



# **b+m Training**

## **Maintenance**



## Welcome to the training center of b+m...

Robots are our passion – yours as well?

Do you want to stay up-to-date with the latest technology and expand your present knowledge through further education and training? Do you want to be an important part of your company and be able to assist your colleagues and supervisors with help and advice?

Then you have come to the right place!

For over 20 years, we have successfully provided training on various topics in the field of painting technology, with the program always adapted to the latest technology. Our experienced instructors are real practitioners from the company, so that adequate expertise and enhanced product knowledge is actively passed on to the students.

On the following pages you will find our extensive training program for programming and maintenance of our robots.

Take a look and talk to us – we are happy to create an individual training package for you from our extensive range.

Your benefits:

- Small learning groups
- Time for individual questions and solution strategies
- Extensive practical training directly on the robot

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<b>Contact:</b>	training@bm-systems.com
<b>Training types:</b>	Basic courses Advanced courses Intensive courses
<b>Number of participants:</b>	Maximal 4 persons
<b>Training site:</b>	b+m training center
<b>Costs:</b>	On demand

## Operating the Robot

### Training goal

With active participation, the trainees will learn to turn on and start the robot system, how the system works and to recognize and fix simple faults.

### Target group

This course is intended for system operators, system managers, maintenance personnel, project managers and plant managers.

<b>Course:</b>	T1-T2-BR
<b>Training type:</b>	Basic course
<b>Duration:</b>	2 days
<b>Number of participants:</b>	Maximal 4 persons
<b>Training site:</b>	b+m training center
<b>Prior knowledge:</b>	None

### Contents

- **Work Safety**  
Emergency stop and protection monitoring
- **Structure and Function**  
Summarized description of all components
- **Operation and Monitoring**  
Operation on control cabinet and teach pendant,  
Axis and space monitoring,  
Bearing and checking the “0”-position
- **User Interface**  
Menu structure, overview of the most important functions,  
Basics of robot movement,  
Program playback (manual and automatic mode),  
Manual control of external signals
- **Faults, Error Messages, Information**  
Reaction after a crash or emergency stop,  
Recognize/fix warning and error messages

## Electrical Maintenance

### Training goal

With active participation, the trainees will learn to maintain the system properly, to detect errors, to analyze and replace defective parts professionally.

### Target group

This course is intended for maintenance personnel with basic electrical training.

<b>Course:</b>	T1-T2-WE
<b>Training type:</b>	Advanced course
<b>Duration:</b>	1 day
<b>Number of participants:</b>	Maximal 4 persons
<b>Training site:</b>	b+m training center
<b>Prior knowledge:</b>	Training: Operating the Robot

### Contents

- **Electrical Design of the Manipulator**  
Servomotors,  
Purge unit
- **Control Cabinet Design and Function Description of the Components**  
Robot control,  
Axis amplifier and power unit,  
Safety control,  
Communication interface
- **Maintenance Work**  
Robot control,  
Axis amplifier and power unit,  
Control cabinet fan,  
Mastering (zeroing) of the axes
- **Troubleshooting and Repair**  
Error localization,  
Documentation,  
Practical exercises and training
- **Exchanging the Electrical Components and Commissioning**  
Exchanging the robot control and commissioning,  
Exchanging the axis amplifier and power unit and commissioning,  
Exchanging the safety control and commissioning

## Mechanical Maintenance

### Training goal

With active participation, the trainees will learn to maintain the system properly, to detect errors, to analyze and replace defective parts professionally.

### Target group

This course is intended for maintenance personnel with basic mechanical training.

<b>Course:</b>	T1-T2-WM
<b>Training type:</b>	Advanced course
<b>Duration:</b>	2 days
<b>Number of participants:</b>	Maximal 4 persons
<b>Training site:</b>	b+m training center
<b>Prior knowledge:</b>	Training: Operating the Robot

### Contents

- Mechanical Structure of the Painting Robot**  
 Explanation of the maintenance plan,  
 Activities in maintenance 1 and 2 of  
 the mechanical system
- Maintenance of the Mechanical System**  
 General information,  
 Recommended lubricants,  
 Fill volumes,  
 Lubricating points
- Information for Individual Maintenance Jobs**  
 Checking the cable routing, cable connections,  
 and pneumatic connections,  
 Changing the grease of the gears of axes 1, 2 and 3,  
 Changing the grease of the gears of the hand axes,  
 Regreasing the wrist
- Troubleshooting**  
 “0”-position – function/meaning/checking,  
 Diagnosis of gear wear

## Mechanics Intensive Course

### Training goal

With active participation, the trainees will learn specialized replacement of defective parts.

### Target group

This course is intended for maintenance personnel with basic mechanical training.

<b>Course:</b>	T1-T2-WM intensive
<b>Training type:</b>	Intensive course
<b>Duration:</b>	5 days
<b>Number of participants:</b>	Maximal 4 persons
<b>Training site:</b>	b+m training center
<b>Prior knowledge:</b>	Training: Operating the Robot and Mechanical Maintenance
<b>Recommended:</b>	Adequate work and protective clothing

## Contents

### ■ Mechanical Structure of the Drive Units of the Painting Robot

General information about the robot mechanics,  
Structure and function of the drive components,  
Bearing/gearbox/shaft seals,  
Proper use of the required lubricants,  
Compliance with the sealing concept

### ■ Replacing the Drive Components

Basic procedure when replacing the drive components,  
Bearing/gearbox/shaft seals,  
Compliance with the load limits of the individual components during replacement,  
Required special tools and their most effective applications,  
Recommended tools,  
Personal safety during service work

### ■ Troubleshooting

Recognizing and eliminating negative influencing factors from the outside,  
Eliminating and detecting leaks and their sources,  
Diagnosing wear on the gearbox,  
Diagnosing bearings to be replaced

The content of this training enables trained personnel to replace defective drive components. Beyond the simple maintenance, this course will focus on the main axes that require special knowledge to replace. In addition to the theoretical part, the learned knowledge is directly translated into a practical part. The training participants learn to replace defective components of robot mechanics under "real" conditions. At the same time, the use of the required tools is taught under expert guidance in our training center. A training robot is available for this, on which these contents can be shown in a practical way, or directly implemented by the training participants themselves during the training.

## Maintenance Combined Training

### Training goal

With active participation, the trainees will learn to maintain the system properly, to recognize and analyze errors and replace defective parts professionally.

### Target group

This course is intended for system operators, system managers, maintenance personnel, project managers and job managers.

<b>Course:</b>	T1-T2-BR+WE+WM
<b>Training type:</b>	Basic course
<b>Duration:</b>	5 days
<b>Number of participants:</b>	Maximal 4 persons
<b>Training site:</b>	b+m training center
<b>Prior knowledge:</b>	None

### Contents

- Operating the Robot**  
 Work safety,  
 Structure and function,  
 Operation and monitoring,  
 User interface,  
 Faults, error messages, information
- Electrical Maintenance**  
 Structure of Manipulator E- equipment,  
 Control cabinet structure and functional description of the components,  
 Maintenance work,  
 Troubleshooting and repair,  
 Replacement of the electrical components and commissioning
- Mechanical Maintenance**  
 Mechanical design of the painting robots,  
 Maintenance of the mechanical system,  
 Information for the individual maintenance work,  
 Troubleshooting





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