Training programme 2016

This document contains the current training programme 2016, and other useful information.
Realize the full potential of your robotics systems

The extensive range of training courses on offer from ABB has the clear objective of professionally training robotics experts. Against this background we strongly recommend the valuable in-depth courses which we offer in addition to the essential basic courses. Structured to suit target group and category, our program offers a variety of new and proven courses that quickly bring returns.

I would also like to point out our courses in RobotStudio. ABB offers herewith a powerful software that makes a major contribution to increasing efficiency in conjunction with your robotics systems.

We look forward to advising you on all standard courses, customized training and job-related coaching to assist you in utilizing the complete performance potential of your robotics equipment.

Ralf Wöfelschneider, Training Manager
## 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:** 1,300 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

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

Quotation via Email
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
- Testing measuring system
- Measuring tool and work 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:** 2,050 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PG1-YuMi: Programming basics 1 – YuMi

**Target Group**
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel, exclusively for those who use the YuMi robot system. An alternative method to achieve the same result would be to take part in the standard course IRC5 PG1, followed by the extension course IRC5 PS-YuMi.

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

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant, RobotStudio, RobotStudio App
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Testing measuring system
- Measuring tool and work object
- Loading and saving modules and programs and system parameters
- Error messages and status reports
- Backup
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

**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:** 2,150 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course

Quotation via Email
IRC5 Upgrade Workshop: S4C+ Upgrade

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

**Course goals**
- Refresher course and transfer to IRC5
- 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
- Testing measuring system
- Measuring tool and work 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 programming courses S4C / S4C+ PG1, as well as the knowledge acquired therein.
- Basic computer skills

**Information**
**Course duration:** 3.5 days  
**Number of participants:** 3 – 6 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,800 EUR / participant

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**Overview of training plan**
1. IRC5 Upgrade Workshop: S4C+ Upgrade  
2. IRC5 PS-A: Plant operation  
3. Application engineering courses as required  
4. Special programming as required  
5. RobotStudio  
6. Safety  
7. Individual refresher course / advanced course
IRC5 PS-A: Plant operation

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

**Course goals**
- Understand programme execution, functionality and RAPID solution
- Measure cycle time and motion as well as optimize 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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**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. RobotStudio
6. Safety
7. Individual refresher course / advanced course

Quotation via Email
**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: 1,400 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course

**Quotation via Email**
APT-IDFPS-B: Sealing Basics

**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:** 2,400 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. RobotStudio
6. Safety
7. 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:** 1,400 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. RobotStudio  
6. Safety  
7. 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

**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:** 1,900 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. RobotStudio  
6. Safety  
7. Individual refresher course/advanced course

**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

**Quotation via Email**
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:** 1,900 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. RobotStudio
6. Safety
7. 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: 2,600 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. RobotStudio
6. Safety
7. 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: 1,900 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. RobotStudio
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: 1,600 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. RobotStudio
6. Safety
7. 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:** 1,900 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. RobotStudio
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
– This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

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: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-MIG: Migration

Target group
Start-up engineers, programmers, service personnel

Course goals
- In the course Migration, the procedure for the migration of a production system from S4C+ to IRC5 is carried out using the relevant equipment
- Participants make use of RobotStudio to a large extent
- Installation of RobotStudio on own PC

Contents
- Occupational Safety
- Data backup (manual)
- System building in RobotStudio
- Comparison of old and new parameter structure
- Preparation of data for porting
- Hints for the selection of new mechanics
- Testing and optimizing new equipment

Prerequisites
- Basic course IRC5 PG1
- Advanced computer skills
- Administrator rights for installing programs

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: 1,900 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. RobotStudio
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

**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:** 2,600 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. RobotStudio  
6. Safety  
7. Individual refresher course / advanced course

**Quotation via Email**
IRC5 PS-S+EPS: SafeMove and EPS

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: 4 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 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. RobotStudio
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:** 2,400 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. RobotStudio
6. Safety
7. 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

**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

**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:** 2,600 EUR / participant
- **Notes:** Exercises on robots are performed on the systems and types of robots that are available at the Training Center for Robots

**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, synchronized and coordinated movements
- Controlling movement tasks with additional management tasks

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

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
– This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

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: 2,600 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-X1: 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 work object using coordinated external axes

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 work objects

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

Information
Course duration: 6 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
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 PG1: Programming basics 1
2. IRC5 PS-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-X2: 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 work object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

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 work 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: 1,900 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-X3: Trimming external axes

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

Course goals
- Control intervention and getting to know additional axes
- Optimized control
- Evaluation of the quality of control in relation to the automation task

Contents
- Occupational health and safety
- Fine-tuning servo control by recording the control response
- Utilizing TuneMaster
- Displaying and recording control signals

Prerequisites
- IRC5 PS-X2: Configuring external axes
- Electrical expertise
- Advanced computer skills

Information
Course duration: 2.5 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,600 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-YuMi

**Target Group**
Programmers, startup engineers, plant managers, project managers, planners and electrical equipment service personnel with experience of IRC5 who want to use the YuMi robot system.

**Course goals**
- Independent execution of YuMi operating functions
- Independently developing, implementing, testing, optimizing and the documentation of simple movement programs
- Basic knowledge of IRC5 is a prerequisite

**Contents**
- Occupational health and safety
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

**Prerequisites**
- IRC5 PG1
- 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:** 1,900 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. RobotStudio  
6. Safety  
7. 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: 1,900 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. RobotStudio
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-RS-Online: RobotStudio Online

**Target Group**
Startup engineers, plant managers, maintenance and service personnel

**Course goals**
- Use RobotStudio in practice with the robot controller
- This course does not cover CAD programming in RobotStudio

**Contents**
- Creation and modification of systems, as well as booting systems
- Networking, design and online communication with RobotStudio
- Creating so-called “relationships” between the robot controller and virtual systems (transmission and comparison of data elements)
- I/O configuration
- Creation of virtual duplicates, program editor
- Online tools, “Job” creation
- Online signal analysis

**Prerequisites**
- Basic course PG1 of the respective controller generation
- 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-A: Plant operation
3. Application engineering courses as required
4. Special programming as required
5. **RobotStudio**
6. Safety
7. Individual refresher course / advanced course

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**Quotation via Email**
IRC5 PS-RS1: RobotStudio 1

**Target Group**
- Planners, startup engineers, programmers, plant managers and project managers

**Course goals**
- Visualising and creating complex tasks for robot control systems using the RobotStudio offline tool
- Programming without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation and licensing issues
- Work surface functions
- Data management and project related structures in RobotStudio
- Integration of geometric data, CAD data formats
- Possibilities for creation of systems and units
- Design of the robot work environment in RobotStudio
- Creation and editing graphic components
- Base frame systems in RobotStudio
- Creation and measurement of tools and work objects
- Bringing movement to graphic objects
- Creating positions and paths
- Check accessibility of positions
- Automatic path generation on curved bodies
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Possibilities for simulation, cycle times, collision check and signal analysis
- Recording applications
- Incorporating external axes
- Programming a MultiMove station
- Replication and practical testing on a robot training unit

**Prerequisites**
- Basic course PG1 of the respective controller 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:** 2,150 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. **RobotStudio**
6. Safety
7. Individual refresher course/advanced course
IRC5 PS-RS2: RobotStudio 2

**Target Group**
Offline programmers, simulation and construction engineers, startup engineers, planners

**Course goals**
- Implementation of simulation tasks for new systems with SmartComponents
- Carry out cycle time investigations
- Optimization and modification of existing systems with RobotStudio

**Contents**
- Features relating to the integration of existing programs into RobotStudio
- Visualization of SafeMove zones
- SmartComponents
- System design with material flow and logic components
- I/O configuration in simulation and control
- Bringing movement to graphic objects
- Screenmaker, for customizing teach pendant screens

**Prerequisites**
- IRC5 PS-RS1: RobotStudio 1
- 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:** 2,200 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. **RobotStudio**
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-RS-AWPP: RS ArcWelding PowerPac

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

**Course goals**
- Offline programming of arc welding programs using RobotStudio
- Taking into account collision detection and arm configuration
- Program / process optimization
- Implementation on actual welding equipment

**Contents**
- Building an ArcWelding PowerPac
- Interacting with an AW-PP interface
- Importing geometry
- Library function
- Creation of robot positions relative to geometry
- Create a welding system
- Programming welding seams offline
- Create welding parameter templates
- Synchronizing sequences with a virtual machine, thus creating a Rapid structure
- Loading the program into a real welding cell and correcting positions

**Prerequisites**
- IRC5 APT-S1 Inert gas welding
- IRC5 PS-RS RobotStudio
- Please supply your own PC with admin rights

**Information**
**Course duration:** 3 days  
**Number of participants:** 3 – 6 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 PG1: Programming basics 1  
2. IRC5 PS-A: Plant operation  
3. Application engineering courses as required  
4. Special programming as required  
5. RobotStudio  
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: 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: 2,400 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. RobotStudio
6. Safety
7. Individual refresher course / advanced course
IRC5 PS-S-Adm: SafeMove Administrator

**Target group**
- Programmers, startup engineers, plant managers and service personnel, responsible for programming with SafeMove

**Course goals**
- Testing and acceptance of SafeMove programming
- Access concept and documentation

**Contents**
- Occupational health and safety
- Over-run principle
- Simulation in RobotStudio
- Testing on a robot
- Managing access rights
- Documentation of the complete safety concept
- Final examination for all courses of the training series: (IRC5 PG1, IRC5 PS-S, IRC5 MS, IRC5 PS-S-Adm)
- Presentation of certificates and permits

**Prerequisites**
IRC5 PS-S Safe Move and IRC5 Machine Safety

**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:** 1,400 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. RobotStudio
6. **Safety**
7. 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

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
- Testing measuring system
- Measuring tool and work 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: 2,050 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
Programmers

IRC5 PG1-YuMi: Programming basics 1 – YuMi

Target Group
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel, exclusively for those who use the YuMi robot system. An alternative method to achieve the same result would be to take part in the standard course IRC5 PG1, followed by the extension course IRC5 PS-YuMi

Course goals
- Independent execution of YuMi operating functions
- Independently developing, implementing, testing, optimising and the documentation of simple movement programs

Contents
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant, RobotStudio, RobotStudio App
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Testing measuring system
- Measuring tool and work object
- Loading and saving modules and programs and system parameters
- Error messages and status reports
- Backup
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

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: 2,150 EUR/participant

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Quotation via Email

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: S4C+ Upgrade

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

**Course goals**
- Refresher course and transfer to IRC5
- 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
- Testing measuring system
- Measuring tool and work 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 programming courses S4C / S4C+ PG1, as well as the knowledge acquired therein.
- Basic computer skills

**Information**
**Course duration:** 3.5 days  
**Number of participants:** 3 – 6 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,800 EUR / participant

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**Quotation via Email**

**Overview of training plan**
1. IRC5 Upgrade Workshop: S4C+ Upgrade  
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:** 1,400 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
APT-IDFPS-B: Sealing Basics

**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:** 2,400 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:** 1,400 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-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: 1,900 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

**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:** 1,900 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:** 2,600 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: 1,900 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 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: 1,600 EUR/participant

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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
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: 1,900 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
- Please supply your own PC with admin rights
- 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: 2,400 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:** 2,400 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 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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

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: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 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
Start-up engineers, programmers, service personnel

Course goals
- In the course Migration, the procedure for the migration of a production system from S4C+ to IRC5 is carried out using the relevant equipment
- Participants make use of RobotStudio to a large extent
- Installation of RobotStudio on own PC

Contents
- Occupational Safety
- Data backup (manual)
- System building in RobotStudio
- Comparison of old and new parameter structure
- Preparation of data for porting
- Hints for the selection of new mechanics
- Testing and optimizing new equipment

Prerequisites
- Basic course IRC5 PG1
- Advanced computer skills
- Administrator rights for installing programs

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: 1,900 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+EPS: SafeMove and EPS

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: 4 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 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: 2,400 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, synchronized 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:** 2,600 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. 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-PM: PickMaster 3 basics

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

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

**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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

**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

**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:** 2,600 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-RWMT: RobotWare Machine Tending

**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:** 2,600 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 PS-X1: 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 work object using coordinated external axes

**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 work objects

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

**Information**
Course duration: 6 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
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 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-X2: 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 work object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

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 work 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: 1,900 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-X3: Trimming external axes

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

**Course goals**
- Control intervention and getting to know additional axes
- Optimized control
- Evaluation of the quality of control in relation to the automation task

**Contents**
- Occupational health and safety
- Fine-tuning servo control by recording the control response
- Utilizing TuneMaster
- Displaying and recording control signals

**Prerequisites**
- IRC5 PS-X2: Configuring external axes
- Electrical expertise
- Advanced computer skills

**Information**
- **Course duration:** 2.5 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 1,600 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
Programmers, startup engineers, plant managers, project managers, planners and electrical equipment service personnel with experience of IRC5 who want to use the YuMi robot system.

Course goals
- Independent execution of YuMi operating functions
- Independently developing, implementing, testing, optimizing and the documentation of simple movement programs
- Basic knowledge of IRC5 is a prerequisite

Contents
- Occupational health and safety
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

Prerequisites
- IRC5 PG1
- 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: 1,900 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-ProfiNet

Target group
Start-up engineers, service personnel, programmers

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

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

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: 1,900 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-RS1: RobotStudio 1

**Target Group**
- Planners, startup engineers, programmers, plant managers and project managers

**Course goals**
- Visualising and creating complex tasks for robot control systems using the RobotStudio offline tool
- Programming without direct intervention in the robot (offline)

**Contents**
- Occupational health and safety
- Installation and licensing issues
- Work surface functions
- Data management and project related structures in RobotStudio
- Integration of geometric data, CAD data formats
- Possibilities for creation of systems and units
- Design of the robot work environment in RobotStudio
- Creation and editing graphic components
- Base frame systems in RobotStudio
- Creation and measurement of tools and work objects
- Bringing movement to graphic objects
- Creating positions and paths
- Check accessibility of positions
- Automatic path generation on curved bodies
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Possibilities for simulation, cycle times, collision check and signal analysis
- Recording applications
- Incorporating external axes
- Programming a MultiMove station
- Replication and practical testing on a robot training unit

**Prerequisites**
- Basic course PG1 of the respective controller 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:** 2,150 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
IRC5 PS-RS2: RobotStudio 2

**Target Group**
Offline programmers, simulation and construction engineers, startup engineers, planners

**Course goals**
- Implementation of simulation tasks for new systems with SmartComponents
- Carry out cycle time investigations
- Optimization and modification of existing systems with RobotStudio

**Contents**
- Features relating to the integration of existing programs into RobotStudio
- Visualization of SafeMove zones
- SmartComponents
- System design with material flow and logic components
- I/O configuration in simulation and control
- Bringing movement to graphic objects
- Screenmaker, for customizing teach pendant screens

**Prerequisites**
- IRC5 PS-RS1: RobotStudio 1
- 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:** 2,200 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**
- Offline programming of arc welding programs using RobotStudio
- Taking into account collision detection and arm configuration
- Program / process optimization
- Implementation on actual welding equipment

**Contents**
- Building an ArcWelding PowerPac
- Interacting with an AW-PP interface
- Importing geometry
- Library function
- Creation of robot positions relative to geometry
- Create a welding system
- Programming welding seams offline
- Create welding parameter templates
- Synchronizing sequences with a virtual machine, thus creating a Rapid structure
- Loading the program into a real welding cell and correcting positions

**Prerequisites**
- IRC5 APT-S1 Inert gas welding
- IRC5 PS-RS RobotStudio
- Please supply your own PC with admin rights

**Information**
**Course duration:** 3 days
**Number of participants:** 3 – 6 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 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 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: 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: 2,400 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-Adm: SafeMove Administrator

Target group
- Programmers, startup engineers, plant managers and service personnel, responsible for programming with SafeMove

Course goals
- Testing and acceptance of SafeMove programming
- Access concept and documentation

Contents
- Occupational health and safety
- Over-run principle
- Simulation in RobotStudio
- Testing on a robot
- Managing access rights
- Documentation of the complete safety concept
- Final examination for all courses of the training series: (IRC5 PG1, IRC5 PS-S, IRC5 MS, IRC5 PS-S-Adm)
- Presentation of certificates and permits

Prerequisites
IRC5 PS-S Safe Move and IRC5 Machine Safety

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: 1,400 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, 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:** 2,150 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 taughted positions
- System data search with subsequent sorting function
- Adjusting system parameters

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

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: 2,250 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
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**

**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
- Testing measuring system
- Measuring tool and work 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:** 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
IRC5 PG1-YuMi: Programming basics 1 – YuMi

**Target Group**
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel, exclusively for those who use the YuMi robot system. An alternative method to achieve the same result would be to take part in the standard course IRC5 PG1, followed by the extension course IRC5 PS-YuMi

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

**Contents**
- Occupational health and safety
- Structure and function of the robot system, dialogue concept of FlexPendant, RobotStudio, RobotStudio App
- RAPID program structure
- Types of movement in manual and automatic operation
- Writing simple movement programs
- Monitoring input and output signals
- Testing measuring system
- Measuring tool and work object
- Loading and saving modules and programs and system parameters
- Error messages and status reports
- Backup
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

**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:** 2,150 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
- Please supply your own PC with admin rights
- 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:** 2,400 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: 1,400 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
APT-IDFPS-B: Sealing Basics

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: 2,400 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
Commissioning personnel

IRC5 APT-IDFPS-SE: Sealing Electric

Target Group
Startup engineers, electrical service and application personnel

Course goals
- System overview
- To locate faults in the system
- Reducing downtime to a minimum by rapid error identification
- Ability to commission an IDF system

Contents
- Occupational health and safety
- Detailed description of the form and function of the data backup
- Working with schematics
- Practical exercises for error detection, systematic troubleshooting using appropriate software (RobView, RobotStudio, terminal program)
- Creating a system
- Loading and executing test programs
- Getting to know the IDF structure, soft and hardware
- Basic settings of the IDF control
- Solving application problems
- Carrying out an IPS software update
- Connections of the application modules in the IRC5 controller
- Swopping components and tuning the system

Prerequisites
- Basic course PG1 of the respective controller generation
- Basic computer skills
- Electro-technical training

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: 2,400 EUR/participant

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Quotation via Email

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-IDFPS-ME: Sealing Mechanic

**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:** 1,900 EUR/participant

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**Overview of training plan**
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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: 1,400 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 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: 1,900 EUR/participant

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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:** 1,900 EUR/participant

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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**: 2,600 EUR/participant

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6. Safety
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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**: 1,900 EUR / participant

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3. Application engineering courses as required
4. **Special programming as required**
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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course / advanced course

**Quotation via Email**
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:** 1,600 EUR/participant

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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:** 1,900 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-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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

**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:** 4 days
- **Number of participants:** 4 persons
- **Maximum:** 4 persons per training robot
- **Dates:** Subject to agreement
- **Venue:** Training Center in Friedberg / Hessen
- **Price:** 2,400 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: 2,400 EUR/participant

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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

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

**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:** 2,600 EUR/participant

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**Overview of training plan**
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 PS-S+EPS: SafeMove and EPS

**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: 4 days  
Number of participants: 6 persons  
Maximum: 3 persons per training robot  
Dates: Subject to agreement  
Venue: Training Center in Friedberg / Hessen  
Price: 2,400 EUR/participant

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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:** 2,400 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

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, synchronized 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: 2,600 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
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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course
IRC5 PS-PM: PickMaster 3 basics

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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

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: 2,600 EUR/participant

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8. Individual refresher course / advanced course

Quotation via Email
IRC5 PS-X1: Programming external axes

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

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

Course goals
– Getting to know the control functions
– Using external axes in the robot system
– Moving the robot or the work object using coordinated external axes

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 work objects

Information
Course duration: 6 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg/Hessen
Price: 1,900 EUR/participant

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6. Safety
7. IRC5 PG2: Programming basics 2
8. Individual refresher course/advanced course

Quotation via Email
**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 work object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

**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 work 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:** 1,900 EUR/participant

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6. Safety
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8. Individual refresher course / advanced course

**Quotation via Email**
Commissioning personnel

IRC5 PS-X3: Trimming external axes

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

**Course goals**
- Control intervention and getting to know additional axes
- Optimized control
- Evaluation of the quality of control in relation to the automation task

**Contents**
- Occupational health and safety
- Fine-tuning servo control by recording the control response
- Utilizing TuneMaster
- Displaying and recording control signals

**Prerequisites**
- IRC5 PS-X2: Configuring external axes
- Electrical expertise
- Advanced computer skills

**Information**
- Course duration: 2.5 days
- Number of participants: 3 persons
- Maximum: 3 persons per training robot
- Dates: Subject to agreement
- Venue: Training Center in Friedberg / Hessen
- Price: 1,600 EUR/participant

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6. Safety
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8. Individual refresher course / advanced course
IRC5 PS-YuMi

**Target Group**
Programmers, startup engineers, plant managers, project managers, planners and electrical equipment service personnel with experience of IRC5 who want to use the YuMi robot system.

**Course goals**
- Independent execution of YuMi operating functions
- Independently developing, implementing, testing, optimizing and the documentation of simple movement programs
- Basic knowledge of IRC5 is a prerequisite

**Contents**
- Occupational health and safety
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

**Prerequisites**
- IRC5 PG1
- 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:** 1,900 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-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: 1,900 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
Target Group
Startup engineers, plant managers, maintenance and service personnel

Course goals
- Use RobotStudio in practice with the robot controller
- This course does not cover CAD programming in RobotStudio

Contents
- Creation and modification of systems, as well as booting systems
- Networking, design and online communication with RobotStudio
- Creating so-called “relationships” between the robot controller and virtual systems (transmission and comparison of data elements)
- I/O configuration
- Creation of virtual duplicates, program editor
- Online tools, “Job” creation
- Online signal analysis

Prerequisites
- Basic course PG1 of the respective controller generation
- 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 PS-RS1: RobotStudio 1

#### Target Group
- Planners, startup engineers, programmers, plant managers and project managers

#### Course Goals
- Visualising and creating complex tasks for robot control systems using the RobotStudio offline tool
- Programming without direct intervention in the robot (offline)

#### Contents
- Occupational health and safety
- Installation and licensing issues
- Work surface functions
- Data management and project related structures in RobotStudio
- Integration of geometric data, CAD data formats
- Possibilities for creation of systems and units
- Design of the robot work environment in RobotStudio
- Creation and editing graphic components
- Base frame systems in RobotStudio
- Creation and measurement of tools and work objects
- Bringing movement to graphic objects
- Creating positions and paths
- Check accessibility of positions
- Automatic path generation on curved bodies
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Possibilities for simulation, cycle times, collision check and signal analysis
- Recording applications
- Incorporating external axes
- Programming a MultiMove station
- Replication and practical testing on a robot training unit

#### Prerequisites
- Basic course PG1 of the respective controller 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:** 2,150 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-RS2: RobotStudio 2**

**Target Group**
Offline programmers, simulation and construction engineers, startup engineers, planners

**Course goals**
- Implementation of simulation tasks for new systems with SmartComponents
- Carry out cycle time investigations
- Optimization and modification of existing systems with RobotStudio

**Contents**
- Features relating to the integration of existing programs into RobotStudio
- Visualization of SafeMove zones
- SmartComponents
- System design with material flow and logic components
- I/O configuration in simulation and control
- Bringing movement to graphic objects
- Screenmaker, for customizing teach pendant screens

**Prerequisites**
- IRC5 PS-RS1: RobotStudio 1
- 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:** 2,200 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 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: 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: 2,400 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-S-Adm: SafeMove Administrator

**Target group**
- Programmers, startup engineers, plant managers and service personnel, responsible for programming with SafeMove

**Course goals**
- Testing and acceptance of SafeMove programming
- Access concept and documentation

**Contents**
- Occupational health and safety
- Over-run principle
- Simulation in RobotStudio
- Testing on a robot
- Managing access rights
- Documentation of the complete safety concept
- Final examination for all courses of the training series: (IRC5 PG1, IRC5 PS-S, IRC5 MS, IRC5 PS-S-Adm)
- Presentation of certificates and permits

**Prerequisites**
IRC5 PS-S Safe Move and IRC5 Machine Safety

**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:** 1,400 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, 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:** 2,150 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**: 1,300 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 minimize 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:** 2,000 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 minimize 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: 2,000 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 1600 / 1600ID: Mechanics course on robot mechanics IRB 1600 / 1600ID

**Target group**
Mechanical service personnel

**Course goals**
– Rapid diagnosis of the cause of the error can minimize 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: 2,500 EUR / participant
Note: The mechanics course for IRB 1600ID takes the form of the IRB 2600 mechanics course

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Quotation via Email

**Overview of training plan**
1. IRC5 BE: Operation
2. Mechanics courses
3. Individual refresher course / advanced course
IRC5 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 minimize 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:** 2,000 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 2600 / 2600ID: Mechanics course on robot mechanics IRB 2600 / 2600ID

Target group
Mechanical service personnel

Course goals
– Rapid diagnosis of the cause of the error can minimize 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: 2,500 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 minimize 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: 2,000 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: Mechanics course on robot mechanics IRB 4400

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimize 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:** 2,000 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 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 minimize 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:** 2,500 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 minimize 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:** 2,500 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 minimize 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:** 2,500 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 6640: Mechanics course on robot mechanics IRB 6640

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimize 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

**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

**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
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 minimize 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
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 minimize 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 FP: 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: 1,400 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

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
- Testing measuring system
- Measuring tool and work 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: 2,050 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 PG1-YuMi: Programming basics 1 – YuMi

Target Group
Programmers, startup engineers, plant managers, project managers, planners, electrical equipment service personnel, exclusively for those who use the YuMi robot system. An alternative method to achieve the same result would be to take part in the standard course IRC5 PG1, followed by the extension course IRC5 PS-YuMi

Course goals
– Independent execution of YuMi operating functions
– Independently developing, implementing, testing, optimising and the documentation of simple movement programs

Contents
– Occupational health and safety
– Structure and function of the robot system, dialogue concept of FlexPendant, RobotStudio, RobotStudio App
– RAPID program structure
– Types of movement in manual and automatic operation
– Writing simple movement programs
– Monitoring input and output signals
– Testing measuring system
– Measuring tool and work object
– Loading and saving modules and programs and system parameters
– Error messages and status reports
– Backup
– Using the YuMi App to program Pick and Place tasks
– Use of MultiMove for synchronized movement
– Introduction to the IntegratedVision application for object recognition

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: 2,150 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 minimize downtime

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

Contents
- Occupational health and safety
- Detailed explanation of the structure and function of the robot and controller
- Program errors and how to recognize 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

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 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: 1,600 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
APT-IDFPS-B: Sealing Basics

**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:** 2,400 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-IDFPS-SE: Sealing Electric

Target Group
Startup engineers, electrical service and application personnel

Course goals
- System overview
- To locate faults in the system
- Reducing downtime to a minimum by rapid error identification
- Ability to commission an IDFP system

Contents
- Occupational health and safety
- Detailed description of the form and function of the data backup
- Working with schematics
- Practical exercises for error detection, systematic troubleshooting using appropriate software (RobView, RobotStudio, terminal program)
- Creating a system
- Loading and executing test programs
- Getting to know the IDFP structure, soft and hardware
- Basic settings of the IDFP control
- Solving application problems
- Carrying out an IPS software update
- Connections of the application modules in the IRC5 controller
- Swopping components and tuning the system

Prerequisites
- Basic course PG1 of the respective controller generation
- Basic computer skills
- Electro-technical training

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: 2,400 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-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:** 1,900 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:** 1,600 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-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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

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: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 EUR/participant

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Overview of training plan
1. IRC5 PG1: Programming basics
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:** 2,400 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+EPS: SafeMove and EPS

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: 4 days
Number of participants: 6 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 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-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:** 2,400 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

**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, synchronized 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:** 2,600 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 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-RWMT: RobotWare Machine Tending

**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:** 2,600 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-X1: 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 work object using coordinated external axes

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 work objects

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

Information
Course duration: 6 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
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 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-X2: 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 work object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

**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 work 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:** 1,900 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-X3: Trimming external axes

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

Course goals
- Control intervention and getting to know additional axes
- Optimized control
- Evaluation of the quality of control in relation to the automation task

Contents
- Occupational health and safety
- Fine-tuning servo control by recording the control response
- Utilizing TuneMaster
- Displaying and recording control signals

Prerequisites
- IRC5 PS-X2: Configuring external axes
- Electrical expertise
- Advanced computer skills

Information
Course duration: 2.5 days
Number of participants: 3 persons
Maximum: 3 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 1,600 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-YuMi

**Target Group**
Programmers, startup engineers, plant managers, project managers, planners and electrical equipment service personnel with experience of IRC5 who want to use the YuMi robot system.

**Course goals**
- Independent execution of YuMi operating functions
- Independently developing, implementing, testing, optimizing and the documentation of simple movement programs
- Basic knowledge of IRC5 is a prerequisite

**Contents**
- Occupational health and safety
- Using the YuMi App to program Pick and Place tasks
- Use of MultiMove for synchronized movement
- Introduction to the IntegratedVision application for object recognition

**Prerequisites**
- IRC5 PG1
- 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:** 1,900 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-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:** 1,900 EUR/participant

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**Overview of training plan**
1. IRC5 PG1: Programming basics 1
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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:** 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:** 2,400 EUR / participant

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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-S-Adm: SafeMove Administrator

**Target group**
- Programmers, startup engineers, plant managers and service personnel, responsible for programming with SafeMove

**Course goals**
- Testing and acceptance of SafeMove programming
- Access concept and documentation

**Contents**
- Occupational health and safety
- Over-run principle
- Simulation in RobotStudio
- Testing on a robot
- Managing access rights
- Documentation of the complete safety concept
- Final examination for all courses of the training series: (IRC5 PG1, IRC5 PS-S, IRC5 MS, IRC5 PS-S-Adm)
- Presentation of certificates and permits

**Prerequisites**
IRC5 PS-S Safe Move and IRC5 Machine Safety

**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:** 1,400 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.
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
- Testing measuring system
- Measuring tool and work 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: 2,050 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: 1,400 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
APT-IDFPS-B: Sealing Basics

**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:** 2,400 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-IDFPS-SE: Sealing Electric

Target Group
Startup engineers, electrical service and application personnel

Course goals
- System overview
- To locate faults in the system
- Reducing downtime to a minimum by rapid error identification
- Ability to commission an IDF system

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: 2,400 EUR/participant

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Prerequisites
- Basic course PG1 of the respective controller generation
- Basic computer skills
- Electro-technical training

Contents
- Occupational health and safety
- Detailed description of the form and function of the data backup
- Working with schematics
- Practical exercises for error detection, systematic troubleshooting using appropriate software (RobView, RobotStudio, terminal program)
- Creating a system
- Loading and executing test programs
- Getting to know the IDF structure, soft and hardware
- Basic settings of the IDF control
- Solving application problems
- Carrying out an IPS software update
- Connections of the application modules in the IRC5 controller
- Swopping components and tuning the system

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

**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**: 1,900 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-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: 1,400 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-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: 1,900 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:** 1,900 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:** 2,600 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 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:** 1,900 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
IRCS 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:** 1,900 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
IRCC5 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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

Contents
- Occupational health and safety
- Producing a system with the Force Control for Machining option with the help of the Graphical User Interface (GUI)
- 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: 4 days
Number of participants: 4 persons
Maximum: 4 persons per training robot
Dates: Subject to agreement
Venue: Training Center in Friedberg / Hessen
Price: 2,400 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 PS-S+EPS: SafeMove and EPS

**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:** 4 days
**Number of participants:** 6 persons
**Maximum:** 3 persons per training robot
**Dates:** Subject to agreement
**Venue:** Training Center in Friedberg / Hessen
**Price:** 2,400 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 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: 2,400 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, synchronized 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:** 2,600 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 basics

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
- This course provides an important basis. For the implementation of own projects, an extensive deeper knowledge is required, accompanied by specific process expert coaching or self-study.

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: 2,600 EUR/participant

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Quotation via Email

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-Online: RobotStudio Online

Target Group
Startup engineers, plant managers, maintenance and service personnel

Course goals
- Use RobotStudio in practice with the robot controller
- This course does not cover CAD programming in RobotStudio

Contents
- Creation and modification of systems, as well as booting systems
- Networking, design and online communication with RobotStudio
- Creating so-called “relationships” between the robot controller and virtual systems (transmission and comparison of data elements)
- I/O configuration
- Creation of virtual duplicates, program editor
- Online tools, “Job” creation
- Online signal analysis

Prerequisites
- Basic course PG1 of the respective controller generation
- 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. Individual refresher course/advanced course
IRC5 PS-RS1: RobotStudio 1

Target Group
- Planners, startup engineers, programmers, plant managers and project managers

Course goals
- Visualising and creating complex tasks for robot control systems using the RobotStudio offline tool
- Programming without direct intervention in the robot (offline)

Contents
- Occupational health and safety
- Installation and licensing issues
- Work surface functions
- Data management and project related structures in RobotStudio
- Integration of geometric data, CAD data formats
- Possibilities for creation of systems and units
- Design of the robot work environment in RobotStudio
- Creation and editing graphic components
- Base frame systems in RobotStudio
- Creation and measurement of tools and work objects
- Bringing movement to graphic objects
- Creating positions and paths
- Check accessibility of positions
- Automatic path generation on curved bodies
- Synchronizing data between the unit and the virtual system
- Integration of the program editor
- Possibilities for simulation, cycle times, collision check and signal analysis
- Recording applications
- Incorporating external axes
- Programming a MultiMove station
- Replication and practical testing on a robot training unit

Prerequisites
- Basic course PG1 of the respective controller 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: 2,150 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. Individual refresher course/advanced course
IRC5 PS-RS2: RobotStudio 2

**Target Group**
Offline programmers, simulation and construction engineers, startup engineers, planners

**Course goals**
- Implementation of simulation tasks for new systems with SmartComponents
- Carry out cycle time investigations
- Optimization and modification of existing systems with RobotStudio

**Contents**
- Features relating to the integration of existing programs into RobotStudio
- Visualization of SafeMove zones
- SmartComponents
- System design with material flow and logic components
- I/O configuration in simulation and control
- Bringing movement to graphic objects
- Screenmaker, for customizing teach pendant screens

**Prerequisites**
- IRC5 PS-RS1: RobotStudio 1
- 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: 2,200 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-X1: 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 work object using coordinated external axes

**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 work objects

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

**Information**
- **Course duration:** 6 days
- **Number of participants:** 3 persons
- **Maximum:** 3 persons per training robot
- **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 PG1: Programming basics 1
2. Application engineering courses as required
3. Special programming as required
4. Individual refresher course/advanced course
IRC5 PS-X2: 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 work object using coordinated external axes
- Functioning of all components and error diagnostics
- Individual course goals can be agreed together with the participants

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 work 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: 1,900 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-X3: Trimming external axes

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

**Course goals**  
- Control intervention and getting to know additional axes  
- Optimized control  
- Evaluation of the quality of control in relation to the automation task

**Contents**  
- Occupational health and safety  
- Fine-tuning servo control by recording the control response  
- Utilizing TuneMaster  
- Displaying and recording control signals

**Prerequisites**  
- IRC5 PS-X2: Configuring external axes  
- Electrical expertise  
- Advanced computer skills

**Information**  
**Course duration:** 2.5 days  
**Number of participants:** 3 persons  
**Maximum:** 3 persons per training robot  
**Dates:** Subject to agreement  
**Venue:** Training Center in Friedberg / Hessen  
**Price:** 1,600 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
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

Quotation via Email
IRC5 individual courses

**Overview of training plan**

<table>
<thead>
<tr>
<th>Standard and individual courses on site</th>
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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

<table>
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<th>Individual courses in the Friedberg Training Center</th>
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<td>Number of days</td>
<td>Price for Monday to Friday</td>
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</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 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:** 1,500 EUR/participant

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**Quotation via Email**

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**Overview of training plan**
1. IRC5P BE-L: Operation
2. Individual refresher course / advanced course
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 work 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: 2,400 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. 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

**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:** 2,500 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-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: 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

Quotation via Email
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:** 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

Quotation via Email
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 on curved bodies
- 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: 2,150 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**: 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**: 2,400 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. **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
- IRC5P PG2-L: Programming basics 2
- IRC5P PS-RS: RobotStudio Paint
- Special programming as required
- Application engineering courses on Painting
- Safety
- Individual refresher course / advanced course
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 work 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: 2,400 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 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

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

**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:** 2,500 EUR / participant

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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. 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)

**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 on curved bodies
- 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:** 2,150 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 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:** 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:** 2,400 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 Paint
5. **Safety**
6. IRC5P PG2-L: Programming basics 2
7. Individual refresher course / advanced course
IRC5P PG2-L: Programming basics 2 – Painting

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

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

**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

**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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**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

**Overview of training plan**
1. IRC5P PG1-L: Programming basics 1
2. Application engineering courses on Painting
3. Special programming as required
4. IRC5 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.
**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:** 1,500 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 52

Target group
Mechanical service personnel

Course goals
– Rapid diagnosis of the cause of the error can minimize 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: 2,000 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 5400-12

**Target group**
Mechanical service personnel

**Course goals**
- Rapid diagnosis of the cause of the error can minimize 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:** 2,500 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 5500

**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

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

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**Overview of training plan**
1. IRC5P BE-L: Operation
2. Mechanics courses
3. Individual refresher course / advanced course

**Course goals**
- Rapid diagnosis of the cause of the error can minimize 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
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 work 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:** 2,400 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
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 minimize 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 recognize 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: 2,650 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
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:** 2,500 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
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:** 1,900 EUR/participant

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**Quotation via Email**

**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.
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:** 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:** 2,400 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
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 work 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: 2,400 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. 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:** 2,500 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

**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**: 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
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: 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
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 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 on curved bodies
- 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: 2,150 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**
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**Overview of training plan**
1. IRC5P: Introductory course
**IRC5P individual courses**

### Standard and individual courses on site

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<th>Price for Saturday / Sunday</th>
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<td>EUR 3,675</td>
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<td>EUR 4,900</td>
<td>EUR 7,350</td>
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<tr>
<td>5</td>
<td>EUR 12,250</td>
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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

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<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 2,450</td>
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</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: 1,300 EUR/participant

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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
- Testing measuring system
- Measuring tool and work 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:* 2,050 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. Individual refresher course / advanced course

**Quotation via Email**
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
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
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
- Testing measuring system
- Measuring tool and work 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:** 2,050 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
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
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+ 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: 2,150 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
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
- Testing measuring system
- Measuring tool and work 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:** 2,050 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
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
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+ 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:** 2,150 EUR/participant

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**Quotation via Email**

**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. 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+
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

Mechanics courses

Individual refresher course / advanced course
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: 1,300 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 minimize 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: 2,000 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
- S4C+ SE: Electrical equipment course
- Application engineering courses as required
- Special programming as required
- 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
- Testing measuring system
- Measuring tool and work 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: 2,050 EUR/participant

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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
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 minimize 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 recognize 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:** 2,500 EUR/participant

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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
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
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
- Testing measuring system
- Measuring tool and work 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: 2,050 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. 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
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
# Individual courses

## Overview of training plan

### Standard and individual courses on site

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<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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<tr>
<td>5</td>
<td>EUR 11,500</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 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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<tr>
<td>5</td>
<td>EUR 11,500</td>
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</tr>
</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

Individual refresher course/advanced course
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: 1,500 EUR/participant

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Quotation via Email

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

Application engineering courses on Painting

Special programming as required

Individual refresher course/advanced course

Overview of courses
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 work 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: 2,400 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. 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

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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
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
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

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 work 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: 2,400 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
S4P+ APT-L-IPS: Painting – Integrated Prozess System

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 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

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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

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

Quotation via Email
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
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
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: 2,500 EUR / participant

**Contact**
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roboterservice.schulung@de.abb.com

**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 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**: 1,500 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
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 minimize 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:** 2,500 EUR/participant

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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 work 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: 2,400 EUR/participant

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Quotation via Email

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 minimize 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 recognize 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:** 2,650 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

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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
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

Application engineering courses on Painting

Special programming as required

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

**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 work 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:** 2,400 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. 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

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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
## Individual courses

### Overview of training plan

#### Standard and individual courses on site

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<th>Number of days</th>
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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 in the Friedberg Training Center

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<th>Number of days</th>
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### Courses

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### Painting robot IRC5P

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<td>IRC5P APT-L-KA: Painting – Conventional application</td>
<td>3</td>
<td>2,100</td>
</tr>
</tbody>
</table>

### Courses (continued)

<table>
<thead>
<tr>
<th>Courses</th>
<th>Duration (days)</th>
<th>Price (Euro)</th>
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<tbody>
<tr>
<td>IRC5P PS-RS: RobotStudio Paint</td>
<td>5</td>
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<tr>
<td>IRC5P MachineSafety</td>
<td>4</td>
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</tr>
<tr>
<td>IRC5P SE-L: Electrical appliances</td>
<td>5</td>
<td>2,650</td>
</tr>
<tr>
<td>IRC5P SD: Fault and Diagnostics</td>
<td>3</td>
<td>1,900</td>
</tr>
<tr>
<td>IRC5P ME 52: Mechanics</td>
<td>3</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>IRC5P Individual</td>
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</table>

### Industrial robot S4C+

<table>
<thead>
<tr>
<th>Courses</th>
<th>Duration (days)</th>
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</thead>
<tbody>
<tr>
<td>S4C+ BE: Operating</td>
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<tr>
<td>S4C + PG1: Programming basics 1</td>
<td>5</td>
<td>2,050</td>
</tr>
<tr>
<td>S4C + PG2: Programming basics 2</td>
<td>5</td>
<td>2,150</td>
</tr>
<tr>
<td>S4C+ SE Electrical appliances course</td>
<td>5</td>
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</tr>
<tr>
<td>S4C+ ME 4400: Mechanics</td>
<td>3</td>
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</tr>
<tr>
<td>S4C+ Individual</td>
<td>1</td>
<td>2,300</td>
</tr>
<tr>
<td>Courses</td>
<td>Duration (days)</td>
<td>Price (Euro)</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
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<td>--------------</td>
</tr>
<tr>
<td>Painting robot S4P+</td>
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<td></td>
</tr>
<tr>
<td>S4P BE-L: Operating painting</td>
<td>3</td>
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</tr>
<tr>
<td>S4P+ PG1-L: Programming basics 1 painting</td>
<td>5</td>
<td>2,400</td>
</tr>
<tr>
<td>S4P+ PG2-L: Programming basics 2 painting</td>
<td>5</td>
<td>2,500</td>
</tr>
<tr>
<td>S4P+ APT-L-IPS: Painting – Integrated Process System</td>
<td>5</td>
<td>2,900</td>
</tr>
<tr>
<td>S4P+ SE-L: Electrical appliances</td>
<td>5</td>
<td>2,650</td>
</tr>
<tr>
<td>S4P+ ME 5400: Mechanics</td>
<td>4</td>
<td>2,500</td>
</tr>
<tr>
<td>S4P+ Individual</td>
<td>1</td>
<td>2,450</td>
</tr>
</tbody>
</table>
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 aforemen-
tioned 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 sys-
tems. In this context, liability is excluded for consequential damages as a re-
sult 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 reim-
burse 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 reproduc-
tion of the accompanying materials or parts thereof. These may not be repro-
duced, 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 issu-
ance 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 direct-
ly 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 con-
stitute 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.
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.