



LEADING IN PRODUCTION EFFICIENCY

# Ecopaint Training – 培训课程



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尊敬的客户：

我们诚挚地通知您，杜尔公司本土最先进的培训中心已在青浦杜尔厂区落成。

今后，我们可以在中国为您提供杜尔全球标准化的专业课程。

这本手册向您介绍我们标准的培训课程。如果您有任何需求未在其中——例如：RP6/7旧款机器人的培训，涂胶机器人及应用，喷涂或工艺等等，我们将为您量身定制培训。

如果您有任何要求、问题或意见，请随时与我们联系。

杜尔新培训中心欢迎您的到来！

Dear customers,

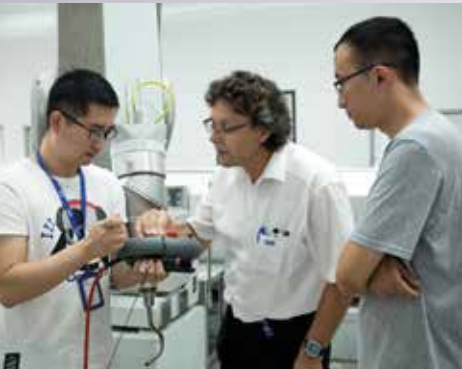
We are very pleased to inform you about the opening of our local state-of-the-art Training Center on our new Dürr Campus in Qingpu, Shanghai.

From now on we are able to offer you professional training courses according to global Dürr standards here in China.

In this booklet we would like to introduce our standard training courses. If you have any demands that you cannot find in here – e.g. training on old robot generation RP6/7, sealing robots and application, paint or sealing process, etc. – we are happy to offer you a customized training course according to your needs.

Please feel free to contact us if you have any requests, questions or comments.

We look forward to welcoming you in our new Training Center!



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# 电气维修保养

## EcoRP E/L

### 课程对象

维修人员

### 课程目标

系统电气设计的概述。学员可对系统主要组件进行错误分析并更换, 设定元件参数。学员可进行预防性保养, 独立装配, 用示教器定位机器人。

### 参加培训条件

接受过电气专业培训的人员或者有长期从事经验的人员

### 课程结构

理论介绍之后, 由教师指导进行培训模块实操。计算机的配置以及诊断软件和培训机器人。

### 课程内容

- » 工作流程图解说
- » 系统界面概述
- » 系统操作及安全相关方面
- » 电路图设计
- » 机器人控制器硬件软件维修保养
- » 通过cfg编辑器或者EcoScreen 3D-OnSite中的辅助工具进行工艺配置
- » EcoScreen操作及监控功能
- » EcoDrive系统的设计, 功能及维修保养
- » 机器人轴调零
- » 电缆更换
- » 阀系统的设计, 功能以及维修保养, 通过测试装置进行故障排除
- » 控制管路中的空气流量, 空气压力和转速的设计, 功能以及故障排除
- » Ex-Purge系统的设计, 功能以及配置
- » 输入/输出组件的设计及功能
- » 高压系统的设计, 功能及设定
- » 系统中使用的传感器的设计以及故障排除。使用专门的测试装置
- » 在EcoScreen3D-OnSite中通过备份服务进行数据备份
- » 概述: 示教器菜单, 移动机器人, 开启现有程序以及用户页面完成维修任务



课程时长: 5天  
每人价格 (净价): CNY 11,000  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

杜尔涂装系统工程(上海)有限公司  
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# ELECTRICAL MAINTENANCE

## EcoRP E/L



### Target group

Maintenance personnel

### Course objective

You will receive an overview of the electrical design of the system. You carry out a fault analysis on the system's main subassemblies and can replace and parameterize the components. We show you how to master the preventive maintenance intervals of the individual assemblies and position the robot independently by means of a teach pendant.

### Admission requirements

Expert training in the area of electrical equipment or comparable long-term work experience.

### Course structure

After a theoretical introduction you will work under the instruction of a trainer on special training models, as well as PCs with configuration and diagnosis software and training robots.

### Course contents

- » Explanation of the process workflows
- » Interface overview of the system
- » System operation and safety-related aspects
- » Design of the wiring diagrams
- » Maintenance, hardware and software of the **EcoRPC** robot controller
- » Process configuration via cfg-editor and additional tools in **EcoScreen 3D-OnSite**
- » **EcoScreen** operating and monitoring functions
- » Design, function and maintenance of **EcoDrive** systems
- » Mastering robot axes
- » Cable replacement
- » Design, function and maintenance of the valve system, troubleshooting by means of a testing device
- » Design, function and troubleshooting for the control circuits of air volume, air pressure and turbine speed
- » Design, function and configuration of the Ex-Purge system
- » Design and function of the input/output subassemblies
- » Design, function and settings on the high-voltage system
- » Design and troubleshooting for the sensors used in the system, with special testing devices
- » Data backup via the backup service in **EcoScreen 3D-OnSite**
- » Overview of the teach pendant menus, moving robots, starting existing programs and user pages for maintenance tasks

Course length: 5 days

Price per person (net): CNY 11,000

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

Dürr Paintshop Systems  
Engineering (Shanghai) Co.,Ltd  
No. 665 Yingshun Road, Qingpu  
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# 机械维修保养

## EcoRP E033/L033

### 课程对象

维修人员

### 课程目标

通过培训使学员掌握机器人重要机械维修工作。培训讲授示教器驱动和操作机器人的原理。

### 参加培训条件

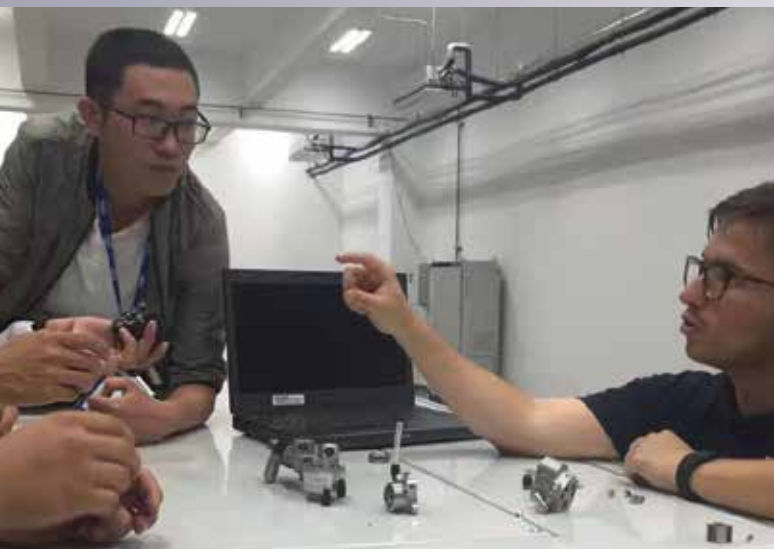
接受过机械专业培训的人员或者有长期从事经验的人员

### 课程结构

理论讲解之后,学员将在培训用机器人上进行实操,并使用专用工具。

### 课程内容

- » 喷涂机器人的设计和功能
- » 维修和保养工作的安全相关方面
- » 保护装置
- » 掌握刹车释放装置
- » 机器人运动部件的维修工作
  - » 1-6轴电机的更换
  - » 1轴驱动单元的更换
  - » 所有齿轮润滑油的更换
  - » 2,3轴传动装置的更换
  - » 更换4,5,6轴齿轮箱
  - » 更换4,5,6轴驱动轴
  - » 更换手轴
  - » 手轴内保护软管的更换
- » 运行前的测量
- » 检查操作安全
- » 轴驱动调零
- » 更换电线及软管
- » 手持式编程器的基本操作功能
- » 操作台上操作模式的选择
- » (用示教器或通过目视化) 运行机器人到固定位置



课程时长: 2天  
每人价格 (净价): CNY 4,400  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

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# MECHANICAL MAINTENANCE

## EcoRP E033/L033



### Target group

Maintenance personnel

### Course objective

In this course you learn how to service mechanical elements of robots, and we show you the principles for driving and operating the robot with the teach pendant.

### Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

### Course structure

After a theoretical introduction, you will work on training robots. Using the special tools intended for these tasks.

### Course contents

- » Design and function of the paint robot
- » Safety-related aspects for maintenance and servicing work
- » Protective gear
- » Handling the brake release device
- » Servicing work on the robot kinematics
  - » Replacing the motors of axes 1-6
  - » Replacing the drive unit of axis 1
  - » Oil change on all gears
  - » Replacing the gears on axes 2 and 3
  - » Replacing the planetary offset gears of axes 4, 5 and 6
  - » Replacing the drive shafts of axes 4, 5 and 6
  - » Replacing the hand axis
  - » Replacing the flexible protective conduit of the hand axis
- » Measures before recommissioning
  - » Checking operational safety
  - » Mastering the axis drives
- » Principles of replacing cables and hoses
- » Basic operating functions on the hand-held programmer
- » Operating mode selection on operator panel
- » Driving the robot into fixed positions (with teach pendant and via visual display)

Course length: 2 days

Price per person (net): CNY 4,400

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

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# 机械维修保养

## EcoRP E133/L133

### 课程对象

维修人员

### 课程目标

通过培训使学员掌握机器人重要机械维修工作。  
培训讲授示教器驱动和操作机器人的原理。

### 参加培训条件

接受过机械专业培训的人员或者有长期从事经验的人员

### 课程结构

理论讲解之后,学员将在培训用机器人上进行实操,  
并使用专用工具。

### 课程内容

- » 喷涂机器人的设计和功能
- » 维修保养工作的安全相关方面
- » 防护装置
- » 掌握刹车释放器
- » 机器人运动部件的维修工作
  - » 1-6轴电机更换
  - » 更换1轴驱动单元
  - » 更换各种齿轮润滑油
  - » 2,3轴传动装置更换
  - » 更换4,5,6轴齿轮箱
  - » 更换手轴
  - » 更换手轴的防护软管
  - » 更换7轴斜齿轮及驱动大齿轮
  - » 更换7轴导向滑块
- » 运作之前的测量
  - » 检查操作安全性
  - » 手轴调零
- » 更换电线及软管的原则
- » 示教器上基本的操作功能
- » 操作台上操作模式的选择
- » 将机器人运动到固定位置。(通过示教器和目视化)
- » 7轴中央润滑系统的功能,维修以及参数设定



课程时长: 3天  
每人价格 (净价): CNY 6,600  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

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# MECHANICAL MAINTENANCE

## EcoRP E133/L133



### Target group

Maintenance personnel

### Course objective

In this course you learn how to service mechanical equipment of robots, and we show you principles for driving and operating the robot with the teach pendant.

### Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

### Course structure

After a theoretical introduction, you will work on training robots using the special tools provided for this work.

### Course contents

- » Design and function of the paint robot
- » Safety-related aspects for maintenance and servicing work
- » Protective gear
- » Handling the brake release device
- » Servicing work on the robot kinematics
  - » Replacing the motors of axes 1-6
  - » Replacing the drive unit of axis 1
  - » Oil change on all gears
  - » Replacing the gears of axes 2 and 3
  - » Replacing the planetary offset gearbox of axes 4, 5 and 6
  - » Replacing the drive shaft of axes 4, 5 and 6
  - » Replacing the hand axis
  - » Replacing the protective hose of the hand axis
  - » Replacing the angular gear and drive gearwheel of axis 7
  - » Replacing the guide carriages of axis 7
- » Measures before recommissioning
  - » Checking operational safety
  - » Mastering the axis drives
- » Principles of replacing cables and hoses
- » Basic operating functions on the teach pendant
- » Operating mode selection on operator panel
- » Driving the robot into fixed positions (with teach pendant and via visual display)
- » Function, servicing and parameterization of the central lubricating system of axis 7

Course length: 3 days

Price per person (net): CNY 6,600

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

Dürr Paintshop Systems  
Engineering (Shanghai) Co.,Ltd  
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# 机械维修保养

## EcoRP L030

### 课程对象

维修人员

### 课程目标

通过培训使学员掌握机器人重要机械维修工作。培训讲授示教器驱动和操作机器人的原理。

### 参加培训条件

接受过机械专业培训的人员或者有长期从事经验的人员

### 课程结构

理论讲解之后,学员将在培训用机器人上进行实操,并使用专用工具。

### 课程内容

- » 钩子机器人的设计及功能
- » 维修保养工作的安全相关方面
- » 保护装置
- » 掌握刹车释放装置
- » 机器人运动部件的维修工作
  - » 1-3轴电机更换
  - » 1,2轴锥齿轮的更换(理论)
  - » 1,2轴摆线齿轮的更换(理论)
  - » 更换Z轴斜齿轮
  - » 更换Z轴丝杆齿轮单元
- » 运行前的测量
  - » 检查操作安全性
  - » 轴电机校准



课程时长: 1天  
每人价格(净价): CNY 2,200  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

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# MECHANICAL MAINTENANCE

## EcoRP L030



### Course contents

- » Design and function of the handling robot
- » Safety-related aspects for maintenance and servicing work
- » Protective gear
- » Handling the brake release device
- » Servicing work on the kinematic equipment of robots
  - » Replacing the motors of axes 1-3
  - » Replacing the bevel gears of axes 1 and 2 (theory)
  - » Replacing the cycloid gears of axes 1 and 2 (theory)
  - » Replacing the angular gear of axis Z
  - » Replacing the spindle gear unit of axis Z
- » Measures before recommissioning
  - » Checking operational safety
  - » Mastering the axis drives

### Target group

Maintenance personnel

### Course objective

In this course you learn how to service mechanical elements of robots, and we show you the principles for driving and operating the robot with the teach pendant.

### Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience.

### Course structure

After a theoretical introduction, you will work under instruction on training robots. You will use the special tools provided for this work.

Course length: 1 day

Price per person (net): CNY 2,200

Minimum number of participants: 4

Maximum number of participants: 6

#### CONTACT

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# 基础课程

## 示教程序/EcoScreen 3D-OnSite

### 课程对象

机器人程序员, 系统操作者, 维修人员

### 课程目标

机器人控制器的基本设计及其与整个系统的结合, 不同的坐标系对于示教程序是非常重要的。学员还可以掌握用示教器运行杜尔机器人, 编写简单的动作程序以及修改现有的程序。掌握重要的编程指令语言 EcoTalk 及其语句语序, 熟悉 3D-OnSite 的重要功能, 离线编程系统。

### 参加培训条件

对编程和自动化基础知识感兴趣的人员

### 课程结构

机器人工艺(机械设备和示教器控制)安全方面概述之后, 学员将在讲师的指导下进行实操。

### 课程内容

- » 介绍
  - » 喷涂机器人的机械设计以及电气设备
  - » 机器人控制器与整体系统的整合, 以及与其他控制器的通讯
- » 编程练习
  - » 站内操作模式的选择
  - » 坐标系及其含义
  - » 示教器的各项操作功能
  - » 基础机器人编程
  - » 编程语言 EcoTalk 的语序及指令范围
  - » 轨迹影响重叠和SPM
  - » 设计主次程序
  - » 结合生产实践中选取的程序示例分析现有程序
  - » 在培训机器人上独立创建主次程序
- » EcoScreen 3D-OnSite
  - » 概述 EcoScreen 3D-OnSite 的结构菜单与功能
  - » 创建, 复制, 插入以及删除项目和程序
  - » 机器人程序的图表编辑
  - » 讲解3D 图表窗口的编辑功能
  - » 装载以及编辑车身数模
  - » 插入及编辑开枪点指令
  - » 讲解刷子概念及刷子编辑
  - » 备份功能和更改日志



课程时长: 5天  
每人价格(净价): CNY 11,000  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

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# BASIC COURSE

## Teach programming/EcoScreen 3D-OnSite



### Target group

Robot programmers, system operators, maintenance personnel, process engineers

### Course objective

You will get to know the fundamental design of the robot controller and integration into the entire system as well as the different coordinate systems that are important for teach programming. You learn how to move Dürr robots with the aid of the teach pendant, writing simple movement programs and modifying existing programs. Further topics are: the syntax and most important commands of the programming language **EcoTalk** and the most important functions of 3D-OnSite, the offline programming system.

### Admission requirements

Interest in programming and basic knowledge of automation.

### Course structure

After a brief introduction of the robot technology and safety-related instructions, you will work on a training robot under the instruction of a trainer.

### Course contents

- » Introduction
  - » Mechanical design and electrical equipment of the **Ecopaint** robot
  - » Integrating the robot controller into the entire system; communication with other controllers
- » Programming practice
  - » Selecting the operating modes on the station
  - » Coordinate systems and their meaning
  - » Functions and operating elements of the teach pendant
  - » Basics of robot programming
  - » Syntax and range of commands of the programming language **EcoTalk**
  - » Route influence Overlap and SPM
  - » Design of main and subprograms
  - » Analysis of existing programs from production practice, based on selected program examples
  - » Creation and integration of own main and subprograms on training robots
- » **EcoScreen 3D-OnSite**
  - » Overview of functions and menu structure of **EcoScreen 3D-OnSite**
  - » Creating, copying, inserting and deleting of projects and programs
  - » Graphic editing of existing robot programs
  - » Explanation of the editing function of the 3D graphic window
  - » Loading and editing body graphic
  - » Inserting and editing trigger commands
  - » Explaining the brush concept and brush editor
  - » Backup function and change journal

Course length: 5 days

Price per person (net): CNY 11,000

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

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# 高级课程

## 示教程序/EcoScreen 3D-OnSite “钩子/跟踪”

### 课程对象

机器人程序员, 维修及操作人员

### 课程目标

学员将了解必要的校准工具及对象并重建程序。理解程序中的逻辑结构并理解机器人之间的连锁。你会知道这些变量的不同等级并进行评定。了解到指令使用, 以及相关参数的设定。通过培训学习到 EcoTalk 功能原理。

### 参加培训条件

参加过基础编程课程或同等知识水平

### 课程结构

学员可以用示教器或 3D-OnSite 进行编程。在培训系统中可以对跟踪模式进行测试并优化程序。

### 课程内容

- » 校准
  - » 在世界系统中校准车身
  - » 校准工具
- » 编程练习
  - » 编程逻辑结构
  - » 在不同层级创建并使用变量
  - » 走停模式和跟踪模式下的防碰撞连锁
- » 钩子(根据实际情况备选)
  - » 在主程序中整合钩子的通讯
  - » 力度传感器系统的硬件以及功能原理
  - » 钩子在 EcoTalk 程序语言中的命令的特殊范围
  - » 讲解目视化和示教器上的特殊的钩子的菜单
  - » 对实际生产中的实例进行分析
  - » 在培训系统中对程序进行测试和优化
  - » 通过 EcoScreen 3D-OnSite 进行优化的可能性和局限性
- » 跟踪模式(根据实际情况备选)
  - » 对象与输送同步
  - » 对跟踪线上的模块进行编程和优化
  - » 将跟踪系统参数化
- » 模拟
  - » 设置, 实施, 评估机器人的模拟(检查可达性, 奇异点, 手轴角度)
- » 工艺
  - » 讲解刷子表和时间程序
  - » 工艺参数



课程时长: 5/8天  
每人价格(净价): CNY 22,000/35,200  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

杜尔涂装系统工程(上海)有限公司  
中国上海市青浦工业园区  
盈顺路665号, 201799  
电话: +86 21 3979 1489  
Email: china.training@durr.com.cn

# ADVANCED COURSE

## Teach programming/EcoScreen 3D-OnSite “Handling/Tracking”



### Target group

Robot programmers, specialized maintenance and operating personnel.

### Course objective

You will understand the necessity of calibrating tools and objects and will be able to reproduce the relevant procedures. We will teach you how to interpret logical structures in the programs and understand interlocking between the individual robots. As well as the different declaration levels of the variables and how to assess them. You will learn the necessary commands, their use, and the procedure when determining the relevant parameters and be informed about specific commands of **EcoTalk**, their application and meaning as well as the functioning principle.

### Admission requirements

Participation in the basic course in teach programming or comparable knowledge.

### Course structure

You will program with the teach pendant and with **EcoScreen 3D-OnSite**. You will test and optimize the programs on the training equipment.

### Course contents

- » Calibration
  - » Calibration of objects (car body) to world system
  - » Calibration of tools
- » Programming practice
  - » Programming the logic structures
  - » Creating/using variables at different declaration levels
  - » Anti-collision interlocking on Stop & Go and rail tracking lines
- » Handling
  - » Integrating the handler communication in main programs
  - » Hardware and functioning principle of the force sensor system
  - » Handler-specific range of commands of the **EcoTalk** programming language
  - » Explanation of the specific handling menus on the teach pendant and the visualization
  - » Analysis of selected examples from production practice
  - » Testing and optimizing programs on the training system
  - » Possibilities and limits of optimization via **EcoScreen 3D-OnSite**
- » Tracking
  - » Synchronizing the object to the conveyor
  - » Programming and optimizing the modules on the tracking line
  - » Parameterization of the tracking system
- » Simulation
  - » Setting up, carrying out and evaluating the robot simulation (checking reachability, singularity, hand axis angle)
- » Process
  - » Explanation of brush tables and time programs
  - » Parametrization of the process

Course length: 5/8 days

Price per person (net): CNY 22,000/35,000

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

Dürr Paintshop Systems  
Engineering (Shanghai) Co.,Ltd  
No. 665 Yingshun Road, Qingpu  
Industrial Park, Shanghai 201799  
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# 车间操作

## 根据特殊需求定制

### 培训对象

操作人员, 维修人员, 工艺工程师, 机器人编程人员

### 课程目标

操作机器人站。课程内容可根据培训对象和实操需求进行自定义。

### 参加培训条件

具备喷涂/涂胶, 操作自动化设备的知识

### 课程结构

理论介绍之后, 进行培训机器人实操。使用专用工具。

### 课程内容

- » 向客户介绍特殊的安装
  - » 涂装车间的建设和功能
  - » 结合布局图和雾化器图讲解工艺步骤
  - » 机器人区域的机械建设
  - » 介绍不同喷涂元件的作用
  - » 涂装车间的安全盒清洁方面的介绍机
  - » EcoDocu

- » 机器人操作
  - » 示教器菜单以及示教器操作机器人
  - » 操作模式
  - » 进入站内之前的步骤
  - » 在 EcoScreen 或用示教器将机器人运行到固定位置
  - » 机器人防护罩
- » 站的操作
  - » EcoScreen 的操作, 维修及保养
  - » 坐标系(世界和轴)
  - » 阀的功能以及工艺控制
  - » 报警, 统计数据及数据库的备份
  - » 刹车测试和研磨
  - » 重启RPC
  - » PLC和RPC的 先进先出原则(FIFO)
  - » 管理生产和报警协议

### 针对参数的5天课程样板

- » 通过 EcoScreen/3D-OnSite 设定参数
- » 3D-OnSite 功能和结构
- » 3D-OnSite 序的操作与特性以及3D图像编辑器
- » 刷子概念的讲解
- » 刷子表的参数设定和管理
- » 3D-OnSite配置编辑器
- » 运用3D-OnSite时间程序编辑器设定时间程序参数
- » 时间程序监控, 换色分配表, 车身分配表, 油漆更改分配表
- » Overrides的使用
- » 工具, 机器人和工件的校准
- » 数据管理器和更改日志
- » 运用备份功能进行数据存储和恢复
- » 模拟(Ghost)
- » 如何处理系统报错



课程时长: 2.5/5天

每人价格(净价): CNY 5,500/11,000

最少参加人数: 4

最多参加人数: 6

### 联系我们

杜尔涂装系统工程(上海)有限公司  
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# PLANT OPERATION

## Tailored to individual demand

### Target group

Plant operators, maintenance personnel, process engineers, robot programmers

### Course objective

In this course we teach you how to operate a robot station. The course contents can be customized according to target group and participants' needs.

### Admission requirements

Knowledge of paint/sealing application, knowledge of handling automatized production equipment.

### Course structure

After a theoretical introduction, you will work under instruction on training robots. You will use the special tools provided for this work.

### Course contents

- » Introduction to the customer specific installation
  - » Construction and function of the paint shop
  - » Explanation of the process steps with layouts and atomizer schemes
  - » Mechanical construction of the robot zones
  - » Introduction and function of the different application components
  - » Safety and cleaning aspects in the paint shop
  - » **EcoDocu**
- » Robot operation
  - » Menu structure and operating the robot with the Teach pendant
  - » Operation modes
  - » Procedure before entering the station
  - » Fix positions with **EcoScreen** and Teach pendant
  - » Robot protective cover

- » Station operation
  - » Operating, service and maintenance functions in **EcoScreen**
  - » Coordinate systems (World and Axes)
  - » Valve functions and process control
  - » Backup of the alarm logs and statistical data
  - » Brake test and loop in of the brake
  - » Reboot of **EcoRPC**
  - » First in First out principle (FiFo) of PLC und RPC
  - » Managing the production and alarm protocol

Example of a 5 day course focused on parametrization:

- » Parametrization with **EcoScreen/3D-OnSite**
  - » Functions und structure of 3D-OnSite
  - » Handling and features of the 3D-OnSite and 3D-graphic editor
  - » Explanation of the brush concept
  - » Parametrization and managing of the brush table
  - » 3D-OnSite Configuration Editor
  - » Parameterize time programs with the 3D-OnSite time program editor
  - » Time program monitoring, color change assignment, body assignment, paint change assignment.
  - » Calibration of tool, robot and object
  - » Database manager and change logs
  - » Data storage and restore with the Backup-Service
  - » Simulation (Ghost)
  - » How to handle system errors

Course length: 2.5/5 days

Price per person (net): CNY 5,500/11,000

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

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# 维修保养

## 换色模块 EcoLCC2

### 课程对象

机械电气维修人员和喷涂操作者, 以及对工艺感兴趣的员工

### 课程目标

通过课程培训, 您将获得关于换色阀设计和功能以及操作和参数设定的综合介绍。课程针对维护保养, 潜在问题解决进行讲解, 并在模块上进行展示。

### 参加培训条件

接受过机械电气专业培训的人员或者有长期从事经验的人员

### 课程结构

在进行完设计功能以及工作流程讲解之后, 您将根据指导使用杜尔专用工具对换色阀进行维修和保养。目视化软件 EcoScreen 3D-OnSite 用于操作及编程功能。

### 课程内容

- » 设计和功能
  - » 换色阀供漆
  - » 滑块功能
  - » 定位及轨迹测量
- » 工艺流程
  - » 课题雾化器讲解
  - » 阀的设计和功
  - » 手动模式下进行控制功能和时间程序
- » 操作
  - » 操作中检查
  - » 设定冲洗介质和压缩空气的参数
  - » 故障诊断及问题排除
  - » 调整漆压调节器
- » 维修保养
  - » 进行清洁及维修保养工作
  - » 换色滑块的维修工作
  - » 线性驱动的维修工作
  - » 系统参考点设定
- » EcoScreen
  - » 概述以及界面操作
  - » 解决故障信息
- » 利用 EcoScreen 3D-OnSite 设定工艺参数
  - » 冲洗程序的设计
  - » 编辑冲洗程序



课程时长: 2天  
每人价格 (净价): CNY 4,400  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

杜尔涂装系统工程(上海)有限公司  
中国上海市青浦工业园区  
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# MAINTENANCE

## Color changer EcoLCC2



### Target group

Mechanical/electrical maintenance personnel and plant operators, as well as employees interested in technology.

### Course objective

In this course, you will receive a comprehensive introduction into the design and function of the color changer, as well as into its operation and parametrization. The tasks necessary for servicing and potential fault correction will be explained to you and carried out on the display model.

### Admission requirements

Expert training in the area of mechanical/electrical engineering or comparable long-term professional experience.

### Course structure

After an explanation of the design and functions, as well as the process workflows, you will work under instruction on the color changer and use the available Dürr special tools. The visualization software **EcoScreen 3D-OnSite** is used for operating and programming functions.

### Course contents

- » Design and Function
  - » Color changer paint supply
  - » Carriage functions
  - » Positioning and path measurement
- » Process workflow
  - » Explanations on the topic of atomizers
  - » Valve designs and functions
  - » Control functions and time program fetches in manual mode
- » Operation
  - » Checks during operation
  - » Setting parameters for rinse medium and compressed air
  - » Fault diagnosis and problem solving
  - » Adjusting the paint pressure regulator
- » Maintenance
  - » Carrying out cleaning and maintenance work
  - » Servicing work on the caddy
  - » Servicing work on the linear drive
  - » Referencing the system
- » **EcoScreen**
  - » Explanation of the overview and operating interface
  - » Resolving fault messages
- » Process parametrization with **EcoScreen 3D-OnSite**
  - » Design of purging programs
  - » Editing purging programs

Course length: 2 days

Price per person (net): CNY 4,400

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

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# 维修保养

## 雾化器 EcoBell2/3

### 课程对象

维修人员

### 课程目标

通过培训，您将可以进行课程内容中讲授的维修工作，并具备独立分析磨损条件和更换损坏件的能力。

### 参加培训条件

接受过机械专业培训的人员或者有长期从事经验的人员

### 课程结构

理论讲解之后，在培训老师指导下进行雾化器实操。

### 课程内容

- » 旋转雾化器的设计和功能
- » 油漆种类以及装载形式
- » 雾化器的原理
- » 漆膜的形成以及对油漆的影响
- » 旋杯概述
- » 维修及保养工作的安全相关事项
- » 定期保养以及检查工作
- » 雾化器及旋杯的清洁
- » 辨别阀泄漏
- » 雾化器的维修保养
  - » 雾化器更换
  - » 更换及清洁旋杯
  - » 拆装旋杯
  - » 更换及清洁成型空气环
  - » 更换及清洁外部上电装置
  - » 拆装外部上电装置
  - » 更换电阻器及电极针
  - » 更换刷子环
  - » 更换空气马达（转子）
  - » 更换光纤线
  - » 更换控制阀
  - » 拆装控制阀
  - » 拆装带喷嘴的油漆管，油漆管置于中心
- » 校准工具



课程时长: 1天  
每人价格 (净价): CNY 2,200  
最少参加人数: 4  
最多参加人数: 6

### 联系我们

杜尔涂装系统工程（上海）有限公司  
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# MAINTENANCE

## Atomizer EcoBell2/3



### Target group

Maintenance personnel

### Course objective

After participating in the course successfully, you will be capable of carrying out the servicing work specified in the course contents. You will be able to evaluate the wear condition independently and replace worn parts.

### Admission requirements

Expert training in the area of mechanical engineering or comparable long-term work experience

### Course structure

After a theoretical introduction, you will carry out the work under the instruction of a trainer on real atomizers.

### Course contents

- » Design and function of the rotating atomizer
- » Paint types and loading variants
- » Principle and theory of paint atomization
- » Coat build-up and effect paints
- » Bell disk overview
- » Safety-related aspects for maintenance and servicing work
- » Periodic maintenance and inspection work
- » Atomizer and bell disk cleaning
- » Recognizing valve leaks
- » Servicing work on the rotating atomizer
  - » Atomizer exchange
  - » Exchanging and cleaning bell disk
  - » Dismantling and installing bell disk
  - » Exchanging and cleaning shaping air ring
  - » Exchanging and cleaning exterior charging device
  - » Dismantling and installing exterior charging device
  - » Exchanging resistors and electrode tips
  - » Exchanging brush ring
  - » Exchanging bearing unit (turbine)
  - » Exchanging fiber optic cable
  - » Exchanging function valves
  - » Dismantling and installing function valves
  - » Dismantling and installing paint pipe with nozzle, paint pipe centering
- » Calibration tool

Course length: 1 day

Price per person (net): CNY 2,200

Minimum number of participants: 4

Maximum number of participants: 6

### CONTACT

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# 注册及受训条件

## 注册

注册, 确认以及预约必须以书面形式。每种课程, 最少报名人数为4人。最多报名人数为6人。

## 课程费用

注册时会了解到课程费用, 并在培训结束时支付。旅行和住宿费用以及当地转账费用不包括在课程价格中。

## 客户方面取消

课程注册必须以书面形式取消。在课程开始前3个星期取消是免费的。在课程开始前2个星期取消将收取50%的课程价格; 逾期取消收取100%的课程价格。不过, 可提名替代参加者。

## 杜尔方面取消

如果由于培训师突发情况非杜尔公司责任造成的重要原因而不能出席课程, 我们将第一时间通知客户。与此同时, 我们将安排其他日期。然而, 这并不赋予任何进一步的索赔权利。

## 住宿

请告知我们是否需要帮您预定酒店。

请注意所有有关酒店的费用必须由受训者或受训者公司承担。

## 修改权

我们保留调整培训内容以反映技术现状或培训需求的权利。在这方面特别注意各课程计划所规定的注册条件。

## 安全规程

学员须遵守安全及防止事故规例。如果培训要求学员穿戴安全防护装备, 学员须自行准备劳防用品。

## 免责

培训中涉及的信息及培训资料由我们最优良的知识作为依据。然而, 我们对于培训过程中口头或书面形式或培训文件中数据载体中的技术信息错误不负任何责任。以及由此造成的任何损失或次生损失不负责任。

## 复制权

禁止未经授权复制培训文件或将其内容转发、利用和传播给第三方。这同样适用于在数据载体上提供的文档或程序。用于培训用途的软件禁止被删除, 修改, 部分复制或用于任何未经授权的其他方面。

# CONDITIONS OF REGISTRATION AND PARTICIPATION

## Registration

Registrations, confirmations and appointments must be made in writing. For each course, a minimum number of 4 participants must be registered. The maximum number is limited to 6 people per course.

## Course fee

The prices indicated at the time of registration are applicable and are to be paid at the end of the training. Travel and accommodation expenses as well as the costs of local transfers are not included in the course price.

## Cancellation by customer

A course registration must be canceled in writing. Cancellation up to 3 weeks before the course begins is free of charge. Cancellation up to 2 weeks before the course begins will be charged at 50% of the course price. Cancellation made after that time as well as no-shows are charged at 100 % of the course price. However, a replacement participant may be nominated.

## Cancellation by Dürr

We will inform you immediately if a course has to be rescheduled or cannot be completed due to the absence of a trainer or for reasons for which Dürr is not responsible. At the same time, we will propose an alternative date. However, this shall not give right to any further claims.

## Accommodation

Please let us know if we can assist you with making your hotel reservation. Please note that all liabilities in respect to the hotel must be settled by the participants and/or the participants' company.

## Right of modification

We reserve the right to adapt the training contents to reflect the state of the art or the respective training needs. Special attention is drawn in this regard to the entry requirements specified in the respective course programs.

## Safety regulations

The course participants are required to abide by the applicable safety and accident avoidance regulations. If personal protective equipment is a requirement of participation, this must be brought along by the participants and worn during the training.

## Exclusion of liability

The information in the training courses and in the training documents is imparted by us to the best of our knowledge and in good conscience. However, we are unable to accept any liability for any errors in the technical information that is conveyed in the training courses either verbally or in writing, or contained in the training documents or data carriers provided. Neither are we able to accept any liability for any damage or subsequent damage resulting from such errors.

## Copyright

Duplication of the training documents for unauthorized purposes or the forwarding, utilization and communication of its contents to third parties is prohibited. The same applies to documents or programs provided on data carriers. The software provided for training purposes must not be removed, modified, copied in part or used in any other unauthorized manner.



LEADING IN PRODUCTION EFFICIENCY

## Dürr – Leading in Production Efficiency

五大事业单元，一个共同的目标：为客户提供最大的生产效率

- » 涂装和总装系统：用于汽车工业的喷漆车间和总装设备
- » 应用技术：自动应用漆液、密封剂和粘合剂的机器人技术
- » 清洁技术系统：废气净化系统和能效技术
- » 测量和装配系统：平衡设备以及装配、测试和加注技术
- » 木工机械和系统：木材加工行业设备