

EcoBell Cleaner D EB2 SL DC EC

Cleaning Device for EcoBell2 atomizer

Operation manual

MCD00012EN, V03



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Translation of the original operation manual

MCD00012EN, V03

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Information about the document

This document describes the correct handling of the product.

- » Read the document prior to every activity.
- » Prepare the document for the application.
- » Pass on the product only together with the complete documentation.
- » Always follow safety instructions, handling instructions and specifications of every kind.
- » Illustrations can deviate from the technical construction.

Validity range of the document

This document describes the following product:

N05040001

EcoBell Cleaner D EB2 SL DC EC



Hotline and Contact

If you have queries or would like technical information, please contact your dealer or sales partner.

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1 Product overview

1.1 Overview



Fig. 1: EcoBell Cleaner D

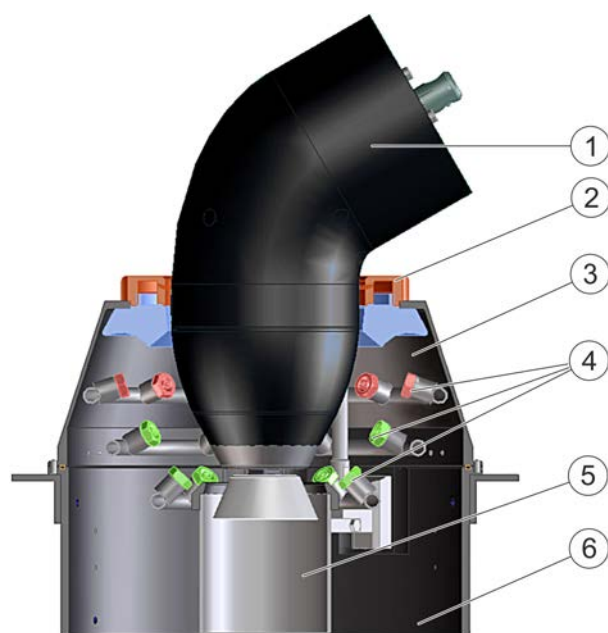


Fig. 2: EcoBell Cleaner D with atomizer

- 1 Rotating Atomizer
- 2 Blow air ring
- 3 Cleaning container
- 4 Cleaning nozzles
- 5 Inner tube
- 6 Drain

1.2 Short description

The EcoBell Cleaner D EB2 SL DC EC cleaning device is used for automatic cleaning of part areas of the **EcoBell** atomizer. The robot moves the atomizer into the cleaning container. Cleaning nozzles spray cleaning agent on the soiled surface of the atomizer. The cleaning agent and the cleaned coating material flow down from the cleaning container. After cleaning, the atomizer moves slowly out from the cleaning device. The air stream from the blow air ring dries the cleaned areas.

2 Safety

2.1 Presentation of Notes

The following notes can appear in this instruction:

DANGER!

High risk situation that can lead to serious injuries or death.

WARNING!

Medium risk situation that can lead to serious injuries or death.

CAUTION!

Low risk situations that can lead to minor injuries.

NOTICE!

Situations that can lead to material damage.

ENVIRONMENT!

Situations that can lead to environmental damage.

Additional information and recommendations.

2.2 Intended Use

Use

The EcoBell Cleaner D EB2 SL DC EC cleaning device is only intended for cleaning Dürr rotating atomizers.

The use is only permitted in the industrial area within the specified technical data ↪ 12 “Technical data”.

The cleaning device is approved for use in explosive areas of Ex zones 1.

Only operate cleaning device together with Dürr rotating atomizers.

- » EcoBell2 SL DC
- » EcoBell2 SL EC


Contact Dürr Systems before the installation if you have any questions ↪ “Hotline and Contact”.

Misuse

If used improperly, it can cause serious injuries. Examples of wrong use are:

- » Use in explosive areas Ex zone 0
- » Setting up the control unit in explosive areas
- » Working on the product in explosive areas
- » Use of unapproved materials
- » Use of components not matching the product
- » Use of atomizers without sealed shaping air ring
- » Operation with high voltage
- » Use without control unit
- » Unauthorized modifications
- » Operation outside of the painting booth.
- » Use without mechanical ventilation and entry protection.

Ex labeling

 II 2G Ex h IIA T6 Gb X

- II - Device group II: all areas except mining
- 2G - Device category: 2 for gas
- h - Ignition protection category
- IIA - Explosion group
- T6 - Temperature class
- Gb - Device protection level: Gb (zone 1)
- X - Restriction: The device is configured for operation in an ambient temperature of 15°C to 40°C.

2.3 Safety devices

The operator must install safety devices securing the operation in potentially explosive area and conforming to the health requirements and safety requirements according to EC Machinery Directive 2006/42/EC.

This could be, for example, the following safety devices for the complete system:

- » Fire protection
- » Entry protection
- » Technical ventilation
- » Emergency stop

The painting booth must meet the requirements of EN 16985:2018 “Painting booth for organic liquid coating materials - Safety requirements”.

The control must meet the requirements of Performance Level d of EN 13849-1:2008 “Safety of machines - Safety-related parts of controls - Part 1: General Design Principles”.

More information is available in the German DGUV Information 209-046 “Lackierräume und -einrichtungen für flüssige Beschichtungsstoffe” and DGUV Information 209-052 “Elektrostatisches Beschichten”.

The following norms are applicable based on the coating material used:

- » Flammable coating materials:
 - » EN 50176:2009 “Stationary electrostatic application equipment for flammable liquid coating materials - Safety requirements”
- » Non-flammable coating materials:
 - » EN 50348:2010 “Stationary electrostatic application equipment for non-flammable liquid coating materials - Safety requirements”

Parent control

The operator must provide a parent control for the “painting system” in total. All relevant, applicable safety requirements and standards depending on the application type and process must be adhered to.

Cleaning device control unit

If the control unit for the cleaning device is not purchased, the operator is required to set up an equivalent unit. The control unit must have the same functions and be designed according to the diagram in the appendix.

The following performance level must be adhered to:

- » Pneumatic components for controlling the blow air valves BL34 and BL35 to PLa
- » Pneumatic components for controlling the thinner valves V31-33 and FGV to Plc

Thinner disengaging valve

During the application with high voltage, a thinner disengaging valve is required. Flammable cleaning medium is released only after the high voltage in the atomizer has been safely dissipated.

Once a set wait period has elapsed after switching off the high voltage and the residual charge has been dissipated, the parent control actuates the thinner disengaging valve (eg. safety timer).


The required wait period needed for the installation of the cleaning device is determined based on special measurements and specifications. The determined wait period must be saved on the control system. Only trained and authorized qualified personnel may carry out modifications on the control system.

The thinner disengaging valve is connected upstream of the three thinner valves. The thinner disengaging valve is directly on the cleaning device.

Secure high voltage dissipation

Nozzles spray the cleaning medium under pressure onto the surface to be cleaned. This can create an explosive atmosphere.

Before the atomizer enters the cleaning device, the high voltage of the atomizer must be switched off and the residual energy dissipated to below the threshold of 0.24mJ. Otherwise, electrostatic discharge can ignite the explosive atmosphere in the cleaning device. The cleaning process may only be started if a non-flammable potential is reached.

 In systems with direct charging, higher system capacities must be taken into account.

A safety device for high voltage dissipation must be set up at the initial commissioning. Use safety engineering control to dissipate high voltage and to monitor it. The cleaning process may be started only after the potential attains a non-dangerous value.

DANGER!

Ignition due to electrostatic discharge

Electrostatic discharge can ignite the cleaning agent-air mixture. It can cause serious injuries or death.

- Use safety features that check secure high voltage dissipation.
- At the time of initial commissioning, ensure that the potential has fallen below the threshold value of 0.24mJ, before the atomizer enters the cleaning device.
- Do not modify safety devices during operation.
- Alterations or modifications on the application engineering can change the system capacity. If necessary, adjust safety devices.

Safety timer (optional)

If robot and control unit of the cleaning device from Dürr Systems is used, a safety timer will be included.

Set a system-specific safety timer at the time of initial commissioning. The safety timer ensures that the potential attains a non-dangerous value. The cleaning process can only be started if the safety timer has run out. In addition, the separate robot control delays the release of high voltage after the cleaning, until the explosive atmosphere has depleted. This ensures that there is no explosive atmosphere in the cleaning device, even if the atomizer is still inside the cleaning device due to a fault.

If there are changes or modifications, please contact your dealer or sales partner ☞ "Hotline and Contact".

2.4 Safety signs

No safety markings are placed on the product.

2.5 Residual risks

Explosions

Sparks, open flames and hot surfaces can cause explosions in explosive atmospheres. It can cause serious injuries or death.

- » Before carrying out any work, make sure that there is no explosive atmosphere.
- » Do not use sources of ignition and open light.
- » Do not smoke.
- » Ground the product.
- » Observe all general safety instructions.
- » Wear specified protective equipment.

Flammable coating materials and their detergents and cleaning agents can cause a fire or an explosion.

- » Ensure that the flashpoint of the fluid is at least 15 K above the ambient temperature.
- » Note explosion group of the fluid.
- » Follow the safety data sheet.
- » Ensure that technical ventilation and fire protection equipment are in operation.
- » Do not use sources of ignition and open light.
- » Do not smoke.
- » Wear specified protective equipment.

Danger from harmful or irritant substances

Contact with hazardous liquids or vapors, can result in serious injury or death.

- » Ensure that the forced ventilation is operational.
- » Follow safety data sheets.
- » Wear specified protective equipment.

Leaking fluids and compressed air:

When working on the product, spurted material and leaking compressed air can cause irreversible damage to the eyes.

Before working on the product:

- » Rinse the system.
- » Disconnect the system from compressed air and material supply system.
- » Secure the system against being switched on again.
- » Depressurize the lines.
- » Wear eye protection.

2.6 Property damage

Replacement Parts

Replacement parts that are not approved by Dürr Systems may not withstand the full operational loads.

It can result in property damage and production disruption.

- » Use exclusively original replacement parts.

2.7 Conduct in the event of a hazardous situation

Conduct in case of danger depends on the operator's installation situation.

Perform the following activities:

- » Close material supply lines.
- » Secure against reconnection.
- » Depressurize the lines.

2.8 Staff qualification

WARNING!

Inadequate qualification

Wrong estimation of dangers can cause serious injury or death.

- Only sufficiently qualified persons may execute all work.
- Some work requires additional qualification. Additional qualifications of specialized personnel are marked with a “+”.

This document is intended for qualified personnel in industry and craftsmanship.

Cleaning staff

The cleaning staff receives regular instructions from the operator about the following contents:

- » Using the product
- » Handling cleaning tools
- » Handling cleaning agents
- » Technical Measures for occupational safety and health

Electrician

Electricians assemble, install, service and repair electrical systems in a professional manner.

Furthermore, electrical engineers have the following knowledge:

- » Guidelines, Standards and Rules of Engineering
- » Local conditions
- » Electrical Systems and Their Loading Limits
- » Technical Measures for occupational safety and health

Mechanic

The mechanic is trained specifically for the field of work in which he works.

Furthermore, he has the following knowledge:

- » Guidelines, Standards and Rules of Engineering
- » Local conditions
- » Technical Measures for occupational safety and health

The mechanic is responsible for the following activities on equipment and components:

- » Assembly
- » Waiting
- » Maintenance
- » Disassembly

Robot programmer

The robot programmer is trained specifically for the field of work in which they work. The robot programmer has been instructed by the operator and receives regular training.

The robot programmer is trained and examined in the following specialized areas:

- » Advanced knowledge in robot programming
- » System knowledge of robot control
- » Automation technology
- » Control and regulation technology
- » system-specific process engineering

Furthermore, the robot programmer possesses the following knowledge:

- » National Health and Safety Regulations
- » Directives and rules of engineering
- » applicable accident prevention regulations

The robot programmer is responsible for the following tasks on equipment and components:

- » Commissioning
- » Maintenance, verification und rectification of faults
- » Preparing measuring protocols and shortage lists
- » Creating commissioning documents

System operator

The system operator is trained specifically for the field of work in which he works.

The system operator has knowledge in the following specialized areas:

- » System-specific process engineering
- » Knowledge of the application processes regarding the application medium used
- » Local technical measures for occupational safety and health

The system operator is responsible for the following tasks on equipment and components:

- » Operate and monitor the system.
- » Introduce measures in the event of faults.
- » Clean the system.

+ additional qualification explosion protection

In addition to the knowledge of the various specialist fields, the mechanic has knowledge of regulations and safety measures when working in potentially explosive areas.

Dürr Systems offers special product training for ☞ "Hotline and Contact".

2.9 Personal protective equipment

When working in explosive areas, the protective clothing, including gloves, must meet the requirements of DIN EN 1149-5. Footwear must meet the requirements of EN ISO 20344 and EN IEC 61340-4-3. The volume resistivity must not exceed 100MΩ.

Wear the specified personal protective equipment when working. Provide the following personal protective equipment:



Anti-Static Safety Boots

Protect feet from crushing, falling items and slipping on slippery ground.

Moreover, anti-static safety boots reduce electrostatic charge by discharging the electrostatic charges.



Eye protection

Protects eyes from dust, paint drops and particles.



Protective gloves

Protect the hands from:

- » mechanical forces
- » Thermal forces
- » Chemical effects



Protective workwear

Tight fitting workwear with low tear strength, tight sleeves and no hanging parts.



Respirator mask

Protects from hazardous gases, vapors, dust and similar materials and media.

3 Design and Function

3.1 Design

The paint mist created by the rotating atomizers reaches not only the vehicle body surfaces to be painted. A fine film of paint forms on the atomizers after a while. This paint must be removed to prevent faults during painting. The cleaning device cleans part areas of the atomizer body.

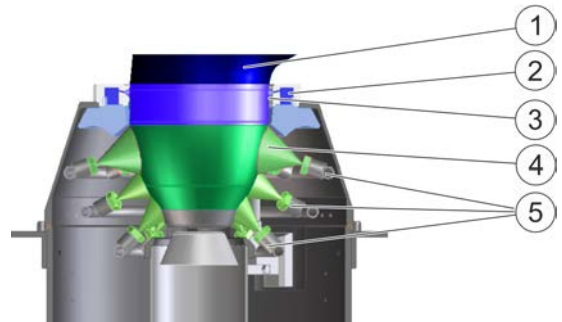


Fig. 3: Cleaning

The robot moves the atomizer (1) through the opening into the cleaning container. A sealing air stream (3) is built up via the blow air ring (2) to prevent the cleaning agent from escaping during cleaning. Spray of cleaning agent (4) is directed through nozzle rings (5) under pressure on the soiled surface of the atomizer. The cleaning agent with the removed paint flows down from the cleaning device.

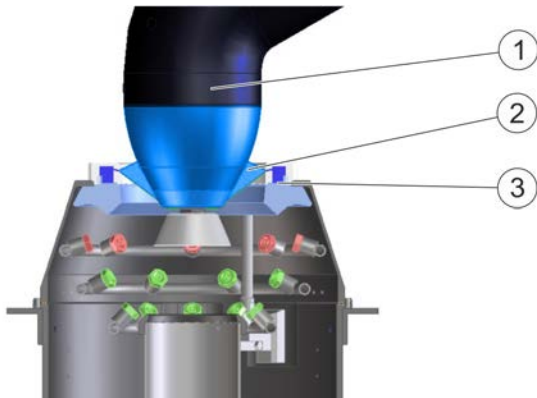


Fig. 4: Drying

After cleaning, the atomizer (1) moves slowly out from the cleaning device. The air stream (2) from the blow air ring (3) dries the cleaned areas.

3.2 Movements and positions

Move to defined positions with defined speeds during the cleaning cycle.

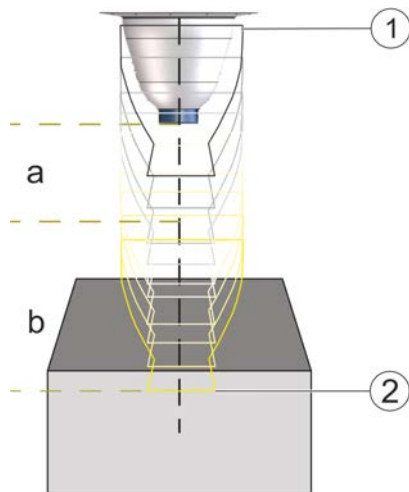


Fig. 5: Positions

- 1 Start and end position "AboveBox"
- 2 Cleaning position "Inbox"
- a Fast movement
- b Slow movement

The "AboveBox" position (1) is the start position for the cleaning cycle. The atomizer is in this case above and exactly on the central axis of the cleaning device. The atomizer quickly moves downwards along the central axis (movement section a). After movement section b, the atomizer moves slowly into the cleaning device.

The "InBox" position (2) is the cleaning position within the cleaning device. The cleaning nozzles are directed to the atomizer. After cleaning, the atomizer moves out slowly from the cleaning device. Compressed air from the blow air ring dries the atomizer (movement section b). The atomizer returns to the "AboveBox" position (movement section a).

The "InBox" position can be moved to, programmed and checked using a teach tool ↗ 6.5 "Check "InBox" position."

3.3 Position cleaning device

The action area is described in the following example in combination with the paint robot **EcoRP 10 R1100**.

The accessibility of all positions above and inside of the cleaning device with the atomizer must be checked.

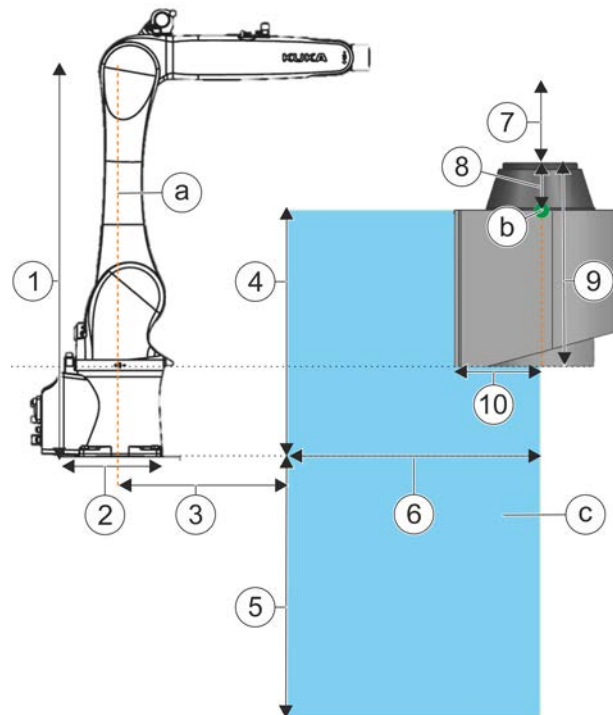


Fig. 6: Action area Paint robot **EcoRP 10 R1100**

Item	Detail	Value
1	Robot, height	960mm
2	Robot basis, width	230mm
3	Distance of robot to action area	400 mm

Item	Detail	Value
4	Action area, height to the top	600 mm
5	Action area, height to the bottom	600 mm
6	Action area, depth	500mm
7	Distance of position "AboveBox" to the blow air ring in the cleaning device	200 mm
8	Distance of position "InBox" to the blow air ring in the cleaning device	125mm
9	Cleaning device, height	488mm
10	Distance of console on cleaning device to the "InBox" point	200 mm
a	Robot axis A1	–
b	"InBox" point	–
c	Action area	–

The "InBox" point of the cleaning device (b) must be inside of the action area (c) of the robot. The action area includes 200° around the robot axis A1 (a). The action area is determined starting from the robot axis.

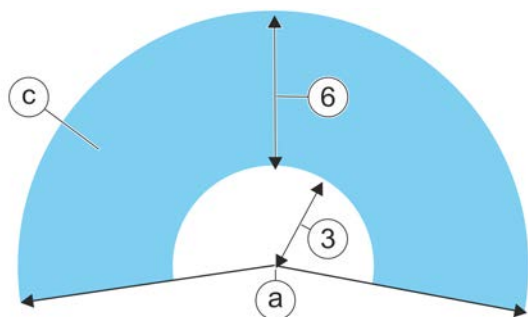


Fig. 7: Action area around axis A1

Optional: Control unit for cleaning device

Optionally, one control unit is provided for the cleaning device. The control unit includes all the MVS valves of the cleaning device for the cleaning process. The control unit is outside of the cleaning device and must be connected to the parent control.

i If the control unit for the cleaning device is not purchased, the operator is required to set up an equivalent unit with the same functions by using the following diagram.

The cleaning device must be positioned in a way that the "Inbox" position is inside of the action area. The action area (c) guarantees that the robot can safely reach the "AboveBox" position.

i The values were determined using the longest atomizer (EcoBell2 SL DC).

3.4 Optional components

The following components are optionally available:

- » Support bracket for assembly
- » Control unit for cleaning device

Optional: Support bracket for assembly

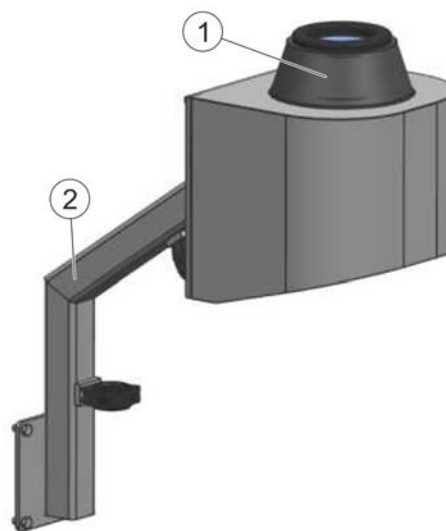


Fig. 8: Cleaner D with support bracket (optional)

The optional support bracket (2) can be used to attach the cleaning device (1) to the booth wall or the steel construction.

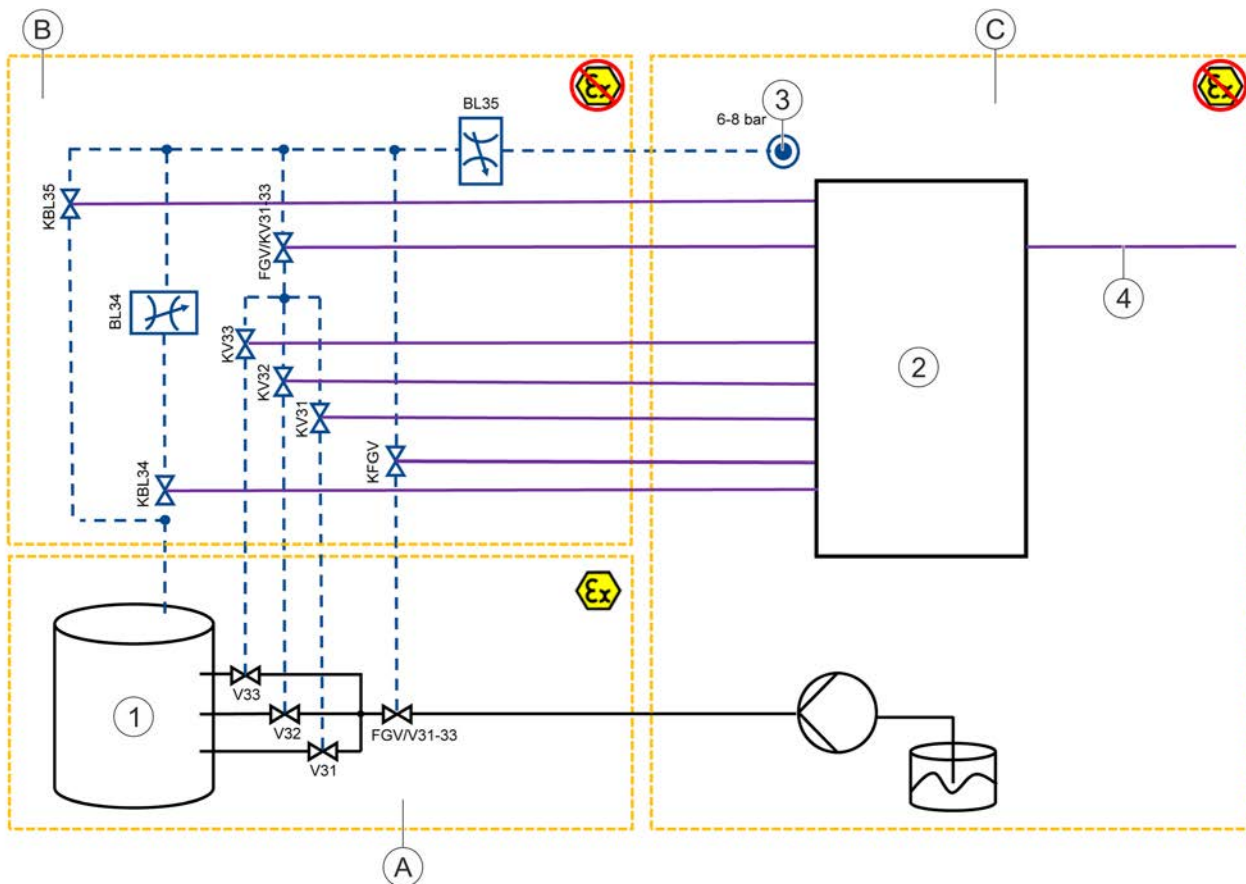


Fig. 9: Setup diagram for cleaning device control unit

- | | | | |
|---|---|-----|-----------------------|
| A | Scope of supply EcoBell Cleaner D | --- | Pneumatic signal |
| B | Optional accessories for EcoBell Cleaner D | — | Paint hose |
| C | Provision by the customer / operator | ⊗ | Solenoid valve |
| 1 | EcoBell Cleaner D | ⊗ | Paint valve |
| 2 | Control system, such as Fanuc R30iA | ⊗ | Pump |
| 3 | Min. 6bar / max. 8bar | ⊗ | Compressed air supply |
| 4 | High voltage is dissipated | ⊗ | Pressure controller |
| — | Electric signal | | |

3.5 Interfaces

The cleaning device has interfaces with:

- » Compressed air
- » Cleaning medium (e.g. thinner)

The interfaces are on the console of the cleaning device.

4 Transport, scope of supply and storage

4.1 Unpacking



DANGER!

Electrostatically charged plastic films and foils in potentially explosive areas

The foil can charge electrostatically at the time of unpacking. Electrostatic discharge can cause sparks that in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Unpack product outside Ex zones.

Personnel:

- » Mechanic
- » + additional qualification explosion protection


Protective equipment:

- » Protective workwear
- » Protective gloves
- » Anti-Static Safety Boots

1. Check the packaging of the assemblies for damage.
 - ⇒ Report damage immediately ↪ "Hotline and Contact".

2. Remove foils outside of potentially explosive areas.

3. Remove packaging material from all assemblies.

4.  Use aids suitable for transport, such as hoists or carrying straps. Observe the weight of the product ↪ 12.1 "Dimensions and weight".

Transport assemblies with suitable hoists to the installation location.

4.2 Transport

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots

Requirements:

- » Cleaning device is disassembled ↪ 11.3 "Disassembly".

1. Use the original packing for transporting.

If the original packing is no longer available, the packing used must meet the following requirements:

- » Comprehensive protection from vibrations
- » Protection from dirt
- » Protection from moisture

2. Place cleaning device onto a pallet using a suitable hoist.
3. Lash cleaning device with a lashing strap on the pallet.
4. Label packaging twice and indicate both contents and weight.

4.3 Scope of delivery

The scope of supply includes the following components:

- » Cleaning device with console for fastening
 - » Fluid hoses (media hoses and compressed air hoses)
 - The lengths of the hoses are sufficient to reach from the cleaning device to the console.
- » Cover hood for cleaning device

The cleaning device is supplied pre-assembled.

- » All other components are separately available.
- » Inspect delivery on receipt for completeness and integrity.
- » Report defects immediately ↪ "Hotline and Contact".

4.4 Handling of packaging material



ENVIRONMENT!

Incorrect disposal

Incorrectly disposed packaging material can damage environment.

- Dispose of material no longer required in an environment-friendly manner.
- Observe local disposal specifications.

4.5 Storage

Requirements for the warehouse:

- » Do not store outdoors.
- » Store in a dry and dust-free place.
- » Do not expose to aggressive media.
- » Protect from solar radiation.
- » Avoid mechanical vibrations.
- » Temperature: 10°C to 40°C
- » Relative humidity: 35% to 90%

5 Assembly

5.1 Safety recommendations

EX WARNING!

Danger of fire and explosion

Sources of ignition in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Before carrying out any work, make sure that there is no explosive atmosphere.

WARNING!

Inadequate qualification

Wrong estimation of dangers can cause serious injury or death.

- Only sufficiently qualified persons may execute all work.
- Some work requires additional qualification. Additional qualifications of specialized personnel are marked with a “+”.

WARNING!

Unsuitable tools in hazardous areas.

Tools that do not have Ex permission can generate sparks and cause a fire or an explosion. Serious injuries or death can result.

- If possible, carry out cleaning and maintenance work outside the Ex zones.
- For activities within the Ex zone, use tools with the corresponding Ex labeling.

WARNING!

Lifting heavy loads

Lifting heavy loads could cause back injuries, crushing or compression. Serious injuries can be the consequence.

- Lift heavy loads only by using suitable hoists. ↪ 12.1 “Dimensions and weight”
- Conduct work with two persons present only.

5.2 Requirements for the Installation point.

- » It should be possible to disconnect the compressed air supply and material feed and to secure it against reconnection.
- » The cleaning device must be integrated in a closed, remote-controlled and automated process.
- » Install the cleaning device in an area with forced ventilation.
- » Lines, seals and screw connections must be designed for the requirements of the cleaning device ↪ 12.4 “Operating values”.
- » All components must be grounded.
- » The installed position of the cleaning device must be accessible for the robot.
- » The cleaning device must be accessible for maintenance when installed.
- » Booth wall and assembly parts must be suitable for carrying the product weight and withstand the stress occurring during the operation.

5.3 Installed position

The cleaning device can be mounted in different positions, depending on the version and drawing:

- » On the booth wall
- » On the steel structure

The upper edge of the cleaning device must be aligned horizontally.

5.4 Assembly

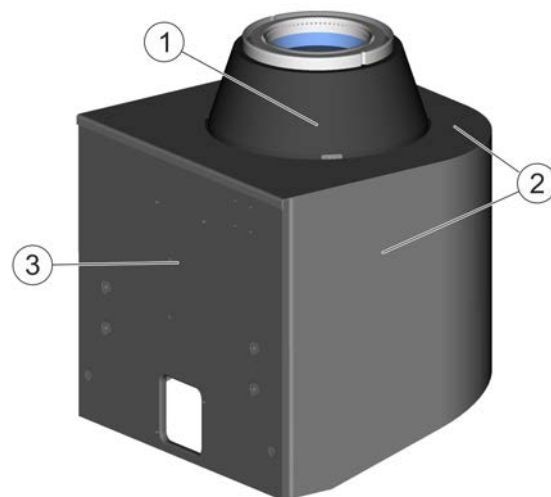


Fig. 10: Cleaning device with console

The cleaning device (1) is mounted on a console (3) and covered with a cover hood (2).

⚠ WARNING!

Lifting heavy loads

Lifting heavy loads could cause back injuries, crushing or compression. Serious injuries can be the consequence.

- Lift heavy loads only by using suitable hoists.
↳ 12.1 "Dimensions and weight"
- Conduct work with two persons present only.

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Protective gloves
- » Anti-Static Safety Boots

1. Mark assembly bores of the console on the installation point in a suitable operating height.

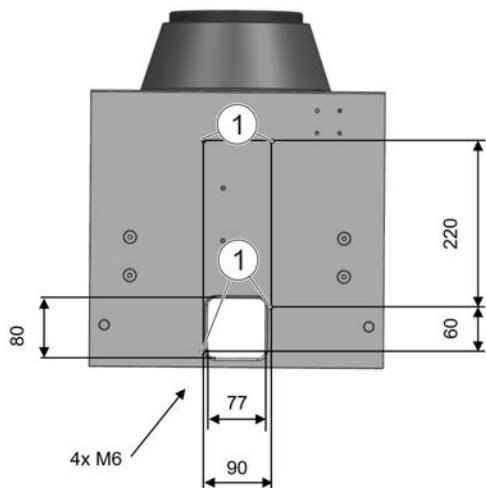


Fig. 11: Assemble bracket

2. Screw the console on the installation point using four screws, M6x25, and washers (1).

Optionally with support bracket:

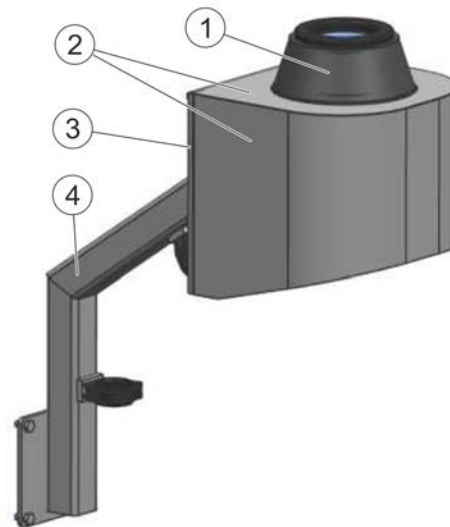


Fig. 12: Cleaner D with support bracket (optional)

The cleaning device (1) is mounted on a console (3) and covered with a cover hood (2). Optionally, the cleaning device can be mounted to a support bracket (4) ↪ 13.3 “Accessories”.

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Protective gloves
- » Anti-Static Safety Boots

1. Screw support bracket onto the console. Refer to the assembly bores of the console Fig. 11.

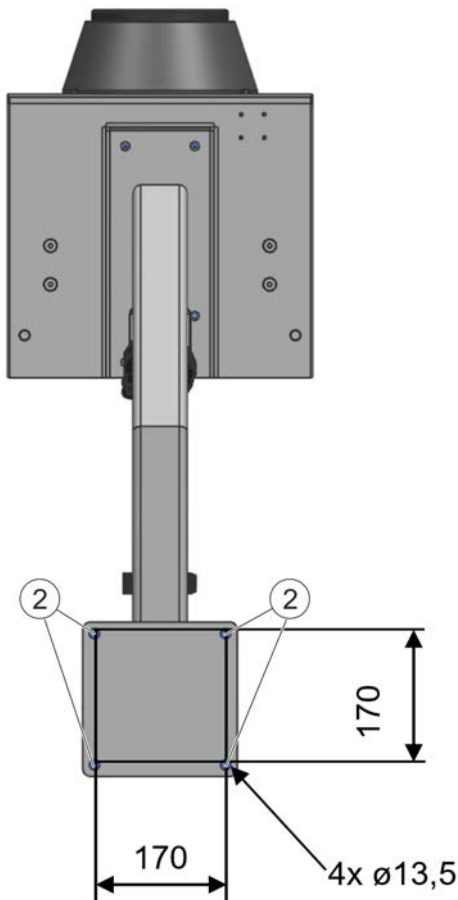


Fig. 13: Assembling bracket

2. Mark assembly bores of the support bracket on the installation point in a suitable operating height.
3. Screw on the support bracket using four screws (2), $\varnothing 13.5\text{mm}$.

5.5 Connecting

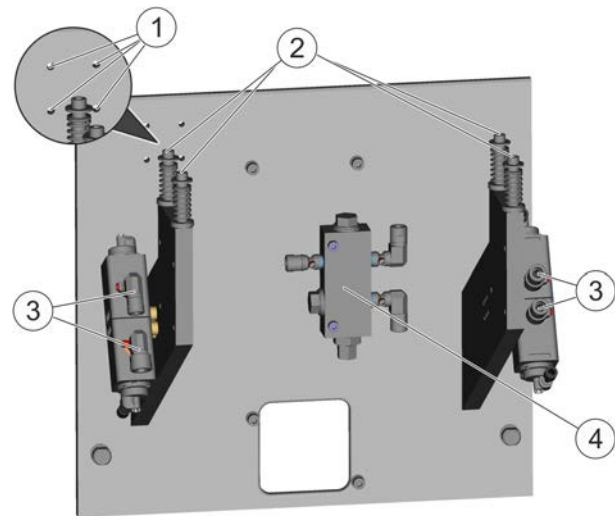


Fig. 14: Bracket with attachment

- 1 Grounding connections
- 2 Springs
- 3 Cleaning medium valves
- 4 Air manifold

The cleaning device is spring-mounted on a bracket. The valves for the cleaning medium (3) and the manifold for air (4) are mounted on the console.

i The cleaning medium must be connected in accordance to the setup diagram (see appendix).

The following performance level must be adhered to:

- » Pneumatic components for controlling the blow air valves BL34 and BL35 to PLa
- » Pneumatic components for controlling the thinner valves V31-33 and FGV to Plc

i All media lines and their connections are uniquely labeled and described using the corresponding technical documentation. The piping must be conducted in accordance with these specifications.

Personnel:

- » Mechanic

Protective equipment:

- » Protective gloves

1. Connect material supply to the valves for the cleaning medium (3).
2. Connect compressed air to the manifold for air (4).

5.6 Ground the cleaning device

WARNING!

Sparks due to electrostatic discharge

If the cleaning device is not properly grounded or the potential equalization fails, components may get charged electrostatically. Electrostatic discharge can cause sparks that in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.


- Check connection of grounding cable.
- Measure volume resistivity.

Personnel:

- » Electrician

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots

1.  Cleaning Device und console are delivered connected to each other. The grounding must start at the console.

Connect console on ground connection with external potential equalization, see figure 5.5 “Connecting”.

2. Connect grounding cable of cover hood with the ground connection of the console.
3. Measure volume resistivity.

6 Commissioning

6.1 Safety Instructions

WARNING!

Ignition due to electrostatic discharge

If loose parts remain in the cleaning device, contact can cause sparks to ignite the explosive atmosphere. It can cause serious injuries or death.

- Before commissioning, ensure that there are no loose parts in the cleaning device such as, for example, tools.
- Commission the cleaning device only as specified.

DANGER!

Ignition due to electrostatic discharge

Electrostatic discharge can ignite the cleaning agent-air mixture. It can cause serious injuries or death.

- Use safety features that check secure high voltage dissipation.
- At the time of initial commissioning, ensure that the potential has fallen below the threshold value of 0.24mJ, before the atomizer enters the cleaning device.
- Do not modify safety devices during operation.
- Alterations or modifications on the application engineering can change the system capacity. If necessary, adjust safety devices.

WARNING!

Sparks due to electrostatic discharging of components

If components of the cleaning device are not grounded, the cleaning device can be charged electrostatically and sparking may occur. In an explosive atmosphere, these sparks can be the source of ignition for fire or explosion. It can cause serious injuries or death.

- Ground cleaning device and all components as specified.
- Before carrying out any work, make sure that there is no explosive atmosphere.
- Working on the cleaning device only by trained staff.

WARNING!

Leakage of flammable purging media

If components are leaking or burst under pressure, there is the danger of fire. Serious injuries can be the consequence.

- Check system (thinner and compressed air) and lines for leakages.
- Replace defective components.
- Wear eye protection and protective clothing.

WARNING!

Danger due to squirting material

Serious injuries can be the consequence.

- Wear eye protection when working on the product.
- Check product for leakage.
- Check all connections for proper assembly.

! WARNING!

Danger to health from harmful or irritant substances

Contact with hazardous liquids or vapors, can result in serious injury or death.

- Ensure that the forced ventilation is operational.
- Follow safety data sheets.
- Wear specified protective clothing.

! WARNING!

Robot movement

If persons are present in the danger zone during the teach sequence, death or serious injuries may ensue.

- Ensure that the robot programmer is able to view the entire danger zone.
- Tduring the teach sequence, make sure that there are no persons present in the danger zone.

! CAUTION!

The pneumatically lockable carriage poses a danger of crushing

The quick action locks on the lid are under tension. The finger could get crushed when working on the lid.

- Wear protective gloves.

! NOTICE!

Danger of collision with atomizer or components

If atomizer or components collide with the cleaning device, that could cause material damage.

- Check all movements and fixed positions of the individual robot programs after installing the cleaning devices.
- The atomizer must move linearly when inserting and retracting.

! NOTICE!

Material damage due to collision

If atomizer and cleaning device collide, that could cause material damage.

- Before commissioning, check the set positions using the Teach tool.
- Correct deviations.

The cleaning device with its spring suspension can balance minor positional deviations of the atomizer. Too great a deviation leads to collision and material damage.

The cleaning device may only be put into operation when completely and properly mounted. All aids (e.g. tools) must be removed out of the danger zone after completion of work.

6.2 Protect cleaning device

During operation, the cleaning device is exposed to various factors e.g. over-spray. The following measures will help extend the life cycle of the cleaning device and ensure smooth fault-free operation.

- » Coat the external surfaces and the cover hood with a thin layer of petroleum jelly.
- » Cover external surfaces with an electrically conductive foil.



For all measures, ensure that:

- The process air must be able to escape on the underside of the cleaning device.
- The bores of the blow air ring must be free from petroleum jelly.

6.3 Check safety devices

- » Integrate the product into the safety devices of the complete system.
- » Ensure that there is a secure reduction in high voltage, before the atomizer enters the cleaning device.

6.4 Setting operating parameters

Personnel:

- » Mechanic

Protective equipment:

- » Protective gloves
- » Anti-Static Safety Boots
- » Input pressures of the media supplied via the tube system are within the required ranges
 - ↳ 12.4 “Operating values”.

6.5 Check “InBox” position.

The correct position of the atomizer in the cleaning device can be checked using a special teach tool
 ↳ 13.2 “Tools”.

Personnel:

- » Robot programmer

Protective equipment:

- » Protective workwear
- » Eye protection
- » Protective gloves

1. Detach atomizer from the quick clamping device of the flange packet.

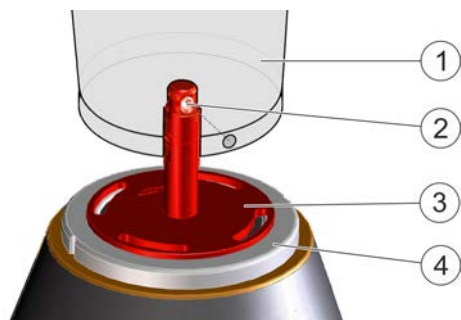


Fig. 15: Tool for EcoBell2 SL

2. Clamp tool (3) in the quick clamp device (2) on the flange packet (1).
3. Move tool into the cleaning device.
 - ⇒ The “InBox” position is reached, when the collar of the tool (3) rests on the blow air ring (4). The springs of the anti-collision device must not deflect.

The exact teach positions are described in chapter ↳ 12.8 “Positions”.

6.6 Final checks

1. Check prior to commissioning:
 - » Correct hose connection of the cleaning device
 - » Tightness
 - » Under all operating conditions, whether the cleaning medium runs unobstructed.
 - » The displays and signals of the cleaning device in the visualizer
 - » Approached positions of the atomizer in the cleaning device

7 Operation

7.1 Safety recommendations

WARNING!

Danger of fire and explosion

Flammable coating materials and their detergents and cleaning agents can cause a fire or an explosion.

- Ensure that the flashpoint of the fluid is at least 15K above the ambient temperature.
- Flammable fluids should only be used, once all components under high tension have been discharged down to a discharge energy of less than 0.24 mJ.
- Only electrically conductive containers may be used for the cleaning fluid. Containers must be grounded.
- Note explosion group of the fluid.
- Follow the safety data sheet.
- Ensure that forced ventilation and fire protection equipment are in operation.
- Do not use sources of ignition and open light.
- Do not smoke.

WARNING!

Electrostatically charged films

If cleaning device is not covered with electrically non-conductive foils, the foil could collect electrostatic charge during operation. Electrostatic discharge can cause an explosion.

- Only use electrically conductive foils.
- Apply a light layer of technical petroleum jelly on the cleaning device.

WARNING!

Fire and explosion hazard due to high voltage

Cleaning process starts before the atomizer is discharged. Flammable cleaning medium and high voltage may cause ignition. These sparks can be a source of ignition in explosive atmospheres. It can cause serious injuries or death.

- Flammable fluids should only be used, once all components under high tension have been discharged down to a discharge energy of less than 0.24mJ.
- Check if the thinner disengaging valve is connected to the external control system.

WARNING!
Fire hazard due to malfunctioning disengaging valve

If the thinner disengaging valve has been manipulated or wrongly actuated, flammable cleaning medium is leaking. The leaking flammable cleaning medium is inside of an infeed line between thinner disengaging valve and thinner valve. It can cause serious injuries or death.

- Have the functioning of the thinner disengaging valve checked by trained personnel.
- Check if the thinner disengaging valve is connected to the external control system.
- Check if the setup diagram of the cleaning device control unit is adhered to.

WARNING!
Fire and explosion hazard due to atomizer purging program

If the atomizer is not discharged and it starts the atomizer purging program in the cleaning device, the flammable cleaning medium and high voltage can cause fire or explosion. It can cause serious injuries or death.

- Do not run atomizer purging programs in the cleaning device.

WARNING!
Sparks due to electrostatic discharging of components

If components of the cleaning device are not grounded, the cleaning device can be charged electrostatically and sparking may occur. In an explosive atmosphere, these sparks can be the source of ignition for fire or explosion. It can cause serious injuries or death.

- Ground cleaning device and all components as specified.
- Before carrying out any work, make sure that there is no explosive atmosphere.
- Working on the cleaning device only by trained staff.

WARNING!
Sparks due to collision

Sparks can occur if atomizer and cleaning device are colliding. In an explosive atmosphere, these sparks can be the source of ignition for fire or explosion. Serious injury and death could be the consequence.

- Before commissioning, check the set positions using the teach tool.
- Correct deviations.
- Before carrying out any work, make sure that there is no explosive atmosphere.
- Working on the cleaning device only by trained staff.

WARNING!
Bell disk rotates in the cleaning device

If the bell disk rotates in the cleaning device during the cleaning, sparks may occur between bell disk and inside tube or the lid of the cleaning device. In an explosive atmosphere, these sparks can be the source of ignition for fire or explosion. Serious injury and death could be the consequence.

- Teaching of movements only by trained staff.

WARNING!
Danger due to damaged components

Operating the product with damaged components can result in serious injury or death.

- Check components at specified intervals for damage.
- If you detect unusual operating sounds or any other noticeable aspects, put the product out of service.
- Contact the manufacturer ↗ “Hotline and Contact”.
- Replace damaged components promptly.

**WARNING!****Cleaning medium escaping under pressure**

If the atomizer does not seal the cleaning device, cleaning agent can escape and cause serious injuries or death.

- Only start cleaning if the atomizer is in the cleaning position or no persons are present within a radius of 3 m around the cleaning device.
- Wear specified protective clothing.
- Ensure that the forced ventilation is operational.

**WARNING!****Danger to health from harmful or irritant substances**

Contact with hazardous liquids or vapors, can result in serious injury or death.

- Ensure that the forced ventilation is operational.
- Follow safety data sheets.
- Wear specified protective clothing.

**WARNING!****Danger due to squirting material**

This can cause serious injuries.

- Check the product for leakage during operation.
- Check all connections for proper assembly in operation.

**WARNING!****Robot movement**

If persons are present in the danger zone during the teach sequence, death or serious injuries may ensue.

- Ensure that the robot programmer is able to view the entire danger zone.
- During the teach sequence, make sure that there are no persons present in the danger zone.

**WARNING!****Hot surfaces due to friction between bell disk and lid**

Incorrect settings or wrong attachment of the atomizer or cleaning device may lead to a positioning error during inserting or retracting the atomizer into and out of the cleaning device.

Hot surfaces are the result if bell disk and lid are rubbing against each other. There is a risk of burning.

- Conduct work on the cleaning device only by trained staff.
- Safety shutoff triggers in case of a robot overload, see robot documentation.

**NOTICE!****Damage due to improper shaping air rings**

If shaping air rings are used without seal, cleaning agent enters the interior of the atomizer. It can result in material damage and a poor paint job.

- Use shaping air rings with seal when using the cleaning device. ↪ 13.3 “Accessories”

**NOTICE!****Material damage due to collision**

If atomizer and cleaning device collide, that could cause material damage.

- Before commissioning, check the set positions using the Teach tool.
- Correct deviations.

**NOTICE!****Bell disk is loosening due to an imbalance or the braking process**

The bell disk is loosening from the drive shaft due to imbalance or strong braking during the cleaning. If the bell disk is dropped in the cleaning device, it falls through the cleaning device into the washout. This can cause property damage.

- Conduct work only by trained staff.
- Align cleaning program with the rotational speed of the bell disk.
- Checking and teaching of the timer and movement programs. Document settings.
- Observe atomizer instructions for cleaning and maintenance.

7.2 General notes

Perform the following checks during operation:

- » Cleaning result on the atomizer
- » Sealing
- » Check cleaning device for wear.
- » Operating pressure ↪ 12 “Technical data”
- » Movement and fixed positions of the individual robot programs

7.3 Operating

7.4 Rinsing

7.4.1 Rinsing program

The rinsing programs of the cleaning device are invoked via a parent control. The figures below show recommendations for the design and execution of the rinsing programs.

The duration of the rinsing program depends on the installation, set pressures and media used.
Check purging program with the coating material used. Adjust, if necessary.

The separate steps of the rinsing program can be visualized in the control unit. Bits in various colors represent the statuses within the program:

- » Blue bit: Component is opened.
- » White bit: Component is closed.
- » Green bit: Nominal value is called.
- » Gray bit: Position request or position check

Example of purging program EcoBell2 SL

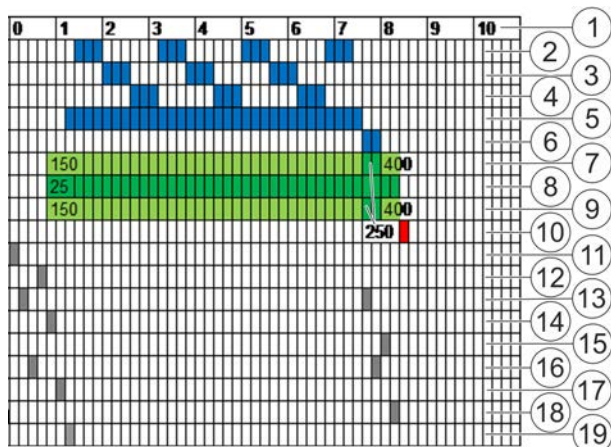


Fig. 16: Example for rinsing program

Item	Detail	Function	Value
1	Duration	–	Seconds

Item	Detail	Function	Value
2	V31	Valve, bottom	6bar
3	V32	Valve, center	6bar
4	V33	Valve, top	6bar
5	BL34	Seal blow air	4bar
6	BL35	Dry blow air	6bar

A standard rinsing program consists of the following steps:

- » Switch off high voltage (11).
- » Move to “AboveBox” position (13).
- » Wait until “AboveBox” position is reached (16)
- » Wait until high voltage is off (12).
- » Move to “InBox” position (14).
- » Wait until the “InBox” position is reached (17).
- » Start shaping air (7+9)
- » Check, if rotational speed is OK (19).
- » Seal with BL 34 cleaning device (5).
- » Clean “InBox” position.
 - » Move to change V31 (2), V32 (3) and V33 (4). Clean the atomizer.
- » Dry with BL 35 atomizer.
 - » Adjust shaping air (7+9), rotational speed (8) remains the same, switch on BL35 (6).
- » Move to “AboveBox” position (13).
- » Increase shaping air (7+9) and rotational speed (8).
- » Wait until “AboveBox” position is reached (16)
- » Move to “InBox” position (14).
- » Wait until the “InBox” position is reached (17).
- » Wait until “AboveBox” position is reached (16)
- » Move to the “Home” position (15).
- » Wait until the “InBox” position is reached (18).
- » Switch off shaping air (7+9) and rotational speed (8).
- » End rinsing program (10).

Adjustments

Different shaping air streams are needed, depending on the atomizer used. Adjusting the shaping air to the corresponding atomizers allows for checking and adjusting the purging programs.

Shaping air when rinsing

Atomizer	LL1	LL2	Speed
EcoBell2 SL EC	150NI	150NI	25,000 1/min
EcoBell2 SL DC	200NI	200NI	55,000 1/min

Shaping air when drying

Atomizer	LL1	LL2	Speed
EcoBell2 SL EC	400NI	400NI	25,000 1/min
EcoBell2 SL DC	400NI	400NI	55,000 1/min

8 Cleaning

8.1 Safety recommendations



WARNING!

Danger of fire and explosion

Sources of ignition in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Before carrying out any work, make sure that there is no explosive atmosphere.



WARNING!

Inadequate qualification

Wrong estimation of dangers can cause serious injury or death.

- Only sufficiently qualified persons may execute all work.
- Some work requires additional qualification. Additional qualifications of specialized personnel are marked with a “+”.



WARNING!

Squirting material and compressed air

When working on the product, spurting material and leaking compressed air can cause irreversible damage to the eyes.

Before working on the product:

- Rinse the system.
- Disconnect the system with the product from material supply and compressed air.
- Secure the system against being switched on again.
- Depressurize the system.
- Wear eye protection.



WARNING!

Danger to health from harmful or irritant substances

Contact with hazardous liquids or vapors, can result in serious injury or death.

- Ensure that the forced ventilation is operational.
- Follow safety data sheets.
- Wear specified protective clothing.



CAUTION!

The pneumatically lockable carriage poses a danger of crushing

The quick action locks on the lid are under tension. The finger could get crushed when working on the lid.

- Wear protective gloves.



NOTICE!

Unsuitable Cleaning Tools

Unsuitable cleaning tools can cause damage.

- Only use cloths, soft brushes and paintbrushes.
- Do not use abrasive cleaning tools.
- Do not use compressed air for cleaning.
- Do not use any thinner spray guns.
- Do not use high pressure for cleaning agents.

! NOTICE!

Material damage due to leakage in blast air ring

Soiled cleaning agent can cause block the fine bores of the blast air ring.

- Ensure that cleaning agent does not reach into the blast air ring.
- Only use soft, lint-free cloth or fine brushes.
- Do not use any hard objects such as wire brushes, scrubbers or scrapers.

! NOTICE!

Material damage due to penetrating auxiliary materials

Auxiliary materials penetrating into pneumatic lines can cause material damage.

- In the event of maintenance work, ensure that no auxiliary material enters the pneumatic lines.
- If auxiliary materials have penetrated, clean lines and dry them.

! NOTICE!

Paint contamination

If the paint residues cannot be removed, there is no guarantee for an error-free functioning. This can cause property damage.

- Clean components.
- Replace any components that cannot be cleaned anymore.

8.2 General notes


Only trained and instructed staff may conduct cleaning work.

Detailed information about the cleaning is given in the operating instructions of the individual components.

Before conducting any work, verify the following:

- » Disconnect assemblies from the energy supply (e.g. pressure). Secure against reconnection.
- » There must be no Ex atmosphere inside of the Ex zone at all times.

Before working on the product:

- » Wear suitable protective equipment (e.g. gloves, protective goggles and safety boots).
- » Use suitable aids (e.g. slings) and tools,  13 "Replacement parts, tools and accessories".
- » Check cleaning device for contamination in order to avoid larger, stubborn contaminants.

Check prior to recommissioning:

- » All assemblies are fully assembled (e.g. covers).
- » All hoses and lines are connected.
- » Check hoses and lines for leakage.
- » Correct grounding of the assemblies
- » Volume resistance test was carried out.
- » Technical ventilation is in operation.
- » No aids (e.g. tools) are lying around in the danger zone



The period of time contaminants require to deposit on assemblies depends on the operating conditions. If 2K coating materials are used, the Cleaning Device must be cleaned and maintained more frequently.

If the personnel has sufficient experience in operating the cleaning device, the intervals may be adjusted to the individual needs.

8.3 Cleaning



Check cleaning device regularly for contamination in order to avoid larger, stubborn contamination.

- Clean contaminated components using a moist cloth.
- Clean the entire cleaning device regularly.

Personnel:

- » Cleaning staff

Protective equipment:

- » Protective gloves
- » Eye protection
- » Respirator mask

Requirements:

- » Ensure a non-explosive atmosphere.
1. Clean the cleaning device using a moist, lint-free cloth or a fine brush; clean carefully starting outside.
 2. Clean blow air ring with a suitable tool (nozzle needle or round brush).
 3. Ensure that all bores are free from residues.

4. The cleaning device is purged with cleaning medium during operation.
If necessary, remove the following components.
Clean components in a cleaning bath:
- » Blow air ring
 - » Drop separator
 - » Purging tube
 - » Lid
5. **! NOTICE!**
Non-conductive materials such as compressed air hoses and media lines, must be cleaned using a moist cloth.
Clean compressed air hoses and media lines using a moist cloth.
6. If necessary, apply technical petrolatum jelly on the cleaning device to protect from external factors.

9 Maintenance

9.1 Safety notes

EX WARNING!

Danger of fire and explosion

Sources of ignition in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Before carrying out any work, make sure that there is no explosive atmosphere.

EX WARNING!

Danger of sparking if components are falling down

Sparking can occur if components fall onto the steel grates. Sparking occurring in an explosive atmosphere can cause fire or explosion. It can cause serious injuries or death.

- Working on the product only by trained staff.
- Conduct work on the product only outside of Ex zones.

EX WARNING!

Risk of injury from unsuitable replacement parts in explosive areas.

Replacement parts not compliant with the specifications of the ATEX guidelines can cause explosions in an explosive atmosphere. Serious injuries and death can be the consequence.

- Use exclusively original replacement parts.

! WARNING!

Squirting material and compressed air

When working on the product, spurted material and leaking compressed air can cause irreversible damage to the eyes.

Before working on the product:

- Rinse the system.
- Disconnect the system with the product from material supply and compressed air.
- Secure the system against being switched on again.
- Depressurize the system.
- Wear eye protection.

! WARNING!

Unsuitable tools in hazardous areas.

Tools that do not have Ex permission can generate sparks and cause a fire or an explosion. Serious injuries or death can result.

- If possible, carry out cleaning and maintenance work outside the Ex zones.
- For activities within the Ex zone, use tools with the corresponding Ex labeling.

! WARNING!

Inadequate qualification

Wrong estimation of dangers can cause serious injury or death.

- Only sufficiently qualified persons may execute all work.
- Some work requires additional qualification. Additional qualifications of specialized personnel are marked with a “+”.

! WARNING!

Danger to health from harmful or irritant substances

Contact with hazardous liquids or vapors, can result in serious injury or death.

- Ensure that the forced ventilation is operational.
- Follow safety data sheets.
- Wear specified protective clothing.

⚠ WARNING!

Lifting heavy loads

Lifting heavy loads could cause back injuries, crushing or compression. Serious injuries can be the consequence.

- Lift heavy loads only by using suitable hoists. ↪ 12.1 “Dimensions and weight”
- Conduct work with two persons present only.

⚠ CAUTION!

The pneumatically lockable carriage poses a danger of crushing

The quick action locks on the lid are under tension. The finger could get crushed when working on the lid.

- Wear protective gloves.

9.2 General notes

Only trained and instructed staff may conduct maintenance work.

Detailed information about the maintenance is given in the operating instructions of the individual components.

Before conducting any work, verify the following:

- » Disconnect assemblies from the energy supply (e.g. pressure). Secure against reconnection.
- » There must be no Ex atmosphere inside of the Ex zone at all times.

9.3 Maintenance schedule



The specified maintenance intervals are recommendations only. The intervals may vary depending on the operating conditions.



If a maintenance assistant is used in the system visualizer, the maintenance intervals of the maintenance assistant are valid.

Before working on the product:

- » Wear suitable protective equipment (e.g. gloves, protective goggles and safety boots).
- » Use suitable aids (e.g. slings) and tools, ↪ 13 “Replacement parts, tools and accessories”.
- » Use only approved replacement parts and accessories, ↪ 13 “Replacement parts, tools and accessories”.
- » The specified maintenance intervals must be adhered to and documented.
- » Check cleaning device for contamination in order to avoid larger, stubborn contaminants.

Check prior to recommissioning:

- » All assemblies are fully assembled (e.g. covers).
- » All hoses and lines are connected.
- » Check hoses and lines for leakage.
- » Correct grounding of the assemblies
- » Volume resistance test was carried out.
- » Technical ventilation is in operation.
- » No aids (e.g. tools) are lying around in the danger zone

Interval	Maintenance work
weekly	Clean blow air ring and check for damage ↪ 8.3 “Cleaning”.
	Check collision protection for function, soiling and damage.
monthly	Clean cover hood and check for damage ↪ 8.3 “Cleaning”.
	Check cleaning nozzles for soiling and damages.
	Check cleaning container for soiling and damages.
	Check hose connections. Replace, if necessary ↪ 9.4.1 “Dismantling”.
	Check system pressure ↪ 6.4 “Setting operating parameters”.
	Check process valves and media lines for operation and for tightness.

9.4 Dismantle and assemble

9.4.1 Dismantling

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots
- » Protective gloves
- » Eye protection

Requirements:

- » Ensure a non-explosive atmosphere.
- » All lines have been rinsed and de-pressurized.
- » Connections are disassembled.

Disassemble cover hood.



Fig. 17: Disassemble cover hood.

1 Keyhole connection

1. Push up cover hood. Pull it off the cleaning device.

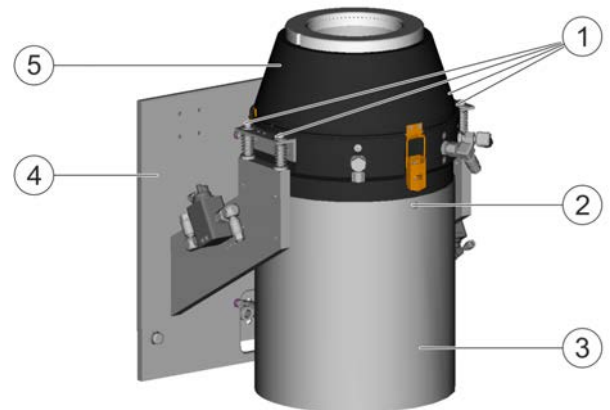


Fig. 18: Disassemble tube

2. Loosen pipe (3) with three screws (2) from the cleaning device (5). Remove pipe towards the bottom.

3. Loosen screws (1). Remove cleaning device (5) from the console (4).

Dismantling Housing

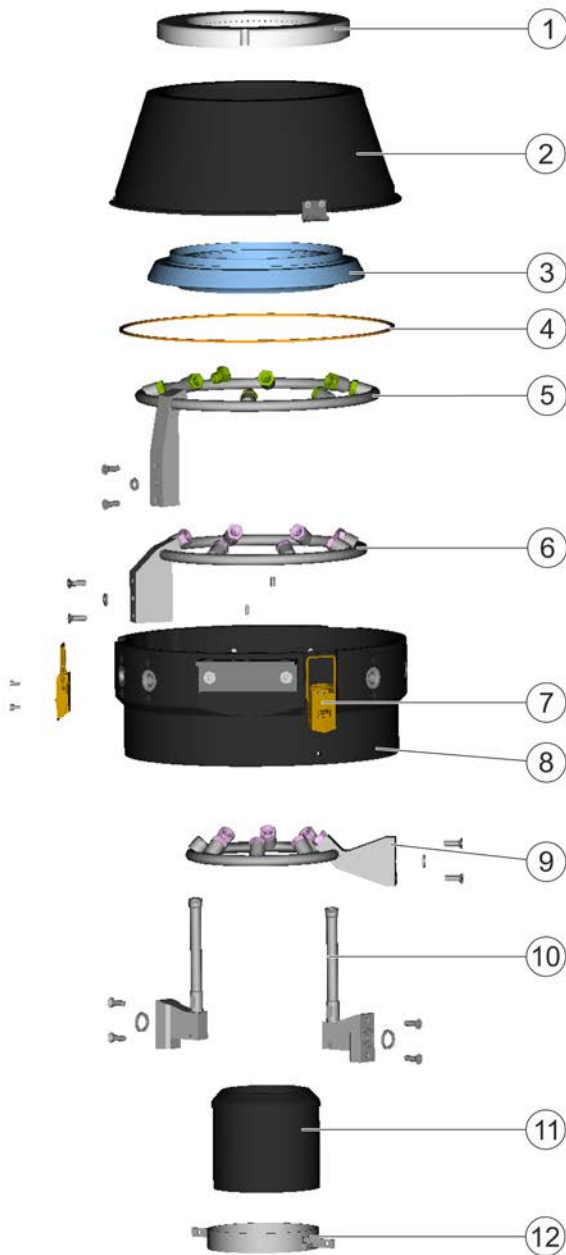


Fig. 19: Exploded-view drawing

4. Unlock and loosen three quick release fasteners (7).
5. Lift up cover (2) with blow air ring (1), (3) and flat seal (4).

6. Remove two screws on the upper nozzle ring (5).
7. Remove top nozzle ring (5) from the housing.
8. Remove two screws on the middle nozzle ring (6).
9. Remove middle nozzle ring (6).
10. Remove two screws on the lower nozzle ring (9).
11. Remove nozzle ring (9).
12. Thread-off screws on the air flow tubes (10) of the blow air and clearance air.
13. Remove air flow tubes (10) with inner tube support bracket (11) from the housing.
14. If necessary, unscrew threaded pins on support bracket for inner tube (11).
15. Remove inner tube support bracket (12) and inner tube (11).

Dismantle blow air ring

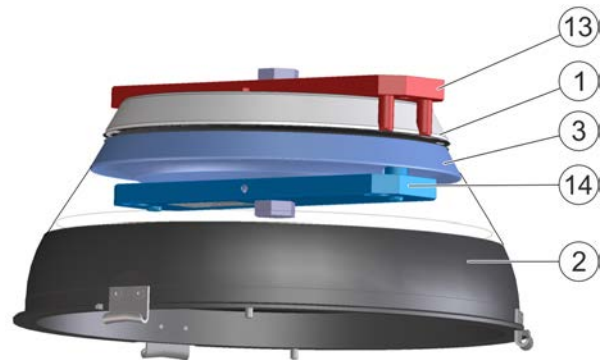


Fig. 20: Disassemble blow air ring

1. Blow air ring top part
2. Cover (top part transparent)
3. Blow air ring bottom part
13. Assembly tool for blow air ring top part
14. Assembly tool for blow air ring bottom part
16. Guide special tool for bottom of blow air ring (14) from below into the lid (2). Fit it on the assembly bore.
17. Set special tool for top side of blow air ring (13) from above on the assembly bores on the blow air ring (1).

18. Use an open-end wrench and a ratchet, including socket, on the hexagonal nuts of the special tool. Unscrew blow air ring (1) from the lid (2).
⇒ The cleaning device is dismantled.
19. Clean individual parts ↪ 8.3 "Cleaning".

9.4.2 Assembly

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots
- » Protective gloves
- » Eye protection

Assembling Housing

1. Screw inner tube support bracket (12) on the air flow tubes (10) with threaded pins and tighten.
2. Fasten inner tube (11) on inner tube support bracket (12) using threaded pins.
3. Screw air flow tubes (10) with screws into the housing (8).
4. Tighten lower nozzle ring (9) with screws into the housing (8).
5. Tighten middle nozzle ring (6) with screws into the housing (8)
6. Tighten top nozzle ring (5) with screws into the housing (8).

Assembling lid

7. Place top part of the blow air ring (1) on the cover (2).
8. Insert lower part of blow air ring (3) into the cover (2) from below.
9. Use an open-end wrench and a ratchet, including socket, on the hexagonal nuts of the special tool to tighten the blast air ring (1), (3) with 15Nm.
10. Place flat seal (4) on the housing (8).
11. Place cover (2) on the housing (8).
12. Unlock and loosen three quick release fasteners (7).

Assemble bracket

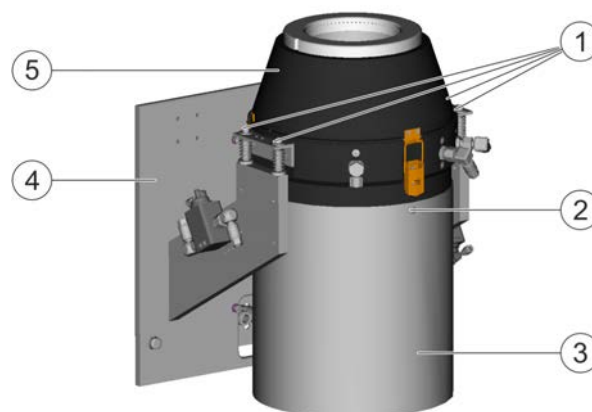


Fig. 21: Assemble bracket

13. Place the cleaning device (5) on springs. Fasten with screws (1).
14. Assemble pipe (3) with three screws (2) to the cleaning device (5).

Assemble cover hood

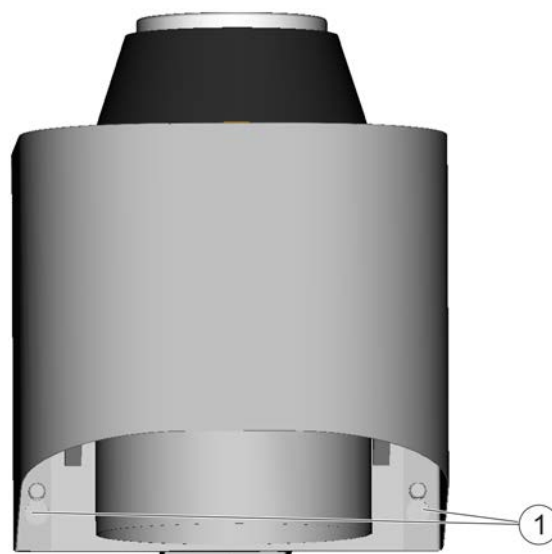


Fig. 22: Assemble cover hood

- 1 Keyhole connection
15. Fit cover hood to the screws (1). Push down above keyhole connection.
⇒ Cleaning device is assembled.

10 Faults

10.1 Safety recommendations

DANGER!

Danger of fire and explosion

If the atomizer moves into the cleaning device with high voltage, sparking occurs. This can result in fire or explosion.

- Use safety features that check secure high voltage dissipation.
- At the time of initial commissioning, ensure that the potential has fallen below the threshold value of 0.24mJ, before the atomizer enters the cleaning device.
- Do not modify safety devices during operation.
- Alterations or modifications on the application engineering can change the system capacity. If necessary, adjust safety devices.

DANGER!

Ignition due to electrostatic discharge

Electrostatic discharge can ignite the cleaning agent-air mixture. It can cause serious injuries or death.

- Use safety features that check secure high voltage dissipation.
- At the time of initial commissioning, ensure that the potential has fallen below the threshold value of 0.24mJ, before the atomizer enters the cleaning device.
- Do not modify safety devices during operation.
- Alterations or modifications on the application engineering can change the system capacity. If necessary, adjust safety devices.

WARNING!

Danger of fire and explosion

Sources of ignition in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Before carrying out any work, make sure that there is no explosive atmosphere.

WARNING!

Bell disk rotates in the cleaning device

If the bell disk rotates in the cleaning device during the cleaning, sparks may occur between bell disk and inside tube or the lid of the cleaning device. In an explosive atmosphere, these sparks can be the source of ignition for fire or explosion. Serious injury and death could be the consequence.

- Teaching of movements only by trained staff.

WARNING!

Hot surfaces due to friction between bell disk and lid

Incorrect settings or wrong attachment of the atomizer or cleaning device may lead to a positioning error during inserting or retracting the atomizer into and out of the cleaning device. Hot surfaces are the result if bell disk and lid are rubbing against each other. There is a risk of burning.

- Conduct work on the cleaning device only by trained staff.
- Safety shutoff triggers in case of a robot overload, see robot documentation.

WARNING!

Danger due to damaged components

Operating the product with damaged components can result in serious injury or death.

- Check components at specified intervals for damage.
- If you detect unusual operating sounds or any other noticeable aspects, put the product out of service.
- Contact the manufacturer “Hotline and Contact”.
- Replace damaged components promptly.

NOTICE!

Material damage due to collision

If atomizer and cleaning device collide, that could cause material damage.

- Before commissioning, check the set positions using the Teach tool.
- Correct deviations.

10.2 Behavior during faults

If faults occur:

- » Shut down the power supply. Secure against reconnection.
Verify that no current is present in cables.
- » Disconnect the compressed air supply and material feed. Secure against reconnection.

Depressurize the lines.

- » Follow the defects table to correct the fault.

10.3 Fault Indicator

Faults are indicated in the fault report line of the visualizer in text form.

10.4 Defects table

Fault description	Cause	Remedy	Personnel
Poor cleaning results	Nozzle ring defective	Replace nozzle ring ↪ 10.5.1 “Clean the nozzle ring”.	Mechanic
	Input pressure does not match.	Check operating parameters ↪ 6.4 “Setting operating parameters”.	Mechanic
	Purging program faulty	Check purging program ↪ 7.4.1 “Rinsing program”.	System operator
	Cleaning interval too long	Increase cleaning interval ↪ 7.4.1 “Rinsing program”.	System operator
	High voltage is not discharged. Thinner disengaging valve is closed.	Adjust timer program (e.g. safety timer). Switch off high voltage, before approaching the “AboveBox” position. ↪ 7.4.1 “Rinsing program”.	System operator
Atomizer is not dried completely.	Seal on the air riser tube damaged	Replace seal ↪ 10.5.2 “Replace seals on the air riser tube.”.	Mechanic
	Insufficient drying air	Check operating parameters ↪ 6.4 “Setting operating parameters”.	Mechanic
	Bores on blow air ring clogged	Clean blow air ring ↪ 8.3 “Cleaning”.	Mechanic
Cleaning agent sprays upwards.	Blast air ring does not properly seal towards the atomizer.	Check “InBox” position ↪ 6.5 “Check “InBox” position.”.	System operator
	Blow air pressure on blow air ring is too low.	Check blow air pressure settings. Check operating parameters ↪ 6.4 “Setting operating parameters”.	Mechanic
	Atomizer is not in cleaning position.	Set “InBox” position ↪ 6.5 “Check “InBox” position.”.	System operator
Error message from speed monitoring	Rotating bell disk is decelerated, e.g. due to collision.	Check motion sequences and parameters.	Robot programmer

10.5 Troubleshooting

10.5.1 Clean the nozzle ring

Personnel:

- » Mechanic

Protective equipment:

- » Protective gloves
- » Protective workwear
- » Anti-Static Safety Boots
- » Eye protection

Requirements:

- » Ensure a non-explosive atmosphere.
- » Cleaning device has been purged and disconnected from material supply.
- » Lines are depressurized.
- » Cleaning device is dismantled ↪ 9.4.1 “Dismantling”.

1. Unscrew nozzles from the nozzle ring.
2. Clean nozzles using a moist cloth.
3. Replace damaged nozzles.
4. Apply screw locking onto the threads ↪ 12.6 “Operating and auxiliary materials”.
5. Screw nozzles onto the threads.
6. Assemble cleaning device ↪ 9.4.2 “Assembly”.

10.5.2 Replace seals on the air riser tube.

Personnel:

- » Mechanic

Protective equipment:

- » Anti-Static Safety Boots
- » Protective gloves
- » Eye protection

Requirements:

- » Ensure a non-explosive atmosphere.
1. Remove cover hood on cleaning device.
 2. Open quick release fasteners on cleaning device.
 3. Remove lid from cleaning device.

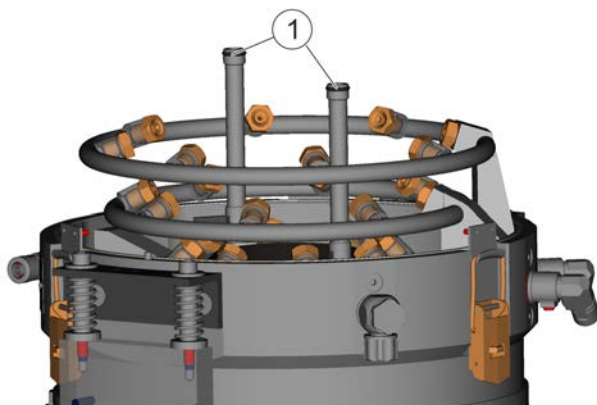


Fig. 23: Replace seals

4. Replace seals (1).

5. Set lid on the cleaning device.
6. Close quick release fasteners on cleaning device.
7. Set cover hood onto the cleaning device.
 - ⇒ If the cover hood seat closes flush with the bracket, the seat is correct.

11 Disassembly and Disposal

11.1 Safety recommendations

⚠ WARNING!

Risk of injury due to escaping material and compressed air

Escaping compressed material can cause serious injury.

Before carrying out any work:

- Disconnect the system, in which the cleaning device is installed, from compressed air and material supply.
- Secure the system against being switched on again.
- Depressurize the lines.

11.2 Disconnecting connections

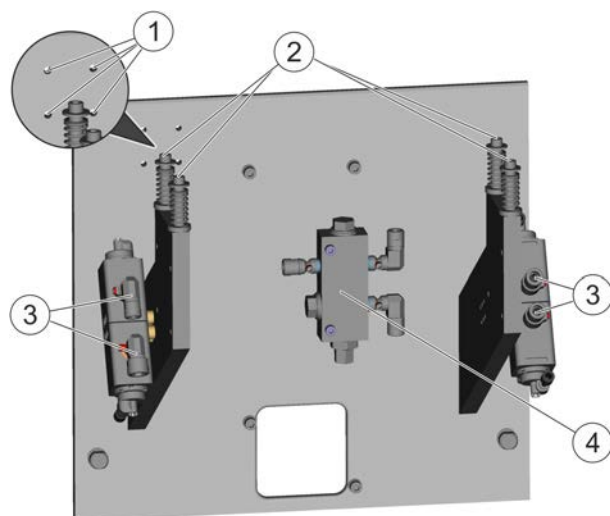


Fig. 24: Bracket with attachment

- 1 Grounding connections
- 2 Springs
- 3 Cleaning medium valve
- 4 Air manifold

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots
- » Protective gloves

Requirements:

- » Ensure a non-explosive atmosphere.
1. Disconnect compressed air from the manifold for air (4).
 2. Disconnect material supply from the valves for cleaning agents (3).
 3. Disconnect ground connections (1).

11.3 Disassembly

Personnel:

- » Mechanic

Protective equipment:

- » Protective workwear
- » Anti-Static Safety Boots
- » Protective gloves

Requirements:

- » Cleaning device is disconnected from the material supply and compressed air supply and depressurized.
- » Cleaning device is cleaned of all residues ↪ 8.3 "Cleaning".

1. Disassemble hoses and components ↪ 9.4.1 "Dismantling".

11.4 Disposal

ENVIRONMENT!

Incorrect disposal

Improper waste disposal threatens the environment and prevents re-use and recycling.

- Always dispose of components in accordance with their characteristic.
- Collect leaked out operating and auxiliary materials completely.
- Dispose of operating and auxiliary materials according to the disposal provisions in force.
- In case of doubt, refer to the local disposal authorities.

12 Technical data

12.1 Dimensions and weight

Detail	Value
Height	488mm
Width	395mm
Depth	379mm
Cleaning device, weight	15 kg
Support bracket, weight	11kg

12.2 Connections

Detail	Value
Cleaning agent connection V31-33	Screw-in plug connection D12 (6-8bar)
Drying air BL34/35	Screw-in plug connection D12 (6-8bar)
Control air V31-33 and FGV	4 x screw-in plug connector D6 (6bar)

Detail	Value
Cleaning medium leakage	Open pipe (diameter 254mm) Optionally, a funnel or container can be placed beneath it.
Drying air leakage	Open bore rim (Mechanical point of contact between atomizer and cleaning device possible)
Optional: Control unit for cleaning device	7 x solenoid valve connection (break contact closed, 2-wire cable (+24V / 0V))

12.3 Operating conditions

Detail	Value
Ambient temperature, min.	15°C
Ambient temperature, max.	40°C
Recommended ambient temperature	23 ± 3°C
Humidity	35 - 90%
Recommended humidity	65 ± 5%
Ex labeling	⊕ II 2G Ex h IIA T6 Gb X

12.4 Operating values

Compressed air

Detail	Value
Compressed air operating pressure, min.	4bar
Compressed air operating pressure, max.	6bar

Cleaning

Detail	Value
Cleaning agent pressure, min.	6bar
Cleaning agent pressure, max.	10bar
Cleaning agent temperature, max.	60°C
Cleaning quantity per cleaning sequence	500-600mL
Total air flow, max.	1000NI/min
Cleaning duration	20-30s

Spray angle

Detail	Value
Lower nozzle ring	45°
Middle nozzle ring	45°
Top nozzle ring	60°

Shaping air

Detail	EcoBell2 SL EC	EcoBell2 SL DC
Shaping air	150NI	200NI
Bell disk rotational speed	25,000RPM	55,000 1/min

12.5 Compressed air quality

- » Purity classes ISO 8573-1:2010 1:4:1
- » Limitations for purity class 4 (pressure dew point max.):
 - » ≤ -3 °C at 7 bar absolute
 - » ≤ +1 °C at 9 bar absolute
 - » ≤ +3 °C at 11 bar absolute

12.6 Operating and auxiliary materials

Description	Type
Screw locking, intermediate strength	Loctite type 243
Cleaning agents	Purging agent of the system, matched for the paint system used

12.7 Material specification

Material

Suitable Material:

- » Flammable and non-flammable coating materials
- » 1K coating materials and 2K coating materials
- » Cleaning media and solvent
Cleaning media of the explosion group IIA
- » Master lacquer
- » 2K hardener

Material specifications:

- » Vapor pressure max 0.5bar above atmosphere
- » Ignition temperature >50°C
- » Temperature, max. 50 °C, always 15K below flashpoint of cleaning media

12.8 Positions

The values in the table are measured in the “InBox” position and refer to the teaching tool without Z correction ↪ 13.2 “Tools”. The position values are measured in the view “Coordinate world” in Z direction.

Inbox	EcoBell2 SL EC	EcoBell2 SL DC
WaitPos1	+ 75mm	+ 75mm
WaitTime1	3s	3s
WaitPos2	+ 95mm	–
WaitTime2	3s	–
FastPos	+ 185mm	+ 185mm
AboveBox	+ 285mm	+ 285mm
Velocity “Inbox” to “FastPos”	30mm/s	30mm/s
Velocity from “FastPos” to “AboveBox”	200mm/s	200mm/s

13 Replacement parts, tools and accessories

13.1 Spare part

Item numbers relate to the ↪ 9.4.1 “Dismantling”.

Item	Replacement parts	Material no.
1	Blow air ring, top part	M35010180
3	Blow air ring, bottom part	M35010181
7	Fastener	M53010004
–	Round jet nozzle 45°	M09090005
–	Round jet nozzle 60°	M09090006
–	O-Ring 6.3 x 9.5x1.8	M08030434
–	Control valve	N32040084

13.2 Tools

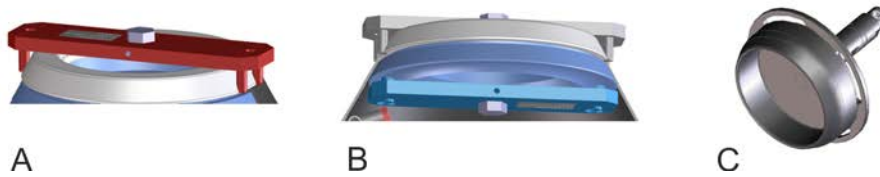


Fig. 25: Tool

Item	Denomination	Quantity	Material no.
A	Cleaner tool interior	1	W02020123
B	Cleaner tool exterior	1	W02020124
C	Setting tool EcoBell , EcoBell2 SL	1	W17150009



Tightening torque when using special tools for low air ring is 15Nm.

13.3 Accessories

Detail	Value
Assembly support bracket	M19023576
Control unit for cleaning device	N32220006

13.4 Order


WARNING!
Risk of injury from unsuitable replacement parts in explosive areas.

Replacement parts not compliant with the specifications of the ATEX guidelines can cause explosions in an explosive atmosphere. Serious injuries and death can be the consequence.

- Use exclusively original replacement parts.


WARNING!
Risk of injury from unsuitable replacement parts

Parts of third party suppliers may not bear the loads. Serious injuries and death can result.

- Only use original replacement parts.

Ordering replacement parts, tools and accessories as well as information on products that are listed without order number ↪ “Hotline and Contact”.

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Translation of the original operation manual

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