LEADING IN PRODUCTION EFFICIENCY

Ecopaint Robot PAINTING STATIONS

IDEAL FOR A PERFECTLY PAINTED SURFACE

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» *Exterior painting station*

Ecopaint Robot PAINTING STATIONS

Leading the market for years – with ECO⊕EFFICIENCY

The **ECO⊕EFFICIENCY** System covers all aspects of efficiency, which Dürr uses to support its customers in the production process so that unit costs are sustainable – while ensuring highest quality. The continuous development of all key technology serves as the basis for **ECO⊕EFFICIENCY** and makes us the international leading provider in application technology.

Ecopaint Robot painting stations are designed for the automatic surface coating of automobile bodies and their small parts in series painting. **Ecopaint** Robots coat the entire range of interior and exterior areas and are suitable for ESTA, AIR and powder applications with all paint materials, including solvents, waterborne and powder paints.

The paint and application robots from the **Ecopaint** Robot product family are based on the **ECO⊕EFFICIENCY** concept, systematically improving production efficiency and keep unit costs sustainable while ensuring highest quality. The system covers all aspects of efficiency and optimizes the production process, with respect to material and energy usage, assembly, start-up times and maintenance. The **Ecopaint** Robot improves the flexibility and profitability and guarantees highest quality in the entire painting process.

Energy efficiency

The sustainable use of energy is more relevant than ever today. Due to our improved drive technology, cooling and robot movement, up to 30 % of energy can be saved.

Modular layouts

Upgrade projects and new systems business show the advantages of modular building concepts. The flexibility leads to optimal layouts.

Efficiency of materials

Ecopaint Robot painting stations come out on top with their material use, short color change times and minimum paint and solvent losses. Application equipment of up to two dosing pumps can be placed in the horizontal robot arm and process and control technology is integrated into the robot.

Short installation and start-up times

At Dürr the pre-commissioning phase begins virtually. Painting programmes are set up in advance; tested in Dürr testing centers and optimized. This shortens the pre-commissioning phase. Short assembly times thus allow for the robots to be installed in existing paint shops.

Simplified maintenance

Common kinematic design painting robots and hood openers and identical controls for door openers simplify maintenance and spare part replacement.

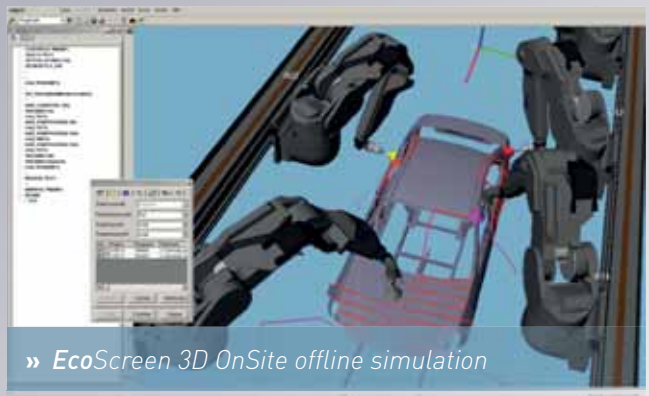
Ecopaint Robot – HIGHEST FLEXIBILITY DURING PAINTING

Two processes for the operation of **Ecopaint** Robot painting stations:

In stop-and-go operations the car body is conveyed into the booth and held stationary while painting.

For tracking operations, the car body is conveyed at a constant speed through the spray booth for painting.

Stop-and-go robots typically move on rails or travelling axes; tracking robots can be either pedestal-mounted (line tracking) or rail-mounted (rail tracking).



» ***Eco**Screen 3D OnSite offline simulation*

» *Standard version of the robot with a **Eco**Bell2 ICC rotation atomizer*

Ecopaint Robot painting stations provide customer-specific solutions due to flexible modular designs:

- Modular robot arm concepts allow for flexible integration of the Dürr paint dosing and color change systems: **Eco**Purge ICC, **Eco**Purge MCC and **Eco**Purge LCC
- Robots can be installed in either pedestal or rail-mounted designs
- Application robots for opening, holding and closing of doors and hoods
- Dürr control concept to drive all robot variants with integrated safety PLC, operating unit, PC and monitor

Simulation capabilities are used to design the painting station including consideration for and optimization of process-specific parameters such as conveyor-type, spray booth characteristics and painting requirements. With the aid of 3D models of the car bodies to be painted, the **Eco**Screen 3D OnSite software designs the paint path and spray patterns for the complete painting station. The robot control system transfers the data for the motion sequence and the painting. Teaching of the robot is only necessary when dealing with difficult parts for fine-tuning.

Controls, safety controls and power supplies for the robots are located at a user-friendly height in the control panels next to the booths. The **Eco**Screen visualization and operator panel is located on the station control panel.

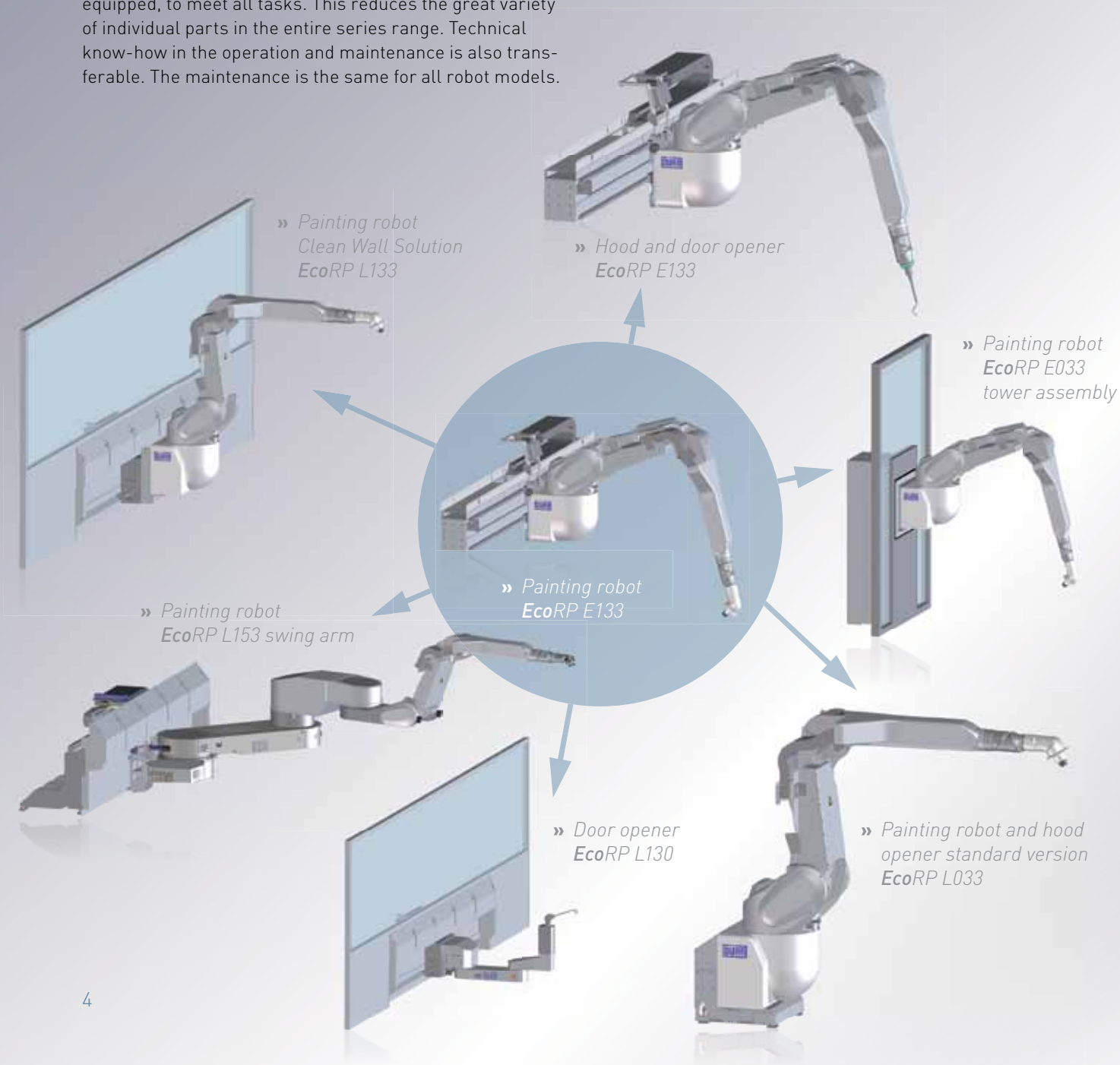
EcoRP PAINTING ROBOT

A suitable production concept for every task

Frequent model changes and amended automobile designs require the use of flexible paint automation, not only to meet styling demands, but also to provide world-class paint quality.

Our robots are built out of modules and are completely equipped, to meet all tasks. This reduces the great variety of individual parts in the entire series range. Technical know-how in the operation and maintenance is also transferable. The maintenance is the same for all robot models.

The task of the painting robot is to move the atomizer around the surface to be painted, while maintaining a constant speed, distance and orientation. This technique ensures a homogenous paint film.



» *Painting robot Clean Wall Solution **Eco**RP L133*

» *Hood and door opener **Eco**RP E133*

» *Painting robot **Eco**RP E033 tower assembly*

» *Painting robot **Eco**RP E133*

» *Painting robot **Eco**RP L153 swing arm*

» *Door opener **Eco**RP L130*

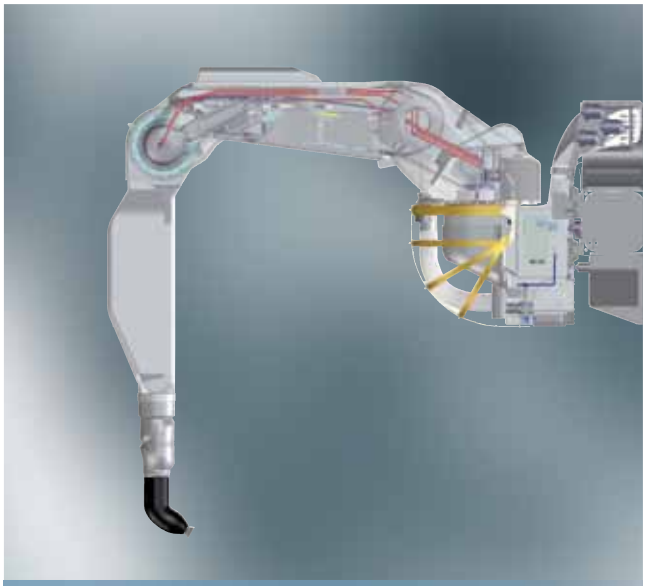
» *Painting robot and hood opener standard version **Eco**RP L033*

SERVICE SPECTRUM
EcoRP PAINTING ROBOT

Ideal customer-orientated solutions for each painting task:

- Painting robots for exterior and interior painting
- Pedestal or rail-mounted configurations
- 6 – 9 paint axes and a maximum of 3 additional servo drives for dosing and paint color change systems (**Eco**LCC)
- Robot arms for dosing and paint color change systems **Eco**Purge ICC, **Eco**Purge MCC, **Eco**Purge LCC for up to 36 colors, and special paint supply **Eco**Supply P with unlimited amount of colors
- 140° double-jointed hand axis, with 75 mm inner diameter for secure hose guidance to the atomizer
- Integrated air and paint flow rate controls, O/E converter and pneumatic valves
- Central hose routing through the robot axes to minimize wear and tear
- Smooth surfaces for optimal cleaning
- High availability
- Integrated automatic mastering of axes 1, 2, 3 and travelling axes
- Explosion protection design in ATEX Category 2, 3; FM approval for Class 1 Div 1; UL approval, TIIS certification
- Gearbox with central cable routing through the robot axes
- Usage in other application areas, e.g. quality measurements, flaming and cleaning of plastic parts, cleaning of automobile bodies and cavity preservation

» *Central cable routing through the robot axes*



» *Shaft gearbox with central cable routing*

» *EcoRP Robot Opening, holding and closing during interior painting*

Technical data

PAINTING ROBOT	EcoRP E133, EcoRP L133, EcoRP E033, EcoRP L033		EcoRP L153, EcoRP L053	
	Application Area	Max. Speed	Application Area	Max. Speed
Axis 1 Robot rotation	EcoRP E ±95° EcoRP L ±115°	115°/s	±90°	72°/s
Axis 2 Vertical arm swivelling	EcoRP E -60°/+110° EcoRP L +65°/-105°	115°/s	+25°/-90°	115°/s
Axis 3 Horizontal arm swivelling	+80°/-75°	115°/s	+80°/-75°	115°/s
Axis 4 hand axis	(total x°) ±540°	540°/s	(total x°) ±540°	540°/s
Axis 5 hand axis		540°/s		540°/s
Axis 6 hand axis		700°/s		700°/s
Axis 7 Travelling axis	Maximum 50 m	1.5 m/s	Maximum 50 m	1.2 m/s
Axis 8			+40°/-90°	+55°/s
Axis 9			+60°/90°	+69°/s

Weight	EcoRP L033 approx. 700 kg EcoRP L133 approx. 600 kg EcoRP E033 approx. 600 kg EcoRP E133 approx. 600 kg	Robot approx. 950 kg Swing arm approx. 2,700 kg
Arm length	Arm 1: 1,000 / 1,250 mm Arm 2: 1,726 mm	Arm 1: 1,000 mm / 1,250 mm Arm 2: 1,726 mm
Application area (without travelling axis)	Height: 5,952 mm Width: 6,356 mm	Height: 5,952 mm Width: 7,952 mm (depending on robot)
Max. conveyor speed	2,000 mm/s	1,500 mm/s
Max. acceleration	8,000 mm/s²	5,000 mm/s²
Explosion protection	ATEX Category 2, 3; FM Class 1 Div 1; TIIS	ATEX Category 2, 3; FM Class 1 Div 1
Repeat accuracy	±0.1 mm	±0.5 mm
Strength for door handling	200 N	200 N
Load on arm 1 and arm 2	Each 30 kg*	Each 30 kg*

* applies with reduced dynamics

EcoRP HANDLING ROBOT

Opening, holding and closing during interior painting

The Scara robots have been developed to assist with application tasks for interior door painting. This provides a greater process control with higher line speeds, as the painting robots do not have to take over the tasks of the handling robots. The modular construction of the hood and trunk openers is identical in construction to the painting robot and instead of the atomizer; each is equipped with panel opening tools.

» *EcoRP L030 (Scara)*
Door opener with 3 axes

» *EcoRP L130 (Scara)*
Door opener, moveable, with 4 axes

» *EcoRP door opener with 6 – 7 axes*

Areas of application: Stop-and-go and tracking operations.
Description: This door opener is constructed following the Scara Principle. The axes 1 and 2 are used for horizontal positioning and the Z axis is used for the vertical positioning. The gripper tool on the axis is usually in the form of a hook. Safe, reliable performance is achieved through sensors that register the various operating statuses, thus avoiding handling errors and collisions. The door opener is placed on a travelling axis.

Areas of application: Stop-and-go and tracking operations.
Description: This robot is used to open, hold and close engine and trunk hoods with gripper tools. This improves the flexibility by three degrees of movement in the opening process.

» *EcoRP door opener with 4 axes*

» *EcoRP E133 as hood opener*

Your benefits

- » Modular construction for easy service and maintenance
- » Streamlined, easy-to-clean, slim yet robust construction
- » Special opening tools for safe and repeatable processes
- » Different arm lengths and spaces allow equipment to be adapted to customer-specific painting processes
- » Same drives and controllers are used for the door openers and painting robots
- » Hood opener and painting robot identical in construction

Technical data

DOOR OPENER	**Eco**RP L030 and **Eco**RP L130	
	Application Area	Max. Speed
Axis 1 Horizontal arm 1 swivelling	+/- 90° (**Eco**RP L130) +/- 110° (**Eco**RP L030)	130°/s
Axis 2 Horizontal arm 2 swivelling	+/- 155° (**Eco**RP L130) +/- 170° (**Eco**RP L030)	130°/s
Axis Z Vertical lifting axis	315 mm	250 mm/s
Axis 7 Travelling axis (only **Eco**RP L130)	depending on travelling axis length	1,500 mm/s
Max. conveyor speed	800 mm/s	
Max. acceleration	4,000 mm/s²	
Load-bearing capacity	max. 500 N	
Explosion protection	ATEX Category 2, 3; FM Class 1 div, 1 TIIS Certification	
Weight	250 kg (**Eco**RP L130); 290 kg (**Eco**RP L030)	
Installation	**Eco**RP L030 connected to grating, **Eco**RP L130 on **Eco**Rail C	

EcoRail TRAVELLING AXES

Mobility for painting and application robots

Robots can be moved parallel to the conveyor direction in the painting booth using EcoRail E and EcoRail C travelling axes. The travelling axis is a freely programmable horizontal axis of motion for robots. With the Clean Wall solution, the travelling axis is integrated into the booth wall to save space.

EcoRail E

The possibility exists to install the EcoRail E travelling axis at different heights – according to the specific painting job. This ensures that painting and application robots are mounted at the optimum height. The advantages are:

- Accessibility to all areas to be painted
- Interference- free view inside the booth
- Greater flexibility during painting jobs

EcoRail C

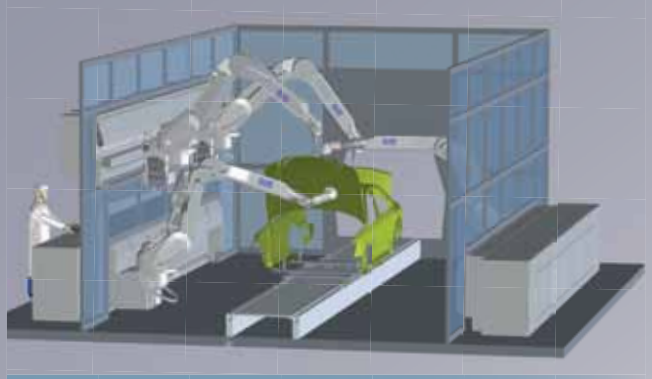
The EcoRail C travelling axis is installed low on the booth wall. The advantages are:

- Automatic mastering
- Explosion-protected version
- Reduced booth width
- Expansion of workspace for robots
- Capacity for 24 circulating colors, max. 36 random colors

An optional EcoRail C cover strip has been designed for protection during assembly.

EcoRail VSS

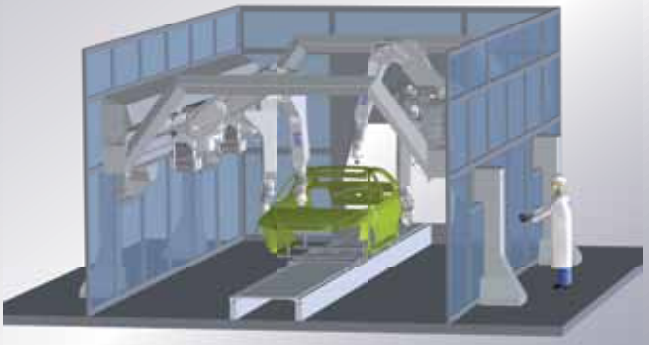
The EcoRail VSS with two travelling axes is a heavy duty rail and can be used for a swing arm robot or sword brushes.



» *Dual Rail Clean Wall solution*

For complex requirements

With box concepts in combination zones or during tracking, it may be necessary to have two travelling axes arranged vertically above each other. This achieves shortened zone lengths for painting booths. EcoRail E and EcoRail C are available as an optional Clean Wall design. This design protects the adjacent booth wall and the robot travelling axis components from painting process contamination (overspray) and minimizes the cleaning requirements.



» *EcoRail E*

» *Painting robot on **Eco**Rail C*

» *Painting robot on **Eco**Rail E*

» *Hood opener on **Eco**Rail E*
*Painting robot on **Eco**Rail C*

Your benefits

- Low-maintenance technology through:
  - Replaceable guide elements
  - Automatic centralized lubrication
  - Specialized jig changing to replace the linear guides and motors
- Flexible lengths possible due to a modular structure
- Clean Wall design available
- Complete corrosion protection for use in an aggressive atmosphere
- Smooth running and wear resistant
- High system availability
- Individualized concept solutions for special requirements
- Easy-to-clean

Technical Data

TRAVELLING AXIS	**Eco**Rail C	**Eco**Rail E	**Eco**Rail VSS
PERFORMANCE DATA			
Speed	1.5 m/s	1.5 m/s	1.5 m/s
Acceleration	5.0 m/s²	5.0 m/s²	4.0 m/s²
Weight of travelling axis	275 kg/m	220 kg/m	800 kg/m
Weight of carriage with drive	0.5 mm	0.5 mm	1 mm
Max. axis length*	50 m	50 m	15 m
Max. number of robots/ travelling axes	4	3	2
APPLICATION AREA			
Painting robot **Eco**RP E133	-	+	-
Painting robot **Eco**RP L133	+	-	-
Hood opener **Eco**RP E133	-	+	-
Hood opener **Eco**RP L133	+	-	-
Door opener (Scara) **Eco**RP L130	+	-	-
Swing arm **Eco**RP L153	-	-	+
Exterior painting	+	+	-
Interior painting	+	+	+

* Further axis lengths on request
- not available, + available

ROBOT AND PROCESS CONTROL

The EcoRPC is the control used for the **Ecopaint** robot system.

Your benefits

» Multikinematic/multiprocessor–capable with up to three movement/process units
» Integrated SPS system for simple adjustment and diagnosis of both process and automation functions
» Simple maintenance

Modular switch cabinets

Control, security control and voltage supply of Dürr painting stations is supplied by modular switch cabinets. The modular construction enables optimal configuration for respective application processes. The switch cabinets are differentiated according to the function: **Eco**RCMP (Robot Control Modular Panel): modular control cabinet for the steering of all **Ecopaint** robot variants. **Eco**SCMP (Station Control Modular Panel): station SPS control with integrated safety-related part and operating panel with a PC and an integrated monitor. **Eco**PSMP (Power Supply Modular Panel): input panel for up to 6 robots.

Visualization

The user interface and plant visualization system **Eco**Screen serves an important function as go-between between man and paint shop. It is the task of **Eco**Screen, through operator guidance, to simplify the operation of the systems and to make the complex parameterization transparent for the user.

EcoScreen 3D OnSite is a 3D visualisation and programming software developed by Dürr. Responsible for the production and processing of robot programmes, it was conceived for the parameterization of the relevant process data. In this way, the robot cell user is directly involved and has an optimal work tool available for programming and simulation in the production.

Your benefits

» Quick integration, installation and maintenance due to plug and socket connections
» Space saved due to compact construction
» The positioning of the booth can be followed independently and flexibly due to the closed design
» Spare part stocking is reduced
» Service and maintenance work is easy, as the individual booths are built the same
» All booths are pre-tested and thus secured of a high level of reliability
» Lower energy use
» The booths are subject to permanent product maintenance by Dürr and are documented with serial numbers
» For the US market, a UL variant is available. (Underwriters Laboratories)
» For the Japanese market, a TIIS-certified variant is available

» *Plant visualization system **Eco**Screen*

LEADING IN PRODUCTION EFFICIENCY

Dürr – Leading in Production Efficiency

Four divisions, one goal: maximum production efficiency for our customers

- **Paint and Assembly Systems:** Paint shops and final assembly plants for the automotive industry and aerospace construction
- **Application Technology:** Robot and application technology for applying paint, adhesives and sealants
- **Measuring and Process Systems:** Balancing technology, cleaning and surface processing technology as well as testing, filling and assembly products
- **Clean Technology Systems:** Exhaust air purification systems, energy efficiency technologies

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