 4 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

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Overview of training plan
1. IRC5 Upgrade Workshop: Robot specialists
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG3: Programming basics 3
7. Individual refresher course / advanced course
IRC5 APT-F: Milling

Target group
Programmers, plant managers

Course goals
– Changing and/or optimising the application

Contents
– Occupational health and safety in dealing with the application
– Training on a milling station
– Producing your own data relevant to the milling process
– Writing and testing application program
– Adjusting and improving milling processes

Prerequisites
– Basic course PG1 of the corresponding control generation
– Basic computer skills

Information
Course duration: 2 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 APT-KS: Adhesion Sealing

Target group
Programmers, start-up engineers, plant managers, application engineers

Course goals
- Independently developing, implementing, testing, optimising and documenting simple adhesion and seam sealing programs
- Changing and/or optimising the application

Contents
- Occupational health and safety in dealing with the application
- Teaching the application software DispenseWare
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Programming adhesive seams
- Evaluating seam results

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 2 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 APT-KS-IDFP: Adhesion and sealing – Integrated Dispensing Function Pac

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Using the IDFP system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Independently developing, implementing, testing, optimising and documenting simple application programs
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functioning of the application “Integrated Dispensing Function Pac”
- Getting to know and applying application related data types, instructions and software commands
- Programming adhesive seams
- Evaluating and optimising seam results
- Architecture of the “Integrated Prozess System”
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Backup and diagnosis
- Restoring defective systems
- Performing an IPS software update

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 4 days
**Number of participants:** 4 persons
**Maximum:** 4 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 APT-P: Spot welding

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated spot welding tongs
- Setting up spot welding tongs on the IRB
- Teaching basic skills on the structure and process in a spot welding plant
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- Teaching the application software SpotWare
- Connecting the welding controls to the controls of the robot system
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Adjusting application related system parameters
- Tong measurement
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 2 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course

Quotation via Email
IRC5 APT-RB: Roller beading

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated roller beading tool
- Setting up a roll beading tool on the IRB
- Teaching basic skills on the structure and process in a roll beading application
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- How the system works
- Adjusting application related system parameters
- Getting to know and applying application related instructions and software commands
- Discussing RH system modules
- Performing RH calibration
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg/Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 APT-S1: Shielded arc welding 1

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Course goals**
- Making changes to the application
- Making weld seams

**Contents**
- Occupational health and safety in dealing with the application
- Teaching the application software ArcWare
- Using the ABB-Production-Manager
- Getting to know and applying application related instructions and software commands
- Programming weld seams with predefined welding data
- Correcting weld seams

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 APT-S2: Shielded arc welding 2

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- The independent programming of a welding plant
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Safety with robot welding plants
- Occupational health and safety of inert gas welding
- Adjusting application related system parameters
- Systematic structure of a welding program with observation of the programming guidelines
- Definition of seam, pendulum and welding data
- Programming weld seams
- Programming with external axes
- Troubleshooting the welding program
- Error diagnostics in the welding program
- Automatic TCP measurement and monitoring
- Basics of the different types of arcs
- Welding with different material strengths
- Documenting the welding routines

**Prerequisites**
- Participation in the application course on Inert gas welding 1
- Arc welding skills
- Basic computer skills

**Information**
**Course duration:** 5 days  
**Number of participants:** 3 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 PS-C: Conveyor tracking

**Target group**
Project managers, programmers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Connecting material handling technology to the robot system
- The programming of manufacturing processes with material handling synchronisation
- Individual course goals can be agreed together with the participants

**Contents**
- Occupational health and safety
- Installation of the additional hardware components such as encoder module, encoder and start signal system
- Determining the corresponding parameters
- Functional testing
- Programming the material handling synchronisation

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR / participant

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**Overview of training plan**
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3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 PS-EE: Energy Efficiency

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Utilisation of the energy saving features incorporated in RobotStudio
- Reducing energy consumption and wear
- Achieve gains in productivity

**Contents**
- Occupational health and safety
- Monitoring energy, temperature and performance at the robot as well as in the virtual system
- Data analysis and processing
- Motion optimisation: paths, velocities, acceleration
- Analysis of waiting time in a program
- Energy related RAPID-commands and system parameters

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

**Information**
- **Course duration**: 2.5 days
- **Number of participants**: 3 – 6 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 1,500 EUR/participant

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**Overview of training plan**
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2. Application engineering courses as required
3. **Special programming as required**
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 PS-EPS: Electronic Position Switches

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the EPS card
- Creating the system prerequisites for the operation of EPS
- Configuration of the EPS card

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS: Card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration**: 2 days
- **Number of participants**: 6 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-EPS+S: Electronic Position Switches and SafeMove

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the EPS and SafeMove cards
- Creating the system prerequisites for the operation of EPS and SafeMove
- Configuration of the EPS and SafeMove cards

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Mechanical installation and electrical integration of the SafeMove card
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 4 days  
**Number of participants:** 6 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1  
2. Application engineering courses as required  
3. Special programming as required  
4. IRC5 PS-RS: RobotStudio  
5. Safety  
6. IRC5 PG2: Programming basics 2  
7. IRC5 PG3: Programming basics 3  
8. Individual refresher course/advanced course
IRC5 PS-HPR: HomePosRunning

**Target group**
Planners, start-up engineers, programmers

**Course goals**
- Understanding and setting up the HomePosRunning option
- Definition and secure storage of the machined parts with the HomePosRunning functionality

**Contents**
- Occupational health and safety
- Producing a system with the HomePosRunning option
- Functionality and operation of HomePosRunning
- Writing a program whilst taking into account the HomePosRunning functionality
- Getting to know and applying application relating instructions and functions
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration**: 3 days
- **Number of participants**: 4 persons
- **Maximum**: 4 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-I: Initiation

Target group
Start-up engineers, programmers

Course goals
- For course IRC5 PS-I (Commissioning), tips will be provided for building a new system and the operating system for the controls will be installed
- The participant will use RobotStudio (online functionality) more
- Topics that are only briefly addressed in the course (e.g. system parameters) are independently practised by the participants with the help of the documentation
- Installation of the robot software on the participant’s own computer

Contents
- Occupational health and safety
- Explaining programming regulations in accordance with ABB standards
- Programming branches and loops
- System parameters: Meaning, change, backup
- Circuit diagrams (security and I/O signals)
- Producing a system, installation of the control software
- Converting process descriptions into functional solutions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Own computer
- Administrator rights for installing programs
- Electrical expert

Information
Course duration: 4 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-IV: Integrated Vision

**Target group**
Planners, start-up engineers, programmers, maintenance personnel

**Course goals**
Mechanical and electrical integration of camera systems

**Contents**
- System Overview
- Installation and Setup
- RobotStudio and FlexPendant user interface
- Camera configuration and calibration
- Vision tools and RAPID instructions
- Functions and data types

**Prerequisites**
- Participation in the course on Programming basics 2 or the IRC5 Upgrade workshop
- Advanced computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-FCM: Force Control for Machining

Target group
Planners, start-up engineers, programmers

Course goals
- Understanding and setting up the Force Control for Machining option
- Getting to know the functionality of the force-controlled process regulation on the machined part

Contents
- Occupational health and safety
- Producing a system with the Force Control for Machining option with the help of the Graphical User Interface (GUI)
- Getting to know and using the graphical user interface
- Aligning the machined part with the force-controlled process regulation
- Getting to know and applying application relating instructions and functions
- Programming the application processes – force-controlled process and speed-controlled process
- Assembly basics

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-S: SafeMove

Target group
Planners, start-up engineers, programmers, electrical equipment service personnel

Course goals
- Mechanical/Electrical integration of the SafeMove card
- Creating the system prerequisites for the operation of SafeMove
- Configuration of the SafeMove card

Contents
- Occupational health and safety
- Mechanical installation and electrical integration of the SafeMove card
- Connecting an initiator
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-M: Multitasking

**Target group**
Project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Getting to know and programming the functionality of controls when applying the option of Multitasking

**Contents**
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 4 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-MMV: MultiMove

Target group
Start-up engineers, programmers, plant manager, electrical equipment service personnel, project managers, planners

Course goals
- Understanding MultiMove
- Commissioning and programming MultiMove systems
- Measuring and monitoring the associated coordinate systems
- Writing movement programs (independent, synchronous, coordinated)
- Mastering Special MMV declarations and instructions

Contents
- Occupational health and safety
- Structure of the hardware
- Creating a system with MultiMove
- Calibration of monitoring systems
- Getting to know measurement methods for tool / work object and basic coordinates (Applying measurement routines)
- Testing the coordination of movement
- System parameters and backup
- Loading, editing, starting up and saving tasks
- Programming of independent, synchronised and coordinated movements
- Controlling movement tasks with additional management tasks

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR / participant
Notes: Exercises on robots are performed on the systems and types of robots that are available at the Training Center for Robots

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
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4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
Target group
Planners, start-up engineers, programmers, project managers

Course goals
- Carrying out the electrical and mechanical commissioning of the robot system
- Knowing the basic functions of PickMaster
- Connecting material handling technology to the robot system
- Individual course goals can be agreed together with the participants

Contents
- Occupational health and safety
- System structure
- Installation of the PickMaster software
- Structure and wiring of a PickMaster system
- Structure of the robot programs
- Defining lines and projects
- Calibrating the camera
- Calibrating material handling technology
- PLC connection
- Backing up the whole system

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 persons per company
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 9,600 EUR/course with a maximum of 3 persons per company

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course

Quotation via Email
IRC5 PS-RWMT: RobotWare Machine Tending

**Target group**
Programmers, startup engineers, plant managers, Electrical equipment service personnel, employees of companies with material handling robots

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Knowledge of working with RobotStudio
- Advanced computer skills

**Information**
**Course duration:** 5 days  
**Number of participants:** 3 – 6 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1  
2. Application engineering courses as required  
3. **Special programming as required**  
4. IRC5 PS-RS: RobotStudio  
5. Safety  
6. IRC5 PG2: Programming basics 2  
7. IRC5 PG3: Programming basics 3  
8. Individual refresher course / advanced course
IRC5 PS-XP: Programming external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR / participant

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**Contents**
- Occupational health and safety
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 PS-X: Programming and configuring external axes

Target group
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

Course goals
- Getting to know the control functions
- Commissioning an external axis
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

Contents
- Occupational health and safety
- Circuit diagrams, connection variants
- Booting for external axes
- Rectifiers, driver stages, motor units for external axes
- Carrying out configurations and system parameters based on defined specifications
- Fine-tuning the server control by recording its regular behaviour
- Special features such as external transmissions, IndependentMove
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course/advanced course
IRC5 PS-ProfiNet

Target group
Start-up engineers, service personnel, programmers

Course goals
– Logging I/O Unit onto ProfiNet Bus System via IRC5 serial interface
– Configuration of the serial interface
– Dealing with faults

Contents
– ProfiNet Basics
– Creating ProfiNet Topology
– Configuration of the serial interface
– Creating and managing a new project
  (saving, compiling, loading, testing and archiving)
– Analysing and rectifying faults
– Component replacement

Prerequisites
– Basic course PG1 of the corresponding control generation
– Knowledge concerning Siemens STEP7

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation and licensing issues
- Work surface functions
- Creating virtual systems
- Integration of geometric data and libraries
- Creation and measurement of tools and work objects
- Establishment of points and paths on CAD objects
- Automatic path generation along body curves
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Simulation capabilities
- Signal analysis
- Collision checking and position accessibility
- Using external axis
- Programming a Multimove station
- Creating an application with “Smart Components”
- Fundamentals for the creation of user interfaces on the FlexPendant

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 5 days
**Number of participants:** 3 – 6 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,100 EUR/participant

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2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 Machine Safety

**Target group**
Plant managers, maintenance personnel, safety officials, designers, planners

**Course goals**
Insight into Machine Safety requirements of robotic workstations

**Contents**
- Overview and classification
- In context: Machinery Directives 2006/42/EC – Product Safety Act
- Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  a) Basic health and safety requirements
  b) Explanation: Machinery – incomplete machinery
  c) EC – Declaration of Conformity – Installation Instructions
  d) Commissioning and start-up of a machine
  e) Applying directives and harmonized standards
  f) Approach to risk assessment
  g) Risk appraisal
  h) Risk evaluation
- Case Study: Robot safety of the latest generation

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. **Safety**
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 PG2: Programming basics 2

Target group
Programmers, plant managers, project managers, planners, start-up engineers

Course goals
- Using the options provided by control for the application
- Devising and testing concepts for the optimum use of the system or for solving application tests
- Operating and learning the editing and testing options on the robot in RobotStudio (online functionality) and with the virtual control
- The application of a programming tool for editing and testing programs on the computer

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,050 EUR/participant

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Contents
- Occupational health and safety
- Using the extended set of commands and optional arguments
- Producing and using your own routines and modules
- Programming your own instructions and functions
- System parameters (use of the system signals, password protection, etc.)
- Troubleshooting and interrupt programming
- Booting up the system (installation of the operating system)
- Calibrating the measurement system
- Local, global and routine data
- Writing programs on the computer (offline and online)

Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. IRC5 PG3: Programming basics 3
8. Individual refresher course / advanced course
IRC5 PG3: Programming basics 3

**Target group**
Programmers, procedural developers, start-up engineers

**Course goals**
- Production and application of complex instructions and programming techniques
- Use of extended programming functions

**Contents**
- Occupational health and safety
- Changing compiled data elements
- Dynamic access of data elements
- Integrating instructions you have written yourself
- Programming world zones for surveying the working area and defining home zones
- Extended interrupt applications
- Automatic loading and saving of modules
- Processing strings
- Dynamic routine access / late connection
- Extended troubleshooting / error numbers you have written yourself
- Producing log files, writing data in the log file
- Measuring clock intervals
- Data types you have written yourself
- Arrays
- Calculating intermediate positions from taught positions
- Search and reflect functions
- Adjusting system parameters

**Prerequisites**
- Participation in the course on Programming basics 2 or the IRC5 Upgrade workshop
- Advanced computer skills
- Programming experience with IRC5 control and RobotStudio (online functionality)

**Information**
**Course duration:** 5 days
**Number of participants:** 3 – 6 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,150 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. IRC5 PS-RS: RobotStudio
5. Safety
6. IRC5 PG2: Programming basics 2
7. **IRC5 PG3: Programming basics 3**
8. Individual refresher course / advanced course
Industrial robot IRC5
Commissioning personnel training plan

Training plan blocks are linked to the associated course descriptions. Click on "Overview of training plan" to go back.

- IRC5 PG1: Programming basics 1
- IRC5 PS-I: Initiation
- IRC5 PS-RS: RobotStudio
- IRC5 PG2: Programming basics 2
- Safety
- Special programming as required
- Application engineering courses as required
- IRC5 Upgrade Workshop: Robot specialists
- Individual refresher course / advanced course
IRC5 PG1: Programming basics 1

Target group
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel

Course goals
– Independent execution of operating functions
– Independently developing, implementing, testing, optimizing and documenting simple movement programs

Contents
– Occupational health and safety
– Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
– RAPID program structure
– Types of movement in manual and automatic operation
– Writing simple movement programs
– Monitoring input and output signals
– Measuring tool and plant object
– Loading and saving modules and programs and system parameters
– Error messages and status report
– Backup
– Performing handling tasks
– Programming robot movements and controlling the gripper

Prerequisites
Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,950 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course

Quotation via Email
IRC5 Upgrade Workshop: Robot specialists

**Target group**
- Robot specialists

**Course goals**
- Advanced programming skills
- Gaining the prerequisites to attend IRC5 PG3

**Contents**
- Occupational health and safety
- Main topics from basic courses IRC5 PG1 and PG2
- Prioritization of topics at the start of training
- Perform contents individually
- Consideration and deeper examination of know issues in-and-around IRC5

**Prerequisites**
- Robot controller expert
- Several years of experience in robotic installation, commissioning and programming
- Sound computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 4 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 Upgrade Workshop: Robot specialists
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-I: Initiation

Target group
Start-up engineers, programmers

Course goals
- For course IRC5 PS-I (Commissioning), tips will be provided for building a new system and the operating system for the controls will be installed
- The participant will use RobotStudio (online functionality) more
- Topics that are only briefly addressed in the course (e.g. system parameters) are independently practised by the participants with the help of the documentation
- Installation of the robot software on the participant’s own computer

Contents
- Occupational health and safety
- Explaining programming regulations in accordance with ABB standards
- Programming branches and loops
- System parameters: Meaning, change, backup
- Circuit diagrams (security and I/O signals)
- Producing a system, installation of the control software
- Converting process descriptions into functional solutions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Own computer
- Administrator rights for installing programs
- Electrical expert

Information
Course duration: 4 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 APT-F: Milling

Target group
Programmers, plant managers

Course goals
- Changing and / or optimising the application

Contents
- Occupational health and safety in dealing with the application
- Training on a milling station
- Producing your own data relevant to the milling process
- Writing and testing application program
- Adjusting and improving milling processes

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 2 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,300 EUR / participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
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5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 APT-KS: Adhesion Sealing

Target group
Programmers, start-up engineers, plant managers, application engineers

Course goals
- Independently developing, implementing, testing, optimising and documenting simple adhesion and seam sealing programs
- Changing and/or optimising the application

Contents
- Occupational health and safety in dealing with the application
- Teaching the application software DispenseWare
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Programming adhesive seams
- Evaluating seam results

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 2 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,300 EUR/participant

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1. IRC5 PG1: Programming basics 1
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4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 APT-KS-A: Adhesion Sealing – Application

Target group
Mechanical service personnel, application engineers

Course goals
– Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
– Making the necessary calibrations on mechanical components
– Making changes to the application

Contents
– Occupational health and safety in dealing with the application
– Getting to know the functioning of the application "Integrated Dispensing Function Pac”
– Getting to know and applying application related instructions and software commands
– Getting to know and applying application related data types
– Carrying out maintenance and repairs on SPA400/SPA410
– Carrying out maintenance and repairs on the dosing device
– Functional testing of the hardware components
– Performing settings and calibrations
– Using and understanding the relevant maintenance instructions

Prerequisites
– Basic course PG1 of the corresponding control generation
– Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
Commissioning personnel

IRC5 APT-KS-IDFP: Adhesion and sealing – Integrated Dispensing Function Pac

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Using the IDFP system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Independently developing, implementing, testing, optimising and documenting simple application programs
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functioning of the application “Integrated Dispensing Function Pac”
- Getting to know and applying application related data types, instructions and software commands
- Programming adhesive seams
- Evaluating and optimising seam results
- Architecture of the “IntegratedProzessSystem”
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Backup and diagnosis
- Restoring defective systems
- Performing an IPS software update

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 4 persons
- **Maximum:** 4 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 APT-P: Spot welding

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated spot welding tongs
- Setting up spot welding tongs on the IRB
- Teaching basic skills on the structure and process in a spot welding plant
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- Teaching the application software SpotWare
- Connecting the welding controls to the controls of the robot system
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Adjusting application related system parameters
- Tong measurement
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 2 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,300 EUR/participant

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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 APT-RB: Roller beading

Target group
Programmers, start-up engineers, plant managers, application engineers

Course goals
- This application gives you the skills you need to safely move the IRB with integrated roller beading tool
- Setting up a roll beading tool on the IRB
- Teaching basic skills on the structure and process in a roll beading application
- Recognising and optimising problematic processes
- Changing and/or optimising the application

Contents
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- How the system works
- Adjusting application-related system parameters
- Getting to know and applying application-related instructions and software commands
- Discussing RH system modules
- Performing RH calibration
- Writing and testing application program

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 1,800 EUR/participant

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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 APT-S1: Shielded arc welding 1

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- Making changes to the application
- Making weld seams

**Contents**
- Occupational health and safety in dealing with the application
- Teaching the application software ArcWare
- Using the ABB-Production-Manager
- Getting to know and applying application related instructions and software commands
- Programming weld seams with predefined welding data
- Correcting weld seams

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration**: 3 days
- **Number of participants**: 3 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 1,800 EUR/participant

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5. IRC5 PS-RS: RobotStudio  
6. Safety  
7. IRC5 PG2: Programming basics 2  
8. Individual refresher course/advanced course
IRC5 APT-S2: Shielded arc welding 2

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- The independent programming of a welding plant
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Safety with robot welding plants
- Occupational health and safety of inert gas welding
- Adjusting application related system parameters
- Systematic structure of a welding program with observation of the programming guidelines
- Definition of seam, pendulum and welding data
- Programming weld seams
- Programming with external axes
- Troubleshooting the welding program
- Error diagnostics in the welding program
- Automatic TCP measurement and monitoring
- Basics of the different types of arcs
- Welding with different material strengths
- Documenting the welding routines

**Prerequisites**
- Participation in the application course on Inert gas welding 1
- Arc welding skills
- Basic computer skills

**Information**
**Course duration:** 5 days
**Number of participants:** 3 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,500 EUR/participant

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4. Special programming as required
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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 PS-C: Conveyor tracking

Target group
Project managers, programmers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Connecting material handling technology to the robot system
- The programming of manufacturing processes with material handling synchronisation
- Individual course goals can be agreed together with the participants

Contents
- Occupational health and safety
- Installation of the additional hardware components such as encoder module, encoder and start signal system
- Determining the corresponding parameters
- Functional testing
- Programming the material handling synchronisation

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 PS-EE: Energy Efficiency

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Prerequisites**
– Basic course PG1 of the corresponding control generation
– Advanced computer skills

**Course goals**
– Utilisation of the energy saving features incorporated in RobotStudio
– Reducing energy consumption and wear
– Achieve gains in productivity

**Contents**
– Occupational health and safety
– Monitoring energy, temperature and performance at the robot as well as in the virtual system
– Data analysis and processing
– Motion optimisation: paths, velocities, acceleration
– Analysis of waiting time in a program
– Energy related RAPID-commands and system parameters

**Information**
**Course duration:** 2.5 days
**Number of participants:** 3 – 6 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 1,500 EUR/participant

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2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. **Special programming as required**
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 PS-EPS: Electronic Position Switches

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/ Electrical integration of the EPS card
- Creating the system prerequisites for the operation of EPS
- Configuration of the EPS card

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS: Card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 2 days
- **Number of participants:** 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/ advanced course
IRC5 PS-EPS+S: Electronic Position Switches and SafeMove

Target group
Project managers, programmers, start-up engineers, electrical equipment service personnel

Course goals
- Mechanical/Electrical integration of the EPS and SafeMove cards
- Creating the system prerequisites for the operation of EPS and SafeMove
- Configuration of the EPS and SafeMove cards

Contents
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Mechanical installation and electrical integration of the SafeMove card
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
   - Special programming as required
4. IRC5 PS-RS: RobotStudio
5. IRC5 PG2: Programming basics 2
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 PS-HPR: HomePosRunning

**Target group**
Planners, start-up engineers, programmers

**Course goals**
- Understanding and setting up the HomePosRunning option
- Definition and secure storage of the machined parts with the HomePosRunning functionality

**Contents**
- Occupational health and safety
- Producing a system with the HomePosRunning option
- Functionality and operation of HomePosRunning
- Writing a program whilst taking into account the HomePosRunning functionality
- Getting to know and applying application relating instructions and functions
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 3 days
**Number of participants:** 4 persons
**Maximum:** 4 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. **Special programming as required**
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course

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Quotation via Email
IRC5 PS-FCM: Force Control for Machining

Target group
Planners, start-up engineers, programmers

Course goals
- Understanding and setting up the Force Control for Machining option
- Getting to know the functionality of the force-controlled process regulation on the machined part

Contents
- Occupational health and safety
- Producing a system with the Force Control for Machining option with the help of the Graphical User Interface (GUI)
- Getting to know and using the graphical user interface
- Aligning the machined part with the force-controlled process regulation
- Getting to know and applying application relating instructions and functions
- Programming the application processes – force-controlled process and speed-controlled process
- Assembly basics

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

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3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 PS-IV: Integrated Vision

**Target group**
Planners, start-up engineers, programmers, maintenance personnel

**Course goals**
Mechanical and electrical integration of camera systems

**Contents**
- System Overview
- Installation and Setup
- RobotStudio and FlexPendant user interface
- Camera configuration and calibration
- Vision tools and RAPID instructions
- Functions and data types

**Prerequisites**
- Participation in the course on Programming basics 2 or the IRC5 Upgrade workshop
- Advanced computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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3. Application engineering courses as required
4. **Special programming as required**
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 PS-RWMT: RobotWare Machine Tending

**Target group**
Programmers, startup engineers, plant managers, Electrical equipment service personnel, employees of companies with material handling robots

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Knowledge of working with RobotStudio
- Advanced computer skills

**Course goals**
- Integration of RobotWare Machine Tending in an automated material handling system

**Information**
- **Course duration**: 5 days
- **Number of participants**: 3 – 6 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 2,500 EUR/participant

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4. **Special programming as required**
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 PS-S: SafeMove

Target group
Planners, start-up engineers, programmers, electrical equipment service personnel

Course goals
- Mechanical/Electrical integration of the SafeMove card
- Creating the system prerequisites for the operation of SafeMove
- Configuration of the SafeMove card

Contents
- Occupational health and safety
- Mechanical installation and electrical integration of the SafeMove card
- Connecting an initiator
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 PS-M: Multitasking

**Target group**
Project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Getting to know and programming the functionality of controls when applying the option of Multitasking

**Contents**
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
**IRC5 PS-MMV: MultiMove**

**Target group**
Start-up engineers, programmers, plant manager, electrical equipment service personnel, project managers, planners

**Course goals**
- Understanding MultiMove
- Commissioning and programming MultiMove systems
- Measuring and monitoring the associated coordinate systems
- Writing movement programs (independent, synchronous, coordinated)
- Mastering Special MMV declarations and instructions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3–6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR / participant
- **Notes:** Exercises on robots are performed on the systems and types of robots that are available at the Training Center for Robots

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4. **Special programming as required**
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
Target group
Planners, start-up engineers, programmers, project managers

Course goals
- Carrying out the electrical and mechanical commissioning of the robot system
- Knowing the basic functions of PickMaster
- Connecting material handling technology to the robot system
- Individual course goals can be agreed together with the participants

Contents
- Occupational health and safety
- System structure
- Installation of the PickMaster software
- Structure and wiring of a PickMaster system
- Structure of the robot programs
- Defining lines and projects
- Calibrating the camera
- Calibrating material handling technology
- PLC connection
- Backing up the whole system

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 persons per company
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 9,600 EUR / course with a maximum of 3 persons per company

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 PS-XP: Programming external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. **Special programming as required**
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course

**Contents**
- Occupational health and safety
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes
IRC5 PS-X: Programming and configuring external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Commissioning an external axis
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR / participant

**Contents**
- Occupational health and safety
- Circuit diagrams, connection variants
- Booting for external axes
- Rectifiers, driver stages, motor units for external axes
- Carrying out configurations and system parameters based on defined specifications
- Fine-tuning the server control by recording its regular behaviour
- Special features such as external transmissions, IndependentMove
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course

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**Quotation via Email**
IRC5 PS-ProfiNet

Target group
Start-up engineers, service personnel, programmers

Course goals
- Logging I/O Unit onto ProfiNet Bus System via IRC5 serial interface
- Configuration of the serial interface
- Dealing with faults

Contents
- ProfiNet Basics
- Creating ProfiNet Topology
- Configuration of the serial interface
- Creating and managing a new project
  (saving, compiling, loading, testing and archiving)
- Analysing and rectifying faults
- Component replacement

Prerequisites
- Basic course PG1 of the corresponding control generation
- Knowledge concerning Siemens STEP7

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation and licencing issues
- Work surface functions
- Creating virtual systems
- Integration of geometric data and libraries
- Creation and measurement of tools and work objects
- Establishment of points and paths on CAD objects
- Automatic path generation along body curves
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Simulation capabilities
- Signal analysis
- Collision checking and position accessibility
- Using external axis
- Programming a Multimove station
- Creating an application with “Smart Components”
- Fundamentals for the creation of user interfaces on the FlexPendant

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 5 days
**Number of participants:** 3 – 6 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,100 EUR/participant

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**Overview of training plan**
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2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 Machine Safety

**Target group**
Plant managers, maintenance personnel, safety officials, designers, planners

**Course goals**
Insight into Machine Safety requirements of robotic workstations

**Contents**
- Overview and classification
- In context: Machinery Directives 2006/42/EC – Product Safety Act
- Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  - a) Basic health and safety requirements
  - b) Explanation: Machinery – incomplete machinery
  - c) EC – Declaration of Conformity – Installation Instructions
  - d) Commissioning and start-up of a machine
  - e) Applying directives and harmonized standards
  - f) Approach to risk assessment
  - g) Risk appraisal
  - h) Risk evaluation
- Case Study: Robot safety of the latest generation

**Prerequisites**
Basic computer skills

**Information**
- **Course duration**: 3 days
- **Number of participants**: 3 – 6 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
IRC5 PG2: Programming basics 2

Target group
Programmers, plant managers, project managers, planners, start-up engineers

Course goals
- Using the options provided by control for the application
- Devising and testing concepts for the optimum use of the system or for solving application tests
- Operating and learning the editing and testing options on the robot in RobotStudio (online functionality) and with the virtual control
- The application of a programming tool for editing and testing programs on the computer

Contents
- Occupational health and safety
- Using the extended set of commands and optional arguments
- Producing and using your own routines and modules
- Programming your own instructions and functions
- System parameters (use of the system signals, password protection, etc.)
- Troubleshooting and interrupt programming
- Booting up the system (installation of the operating system)
- Calibrating the measurement system
- Local, global and routine data
- Writing programs on the computer (offline and online)

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,050 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 PS-I: Initiation
3. Application engineering courses as required
4. Special programming as required
5. IRC5 PS-RS: RobotStudio
6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course
Industrial robot IRC5
Mechanical service personnel training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.
IRC5 BE: Operation

Target group
Plant operators, mechanical service personnel, application engineers

Course goals
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)

Contents
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report

Prerequisites
None

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,250 EUR/participant

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
IRC5 ME 120: Mechanics course on robot mechanics IRB 120

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 – 4 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,900 EUR/participant

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**Overview of training plan**
1. IRC5 BE: Operation
2. **Mechanics courses**
3. Individual refresher course/advanced course
IRC5 ME 140: Mechanics course on robot mechanics IRB 140

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 – 4 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,900 EUR/participant

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**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
Target group
Mechanical service personnel

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Information
Course duration: 4 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant
Note: The mechanics course for IRB 1600ID takes the form of the IRB 2600 mechanics course

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
IRCC5 ME 2400: Mechanics course on robot mechanics IRB 2400/M2004

Target group
Mechanical service personnel

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Information
Course duration: 3 days
Number of participants: 3–4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 1,900 EUR/participant

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
Target group
Mechanical service personnel

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Information
Course duration: 4 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
IRC5 ME 360: Mechanics course on robot mechanics IRB 360

Target group
Mechanical service personnel

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

Information
Course duration: 3 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,900 EUR/participant

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
IRC5 ME 4400: Mechanics course on robot mechanics IRB 4400

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
Course duration: 3 days  
Number of participants: 3 – 4 persons  
Dates: Subject to agreement  
Venue: Training Center in Friedberg / Hessen  
Price: 1,900 EUR/participant

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**Overview of training plan**
1. IRC5 BE: Operation  
2. Mechanics courses  
3. Individual refresher course/advanced course
IRC5 ME 4400 FP: Mechanics course on robot mechanics IRB 4400 FoundryPrime

**Target group**
Mechanical service personnel, who maintain Foundry Prime robots

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in FoundryPrime in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Foundry Prime mechanics course module: Explanation of the special features in Foundry Prime version. Specific topics concerning operation and maintenance of Foundry Prime
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**

- **Course duration:** 4 days
- **Number of participants:** 3 – 4 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,400 EUR/participant

The training course will take place using modified standard robotic mechanisms. Foundry Prime-specific details will be explained using sample parts and/or the documentation

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**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
IRC5 ME 4600: Mechanics course on robot mechanics IRB 4600

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
Course duration: 4 days
Number of participants: 3–4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course

Quotation via Email
IRC5 ME 4600 FP: Mechanics course on robot mechanics IRB 4600 FoundryPrime

**Target group**
Mechanical service personnel, who maintain Foundry Prime robots

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in FoundryPrime in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Foundry Prime mechanics course module: Explanation of the special features in Foundry Prime version. Specific topics concerning operation and maintenance of Foundry Prime
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
**Course duration:** 4 days
**Number of participants:** 3–4 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,400 EUR/participant

The training course will take place using modified standard robotic mechanisms. Foundry Prime-specific details will be explained using sample parts and/or the documentation

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**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
IRC5 ME 6600: Mechanics course on robot mechanics IRB 6600

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
**Course duration:** 5 days  
**Number of participants:** 3–6 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,900 EUR/participant

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**Overview of training plan**
1. IRC5 BE: Operation  
2. Mechanics courses  
3. Individual refresher course/advanced course
IRC5 ME 6600 FP / 7600 FP: Mechanics course on robot mechanics
IRB 6600 and IRB 7600 FoundryPrime

Target group
Mechanical service personnel, who maintain Foundry Prime robots

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in FoundryPrime in accordance with regulations

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Foundry Prime mechanics course module: Explanation of the special features in Foundry Prime version. Specific topics concerning operation and maintenance of Foundry Prime
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Information
Course duration: 5 days
Number of participants: 3–6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,900 EUR/participant

The training course will take place using modified standard robotic mechanisms of type IRB 660. Foundry Prime-specific details of type IRB 7600 will be explained using sample parts and/or the documentation

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
IRC5 ME 6640: Mechanics course on robot mechanics IRB 6640

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
- **Course duration**: 5 days
- **Number of participants**: 3 – 6 persons
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 2,900 EUR / participant

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**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
IRC5 ME 6640 FP : Mechanics course on robot mechanics IRB 6640 FoundryPrime

**Target group**
Mechanical service personnel, who maintain Foundry Prime robots

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in FoundryPrime in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Foundry Prime mechanics course module: Explanation of the special features in Foundry Prime version. Specific topics concerning operation and maintenance of Foundry Prime
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,900 EUR/participant

The training course will take place using modified standard robotic mechanisms. Foundry Prime-specific details will be explained using sample parts and/or the documentation

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**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
Mechanical service personnel

IRC5 ME 6700: Mechanics course on robot mechanics IRB 6700

Target group
Mechanical service personnel

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,900 EUR/participant

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Overview of training plan
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course/advanced course
IRC5 ME FoundryPrime: Mechanics course on FoundryPrime

**Target group**
Mechanical service personnel, who maintain Foundry Prime robots

**Course goals**
– Learn about the special features of the Foundry Prime version
– Master specific requirements for operation

**Contents**
– Occupational health and safety
– Explanation of the special features in Foundry Prime version
– Specific topics concerning operation and maintenance of Foundry Prime

**Prerequisites**
– Operating course BE or basic course PG1 of the corresponding control generation
– Bring your own protective shoes and work clothes

**Information**
**Course duration:** 2 days  
**Number of participants:** 3–4 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 BE: Operation  
2. **Mechanics courses**  
3. Individual refresher course/advanced course
Industrial robot IRC5
Electrical equipment service personnel training plan

Training plan blocks are linked to the associated course descriptions. Click on “Overview of training plan” to go back.
IRC5 PG1: Programming basics 1

**Target group**
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel

**Prerequisites**
Basic computer skills

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course / advanced course
IRC5 SE: Electrical equipment course

Target group
Commissioning personnel, electrical equipment service personnel

Course goals
- System overview
- Locating system faults
- Rapid diagnosis of the cause of the error can minimise downtime

Contents
- Occupational health and safety
- Detailed explanation of the structure and function of the robot and controller
- Program errors and how to recognise them
- System parameters: Meaning, changing, backup
- Signal connection (DeviceNet, Profinet)
- Checking calibration, updating revolution counter, fine calibration
- Working with circuit diagrams
- Practical exercises in error recognition, systematic error diagnostics with the help of suitable software (RobotStudio, terminal program)
- Producing a system, installation of the control software
- Loading and executing test programs

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills
- Electrical engineering qualification

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course / advanced course
IRC5 SD: Faults and Diagnostics

**Target group**
Start-up engineers, electrical equipment service personnel

**Course goals**
- Expansion of knowledge about systematic troubleshooting
- Application of the diagnostic facilities of the IRC5 controller
- Ordered methods of combating faults

**Contents**
- Occupational health and safety
- Refresher, deepening and expanding the basics from the service course (SE)
- Develop a fault and analysis strategy for more efficient troubleshooting based on case studies
- Plan and structure procedures based on the troubleshooting method (MeFes)
- Aftercare and avoidance of future faults
- Use measurement tools to perform diagnostics (e.g. oscilloscopes, bus testers, etc.)
- Using ABB supplied software and recommendations for using external software

**Prerequisites**
- Participation in a IRC5 SE course
- Electro-technical training
- Sound computer skills

**Information**
- Course duration: 2.5 days
- Number of participants: 3 – 6 persons
- Maximum: 3 persons per training robot
- Dates: Subject to agreement
- Venue: Training Center in Friedberg / Hessen
- Price: 1,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. **IRC5 SD: Faults and Diagnostics**
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course / advanced course
IRC5 APT-KS-IDFP: Adhesion and sealing – Integrated Dispensing Function Pac

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Using the IDFP system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Independently developing, implementing, testing, optimising and documenting simple application programs
- Making changes/optimisations to the application

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Contents
- Occupational health and safety in dealing with the application
- Getting to know the functioning of the application “Integrated Dispensing Function Pac”
- Getting to know and applying application related data types, instructions and software commands
- Programming adhesive seams
- Evaluating and optimising seam results
- Architecture of the “Integrated ProzessSystem”
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Backup and diagnosis
- Restoring defective systems
- Performing an IPS software update

Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course

Quotation via Email
IRC5 PS-C: Conveyor tracking

**Target group**
Project managers, programmers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Connecting material handling technology to the robot system
- The programming of manufacturing processes with material handling synchronisation
- Individual course goals can be agreed together with the participants

**Contents**
- Occupational health and safety
- Installation of the additional hardware components such as encoder module, encoder and start signal system
- Determining the corresponding parameters
- Functional testing
- Programming the material handling synchronisation

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration**: 3 days
- **Number of participants**: 3 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-EE: Energy Efficiency

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Utilisation of the energy saving features incorporated in RobotStudio
- Reducing energy consumption and wear
- Achieve gains in productivity

Contents
- Occupational health and safety
- Monitoring energy, temperature and performance at the robot as well as in the virtual system
- Data analysis and processing
- Motion optimisation: paths, velocities, acceleration
- Analysis of waiting time in a program
- Energy related RAPID-commands and system parameters

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 2.5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,500 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-EPS: Electronic Position Switches

Target group
Project managers, programmers, start-up engineers, electrical equipment service personnel

Course goals
– Mechanical/Electrical integration of the EPS card
– Creating the system prerequisites for the operation of EPS
– Configuration of the EPS card

Contents
– Occupational health and safety
– Mechanical installation and electrical integration of the EPS: Card
– Connecting an initiator
– Producing a system with the EPS option
– Creating a security user
– Configuration of the EPS application
– Help routines for supporting EPS
– Testing and documentation of the EPS configuration
– Final functional testing

Prerequisites
– Basic course PG1 of the corresponding control generation
– Basic computer skills

Information
Course duration: 2 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-EPS+S: Electronic Position Switches and SafeMove

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the EPS and SafeMove cards
- Creating the system prerequisites for the operation of EPS and SafeMove
- Configuration of the EPS and SafeMove cards

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Mechanical installation and electrical integration of the SafeMove card
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. **Special programming as required**
6. Safety
7. Individual refresher course/advanced course

**Quotation via Email**
IRC5 PS-FCM: Force Control for Machining

**Target group**
Planners, start-up engineers, programmers

**Course goals**
- Understanding and setting up the Force Control for Machining option
- Getting to know the functionality of the force-controlled process regulation on the machined part

**Contents**
- Occupational health and safety
- Producing a system with the Force Control for Machining option with the help of the Graphical User Interface (GUI)
- Getting to know and using the graphical user interface
- Aligning the machined part with the force-controlled process regulation
- Getting to know and applying application relating instructions and functions
- Programming the application processes – force-controlled process and speed-controlled process
- Assembly basics

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 4 persons
- **Maximum:** 4 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-IV: Integrated Vision

**Target group**
Planners, start-up engineers, programmers, maintenance personnel

**Course goals**
Mechanical and electrical integration of camera systems

**Contents**
- System Overview
- Installation and Setup
- RobotStudio and FlexPendant user interface
- Camera configuration and calibration
- Vision tools and RAPID instructions
- Functions and data types

**Prerequisites**
- Participation in the course on Programming basics 2 or the IRC5 Upgrade workshop
- Advanced computer skills

**Information**
Course duration: 4 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. **Special programming as required**
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-S: SafeMove

Target group
Planners, start-up engineers, programmers, electrical equipment service personnel

Course goals
- Mechanical/Electrical integration of the SafeMove card
- Creating the system prerequisites for the operation of SafeMove
- Configuration of the SafeMove card

Contents
- Occupational health and safety
- Mechanical installation and electrical integration of the SafeMove card
- Connecting an initiator
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
**IRC5 PS-M: Multitasking**

**Target group**
Project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Getting to know and programming the functionality of controls when applying the option of Multitasking

**Contents**
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. **Special programming as required**
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-MMV: MultiMove

**Target group**
Start-up engineers, programmers, plant manager, electrical equipment service personnel, project managers, planners

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

**Course goals**
- Understanding MultiMove
- Commissioning and programming MultiMove systems
- Measuring and monitoring the associated coordinate systems
- Writing movement programs (independent, synchronous, coordinated)
- Mastering Special MMV declarations and instructions

**Contents**
- Occupational health and safety
- Structure of the hardware
- Creating a system with MultiMove
- Calibration of monitoring systems
- Getting to know measurement methods for tool / work object and basic coordinates (Applying measurement routines)
- Testing the coordination of movement
- System parameters and backup
- Loading, editing, starting up and saving tasks
- Programming of independent, synchronised and coordinated movements
- Controlling movement tasks with additional management tasks

**Information**
- **Course duration**: 5 days
- **Number of participants**: 3 – 6 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg / Hessen
- **Price**: 2,500 EUR / participant

**Notes**: Exercises on robots are performed on the systems and types of robots that are available at the Training Center for Robots

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Quotation via Email

**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. **Special programming as required**
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-RWMT: RobotWare Machine Tending

**Target group**
Programmers, startup engineers, plant managers, Electrical equipment service personnel, employees of companies with material handling robots

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Knowledge of working with RobotStudio
- Advanced computer skills

**Course goals**
- Integration of RobotWare Machine Tending in an automated material handling system

**Contents**
- Configuration of the User-Interface
- Homepos Running
- Knowledge of datatypes, instructions / functions
- Programming guidelines
- Event handling
- Operation and remote control with signal interface
- RobotWare Machine Tending Powerpack

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. **Special programming as required**
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-XP: Programming external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR / participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. **Special programming as required**
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-X: Programming and configuring external axes

Target group
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

Course goals
- Getting to know the control functions
- Commissioning an external axis
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

Contents
- Occupational health and safety
- Circuit diagrams, connection variants
- Booting for external axes
- Rectifiers, driver stages, motor units for external axes
- Carrying out configurations and system parameters based on defined specifications
- Fine-tuning the server control by recording its regular behaviour
- Special features such as external transmissions, IndependentMove
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course / advanced course

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Quotation via Email
**IRC5 PS-ProfiNet**

**Target group**
Start-up engineers, service personnel, programmers

**Course goals**
- Logging I/O Unit onto ProfiNet Bus System via IRC5 serial interface
- Configuration of the serial interface
- Dealing with faults

**Contents**
- ProfiNet Basics
- Creating ProfiNet Topology
- Configuration of the serial interface
- Creating and managing a new project (saving, compiling, loading, testing and archiving)
- Analysing and rectifying faults
- Component replacement

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Knowledge concerning Siemens STEP7

**Information**
**Course duration:** 3 days  
**Number of participants:** 3 – 6 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1  
2. IRC5 SE: Electrical equipment course  
3. IRC5 SD: Faults and Diagnostics  
4. Application engineering courses as required  
5. **Special programming as required**  
6. Safety  
7. Individual refresher course / advanced course
IRC5 Machine Safety

Target group
Plant managers, maintenance personnel, safety officials, designers, planners

Course goals
Insight into Machine Safety requirements of robotic workstations

Contents
- Overview and classification
- In context: Machinery Directives 2006/42/EC – Product Safety Act
- Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  - a) Basic health and safety requirements
  - b) Explanation: Machinery – incomplete machinery
  - c) EC – Declaration of Conformity – Installation Instructions
  - d) Commissioning and start-up of a machine
  - e) Applying directives and harmonized standards
  - f) Approach to risk assessment
  - g) Risk appraisal
  - h) Risk evaluation
- Case Study: Robot safety of the latest generation

Prerequisites
Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. IRC5 SE: Electrical equipment course
3. IRC5 SD: Faults and Diagnostics
4. Application engineering courses as required
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
Industrial robot IRC5
Application engineer training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.

IRC5 PG1: Programming basics 1

Application engineering courses as required

Special programming as required

Individual refresher course/advanced course

Overview of courses
IRC5 PG1: Programming basics 1

**Target group**
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Prerequisites**
Basic computer skills

**Information**
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,950 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 APT-F: Milling

**Target group**
Programmers, plant managers

**Course goals**
- Changing and / or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Training on a milling station
- Producing your own data relevant to the milling process
- Writing and testing application program
- Adjusting and improving milling processes

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 2 days  
**Number of participants:** 3 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1  
2. Application engineering courses as required  
3. Special programming as required  
4. Individual refresher course / advanced course
IRC5 APT-KS: Adhesion Sealing

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- Independently developing, implementing, testing, optimising and documenting simple adhesion and seam sealing programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Teaching the application software DispenseWare
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Programming adhesive seams
- Evaluating seam results

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 2 days  
**Number of participants:** 3 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
IRC5 APT-KS-A: Adhesion Sealing – Application

Target group
Mechanical service personnel, application engineers

Course goals
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

Contents
- Occupational health and safety in dealing with the application
- Getting to know the functioning of the application
  “Integrated Dispensing Function Pac”
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Carrying out maintenance and repairs on SPA400 / SPA410
- Carrying out maintenance and repairs on the dosing device
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding the relevant maintenance instructions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 APT-KS-IDFP: Adhesion and sealing – Integrated Dispensing Function Pac

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Course goals
- Using the IDFP system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Independently developing, implementing, testing, optimising and documenting simple application programs
- Making changes/optimisations to the application

Contents
- Occupational health and safety in dealing with the application
- Getting to know the functioning of the application “Integrated Dispensing Function Pac”
- Getting to know and applying application related data types, instructions and software commands
- Programming adhesive seams
- Evaluating and optimising seam results
- Architecture of the “IntegratedProzessSystem”
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Backup and diagnosis
- Restoring defective systems
- Performing an IPS software update

Information
Course duration: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course

Quotation via Email
IRC5 APT-P: Spot welding

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated spot welding tongs
- Setting up spot welding tongs on the IRB
- Teaching basic skills on the structure and process in a spot welding plant
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- Teaching the application software SpotWare
- Connecting the welding controls to the controls of the robot system
- Getting to know and applying application related instructions and software commands
- Getting to know and applying application related data types
- Adjusting application related system parameters
- Tong measurement
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 2 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. **Application engineering courses as required**
3. Special programming as required
4. Individual refresher course/advanced course

**Quotation via Email**
IRC5 APT-RB: Roller beading

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- This application gives you the skills you need to safely move the IRB with integrated roller beading tool
- Setting up a roll beading tool on the IRB
- Teaching basic skills on the structure and process in a roll beading application
- Recognising and optimising problematic processes
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Mechanical and electrical structure of the application
- How the system works
- Adjusting application related system parameters
- Getting to know and applying application related instructions and software commands
- Discussing RH system modules
- Performing RH calibration
- Writing and testing application program

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
IRC5 APT-S1: Shielded arc welding 1

Target group
Programmers, start-up engineers, plant managers, application engineers

Course goals
– Making changes to the application
– Making weld seams

Contents
– Occupational health and safety in dealing with the application
– Teaching the application software ArcWare
– Using the ABB-Production-Manager
– Getting to know and applying application related instructions and software commands
– Programming weld seams with predefined welding data
– Correcting weld seams

Prerequisites
– Basic course PG1 of the corresponding control generation
– Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
**IRC5 APT-S2: Shielded arc welding 2**

**Target group**
Programmers, start-up engineers, plant managers, application engineers

**Course goals**
- The independent programming of a welding plant
- Making changes/optimisations to the application

**Contents**
- Occupational health and safety in dealing with the application
- Safety with robot welding plants
- Occupational health and safety of inert gas welding
- Adjusting application related system parameters
- Systematic structure of a welding program with observation of the programming guidelines
- Definition of seam, pendulum and welding data
- Programming weld seams
- Programming with external axes
- Troubleshooting the welding program
- Error diagnostics in the welding program
- Automatic TCP measurement and monitoring
- Basics of the different types of arcs
- Welding with different material strengths
- Documenting the welding routines

**Prerequisites**
- Participation in the application course on Inert gas welding 1
- Arc welding skills
- Basic computer skills

**Information**
**Course duration:** 5 days
**Number of participants:** 3 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
IRC5 PS-C: Conveyor tracking

**Target group**
Project managers, programmers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Connecting material handling technology to the robot system
- The programming of manufacturing processes with material handling synchronisation
- Individual course goals can be agreed together with the participants

**Contents**
- Occupational health and safety
- Installation of the additional hardware components such as encoder module, encoder and start signal system
- Determining the corresponding parameters
- Functional testing
- Programming the material handling synchronisation

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 PS-EPS: Electronic Position Switches

Target group
Project managers, programmers, start-up engineers, electrical equipment service personnel

Course goals
- Mechanical/Electrical integration of the EPS card
- Creating the system prerequisites for the operation of EPS
- Configuration of the EPS card

Contents
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS: Card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Final functional testing

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 2 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 PS-EPS+S: Electronic Position Switches and SafeMove

**Target group**
Project managers, programmers, start-up engineers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the EPS and SafeMove cards
- Creating the system prerequisites for the operation of EPS and SafeMove
- Configuration of the EPS and SafeMove cards

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the EPS card
- Connecting an initiator
- Producing a system with the EPS option
- Creating a security user
- Configuration of the EPS application
- Help routines for supporting EPS
- Testing and documentation of the EPS configuration
- Mechanical installation and electrical integration of the SafeMove card
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 4 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
IRC5 PS-HPR: HomePosRunning

**Target group**
Planners, start-up engineers, programmers

**Course goals**
- Understanding and setting up the HomePosRunning option
- Definition and secure storage of the machined parts with the HomePosRunning functionality

**Contents**
- Occupational health and safety
- Producing a system with the HomePosRunning option
- Functionality and operation of HomePosRunning
- Writing a program whilst taking into account the HomePosRunning functionality
- Getting to know and applying application relating instructions and functions
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 3 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 PS-FCM: Force Control for Machining

**Target group**
Planners, start-up engineers, programmers

**Course goals**
- Understanding and setting up the Force Control for Machining option
- Getting to know the functionality of the force-controlled process regulation on the machined part

**Contents**
- Occupational health and safety
- Producing a system with the Force Control for Machining option with the help of the Graphical User Interface (GUI)
- Getting to know and using the graphical user interface
- Aligning the machined part with the force-controlled process regulation
- Getting to know and applying application relating instructions and functions
- Programming the application processes – force-controlled process and speed-controlled process
- Assembly basics

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 4 persons
- **Maximum:** 4 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,500 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. Individual refresher course / advanced course
**IRC5 PS-S: SafeMove**

**Target group**
Planners, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Mechanical/Electrical integration of the SafeMove card
- Creating the system prerequisites for the operation of SafeMove
- Configuration of the SafeMove card

**Contents**
- Occupational health and safety
- Mechanical installation and electrical integration of the SafeMove card
- Connecting an initiator
- Producing a system with the SafeMove option
- Creating a security user
- Configuration of the SafeMove application
- Help routines for supporting SafeMove
- Using the TestSignalViewer to integrate external axes
- Testing and documentation of the SafeMove configuration
- Final functional testing

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. Individual refresher course/advanced course
IRC5 PS-M: Multitasking

Target group
Project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Getting to know and programming the functionality of controls when applying the option of Multitasking

Contents
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 PS-MMV: MultiMove

Target group
Start-up engineers, programmers, plant manager, electrical equipment service personnel, project managers, planners

Course goals
- Understanding MultiMove
- Commissioning and programming MultiMove systems
- Measuring and monitoring the associated coordinate systems
- Writing movement programs (independent, synchronous, coordinated)
- Mastering Special MMV declarations and instructions

Contents
- Occupational health and safety
- Structure of the hardware
- Creating a system with MultiMove
- Calibration of monitoring systems
- Getting to know measurement methods for tool / work object and basic coordinates (Applying measurement routines)
- Testing the coordination of movement
- System parameters and backup
- Loading, editing, starting up and saving tasks
- Programming of independent, synchronised and coordinated movements
- Controlling movement tasks with additional management tasks

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR / participant
Notes: Exercises on robots are performed on the systems and types of robots that are available at the Training Center for Robots

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Overview of training plan
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
**IRC5 PS-PM: PickMaster 3**

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out the electrical and mechanical commissioning of the robot system
- Knowing the basic functions of PickMaster
- Connecting material handling technology to the robot system
- Individual course goals can be agreed together with the participants

**Contents**
- Occupational health and safety
- System structure
- Installation of the PickMaster software
- Structure and wiring of a PickMaster system
- Structure of the robot programs
- Defining lines and projects
- Calibrating the camera
- Calibrating material handling technology
- PLC connection
- Backing up the whole system

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 persons per company
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 9,600 EUR/course with a maximum of 3 persons per company

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. Individual refresher course/advanced course
IRC5 PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation and licencing issues
- Work surface functions
- Creating virtual systems
- Integration of geometric data and libraries
- Creation and measurement of tools and work objects
- Establishment of points and paths on CAD objects
- Automatic path generation along body curves
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Simulation capabilities
- Signal analysis
- Collision checking and position accessibility
- Using external axis
- Programming a Multimove station
- Creating an application with “Smart Components”
- Fundamentals for the creation of user interfaces on the FlexPendant

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 5 days
**Number of participants:** 3 – 6 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,100 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. Individual refresher course / advanced course
IRC5 PS-XP: Programming external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Individual course goals can be agreed together with the participants

**Contents**
- Occupational health and safety
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
IRC5 PS-X: Programming and configuring external axes

**Target group**
Planners, project managers, start-up engineers, programmers, electrical equipment service personnel

**Course goals**
- Getting to know the control functions
- Commissioning an external axis
- Using external axes in the robot system
- Moving the robot or the plant object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
Course duration: 5 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,500 EUR/participant

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**Contents**
- Occupational health and safety
- Circuit diagrams, connection variants
- Booting for external axes
- Rectifiers, driver stages, motor units for external axes
- Carrying out configurations and system parameters based on defined specifications
- Fine-tuning the server control by recording its regular behaviour
- Special features such as external transmissions, IndependentMove
- Programming with an axis that rotates a device
- Programming uncoordinated linear and rotating axes
- Programming coordinated linear and rotating axes
- Programming dependent axes
- Programming independent axes
- Programming a robot on a process axis
- Measuring coordinate systems and moved plant objects
- Activating and deactivating external axes

**Overview of training plan**
1. IRC5 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course

Quotation via Email
Industrial robot IRC5
Manager training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
IRC5: Introductory course – Industrial robots

Target group
Managers, planners, administrative staff

Course goals
– Getting to know the fields of application for robots
– Perform operating functions independently
– Manual operation
– Loading and testing programs
– Insight into the fields of work of plant operators, programmers and maintenance engineers
– Getting to know the way personnel and procedures cooperate

Contents
– Occupational health and safety
– Robot applications in production practice
– Configuration and function of a robot system
– Types of movement in manual and automatic mode
– Control of inputs and outputs
– Loading and saving modules and programs
– Error messages and situation description
– Documentation and technical support from ABB
– Contact persons and procedures for selected issues

Prerequisites
None

Information
Course duration: 2 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 950 EUR / participant

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Overview of training plan
1. IRC5: Introductory course – Industrial robots
### IRC5 individual courses

#### Overview of training plan

**Standard courses based on the on-site course programme**

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday / Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EUR 2,100</td>
<td>EUR 3,150</td>
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<tr>
<td>2</td>
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<td>5</td>
<td>EUR 10,500</td>
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</tbody>
</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.
Optional: Starts on the first day at 8.00 am if you book an additional half trainer day.
Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day.

**Individual courses on site**

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday/Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EUR 2,300</td>
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<td>2</td>
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<td>EUR 6,900</td>
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<td></td>
</tr>
<tr>
<td>5</td>
<td>EUR 11,500</td>
<td></td>
</tr>
</tbody>
</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.
Optional: Starts on the first day at 8.00 am if you book an additional half trainer day.
Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day.

**Individual courses in the Friedberg Training Center**

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday/Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EUR 2,300</td>
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<td>5</td>
<td>EUR 11,500</td>
<td></td>
</tr>
</tbody>
</table>
Painting robot IRC5P
Plant operator training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.

IRC5P BE-L: Operation

Individual refresher course / advanced course
IRC5P BE-L: Operation painting

**Target group**
Plant operators, mechanical service personnel, application engineers

**Course goals**
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)
- Making changes to the painting application

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report
- Changing the fan geometry data and shift points

**Prerequisites**
None

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3–6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,450 EUR/participant

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**Overview of training plan**
1. IRC5P BE-L: Operation
2. Individual refresher course / advanced course

**Quotation via Email**
Painting robot IRC5P
Plant manager training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
IRC5P PG1-L: Programming basics 1 Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant/RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware “Paintware”
- Structure and functioning of the processware “RobView”

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg/Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Safety
5. Individual refresher course/advanced course
IRC5P APT-L-IPS: Painting – Integrated Process System

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application
- Independently developing, implementing, testing, optimising and documenting simple application programs

Information
Course duration: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,350 EUR/participant

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Quotation via Email

Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Safety
5. Individual refresher course/advanced course

Contents
- Occupational health and safety in dealing with the application
- Architecture of the IPS system
- Explaining and understanding IPS configurations (open/closed loop)
- Extending and optimising the existing IPS configuration
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Calibration and adjustment of sensors
- Performing an IPS software update
- Diagnosis
- Restoring defective systems
- Performing an IPS software update
IRC5P APT-L-KA: Painting – Conventional application

**Target group**
Application mechanics, start-up engineers, mechanical service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functions of the conventional painting system
- Recognising and locating faults in the IPS system (RobView)
- Exchanging hardware components and the associated adjustments
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding maintenance instructions
- Performing possible repairs on the hardware components

**Prerequisites**
Basic course PG1 of the corresponding control generation

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Safety
5. Individual refresher course / advanced course
IRC5P APT-L-CBS: Painting – CartridgeBellSystem

**Target group**
Application mechanics, start-up engineers, mechanical service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functions and operating method of the CBS system
- Recognising and locating faults in the IPS system (RobView)
- Exchanging hardware components and the associated adjustments
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding maintenance instructions
- Performing possible repairs on the hardware components

**Prerequisites**
Basic course PG1 of the corresponding control generation

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Safety
5. Individual refresher course / advanced course
IRC5P PS-RS: RobotStudio Paint

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation licensing issues
- Work surface functions
- Creating virtual systems
- Integration of geometric data and libraries
- Creation and measurement of tools and work objects
- Establishment of points and paths on CAD objects
- Automatic path generation along body curves
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Simulation capabilities
- Signal analysis
- Collision checking and position accessibility
- Using external axis (Conveyor)
- Integration and creation of an application with “PowerPac Painting”

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
Course duration: 5 days
Number of participants: 3 – 6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,100 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. **Special programming as required**
4. Safety
5. Individual refresher course / advanced course
IRC5P Machine Safety

Target group
Plant managers, maintenance personnel, safety officials, designers, planners

Course goals
Insight into Machine Safety requirements of robotic workstations

Contents
– Overview and classification
– In context: Machinery Directives 2006/42/EC – Product Safety Act
– Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  a) Basic health and safety requirements
  b) Explanation: Machinery – incomplete machinery
  c) EC – Declaration of Conformity – Installation Instructions
  d) Commissioning and start-up of a machine
  e) Applying directives and harmonized standards
  f) Approach to risk assessment
  g) Risk appraisal
  h) Risk evaluation
– Case Study: Robot safety of the latest generation

Prerequisites
Basic computer skills

Information
Course duration: 3 days
Number of participants: 3–6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Safety
5. Individual refresher course / advanced course
Painting robot IRC5P
Programmer training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.
IRC5P PG1-L: Programming basics 1 Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of Flex Pendant/RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware “Paintware”
- Structure and functioning of the processware “RobView”

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. IRC5P PS-RS: RobotStudio Paint
5. Safety
6. IRC5P PG2-L: Programming basics 2
7. Individual refresher course / advanced course
IRC5P APT-L-IPS: Painting – Integrated Process System

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application
- Independently developing, implementing, testing, optimising and documenting simple application programs

**Contents**
- Occupational health and safety in dealing with the application
- Architecture of the IPS system
- Explaining and understanding IPS configurations (open/closed loop)
- Extending and optimising the existing IPS configuration
- Getting to know and using software programs that support the application
  - (RobView, terminal program, FTP programs)
- Extending and optimising the existing IPS configuration
- Parameterisation of controllers
- Calibration and adjustment of sensors
- Performing an IPS software update
- Diagnosis
- Restoring defective systems
- Performing an IPS software update

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 4 days
**Number of participants:** 4 persons
**Maximum:** 4 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,350 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. IRC5P PS-RS: RobotStudio Paint
5. Safety
6. IRC5P PG2-L: Programming basics 2
7. Individual refresher course/advanced course
No courses are currently provided in this category.

Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. IRC5P PS-RS: RobotStudio Paint
5. Safety
6. IRC5P PG2-L: Programming basics 2
7. Individual refresher course/advanced course
IRC5P PS-RS: RobotStudio Paint

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 5 days  
**Number of participants:** 3 – 6 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,100 EUR/participant

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**Contents**
- Occupational health and safety  
- Installation licencing issues  
- Work surface functions  
- Creating virtual systems  
- Integration of geometric data and libraries  
- Creation and measurement of tools and work objects  
- Establishment of points and paths on CAD objects  
- Automatic path generation along body curves  
- Synchronizing data between the unit and the virtual system  
- Integration of the program editor  
- Simulation capabilities  
- Signal analysis  
- Collision checking and position accessibility  
- Using external axis (Conveyor)  
- Integration and creation of an application with “PowerPac Painting”

**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1  
2. Application engineering courses on Painting  
3. Special programming as required  
4. IRC5P PS-RS: RobotStudio Paint  
5. Safety  
6. IRC5P PG2-L: Programming basics 2  
7. Individual refresher course/advanced course
IRC5P Machine Safety

**Target group**
Plant managers, maintenance personnel, safety officials, designers, planners

**Course goals**
Insight into Machine Safety requirements of robotic workstations

**Contents**
- Overview and classification
- In context: Machinery Directives 2006/42/EC – Product Safety Act
- Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  - a) Basic health and safety requirements
  - b) Explanation: Machinery – incomplete machinery
  - c) EC – Declaration of Conformity – Installation Instructions
  - d) Commissioning and start-up of a machine
  - e) Applying directives and harmonized standards
  - f) Approach to risk assessment
  - g) Risk appraisal
  - h) Risk evaluation
- Case Study: Robot safety of the latest generation

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3–6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,800 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. IRC5P PS-RS: RobotStudio Paint
5. **Safety**
6. IRC5P PG2-L: Programming basics 2
7. Individual refresher course / advanced course

Quotation via Email
IRC5P PG2-L: Programming basics 2 – Painting

Target group
Programmers, plant managers, project managers, planners, start-up engineers

Course goals
– Using the options provided by control for the painting application
– Devising and testing concepts for the optimum use of the system or for solving application tests
– Operating and learning the editing and testing options on the robot in RobotStudio (online functionality), RobView and with virtual control
– The application of a programming tool for editing and testing programs on the computer
– Connecting material handling technology to the robot system
– Programming of manufacturing processes with material handling synchronisation

Contents
– Occupational health and safety
– Conveyor tracking: Connecting the additional hardware components such as encoder module, encoder hardware and start signal system, determining the associated parameters and subsequent functional testing
– Programming with material handling synchronisation, reflecting individual positions and whole routines
– Programming world zones for surveying the working area and defining home zones
– Booting up the system (installation of the operating system)
– Calibrating the measurement system
– Interrupt and multitasking
– Further programming

Prerequisites
– Basic course PG1 of the corresponding control generation
– Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. IRC5P PS-RS: RobotStudio
5. Safety
6. IRC5P PG2-L: Programming basics 2
7. Individual refresher course/advanced course
Painting robot IRC5P
Mechanical service personnel training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.
IRC5P BE-L: Operation painting

**Target group**
Plant operators, mechanical service personnel, application engineers

**Course goals**
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)
- Making changes to the painting application

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report
- Changing the fan geometry data and shift points

**Prerequisites**
None

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,450 EUR / participant

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**Overview of training plan**
1. IRC5P BE-L: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
IRC5P ME: Mechanics course on robot mechanics IRB 52

Target group
Mechanical service personnel

Course goals
– Rapid diagnosis of the cause of the error can minimise downtime
– Replacing defective parts in good time
– Maintaining the robot mechanics in accordance with regulations

Contents
– Occupational health and safety
– Backup
– Explanation and functioning of the robot mechanics
– Disassembly and assembly of sub-assemblies and individual parts
– Calibrating robots (fine-calibration)
– Use of special tools
– Testing the robot system
– Performing maintenance and adjustment work

Prerequisites
– Operating course BE or basic course PG1 of the corresponding control generation
– Bring your own protective shoes and work clothes

Information
Course duration: 3 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,900 EUR/participant

Contact
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Overview of training plan
1. IRC5P BE-L: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
**IRC5P ME: Mechanics course on robot mechanics IRB 5400-12**

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
**Course duration:** 4 days
**Number of participants:** 3 – 4 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,400 EUR / participant

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**Overview of training plan**
1. IRC5P BE-L: Operation
2. Mechanics courses
3. Individual refresher course / advanced course

**Quotation via Email**
IRC5P ME: Mechanics course on robot mechanics IRB 5500

Target group
Mechanical service personnel

Course goals
– Rapid diagnosis of the cause of the error can minimise downtime
– Replacing defective parts in good time
– Maintaining the robot mechanics in accordance with regulations

Contents
– Occupational health and safety
– Backup
– Explanation and functioning of the robot mechanics
– Disassembly and assembly of sub-assemblies and individual parts
– Calibrating robots (fine-calibration)
– Use of special tools
– Testing the robot system
– Performing maintenance and adjustment work

Prerequisites
– Operating course BE or basic course PG1 of the corresponding control generation
– Bring your own protective shoes and work clothes

Information
Course duration: 4 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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Overview of training plan
1. IRC5P BE-L: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
Painting robot IRC5P
Electrical equipment service personnel training plan

Training plan blocks are linked to the associated course descriptions. Click on "Overview of training plan" to go back.
IRC5P PG1-L: Programming basics 1 Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant/RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware "Paintware"
- Structure and function of the processware "RobView"

**Prerequisites**
Basic computer skills

**Information**
Course duration: 5 days
Number of participants: 3–6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 2,300 EUR/participant

**Contact**
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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. IRC5P SE-L: Electrical equipment course
3. Application engineering courses on Painting
4. IRC5P SD: Faults and Diagnostics
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5P SE-L: Electrical equipment course

Target group
Commissioning personnel, electrical equipment service personnel

Course goals
- System overview
- Locating system faults
- Rapid diagnosis of the cause of the error can minimise downtime

Contents
- Occupational health and safety
- Detailed explanation of structure and working method of the control of the robot, particularly the ex protection
- Program errors and how to recognise them
- System parameters: Meaning, change, backup
- Checking calibration, updating revolution counter, fine-calibration
- Working with circuit diagrams
- Practical exercises for error recognition, systematic error diagnostics with the help of suitable software (RobView, RobotStudio, terminal program)
- Producing a system, installation of the control software
- Loading and executing test programs

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills
- Electrical engineering qualification

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,550 EUR/participant

Contact
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Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. IRC5P SE-L: Electrical equipment course
3. Application engineering courses on Painting
4. IRC5P SD: Faults and Diagnostics
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5P APT-L-IPS: Painting – Integrated Process System

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application
- Independently developing, implementing, testing, optimising and documenting simple application programs

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,350 EUR/participant

Contact
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Contents
- Occupational health and safety in dealing with the application
- Architecture of the IPS system
- Explaining and understanding IPS configurations (open/closed loop)
- Extending and optimising the existing IPS configuration
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Calibration and adjustment of sensors
- Performing an IPS software update
- Diagnosis
- Restoring defective systems
- Performing an IPS software update

Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. IRC5P SE-L: Electrical equipment course
3. Application engineering courses on Painting
4. IRC5P SD: Faults and Diagnostics
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5P SD: Faults and Diagnostics

**Target group**
Start-up engineers, electrical equipment service personnel

**Course goals**
- Expansion of knowledge about systematic troubleshooting
- Application of the diagnostic facilities of the IRC5 controller
- Ordered methods of combating faults

**Contents**
- Occupational health and safety
- Refresher, deepening and expanding the basics from the service course (SE)
- and the IPS course (APT-L-IPS)
- Develop a fault and analysis strategy for more efficient troubleshooting based on case studies
- Plan and structure procedures based on the troubleshooting method (MeFes)
- Aftercare and avoidance of future faults
- Use measurement tools to perform diagnostics (e.g. oscilloscopes, bus testers, etc.)
- Using ABB supplied software and recommendations for using external software

**Prerequisites**
- Participation in a IRC5 SE course and the IPS course (APT-L-IPS)
- Electro-technical training
- Sound computer skills

**Information**
*Course duration:* 3 days
*Number of participants:* 3 – 6 persons
*Maximum:* 3 persons per training robot
*Dates:* Subject to agreement
*Venue:* Training Center in Friedberg / Hessen
*Price:* 1,800 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. IRC5P SE-L: Electrical equipment course
3. Application engineering courses on Painting
4. IRC5P SD: Faults and Diagnostics
5. Special programming as required
6. Safety
7. Individual refresher course / advanced course
No courses are currently provided in this category.

Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. IRC5P SE-L: Electrical equipment course
3. Application engineering courses on Painting
4. IRC5P SD: Faults and Diagnostics
5. Special programming as required
6. Safety
7. Individual refresher course/advanced course
IRC5P Machine Safety

Target group
Plant managers, maintenance personnel, safety officials, designers, planners

Course goals
Insight into Machine Safety requirements of robotic workstations

Contents
- Overview and classification
- In context: Machinery Directives 2006/42/EC – Product Safety Act
- Insight into: Machinery Directives 2006/42/EC, 1st Appendix
  a) Basic health and safety requirements
  b) Explanation: Machinery – incomplete machinery
  c) EC – Declaration of Conformity – Installation Instructions
  d) Commissioning and start-up of a machine
  e) Applying directives and harmonized standards
  f) Approach to risk assessment
  g) Risk appraisal
  h) Risk evaluation
- Case Study: Robot safety of the latest generation

Prerequisites
Basic computer skills

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,800 EUR/participant

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Overview of training plan
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2. IRC5P SE-L: Electrical equipment course
3. Application engineering courses on Painting
4. IRC5P SD: Faults and Diagnostics
5. Special programming as required
6. Safety
7. Individual refresher course / advanced course
Painting robot IRC5P
Application engineer training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
IRC5P PG1-L: Programming basics 1 Painting

Target group
Programmers, plant managers, project managers, planners, electrical equipment service personnel

Course goals
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

Contents
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant/RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware “Paintware”
- Structure and functioning of the processware “RobView”

Prerequisites
Basic computer skills

Information
Course duration: 5 days
Number of participants: 3–6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course

Quotation via Email
IRC5P APT-L-IPS: Painting – Integrated Process System

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application
- Independently developing, implementing, testing, optimising and documenting simple application programs

**Contents**
- Occupational health and safety in dealing with the application
- Architecture of the IPS system
- Explaining and understanding IPS configurations (open/closed loop)
- Extending and optimising the existing IPS configuration
- Getting to know and using software programs that support the application (RobView, terminal program, FTP programs)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Calibration and adjustment of sensors
- Performing an IPS software update
- Diagnosis
- Restoring defective systems
- Performing an IPS software update

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 4 persons
- **Maximum:** 4 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,350 EUR/participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course
IRC5P APT-L-KA: Painting – Conventional application

Target group
Application mechanics, start-up engineers, mechanical service personnel

Course goals
- Using the IPS system and controlling the functions
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

Contents
- Occupational health and safety in dealing with the application
- Getting to know the functions of the conventional painting system
- Recognising and locating faults in the IPS system (RobView)
- Exchanging hardware components and the associated adjustments
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding maintenance instructions
- Performing possible repairs on the hardware components

Prerequisites
Basic course PG1 of the corresponding control generation

Information
Course duration: 3 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,950 EUR/participant

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Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course
Application engineers

IRC5P APT-L-CBS: Painting – CartridgeBellSystem

**Target group**
Application mechanics, start-up engineers, mechanical service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functions and operating method of the CBS system
- Recognising and locating faults in the IPS system (RobView)
- Exchanging hardware components and the associated adjustments
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding maintenance instructions
- Performing possible repairs on the hardware components

**Prerequisites**
Basic course PG1 of the corresponding control generation

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

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**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course
No courses are currently provided in this category.

**Overview of training plan**

1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. **Special programming as required**
4. Individual refresher course / advanced course
IRC5P PS-RS: RobotStudio Paint

Target group
Planners, start-up engineers, programmers, project managers

Course goals
- Carrying out and visualising complex control tasks of a robot system with
  the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

Contents
- Occupational health and safety
- Installation licencing issues
- Work surface functions
- Creating virtual systems
- Integration of geometric data and libraries
- Creation and measurement of tools and work objects
- Establishment of points and paths on CAD objects
- Automatic path generation along body curves
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Simulation capabilities
- Signal analysis
- Collision checking and position accessibility
- Using external axis (Conveyor)
- Integration and creation of an application with “PowerPac Painting”

Prerequisites
- Basic course PG1 of the corresponding control
generation
- Advanced computer skills
- Experience with a CAD program

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,100 EUR/participant

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Overview of training plan
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course

Quotation via Email
Industrial robot IRC5P
Manager training plan

Training plan blocks are linked to the associated course descriptions. Click on "Overview of training plan" to go back.
IRC5P: Introductory course – Paint robots

**Target group**
Managers, planners, administrative staff

**Course goals**
- Getting to know the fields of application for robots
- Perform operating functions independently
- Manual operation
- Loading and testing programs
- Insight into the fields of work of plant operators, programmers and maintenance engineers
- Getting to know the way personnel and procedures cooperate

**Contents**
- Occupational health and safety
- Robot applications in production practice
- Configuration and function of a robot system
- Types of movement in manual and automatic mode
- Control of inputs and outputs
- Loading and saving modules and programs
- Error messages and situation description
- Documentation and technical support from ABB
- Contact persons and procedures for selected issues

**Prerequisites**
None

**Information**
- **Course duration:** 2 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 950 EUR / participant

**Kontakt**
Claudia Pleimfeldner
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**Overview of training plan**
1. IRC5P: Introductory course
**IRC5P individual courses**

**Standard courses based on the on-site course programme**

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<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday/Sunday</th>
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<td>1</td>
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Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.
Optional: Starts on the first day at 8.00 am if you book an additional half trainer day
Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day

**Individual courses on site**

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</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.
Optional: Starts on the first day at 8.00 am if you book an additional half trainer day
Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day

**Individual courses in the Friedberg Training Center**

<table>
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<th>Number of days</th>
<th>Price for Monday to Friday</th>
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</tr>
</tbody>
</table>
Industrial robot S4C+
Plant operator training plan

Training plan blocks are linked to the associated course descriptions. Click on "Overview of training plan" to go back.
S4C+ BE: Operation

**Target group**
Plant operators, mechanical service personnel, application engineers

**Course goals**
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report

**Prerequisites**
None

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,250 EUR / participant

**Contact**
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**Overview of training plan**
1. S4C+ BE: Operation
2. Individual refresher course / advanced course
Industrial robot S4C+
Plant manager training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4C+ PG1: Programming basics 1

Target group
Programmers, plant managers, project managers, planners, electrical equipment service personnel

Course goals
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

Contents
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

Prerequisites
Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,950 EUR / participant

Contact
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Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
No courses are currently provided in this category.

**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
S4C+ PS-M: Multitasking

Target group
Project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Getting to know and programming the functionality of controls when applying the option of Multitasking

Contents
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

Contact
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Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
S4C+ PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 – 6 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,100 EUR/participant

**Contents**
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. **Special programming as required**
4. Individual refresher course / advanced course

**Contact**
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**Quotation**
via Email
Industrial robot S4C+
Programmer training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.

- **S4C+ PG1:**
  - Programming basics 1
  - Application engineering courses as required
  - Special programming as required

- **S4C+ PS-RS:**
  - RobotStudio

- **S4C+ PG2:**
  - Programming basics 2
  - Individual refresher course/advanced course
S4C+ PG1: Programming basics 1

Target group
Programmers, plant managers, project managers, planners, electrical equipment service personnel

Course goals
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

Contents
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

Prerequisites
Basic computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,950 EUR / participant

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Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course / advanced course
No courses are currently provided in this category.

Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course / advanced course
S4C+ PS-M: Multitasking

Target group
Project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Getting to know and programming the functionality of controls when applying the option of Multitasking

Contents
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course/advanced course
S4C+ PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 4 days  
**Number of participants:** 3 – 6 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,100 EUR/participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1  
2. Application engineering courses as required  
3. Special programming as required  
4. **S4C+ PS-RS: RobotStudio**  
5. S4C+ PG2: Programming basics 2  
6. Individual refresher course / advanced course
S4C+ PG2: Programming basics 2

Target group
Programmers, plant managers, project managers, planners, start-up engineers

Course goals
– Using the options provided by control for the application
– Devising and testing concepts for the optimum use of the system or for solving application tests
– Learning and operating the editing and testing options of robots and the learning program QuickTeach
– The application of a programming tool for editing and testing programs on the computer

Contents
– Occupational health and safety
– Using the extended set of commands and optional arguments
– Producing and using your own routines and modules
– Programming your own instructions and functions
– System parameters (use of the system signals, password protection, etc.)
– Troubleshooting and interrupt programming
– Booting up the system (installation of the operating system)
– Calibrating the measurement system
– Local, global and routine data
– Writing programs on the computer (offline and online)

Prerequisites
– Basic course PG1 of the corresponding control generation
– Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,050 EUR/participant

Contact
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Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course/advanced course
Industrial robot S4C+
Commissioning personnel training plan

Training plan blocks are linked to the associated course descriptions. Click on "Overview of training plan" to go back.
S4C+ PG1: Programming basics 1

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course / advanced course
No courses are currently provided in this category.

Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course / advanced course
S4C+ PS-M: Multitasking

Target group
Project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Getting to know and programming the functionality of controls when applying the option of Multitasking

Contents
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 4 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

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Overview of training plan
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course/advanced course
S4C+ PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 4 days  
**Number of participants:** 3 – 6 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,100 EUR / participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1  
2. Application engineering courses as required  
3. Special programming as required  
4. S4C+ PS-RS: RobotStudio  
5. S4C+ PG2: Programming basics 2  
6. Individual refresher course / advanced course
S4C+ PG2: Programming basics 2

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers

**Course goals**
- Using the options provided by control for the application
- Devising and testing concepts for the optimum use of the system or for solving application tests
- Learning and operating the editing and testing options of robots and the learning program QuickTeach
- The application of a programming tool for editing and testing programs on the computer

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

**Information**

**Course duration:** 5 days
**Number of participants:** 3 – 6 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,050 EUR/participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4C+ PG2: Programming basics 2
6. Individual refresher course/advanced course

**Contents**
- Occupational health and safety
- Using the extended set of commands and optional arguments
- Producing and using your own routines and modules
- Programming your own instructions and functions
- System parameters (use of the system signals, password protection, etc.)
- Troubleshooting and interrupt programming
- Booting up the system (installation of the operating system)
- Calibrating the measurement system
- Local, global and routine data
- Writing programs on the computer (offline and online)
Industrial robot S4C+
Mechanical service personnel training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4C+ BE: Operation

Target group
Plant operators, mechanical service personnel, application engineers

Course goals
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency stop)

Contents
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report

Prerequisites
None

Information
Course duration: 3 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,250 EUR/participant

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Overview of training plan
1. S4C+ BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course

Quotation via Email
S4C+ ME 140: Mechanics course on robot mechanics IRB 140

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
**Course duration:** 3 days
**Number of participants:** 3 – 4 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 1,900 EUR/participant

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**Overview of training plan**
1. S4C+ BE: Operation
2. **Mechanics courses**
3. Individual refresher course / advanced course

Quotation via Email
S4C+ ME 2400: Mechanics course on robot mechanics IRB 2400 / M2004

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Note:**
There are two versions of Type IRB 2400. You can find the exact name of your manipulator on the robot’s type plate. The stated course will be performed on the mechanics of the M2004

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Information**
**Course duration:** 3 days
**Number of participants:** 3 – 4 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 1,900 EUR / participant

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**Overview of training plan**
1. S4C+ BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
**S4C+ ME 4400: Mechanics course on robot mechanics IRB 4400**

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
**Course duration:** 3 days
**Number of participants:** 3 – 4 persons
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 1,900 EUR / participant

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**Overview of training plan**
1. S4C+ BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
S4C+ ME 6600: Mechanics course on robot mechanics IRB 6600

Target group
Mechanical service personel

Course goals
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

Contents
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

Prerequisites
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

Information
Course duration: 5 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,900 EUR / participant

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Overview of training plan
1. S4C+ BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
Industrial robot S4C+
Electrical equipment service personnel training plan

Training plan blocks are linked to the associated course descriptions.
Click on “Overview of training plan” to go back.
S4C+ PG1: Programming basics 1

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR/participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. S4C+ SE: Electrical equipment course
3. Application engineering courses as required
4. Special programming as required
5. Individual refresher course/advanced course

**Quotation via Email**
S4C+ SE: Electrical course

**Target group**
Commissioning personnel, electrical equipment service personnel

**Course goals**
- System overview
- Locating system faults
- Rapid diagnosis of the cause of the error can minimise downtime

**Contents**
- Occupational health and safety
- Detailed explanation of the structure and working method of the control of the robot
- Program errors and how to recognise them
- System parameters: Meaning, change, backup
- Checking calibration, updating revolution counter, fine-calibration
- Working with circuit diagrams
- Practical exercises for error recognition, systematic error diagnostics
- Producing a system, installation of the control software
- Loading and executing test programs

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills
- Electrical engineering qualification

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. S4C+ SE: Electrical equipment course
3. Application engineering courses as required
4. Special programming as required
5. Individual refresher course / advanced course
No courses are currently provided in this category.

Overview of training plan
1. S4C+ PG1: Programming basics 1
2. S4C+ SE: Electrical equipment course
3. Application engineering courses as required
4. Special programming as required
5. Individual refresher course/advanced course
S4C+ PS-M: Multitasking

**Target group**
Project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Getting to know and programming the functionality of controls when applying the option of Multitasking

**Contents**
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. S4C+ SE: Electrical equipment course
3. Application engineering courses as required
4. **Special programming as required**
5. Individual refresher course / advanced course

**Quotation via Email**
S4C+ PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**

**Course duration:** 4 days  
**Number of participants:** 3 – 6 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 2,100 EUR/participant

**Contact**
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1  
2. S4C+ SE: Electrical equipment course  
3. Application engineering courses as required  
4. Special programming as required  
5. Individual refresher course / advanced course
Industrial robot S4C+
Application engineer training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4C+ PG1: Programming basics 1

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant / RobotStudio
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Performing handling tasks
- Programming robot movements and controlling the gripper

**Prerequisites**
Basic computer skills

**Information**
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,950 EUR / participant

**Contact**
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Quotation via Email

**Overview of training plan**
1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
No courses are currently provided in this category.

**Overview of training plan**

1. S4C+ PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
S4C+ PS-M: Multitasking

**Target group**
Project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Getting to know and programming the functionality of controls when applying the option of Multitasking

**Contents**
- Occupational health and safety
- Functioning of the controls in Multitasking
- Storage structure and structure of system parameters
- Programming and integrating background tasks
- Synchronisation of a foreground and background task
- Using joint data elements
- Using interrupt programming
- Sequence chains and dispatcher programming
- Creating a background task with different priorities
- Proposed solutions

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. S4C+ PG1: Programming basics
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course / advanced course
**S4C+ PS-RS: RobotStudio**

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
**Course duration:** 4 days  
**Number of participants:** 3 – 6 persons  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
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**Overview of training plan**
1. S4C+ PG1: Programming basics 1  
2. Application engineering courses as required  
3. Special programming as required  
4. Individual refresher course / advanced course
### S4C+ individual courses

**Overview of training plan**

<table>
<thead>
<tr>
<th>Standard courses based on the on-site course programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days</td>
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<tr>
<td>----------------</td>
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<tr>
<td>1</td>
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<td>4</td>
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<tr>
<td>5</td>
</tr>
</tbody>
</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.

Optional: Starts on the first day at 8.00 am if you book an additional half trainer day.

Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day.

<table>
<thead>
<tr>
<th>Individual courses on site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days</td>
</tr>
<tr>
<td>----------------</td>
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<tr>
<td>1</td>
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<td>3</td>
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<td>5</td>
</tr>
</tbody>
</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.

Optional: Starts on the first day at 8.00 am if you book an additional half trainer day.

Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day.

<table>
<thead>
<tr>
<th>Individual courses in the Friedberg Training Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>1</td>
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<td>5</td>
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</tbody>
</table>
Painting robot S4P+
Plant operator training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4P+ BE-L: Operation painting

**Target group**
Plant operators, mechanical service personnel, application engineers

**Course goals**
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency off),
- Making changes to the painting application

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report
- Changing the fan geometry data and shift points

**Prerequisites**
None

**Information**
- **Course duration:** 3 days
- **Number of participants:** three to 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg/Hessen
- **Price:** 1,450 EUR/participant

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**Overview of training plan**
1. S4P+ BE-L: Operation
2. Individual refresher course / advanced course
Painting robot S4P+
Plant manager training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4P+ PG1-L: Programming basics 1 – Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Prerequisites**
Basic computer skills

**Information**
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,300 EUR/participant

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware "Paintware"

**Contact**
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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course
S4P+ APT-L-IPS: Painting – Integrated Prozess System

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,900 EUR/participant

Contents
- Occupational health and safety in dealing with the application
- Practicing the writing of painting programs
- Architecture of the IPS system
- Explaining and understanding IPS configurations (GunControl, open/closed loop, PumpSolution)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Mechanical repairs, error diagnostics of the controls
- Exchanging components
- Calibrating actuators and sensors
- Using a computer to read parameter data via the serial interface
- Diagnosis

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course

Quotation via Email
S4P+ APT-L-CBS: Painting – CartridgeBellSystem

**Target group**
Application mechanics, start-up engineers, mechanical service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functions and operating method of the CBS system
- Recognising and locating faults in the IPS system (serial interface, visualisation computer)
- Exchanging hardware components and the associated adjustments
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding maintenance instructions
- Performing possible repairs on the hardware components

**Prerequisites**
Basic course PG1 of the corresponding control generation

**Information**
- **Course duration:** 3 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,950 EUR / participant

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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course
No courses are currently provided in this category.

Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course
S4C+ PS-RS: RobotStudio

Target group
Planners, start-up engineers, programmers, project managers

Course goals
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

Contents
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

Information
Course duration: 4 days
Number of participants: 3 – 6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,100 EUR/participant

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course
Painting robot S4P+
Programmer training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.

S4P+ PG1-L
Programming basics 1

Application engineering courses on Painting

Special programming as required

S4C+ PS-RS: RobotStudio

S4P+ PG2-L:
Programming basics 2

Individual refresher course/advanced course
S4P+ PG1-L: Programming basics 1 – Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Prerequisites**
Basic computer skills

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Information**
**Course duration:** 5 days
**Number of participants:** 3 – 6 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,300 EUR/participant

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware "Paintware"

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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4P+ PG2-L: Programming basics 2
6. Individual refresher course/advanced course
S4P+ APT-L-IPS: Painting – Integrated Prozess System

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,900 EUR/participant

Contents
- Occupational health and safety in dealing with the application
- Practicing the writing of painting programs
- Architecture of the IPS system
- Explaining and understanding IPS configurations (GunControl, open/closed loop, PumpSolution)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Mechanical repairs, error diagnostics of the controls
- Exchanging components
- Calibrating actuators and sensors
- Using a computer to read parameter data via the serial interface
- Diagnosis

Programmers

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4P+ PG2-L: Programming basics 2
6. Individual refresher course/advanced course
No courses are currently provided in this category.

**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4P+ PG2-L: Programming basics 2
6. Individual refresher course/advanced course
S4C+ PS-RS: RobotStudio

**Target group**
Planners, start-up engineers, programmers, project managers

**Course goals**
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 – 6 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,100 EUR / participant

**Contact**
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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4P+ PG2-L: Programming basics 2
6. Individual refresher course / advanced course
S4P+ PG2-L: Programming basics 2 – Painting

Target group
Programmers, plant managers, project managers, planners, start-up engineers

Course goals
- Using the options provided by control for the painting application
- Devising and testing concepts for the optimum use of the system or for solving application tests
- Learning and operating the editing and testing options of robots and the learning program QuickTeach
- The application of a programming tool for editing and testing programs on the computer
- Connecting material handling technology to the robot system
- Programming of manufacturing processes with material handling synchronisation

Contents
- Occupational health and safety
- Conveyor tracking: Connecting the additional hardware components such as encoder module, encoder hardware and start signal system, determining the associated parameters and subsequent functional testing
- Programming with material handling synchronisation, reflecting individual positions and whole routines
- Programming world zones for surveying the working area and defining home zones
- Booting up the system (installation of the operating system)
- Calibrating the measurement system
- Interrupt and multitasking

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. S4C+ PS-RS: RobotStudio
5. S4P+ PG2-L: Programming basics 2
6. Individual refresher course/advanced course
Painting robot S4P+
Mechanical service personnel training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.

S4P+ BE-L: 
Operation

Individual refresher course/advanced course

Mechanics courses

Overview of courses
S4P+ BE-L: Operation painting

**Target group**
Plant operators, mechanical service personnel, application engineers

**Prerequisites**
None

**Course goals**
- Independent execution of operating functions
- Switching on and starting up the robot system
- Moving the mechanics with a joystick
- Loading, testing and optimising simple movement programs
- Recognising and rectifying simple faults and service interruptions (e.g. emergency off)
- Making changes to the painting application

**Information**
- **Course duration**: 3 days
- **Number of participants**: three to 6 persons
- **Maximum**: 3 persons per training robot
- **Dates**: Subject to agreement
- **Venue**: Training Center in Friedberg/Hessen
- **Price**: 1,450 EUR/participant

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- Types of movement in manual and automatic operation
- Monitoring input and output signals
- Loading and saving modules and programs
- Error messages and status report
- Changing the fan geometry data and shift points

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**Overview of training plan**
1. S4P+ BE-L: Operation
2. Mechanics Course
3. Individual refresher course / advanced course
S4P+ ME: Mechanics course on robot mechanics IRB 5400-12

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
Course duration: 4 days
Number of participants: 3 – 4 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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**Overview of training plan**
1. S4P+ BE-L: Operation
2. Mechanics Course
3. Individual refresher course/advanced course
S4P+ ME: Mechanics course on robot mechanics IRB 5500

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimise downtime
- Replacing defective parts in good time
- Maintaining the robot mechanics in accordance with regulations

**Contents**
- Occupational health and safety
- Backup
- Explanation and functioning of the robot mechanics
- Disassembly and assembly of sub-assemblies and individual parts
- Calibrating robots (fine-calibration)
- Use of special tools
- Testing the robot system
- Performing maintenance and adjustment work

**Prerequisites**
- Operating course BE or basic course PG1 of the corresponding control generation
- Bring your own protective shoes and work clothes

**Information**
- **Course duration:** 4 days
- **Number of participants:** 3 – 4 persons
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,400 EUR / participant

**Contact**
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**Overview of training plan**
1. S4P+ BE-L: Operation
2. Mechanics Course
3. Individual refresher course/advanced course
Painting robot S4P+
Electrical equipment service personnel training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4P+ PG1-L: Programming basics 1 – Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware "Paintware"

**Prerequisites**
Basic computer skills

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3 – 6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

**Contact**
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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. S4P+ SE: Electrical equipment course
3. Application engineering courses on Painting
4. Special programming as required
5. Individual refresher course/advanced course
S4P+ SE: Electrical equipment course

Target group
Commissioning personnel, electrical equipment service personnel

Course goals
- System overview
- Locating system faults
- Rapid diagnosis of the cause of the error can minimise downtime

Contents
- Occupational health and safety
- Detailed explanation of structure and working method of the control of the robot, particularly the ex protection
- Program errors and how to recognise them
- System parameters: Meaning, change, backup
- Checking calibration, updating revolution counter, fine-calibration
- Working with circuit diagrams
- Practical exercises for error recognition, systematic error diagnostics
- Producing a system, installation of the control software
- Loading and executing test programs

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills
- Electrical engineering qualification

Information
Course duration: 5 days
Number of participants: 3 – 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,550 EUR/participant

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. S4P+ SE: Electrical equipment course
3. Application engineering courses on Painting
4. Special programming as required
5. Individual refresher course/advanced course
**S4P+ APT-L-IPS: Painting – Integrated Prozess System**

**Target group**
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

**Course goals**
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and/or optimising the application

**Contents**
- Occupational health and safety in dealing with the application
- Practicing the writing of painting programs
- Architecture of the IPS system
- Explaining and understanding IPS configurations (GunControl, open/closed loop, PumpSolution)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Mechanical repairs, error diagnostics of the controls
- Exchanging components
- Calibrating actuators and sensors
- Using a computer to read parameter data via the serial interface
- Diagnosis

**Prerequisites**
- Basic course PG1 of the corresponding control generation
- Basic computer skills

**Information**
**Course duration:** 5 days
**Number of participants:** 4 persons
**Maximum:** 4 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,900 EUR/participant

**Contact**
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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. S4P+ SE: Electrical equipment course
3. Application engineering courses on Painting
4. Special programming as required
5. Individual refresher course/advanced course

**Electrical equipment service personnel**
No courses are currently provided in this category.

**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. S4P+ SE: Electrical equipment course
3. Application engineering courses on Painting
4. **Special programming as required**
5. Individual refresher course/advanced course
Painting robot S4P+
Application engineer training plan

Training plan blocks are linked to the associated course descriptions.
Click on "Overview of training plan" to go back.
S4P+ PG1-L: Programming basics 1 – Painting

**Target group**
Programmers, plant managers, project managers, planners, electrical equipment service personnel

**Prerequisites**
Basic computer skills

**Course goals**
- Independent execution of operating functions
- Independently developing, implementing, testing, optimising and documenting simple movement programs
- Changing and/or optimising the application

**Contents**
- Occupational health and safety
- Structure and function of the robot system
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Measuring tool and plant object
- Loading and saving modules and programs and system parameters
- Error messages and status report
- Backup
- Programming with conveyor tracking
- Programming with the processware "Paintware"

**Information**
- **Course duration:** 5 days
- **Number of participants:** 3–6 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,300 EUR/participant

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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course/advanced course
S4P+ APT-L-IPS: Painting – Integrated Prozess System

Target group
Programmers, plant managers, project managers, planners, start-up engineers, electrical equipment service personnel

Course goals
- Using the IPS system and controlling the functions
- Making the necessary calibrations after exchanging components or when using new application media
- Controlling painting processes; maintaining and configuring the control system
- Changing and / or optimising the application

Course goals
- Principles of the IPS system
- Explaining and understanding IPS configurations (GunControl, open / closed loop, PumpSolution)
- Extending and optimising the existing IPS configuration
- Parametrisation of controllers
- Mechanical repairs, error diagnostics of the controls
- Exchanging components
- Calibrating actuators and sensors
- Using a computer to read parameter data via the serial interface
- Diagnosis

Prerequisites
- Basic course PG1 of the corresponding control generation
- Basic computer skills

Information
Course duration: 5 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,900 EUR / participant

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course
S4P+ APT-L-CBS: Painting – CartridgeBellSystem

**Target group**
Application mechanics, start-up engineers, mechanical service personnel

**Prerequisites**
Basic course PG1 of the corresponding control generation

**Course goals**
- Using the IPS system and controlling the functions
- Performing necessary maintenance, replacing components or worn parts, servicing and error diagnostics
- Making the necessary calibrations on mechanical components
- Making changes to the application

**Contents**
- Occupational health and safety in dealing with the application
- Getting to know the functions and operating method of the CBS system
- Recognising and locating faults in the IPS system (serial interface, visualisation computer)
- Exchanging hardware components and the associated adjustments
- Functional testing of the hardware components
- Performing settings and calibrations
- Using and understanding maintenance instructions
- Performing possible repairs on the hardware components

**Information**
**Course duration:** 3 days
**Number of participants:** 3 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 1,950 EUR / participant

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**Overview of training plan**
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course
No courses are currently provided in this category.

**Overview of training plan**

1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. **Special programming as required**
4. Individual refresher course / advanced course
S4C+ PS-RS: RobotStudio

Target group
Planners, start-up engineers, programmers, project managers

Course goals
- Carrying out and visualising complex control tasks of a robot system with the help of the offline tool RobotStudio
- Writing a program without direct intervention in the robot (offline)

Contents
- Occupational health and safety
- Basic geometric design
- Importing geometric data
- Library functions
- Moving virtual robots, programming positions and writing programs
- Creating a tool
- Creating robot positions with geometric data
- Using a plant object
- Using the virtual FlexPendant for the manual movement of the robot and for changing the RAPID program
- Using external axes
- Producing graphic and geometric functions, as well as detail levels

Prerequisites
- Basic course PG1 of the corresponding control generation
- Advanced computer skills
- Experience with a CAD program

Information
Course duration: 4 days
Number of participants: 3 – 6 persons
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,100 EUR/participant

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Overview of training plan
1. S4P+ PG1-L Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. Individual refresher course / advanced course

Quotation via Email
### S4P+ individual courses

#### Standard courses based on the on-site course programme

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday/Sunday</th>
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<tbody>
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<td>2</td>
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<td>3</td>
<td>EUR 6,300</td>
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<td>4</td>
<td>EUR 8,400</td>
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<tr>
<td>5</td>
<td>EUR 10,500</td>
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</tr>
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</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.

Optional: Starts on the first day at 8.00 am if you book an additional half trainer day

Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day

#### Individual courses on site

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday/Sunday</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>EUR 2,300</td>
<td>EUR 3,450</td>
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<tr>
<td>2</td>
<td>EUR 4,600</td>
<td>EUR 6,900</td>
</tr>
<tr>
<td>3</td>
<td>EUR 6,900</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>EUR 9,200</td>
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</tr>
<tr>
<td>5</td>
<td>EUR 11,500</td>
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</tr>
</tbody>
</table>

Each course on the first day from 1.00 pm to the last day at 1.00 pm, approx. 30 hours.

Optional: Starts on the first day at 8.00 am if you book an additional half trainer day

Optional: Ends on the last day at 5.00 pm if you book an additional half trainer day

#### Individual courses in the Friedberg Training Center

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Price for Monday to Friday</th>
<th>Price for Saturday/Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EUR 2,300</td>
<td>EUR 3,450</td>
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<tr>
<td>2</td>
<td>EUR 4,600</td>
<td>EUR 6,900</td>
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<td>3</td>
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## Training prices 2014

<table>
<thead>
<tr>
<th>Courses</th>
<th>Duration (days)</th>
<th>Price (Euro)</th>
</tr>
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<tbody>
<tr>
<td><strong>Industry robot IRC5</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRC5: Introductory course – Industrial robots</td>
<td>2</td>
<td>950</td>
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<tr>
<td>IRC5 BE: Operating</td>
<td>3</td>
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<tr>
<td>IRC5 BE-S: Operation Shielded Arc Welding</td>
<td>5</td>
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</tr>
<tr>
<td>IRC5 PG1: Programming basics 1</td>
<td>5</td>
<td>1,950</td>
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<tr>
<td>IRC5 PG2: Programming basics 2</td>
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<tr>
<td>IRC5 PG3: Programming basics 3</td>
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<td>2,150</td>
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<tr>
<td>IRC5 Upgrade Workshop: Robot specialists</td>
<td>5</td>
<td>2,500</td>
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<tr>
<td>IRC5 APT-F: Milling</td>
<td>2</td>
<td>1,300</td>
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<tr>
<td>IRC5 APT-KS: Adhesion and sealing</td>
<td>2</td>
<td>1,300</td>
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<tr>
<td>KS-IDFP: Adhesion and sealing – Integrated Dispensing Function Pac</td>
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<td>2,300</td>
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<tr>
<td>IRC5 APT-KS-A: Adhesion, sealing and application</td>
<td>3</td>
<td>1,800</td>
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<tr>
<td>IRC5 APT-P: Spot welding</td>
<td>2</td>
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<tr>
<td>IRC5 APT-RB: Roller beading</td>
<td>3</td>
<td>1,800</td>
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<tr>
<td>IRC5 APT-S1: Shielded arc welding 1</td>
<td>3</td>
<td>1,800</td>
</tr>
<tr>
<td>IRC5 APT-S1: Shielded arc welding 2</td>
<td>5</td>
<td>2,500</td>
</tr>
<tr>
<td>IRC5 PS-A: Plant operation</td>
<td>4</td>
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<tr>
<td>IRC5 PS-C: Conveyor tracking</td>
<td>3</td>
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<tr>
<td>IRC5 PS-EE: EnergyEfficiency</td>
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<tr>
<td>IRC5 PS-EPS: ElectronicPositionSwitches</td>
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<tr>
<td>IRC5 PS-EPS+S: ElectronicPositionSwitches and SafeMove</td>
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<tr>
<td>IRC5 PS-FCM: Force Control for Machining</td>
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<tr>
<td>IRC5 PS-HPR: HomePosRunning</td>
<td>3</td>
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<tr>
<td>IRC5 PS-I: Initiation</td>
<td>4</td>
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<tr>
<td>IRC5 PS-IV: Integrated Vision</td>
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<tr>
<td>IRC5 PS-M: Multitasking</td>
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<tr>
<td>IRC5 PS-MMV: MultiMove</td>
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<tr>
<td>IRC5 PS-PM: PickMaster (Price for complete course)</td>
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<tr>
<td>IRC5 PS-ProfiNet</td>
<td>3</td>
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<tr>
<td>IRC5 PS-RS: RobotStudio</td>
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<tr>
<td>IRC5 PS-RWMT: RobotWare Machine Tending</td>
<td>5</td>
<td>2,500</td>
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<tr>
<td>IRC5 PS-S: SafeMove</td>
<td>3</td>
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<tr>
<td>IRC5 PS-X: Programming and configuring external axes</td>
<td>5</td>
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<tr>
<td>IRC5 PS-XP: Programming external axes</td>
<td>3</td>
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<tr>
<td>IRC5 MachineSafety</td>
<td>3</td>
<td>1,800</td>
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<tr>
<td>IRC5 SE Electrical appliances course</td>
<td>5</td>
<td>2,300</td>
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<tr>
<td>IRC5 SD: Fault and Diagnostics</td>
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<tr>
<td>IRC5 ME 120: Mechanics</td>
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<tr>
<td>IRC5 ME 140: Mechanics</td>
<td>3</td>
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<tr>
<td>IRC5 ME 1600 / 1600ID: Mechanics</td>
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<tr>
<td>IRC5 ME 2400: Mechanics</td>
<td>3</td>
<td>1,900</td>
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<tr>
<td>IRC5 ME 2600 / 2600 ID: Mechanics</td>
<td>4</td>
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<tr>
<td>IRC5 ME 360: Mechanics</td>
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<tr>
<td>IRC5 ME 4400: Mechanics</td>
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<tr>
<td>IRC5 ME 4400 FP: Mechanics</td>
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<tr>
<td>IRC5 ME 4600: Mechanics</td>
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<tr>
<td>IRC5 ME 4600 FP: Mechanics</td>
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### Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Duration (days)</th>
<th>Price (Euro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRC5 ME 6600: Mechanics</td>
<td>5</td>
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<tr>
<td>IRC5 ME 6600 FP / 7600 FP: Mechanics</td>
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<tr>
<td>IRC5 ME 6640: Mechanics</td>
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<tr>
<td>IRC5 ME 6640 FP: Mechanics</td>
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<tr>
<td>IRC5 ME 6700: Mechanics</td>
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<tr>
<td>IRC5 ME FP: Mechanics</td>
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**Painting robot IRC5P**

<table>
<thead>
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<th>Course Name</th>
<th>Duration (days)</th>
<th>Price (Euro)</th>
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<tbody>
<tr>
<td>IRC5P: Introductory course – Paint robots</td>
<td>2</td>
<td>950</td>
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<tr>
<td>IRC5P BE-L: Operating painting</td>
<td>3</td>
<td>1,450</td>
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<tr>
<td>IRC5P PG1-L: Programming basics 1 for painting</td>
<td>5</td>
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<tr>
<td>IRC5P PG2-L: Programming basics 2 for painting</td>
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<tr>
<td>IRC5P APT-L-IPS: Painting – Integrated Process System</td>
<td>4</td>
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</tr>
<tr>
<td>IRC5P APT-L-CBS: Painting – CartridgeBellSystem</td>
<td>3</td>
<td>1,950</td>
<td></td>
</tr>
<tr>
<td>IRC5P APT-L-KA: Painting – Conventional application</td>
<td>3</td>
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<tr>
<td>IRC5P PS-RS: RobotStudio Paint</td>
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<td>2,100</td>
<td></td>
</tr>
<tr>
<td>IRC5P MachineSafety</td>
<td>3</td>
<td>1,800</td>
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</tr>
<tr>
<td>IRC5P SE-L: Electrical appliances</td>
<td>5</td>
<td>2,550</td>
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<tr>
<td>IRC5P SD: Fault and Diagnostics</td>
<td>3</td>
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### Industrial robot S4C+ **(days)**

<table>
<thead>
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<th>Course Code</th>
<th>Course Name</th>
<th>Duration (days)</th>
<th>Price (Euro)</th>
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<tbody>
<tr>
<td>IRC5P ME 52: Mechanics</td>
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<tr>
<td>IRC5P ME 5400: Mechanics</td>
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<tr>
<td>IRC5P ME 5500: Mechanics</td>
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<tr>
<td>S4C: Operating</td>
<td>3</td>
<td>1,250</td>
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<tr>
<td>S4C + PG1: Programming basics 1</td>
<td>5</td>
<td>1,950</td>
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<tr>
<td>S4C + PG2: Programming basics 2</td>
<td>5</td>
<td>2,050</td>
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<tr>
<td>S4C + PS-M: Multitasking</td>
<td>4</td>
<td>2,300</td>
<td></td>
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<tr>
<td>S4C+ PS-RS: RobotStudio</td>
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<td></td>
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<tr>
<td>S4C+ SE Electrical appliances course</td>
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<tr>
<td>S4C+ ME 140: Mechanics</td>
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<tr>
<td>S4C+ ME 2400: Mechanics</td>
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<tr>
<td>S4C+ ME 4400: Mechanics</td>
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<tr>
<td>S4C+ ME 6600: Mechanics</td>
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<tr>
<td>Courses</td>
<td>Duration (days)</td>
<td>Price (Euro)</td>
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<tr>
<td><strong>Painting robot S4P+</strong></td>
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<tr>
<td>S4P BE-L: Operating painting</td>
<td>3</td>
<td>1,450</td>
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<tr>
<td>S4P+ PG1-L: Programming basics 1 painting</td>
<td>5</td>
<td>2,300</td>
<td></td>
</tr>
<tr>
<td>S4P+ PG2-L: Programming basics 2 painting</td>
<td>5</td>
<td>2,400</td>
<td></td>
</tr>
<tr>
<td>S4P+ APT-L-IPS: Painting – Integrated Process System</td>
<td>5</td>
<td>2,900</td>
<td></td>
</tr>
<tr>
<td>S4P+ APT-L-CBS: Painting – CartridgeBellSystem</td>
<td>3</td>
<td>1,950</td>
<td></td>
</tr>
<tr>
<td>S4P+ SE-L: Electrical appliances</td>
<td>5</td>
<td>2,550</td>
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<tr>
<td>S4P+ ME 5400: Mechanics</td>
<td>4</td>
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<tr>
<td>S4P+ ME 5500: Mechanics</td>
<td>4</td>
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</tbody>
</table>
General course conditions of the
ABB Training Center Friedberg

ABB Automation GmbH
Unternehmensbereich Robotics
Grüner Weg 6, 61169 Friedberg, Germany

1 General remarks
1.1 “Customer” refers to the business person in whose name the seminar was booked.

1.2 “Participant” refers to the natural person who is registered for the seminar or is taking part in the seminar.

1.3 Insofar as these conditions include obligations of the participant, the customer for whom the participant is taking part is completely responsible for ensuring their fulfilment.

1.4 For the course on servicing electrical appliances, as well as for certain individual courses (depending on their requirements), the customer must have a professional electro-technical qualification.

1.5 Participants of mechanics courses or combined operation/mechanics courses must bring their own protective clothing (protective shoes and work clothes).

1.6 The customer is aware that without the prerequisites specified in the seminar programme, the learning goal of a seminar is difficult or impossible to achieve. The customer shall therefore ensure that their appointed participant fulfils these prerequisites.

1.7 If a course participant significantly hinders the progress of the course for the aforementioned reasons, ABB reserves the right to ban the course participant from the course for the sake of other course participants.

2 Registration for the seminars and course venue
2.1 For organisational reasons, the registration must be made in writing. The following information is required: First and last names, as well as complete address with telephone and fax number of the participant, complete name of the customer’s company (if it deviates from that of the participant), name of the seminar and the seminar date.

2.2 Unless stated otherwise in the course description and confirmation, the seminars are held in the Training Center of ABB Automation GmbH, Unternehmensbereich Robotics in Grüner Weg 6, 61169 Friedberg, Germany.

2.3 Insofar as the parties agree that the training shall be held on the customer’s premises, the “Course conditions for courses on the customer’s premises” take priority over these conditions.

2.4 Upon registration, the terms and conditions of business become part of the contract and are acknowledged as legally binding.

3 Data protection
3.1 The customer grants his consent for his data to be processed insofar as this serves the purpose of the legal relationship.

4 Course times
4.1 The course times are as follows: We begin at 10:00 am on the first day. Seminars end daily at 4:30 pm, except on Friday which ends at 1:30 pm. Half-day courses end at 12:30 pm.
5 Confirmation

5.1 ATG/R confirms the receipt of the registration/order (confirmation of receipt) with a registration confirmation. Registrations are dealt with in the order they are received.

5.2 Registrations and registration cancellations are only processed in Friedberg by the training department.

6 Seminar prices

6.1 Please refer to the current price list for the prices. The prices are net prices and are excluding the respectively valid value added tax.

6.2 ATG/R seminar prices include the costs for the use of the required technical equipment and accompanying material. The scope of service is specified in the seminar description or, for customer-specific training courses, in the individually defined agreements.

6.3 Other costs in connection with the seminar and the seminar participation (in particular travel and overnight costs) shall be borne by the participant or the customer. Failure to participate or only partial participation in a seminar does not entitle the participant to a price reduction.

7 Conditions of payment

7.1 The seminar price must be paid in full after the seminar and on receipt of the ATG/R invoice.

8 Customer cancellation

8.1 Cancellations of seminars must be made in writing. In the event of cancellation up to six weeks before the seminar date, the customer shall not be charged. In the event of cancellation up to 14 days before the seminar date, the customer shall be charged 50 percent of the seminar price. In the event of a later cancellation, the customer shall be charged the full seminar price. The customer is however given the option of appointing a participant to take his place.

9 Cancellation/Postponement by ATG/R

9.1 ATG/R reserves the right to change the date and venue or cancel the seminar, even if a registration confirmation has already been issued, in the event of insufficient demand, insufficient participants, speaker cancellations, force majeure or for other important reasons that are not the fault of ATG/R. The affected participants shall be informed without delay and, wherever possible, shall be offered alternatives. In the event of cancellation or postponement of the seminar for one of the aforementioned reasons, no claims for damages may be asserted against ATG/R.

10 Liability disclaimer and indemnity

10.1 The information communicated in the seminar and contained in the accompanying materials, including all handed over data carriers, are didactically and expertly prepared by ATG/R to the best of their knowledge and belief. ATG/R accepts no liability for any errors in the information as defined in clause 1, nor for any resulting damages, in particular consequential damages.

10.2 Irrespective of the above 8.1, customer claims for damages and reimbursement of expenses (hereinafter referred to as claims for damages), for whatever legal reason, in particular due to violation of duties from the obligatory relation and for impermissible actions, are excluded. This does not apply for compulsory liability, e.g. in accordance with the Produkthaftungsgesetz (German Product Liability Act), in the case of intent, gross negligence, injury to life, limb or health or violation of cardinal contract duties. Claims for damages for violation of fundamental contractual obligations are however limited to foreseeable damages that are typical for the contract, insofar as there is no liability as a result of intent, gross negligence or injury to life, limb or health. A change to the onus...
of proof to the detriment of the customer is not associated with the aforementioned stipulations.

10.3 Note: In the service course on electrical appliances, work is performed on live parts with voltages exceeding 42 volts. ABB shall accept no responsibility for accidents resulting from failure of the participant to observe the occupational health and safety regulations.

10.4 Further, ATG/R shall accept no liability for improper dealing of the premises and training appliances at the seminar venue and/or on the customer’s own systems. In this context, liability is excluded for consequential damages as a result of incorrect operation by ATG/R trainers or participants. The customer must indemnify ATG/R against all claims of third parties that are asserted against ATG/R in connection with the aforementioned damages, and must fully reimburse ATG/R for all incurred costs and expenses.

11 Accompanying materials
11.1 The documents reflect the status at the time of the seminar. ATG/R accepts no liability nor guarantees that the information shall remain valid.

11.2 ATG/R reserves all rights, including those of translation, reprint and reproduction of the accompanying materials or parts thereof. These may not be reproduced, forwarded to or processed by third parties, distributed or redesigned in Germany or abroad without the written consent of ATG/R. The software in the seminar rooms is copyrighted and may neither be copied nor removed.

12 Certificate
12.1 At the end of the course, the participant’s qualification will be confirmed with the issuance of a certificate. Participants who are unable to follow the course content due to insufficient prior knowledge or comprehension difficulties will receive a confirmation of participation.

13 Other remarks
13.1 If the customer is a businessman, the sole legal venue for all disputes arising directly or indirectly from the contractual relationship is Mannheim. ATG/R is however also entitled to file a lawsuit at the customer’s location.

13.2 German substantive law, with the exclusion of the Convention of International Sale of Goods (CISG), applies for the legal relationships in connection with this contract.

13.3 Should any individual provision or any part of any provision be or become void, illegal or unenforceable, the validity of the remaining provisions hereof shall in no way be affected. This does not apply if maintaining the contract would constitute unreasonable hardship for one of the parties.
Course conditions for courses on customer’s premises

The following prerequisites must be fulfilled by the customer:

**Occupational health and safety at the training venue**
- For reasons of occupational health and safety, the following conditions must be fulfilled by the customer.
- Secure attachment of the robot to the ground
- Sectioning off the robot movement area
- External emergency stop devices
- Observation of all valid occupational health and safety regulations.

**Training robot equipment**
- For mechanical and electrical equipment courses, the customer must discuss the suitability of the training equipment with ABB
- One robot system is required for one to three course participants
- Two robot systems are required for four to six course participants
- Three robot systems are required for seven to nine course participants
- Corresponding control generation
- Corresponding handling parts
- Storage positions
- On/off unit for six signals

**Training room**
The training room:
- Must be located in the proximity of the training robot
- Should be available for the entire duration of the course
- Should be lockable

**Production equipment risks to be borne by the customer for the course**
ABB expressly points out that training courses bear risks for customer material/equipment, such as but not limited to:
- Collision when moving by hand or using the program; the gripper or another tool may become damaged or destroyed.
- Defects to parts such as components on the safety circuit board; under circumstances a replacement circuit board might not be available.
- Loss of data: There is no up-to-date backup or it was not verified that data is available for the complete installation of a system (system key and installation files).

**Continuation of the training in the event of damage/breakdown of equipment**
In the case of damage occurring to customer material or equipment failure, the following applies:
- Only the theoretical sections of the training plan can be continued.
- In consultation with the training management, the trainer can interrupt the training course and use the training time to carry out repairs.
- There is no entitlement to a repetition of the missing sections of the training course or to additional training hours.

**Responsibility of the customer for damages and breakdowns during training**
The customer bears the risks and costs for all damage and failure of their own equipment during the training course, as well as the inability to achieve the training goal as a result. These risks include, but are not limited to, the following:
- Production downtime as a result of a plant error during the training course
- Necessity to repeat the course
- Defects and damage to customer material/equipment
- Cost of repairs, spare parts, use of maintenance personnel, etc.
Selection of hotels and guest houses

When booking your hotel, please mention that you will be attending a training session at ABB. Some of the hotels and guest houses grant special conditions for such bookings.

<table>
<thead>
<tr>
<th>Name and adress</th>
<th>Distance</th>
<th>Price (€)*</th>
<th>Telephon and fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorheimer Hof (Dorheim part of town)</td>
<td>5,7 km</td>
<td>from 60,–</td>
<td>Tel. 0 60 31 73 70 0</td>
</tr>
<tr>
<td>Wetterauerstr. 70</td>
<td></td>
<td></td>
<td>Fax 0 60 31 73 70 40</td>
</tr>
<tr>
<td>61169 Friedberg</td>
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<td><a href="http://www.dorheimerhof.de">www.dorheimerhof.de</a></td>
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<tr>
<td>Hotel Stadt Friedberg (Stadthalle)</td>
<td>1,5 km</td>
<td>from 66,–</td>
<td>Tel. 0 60 31 60 70</td>
</tr>
<tr>
<td>Am Seebach 2</td>
<td></td>
<td></td>
<td>Fax 0 60 31 60 71 00</td>
</tr>
<tr>
<td>61169 Friedberg</td>
<td></td>
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<tr>
<td><a href="http://www.hotel-stadt-friedberg.de">www.hotel-stadt-friedberg.de</a></td>
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<tr>
<td>Sportpark Bad Nauheim</td>
<td>3,6 km</td>
<td>from 83,–</td>
<td>Tel. 0 60 32 40 04</td>
</tr>
<tr>
<td>In der Aue 30–32</td>
<td></td>
<td></td>
<td>Fax 0 60 32 18 15</td>
</tr>
<tr>
<td>61231 Bad Nauheim</td>
<td></td>
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<tr>
<td><a href="http://www.sportpark-badnauheim.de">www.sportpark-badnauheim.de</a></td>
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<tr>
<td>Hotel “Zur Traube”</td>
<td>27,9 km</td>
<td>from 46,–</td>
<td>Tel. 060 43 / 40 47-0</td>
</tr>
<tr>
<td>Niddaer Gasthofbrauerei</td>
<td></td>
<td></td>
<td>Fax 0 60 43 / 40 47-10</td>
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<tr>
<td>Markt 21</td>
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</tr>
<tr>
<td>63667 Nidda</td>
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<td><a href="http://www.hotel-zur-traube.de">www.hotel-zur-traube.de</a></td>
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</tr>
<tr>
<td>Pension Villa Monje (guest house)</td>
<td>6,0 km</td>
<td>from 40,–</td>
<td>Tel. 0 60 32 8 17 50</td>
</tr>
<tr>
<td>William-Kerckhoff-Str. 2</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>61231 Bad Nauheim</td>
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<tr>
<td><a href="http://www.pension-villa-monne.de">www.pension-villa-monne.de</a></td>
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<tr>
<td>Hotel Bayerischer Hof</td>
<td>4,9 km</td>
<td>from 55,–</td>
<td>Tel. 0 60 32 91 10-0</td>
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<tr>
<td>Mittelstraße 17</td>
<td></td>
<td></td>
<td>Fax 0 60 32 91 10-20</td>
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<tr>
<td>61231 Bad Nauheim</td>
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<td><a href="http://www.hotel-bayerischer-hof.de">www.hotel-bayerischer-hof.de</a></td>
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<tr>
<td>Hotel Arabella Garni</td>
<td>6 km</td>
<td>from 63,–</td>
<td>Tel. 0 60 32 96 07-0</td>
</tr>
<tr>
<td>William-Kerckhoff- Str. 3–4</td>
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<td></td>
<td>Fax 0 60 32 96 07-36</td>
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<tr>
<td>61231 Bad Nauheim</td>
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<td><a href="http://www.arabella-badnauheim.de">www.arabella-badnauheim.de</a></td>
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<tr>
<td>Hotel Brunnenhof Garni</td>
<td>5,9 km</td>
<td>from 69,–</td>
<td>Tel. 0 60 32 9 29 00</td>
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<tr>
<td>Ludwigstr.13</td>
<td></td>
<td></td>
<td>Fax 0 60 32 54 08</td>
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<td><a href="http://www.brunnenhof-hotel-garni.de">www.brunnenhof-hotel-garni.de</a></td>
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<tr>
<td>Hotel Lindemann Garni</td>
<td>6,3 km</td>
<td>from 67,–</td>
<td>Tel. 0 60 32 96 66-5</td>
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<tr>
<td>Frankfurter Straße 95</td>
<td></td>
<td></td>
<td>Fax 0 60 32 96 66-40</td>
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<tr>
<td>61231 Bad Nauheim</td>
<td></td>
<td></td>
<td><a href="http://www.hotel-lindemann.de">www.hotel-lindemann.de</a></td>
</tr>
<tr>
<td>Hotel Spöttel</td>
<td>5,6 km</td>
<td>from 63,–</td>
<td>Tel. 0 60 32 93 04-0</td>
</tr>
<tr>
<td>Luisenstraße 5–7</td>
<td></td>
<td></td>
<td>Fax 0 60 32 93 04-59</td>
</tr>
<tr>
<td>61231 Bad Nauheim</td>
<td></td>
<td></td>
<td><a href="http://www.spoettel-badnauheim.de">www.spoettel-badnauheim.de</a></td>
</tr>
<tr>
<td>Best Western Hotel Rosenau</td>
<td>6,7 km</td>
<td>from 71,–</td>
<td>Tel. 0 60 32 96 46-0</td>
</tr>
<tr>
<td>Steinfurther Straße 1–5</td>
<td></td>
<td></td>
<td>Fax 0 60 32 96 46-666</td>
</tr>
<tr>
<td>61231 Bad Nauheim</td>
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<td><a href="http://www.best-western-rosenau.de">www.best-western-rosenau.de</a></td>
</tr>
<tr>
<td>Dolce Am Kurpark</td>
<td>6,0 km</td>
<td>from 99,–</td>
<td>Tel. 0 60 32 30 30</td>
</tr>
<tr>
<td>Nördlicher Park 16</td>
<td></td>
<td></td>
<td>Fax 0 60 32 30 34 19</td>
</tr>
<tr>
<td>61231 Bad Nauheim</td>
<td></td>
<td></td>
<td><a href="http://www.dolce-bad-nauheim-hotel.de">www.dolce-bad-nauheim-hotel.de</a></td>
</tr>
</tbody>
</table>

* Single room, prices subject to change
How to find us

**Directions via the A45**
Exit the A45 at “Florstadt” and drive in the direction of Friedberg. After the town entrance sign, turn left after the pedestrian traffic lights in the direction of “Industriegebiet Grüner Weg” (industrial area). Follow the main road through the “Industriegebiet Süd” (industrial area) up to the traffic lights crossing. Turn right in the direction of B3 Gießen. At the second lights, turn left into Grüner Weg. ABB is on the left-hand side.

**Directions via the A5**
Exit the A5 at “Friedberg” and drive in the direction of Friedberg, past Rosbach v.d.H. Shortly before the town entrance sign for Friedberg, turn right at the roundabout into Grüner Weg. ABB is on the right-hand side.

**Directions via the B3**
Drive on the bypass up to the “Friedberg West” exit/Industriegebiet Grüner Weg (industrial area). Shortly before the town entrance sign for Friedberg, turn right at the roundabout into Grüner Weg. ABB is on the right-hand side.

**Getting there by public transport**
Travel to Hauptbahnhof Friedberg (main station). There are taxis at the station.

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**Unternehmensbereich Robotics**
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Fax: +49 (0) 60 31 85-297
Email: robotics@de.abb.com
www.abb.de / robotics