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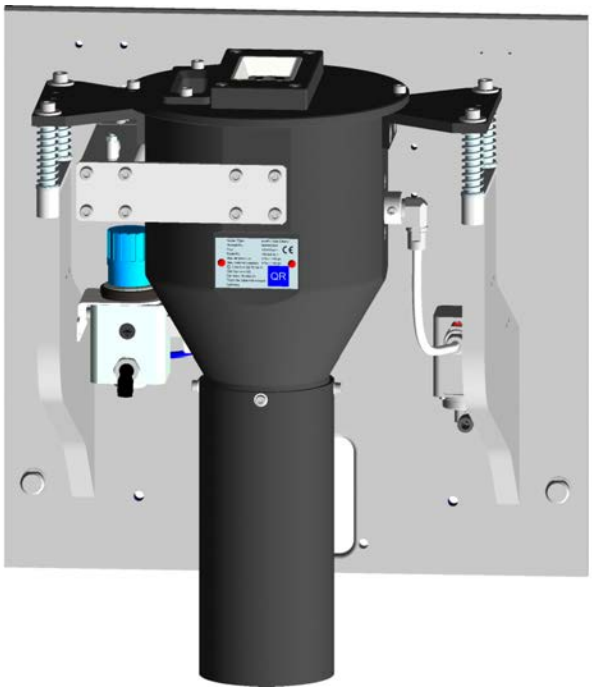

EcoPaintJet Cleaner

Cleaning device for EcoPaintJet applicators

Operation manual

MCD00014EN, V03

N05060001, N05060002

www.durr.com

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:

N05060001 EcoPaintJet Cleaner F.JET	
N05060002 EcoPaintJet Cleaner F.PRO	

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

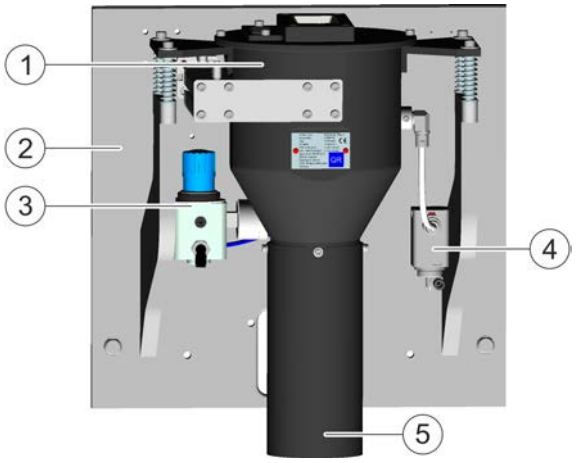

Fig. 1: Overview

1 Cleaning container
2 Console
3 Compressed air regulator
4 Valve cleaning agents
5 Disposal tube

1.2 Short description

The **Eco**PaintJet cleaner (in the following “cleaning device”) is used for automatic cleaning of part areas of the **Eco**PaintJet applicator. In addition, media from the purging process and the color change process with 1K paints are disposed.

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 cleaning device **Eco**PaintJet Cleaner is only intended for cleaning **Eco**PaintJet applicators. The use is only permitted in industrial plants and within the specified technical data ↳ 12 “Technical data”.

Use the cleaning device only under the following conditions:

- Use in non-explosive areas
- Use in explosive areas of Ex zone 2
- Use in 1K paint systems and 2K paint systems with automatic application without high voltage
- Use in coating booths, which are compliant with DIN EN 16985.
- Use with forced ventilation system
- Use of detergents and cleaning agents, which are approved for flammable and non-flammable, liquid coating materials of explosion group IIA

Wrong use

If used improperly, it can cause serious injuries.

Examples of wrong use are:

- Use in explosive areas of Ex zone 0 or Ex zone 1
- Operation outside of the painting booth
- Use of unapproved materials
- Operation without sealing between application device and seal
- Operation with high voltage
- Unauthorized modifications
- Use of component and parts that are not approved by Dürr Systems.
- Operation without mechanical ventilation
- Operation without entry protection

Ex labeling

Ex II 3G Ex h IIA T4 Gc X

II - Device group II: all areas except mining

3G - Device category: 2 (for gaseous atmosphere)

h - Ignition protection category

IIA - Explosion group

T4 - Temperature class

Gc - Device category and device protection level

X - Restriction: Operation at an ambient temperature of between 15°C and 40°C.

2.3 Safety devices

2.3.1 Overview

The operator must install safety related device 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 related devices for the complete system:

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

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

The control must meet the requirements of Performance Level d of EN 13849-1 “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”.

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

- Flammable fluid coating materials
  - EN 50176 “Stationary electrostatic application equipment for flammable liquid coating material - Safety requirements”.
- Non-flammable fluid coating materials:
  - EN 50348 “Stationary electrostatic application equipment for non-flammable liquid coating material - Safety requirements”

2.3.2 Commissioning by Dürr Systems

If the entire system is supplied by Dürr Systems, the integration of the cleaning device into the safety related devices is conducted by Dürr Systems.

Dürr Systems will carry out the assembly and initial commissioning.

2.3.3 Commissioning by operator

The cleaning device is an incomplete machine in the sense of EC Machinery Directive, which must be integrated in a total system.

If the cleaning device is integrated into a system not supplied by Dürr Systems, the integration of the cleaning device is conducted by the operator or by an integrator commissioned by the operator.

The integrator is responsible for the assembly and initial commissioning and they must ensure that all requirements and safety related devices are met and properly implemented.

Process monitoring

The application device must be integrated in the safety concept and fire protection concept of the system. This includes operation in a closed coating booth with technical ventilation, start protection and entry protection.

Grounding

The paint object must be grounded during the coating. The ground-leakage resistance at a test voltage of up to 1000V may not exceed 1MΩ.

Fire protection

The coating booth must have a fire protection system. In the event of fire, the fire protection system shall be activated automatically and without delay. The supply of paint, thinner and compressed air must be switched off automatically.

Emergency stop function

The cleaning device must be integrated into the emergency stop function of the Station.

The emergency stop function affects the entire Station.

- Stop movements of the robots.
- Line voltages of the drives switch off.
- Pressure of the control air switches off. There can still remain a residual pressure in the compressed air lines.
- Drive of the process components switches off. The pressure remains in the material lines.
- The functional valves of the cleaning device are closed and vented:
  - Control air supply for detergent SDD1
  - Dry air TDD1
  - Cylinder functions RG1ZY1R/ RG1ZY1R

WARNING!

Voltage

After actuating the emergency stop function, the Station is not in an operating mode suitable for maintenance, reconditioning or cleaning. It can cause serious injuries or death.

- Observe the working steps described in the instructions, to switch off the Station.
- If the Station is again in proper state, acknowledge emergency stop of the Station.
- Enter the Station only if the “Cleaning” or “Maintenance” operating mode is active.

Parent control

The integrator 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.

The Cleaning Device must be integrated into an existing external control system. The integrator must implement the visualizer in the external control system.

If there are changes or modifications, please contact your dealer or sales partner ↳ “Hotline and Contact”

2.4 Residual risks

Explosion

Sparks, open flames and hot surfaces can cause explosions in explosive atmospheres. Serious injury and death could be the consequence.

- Before carrying out any work on the product, ensure a non-explosive atmosphere.
- Do not use sources of ignition and open light.
- Do not smoke.
- Ground the product.
- Wear suitable protective equipment.

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

- Ensure that the flashpoint of the cleaning agent is at least 15K above the ambient temperature or clean Cleaning Device at the cleaning areas with active technical ventilation, in painting booths, according to EN 16985.
- Observe explosion group of the coating materials and their detergents and cleaning agents.
- 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.
- Ground the product.
- Wear suitable protective equipment.

Escaping material

Material escaping under pressure can cause serious injuries.

Before working on the product:

- Disconnect the system, in which the product is installed, from material supply system.
- Depressurize the lines.
- Secure the system against being switched on again.

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Cleaning Device Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective equipment.

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.

2.5 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.

Incorrect operating parameters

Change in the operating parameters can cause property damage.

- Change in the operating parameters is only allowed if done by authorized personnel.
- Follow technical data ↳ 12.4 “Operating values”.

Hardening material

If the material in the cleaning device and on the applicator hardens, the product will be damaged and the process will be disrupted.

The applicator remains in the cleaning device until the following processes are completed:

- Purge applicator.
- Load applicator.
- Cleaning device cleans.

2.6 Conduct in the event of a hazardous situation

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

Basically:

- Shut down the power supply.
- Secure against reconnection.
- Discharge the residual energy.
- Verify no current is present.
- Close media lines.
- Relieve the lines.

2.7 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 craftmanship.

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 has knowledge in the following specialized areas:

- Advanced knowledge in robot programming
- System knowledge of robot control

Furthermore, the robot programmer possesses the following knowledge:

- Guidelines, standards and rules of engineering
- Local technical measures for occupational safety and health
- Valid accident prevention regulations

+ 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".

2.8 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 Cleaning container

3.1.1 Lid

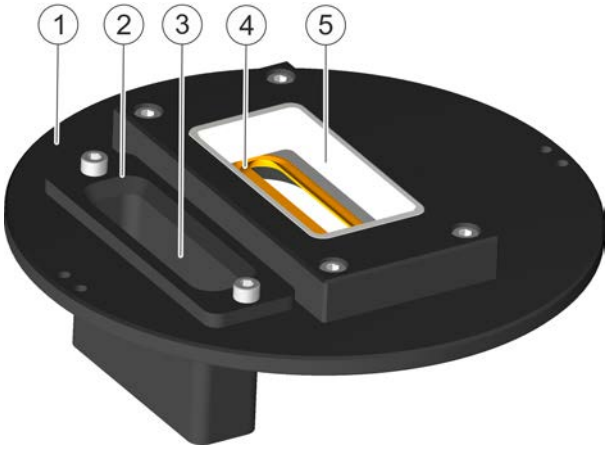

Fig. 2: Lid of cleaning container

The lid (1) has a test opening (3) for testing the spray pattern of the applicator. A purging tube (2) is screwed into the test opening to protect the flat spray nozzles in the cleaning container from contamination. The applicator moves to the applicator mount (5). The seal (4) seals the applicator with the cleaning container.

3.1.2 Housing

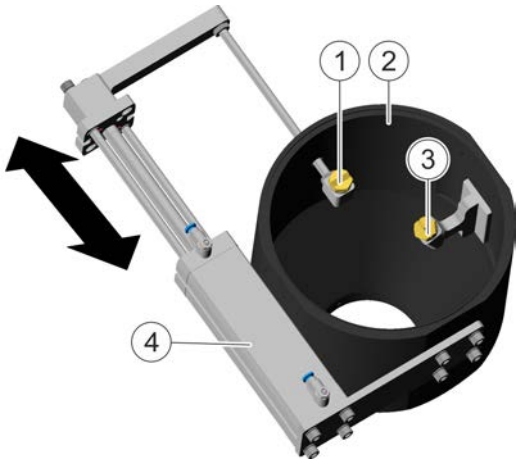

Fig. 3: Cleaning container housing

The housing (2) contains the cleaning nozzle (3) and the blow dry nozzle (1). The pneumatic cylinder (4) is used to move the blow dry nozzle (1) linearly.

3.1.3 End position sensors

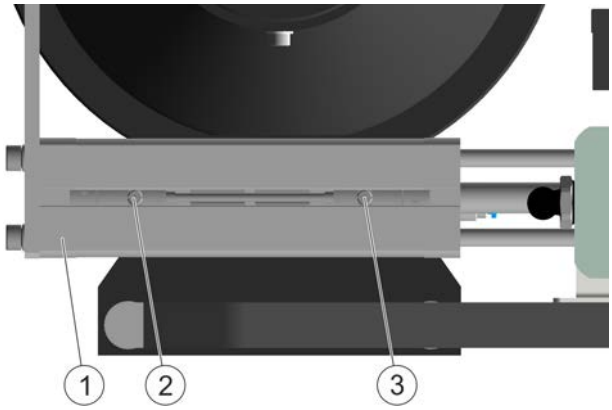

Fig. 4: End position sensors

Two sensors are at the bottom side of the pneumatic cylinder (1). The purging program queries the end position sensors if the end position is actually reached. When the pneumatic cylinder has reached the end positions “moved out” (3) or “moved in” (2), the end position sensors close. The cylinder moves back again.

Optional
The usage of the end position sensors is optional. If the end position sensors are not used, the purging program must be designed with time control.

NOTICE!

Poor painting results and process disruptions

Contamination or wrongly adjusted throttles cause the pneumatic cylinder to run slowly and to be unable to reach the end positions within the specified period. The requirement to move back comes too early.

With end position sensors: Error message on the visualizer “Time-out”

Without end position sensors: Applicator has residual moisture. This affects the painting result and it may lead to process disruptions.

- Check cleaning procedure und cleaning result regularly.
- Clean cleaning device regularly.
- Adjust throttles correctly.

3.2 Console

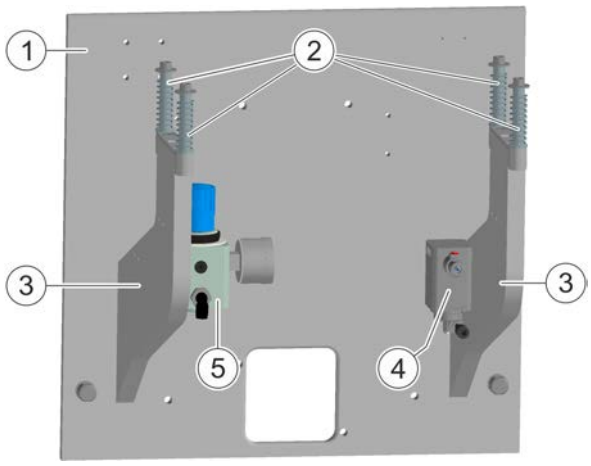

Fig. 5: Console

The console consists of a base plate (1), the corners (3) with the spring mounted mounts (2) for the cleaning device. In addition, a compressed air controller (5) and the cleaning agent valve (4) are screwed onto the console. With the console, the cleaning device is screwed onto a wall, a support bracket or a frame.

3.3 Compressed air controller

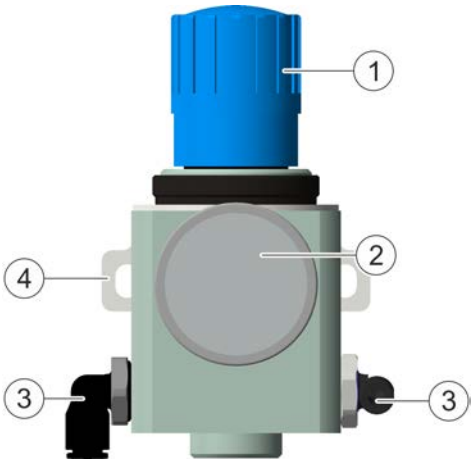

Fig. 6: Compressed air regulator

The compressed air controller consists of a rotary knob (1), the pressure gauge (2), the pneumatic connections (3) and the fastening bracket (4). For details on the operating principle and operation, see the manufacturer’s documentation.

3.4 Cleaning agent valve

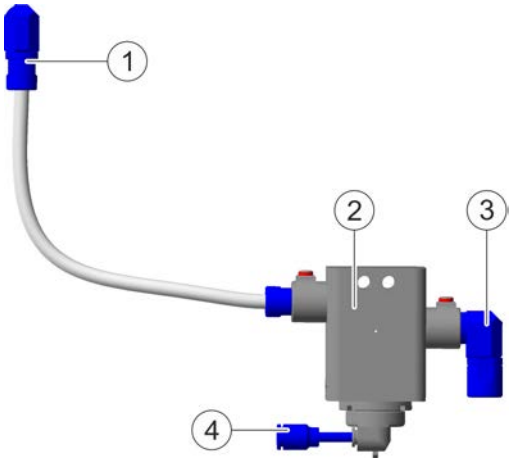

Fig. 7: Cleaning agent valve

The cleaning agent valve is loaded with cleaning agent at the connection (3). If the cleaning agent valve is switched onto the control air connection (4), the cleaning agent flows via the connection (1) to the cleaning nozzle.

Follow the manufacturer’s documentation.

3.5 Disposal tube

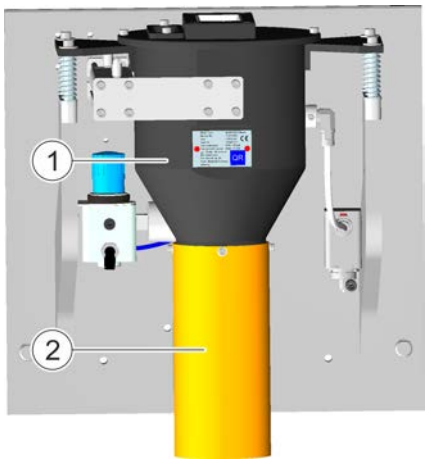

Fig. 8: Disposal tube

The disposal tube (2) is an extension of the cleaning container (1) and it is fastened by four screws. The disposal tube (2) serves as spray protection and leads away the contaminated cleaning agent and the coating material. Under the disposal tube, a funnel or another reception facility is installed at a distance of 100mm. Alternatively, the mixture directly flushes the washout.

Connect the hopper to the collection line:
To prevent the pipe line from clogging, a sufficient gap must be maintained in the piping with DN40.

3.6 Purge and load applicator

The purging and loading processes are performed inside of the cleaning device. To prevent the applicator from remaining contaminated, the applicator remains in the cleaning position between the processes.

Process flow:

- Applicator moves to “ApplClean” cleaning position.
- Applicator purges and/or loads the coating material.
- Applicator is cleaned in the cleaning device.
- Applicator moves to the inspection opening.
- Spray check starts.
  - Inspection OK
  - Inspection not OK:
    Cleaning and spray check are repeated.

NOTICE!

Production disruption due to faulty processes

If the applicator is moved out of the cleaning device between the processes, both cleaning device and applicator become contaminated. Proper functioning of cleaning device and applicator is affected. Application result is deficient.

- Have processes changed by trained staff only.
- Applicator remains in cleaning position while the processes are performed without any change of position inside of the cleaning device.
- After purging and loading, the applicator must be cleaned by the cleaning device.

Follow operating instructions of the application device.

3.7 Cleaning procedure

The applicator moves slowly, centrically, symmetrically and in parallel to the applicator mount. If the calibrated cleaning position is reached, the cleaning process starts. While in cleaning position, the springs are deflected by 2.5mm and the gap between applicator and applicator mount is closed by the seal.

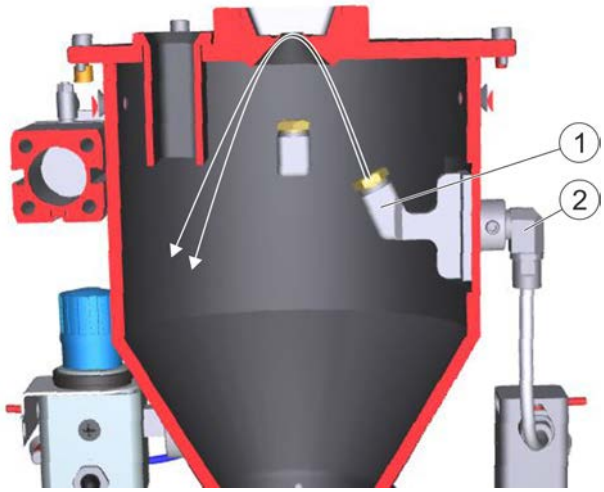

Fig. 9: Cleaning container (sectional view)

If the control valve opens, the cleaning agent flows via the connection (2) to the cleaning nozzle (1). The cleaning nozzle (1) purges paint residues from the surface of the applicator. The contaminated cleaning agent drains downwards via the disposal tube.

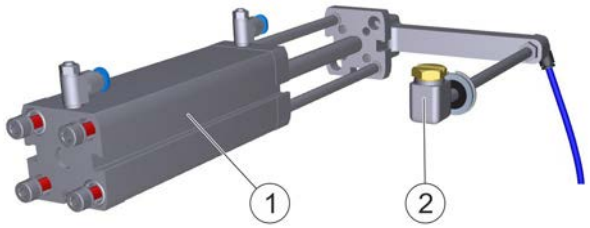

Fig. 10: Blow dry nozzle

After the cleaning, compressed air flows out of the blow out nozzle (2). The pneumatic cylinder (1) moves the blow out nozzle (2) in three double strokes slowly and evenly beneath the applicator. The applicator moves out of the cleaning container to some extent, the blow out nozzle moves again beneath the applicator.

Only N05060001

During the drying, the air jet must be set to prevent any air from entering the paint nozzles of the applicator.

- Slowly increase compressed air. If paint streaks can be seen after the drying, the pressure is set too high.

3.8 Spray check

After the cleaning, the spray pattern of the applicator is checked and the process accuracy is ensured. The applicator applies material via the check opening (3). The spray pattern is visually checked for deflected or missing jets. If the spray pattern is not okay, the applicator must be cleaned again. To prevent the nozzles from becoming contaminated during the check, the check opening has on its bottom a purging tube.

Manual spray check

The system operator wearing protective equipment in the Station checks the spray pattern by conducting a visual inspection for deflected or missing jets.

Automatic spray check (optional)

The automatic spray check is only available if the integration is conducted by Dürr Systems.

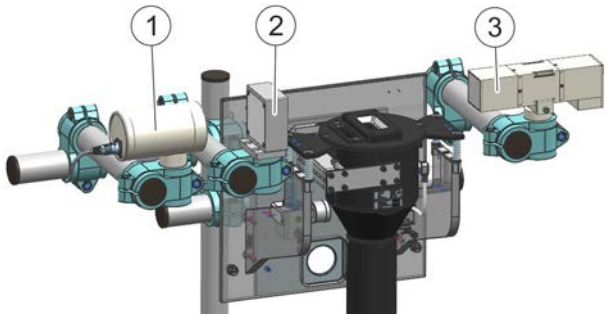

Fig. 11: Automatic spray check

In the case of the automatic spray check, the area of the check opening is illuminated by a spotlight (1) and a diffusor (2). A camera (3) captures the spray pattern and transmits these data to the system control. The system control compares the actual values with the specified nominal values. If the spray pattern is not okay, the applicator will be cleaned again.

3.9 Optional components

The following components are optionally available:

- Support bracket for assembly
- Control unit for cleaning device

Optional: Support bracket for assembly

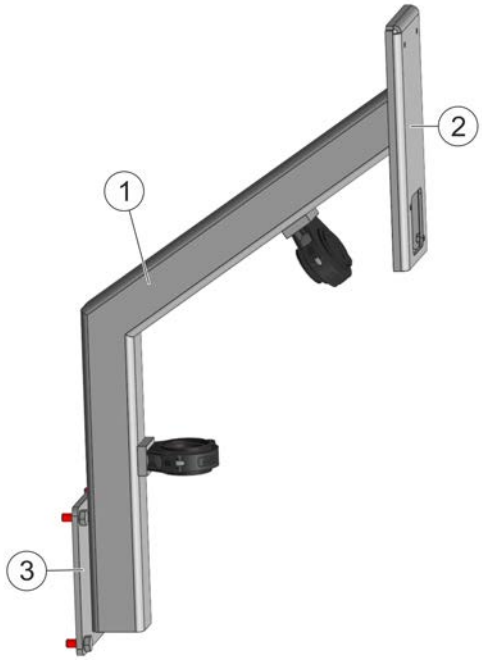

Fig. 12: Support bracket for cleaning device (optional)

The optional support bracket (1) is attached to the booth wall or the steel construction by using the plate (3). The cleaning device is mounted to the support bracket (1) using the console (2).

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. The control unit must be connected to the parent control.

> 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.

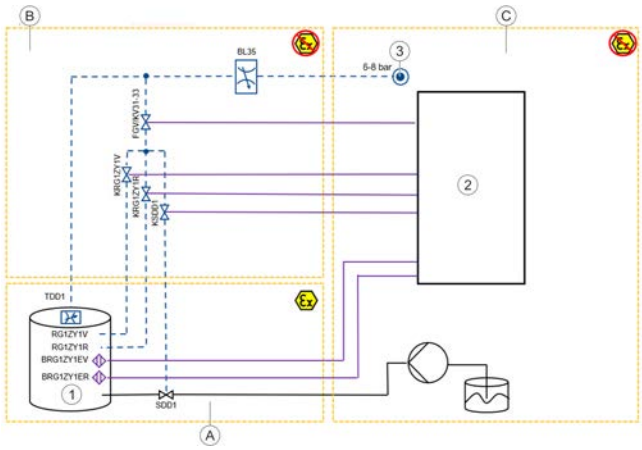

Fig. 13: Setup diagram for cleaning device control unit

A Scope of delivery of **Eco**PaintJet Cleaner
B Optional accessories for **Eco**PaintJet Cleaner
C Provision by the customer / operator
1 **Eco**PaintJet Cleaner
2 Control system e.g. Fanuc R30iA
3 6-8bar
— Electric signal
--- Pneumatic signal
— Paint hose
⋈ Solenoid valve
⋈ Paint valve
◯ Pump
◉ Compressed air supply
⧖ Pressure controller
◈ End position sensor (optional)

3.10 Interfaces

The cleaning device has the following interfaces:

- Compressed air on the compressed air regulator
- Cleaning agent in the cleaning agent valve
- Compressed air for pneumatic cylinder

3.11 Functional diagram

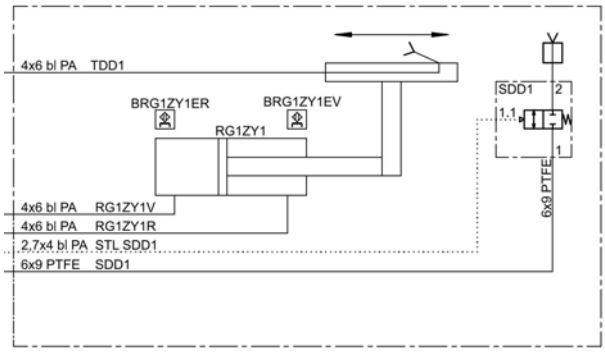

Fig. 14: Functional diagram

Legend

TDD	-	Drying nozzle
SDD	-	Purging nozzle
RG1ZYL1V	-	Move out cylinder.
RG1ZYL1R	-	Move in cylinder.

4 Transport, scope of supply and storage

4.1 Scope of delivery

The cleaning device is supplied pre-assembled. The scope of supply includes the following components:

- Cleaning device with console for fastening
  - Hoses (fluid hoses und compressed air hoses) The lengths of the hoses are sufficient to reach from the cleaning device to the console.

After the unpacking:

- Inspect delivery for completeness and integrity.
- Report defects immediately ↳ “Hotline and Contact”.

4.2 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.

4.3 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.

4.4 Storage

Storage provisions:

- Do not store outdoors.
- Store Cleaning Device only when dry.
- Store in a 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 Installation and initial commissioning

The technical personnel of Dürr Systems will carry out the assembly and initial commissioning. After these steps, the product is transferred to the operator.

If the operator assumes the assembly and initial commissioning, they are responsible that all requirements and safety related devices are met and properly implemented ↳ 2.3 “Safety devices”.

Use only approved application devices, ↳ 2.2 “Intended Use”.

5.2 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!

Unsuitable tools in explosive areas

Tools that do not have Ex approval can generate sparks and cause a fire or an explosion in Ex zones. It can cause serious injuries or death.

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

WARNING!

Raising heavy loads

When lifting heavy loads, it could cause back injuries, crushing or compression.

- Lift heavy loads only by using hoists and suitable stoppers.
- Ensure that the hoists and stoppers have adequate bearing capacity.

NOTICE!

Objects in the system

Objects in the system can cause property damage and production disruption.

- Before switching on, make sure that there are no objects, e.g. ladders or tools, are present in the system.

NOTICE!

Changed hose- and cable lengths

Hose and cable lengths are matched with the components and the process. Changed hose- and cable lengths cause material damage or production disruption.

- Do not extend hoses and cables.
- Do not shorten hoses and cables

5.3 Requirements for the Installation point.

The installation point must meet the requirements of DIN EN 16985 “Painting booths for organic liquid coating materials - Safety requirements”.

- The Cleaning Device must be integrated in a closed, remote controlled and automated process.
- Install the Cleaning Device in an area with forced ventilation.
- All components must be grounded.
- There must be a suitable grounding point at the installation site.
- The installed position of the cleaning device must be accessible for the robot.
- Cleaning Device must be installed in a horizontal position.
- Applicators must be able to move vertically downwards into the the cleaning device.
- The Cleaning Device must be accessible for maintenance when installed.
- The compressed air feed and the material feed must be ensured against interruption and against restart.
- Lines, seals and screw connections must be designed for the requirements of the cleaning device ↳ 12.4 “Operating values”.
- Installation site and assembly parts must be suitable for carrying the product weight and withstand the stress occurring during the operation.

Installation onto support bracket:

- The support bracket must be able to carry the product weight.
- Ensure that the the cleaning device is not assembled in the painting area.

5.4 Installed position

With the console, the cleaning device is screwed horizontally onto a support of the booth steel construction, a support bracket or a frame.

When applying the automatic spray check, the cleaning device is integrated into the spray check setup via an assembly plate.

5.5 Assembly

On the steel structure

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.

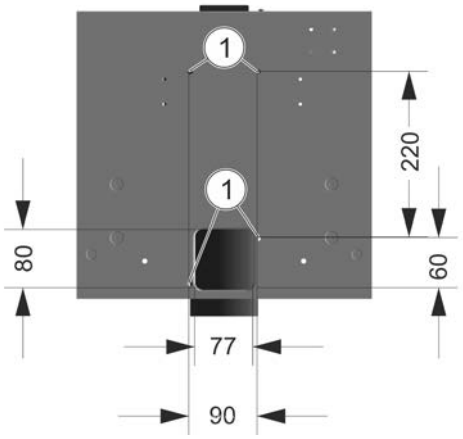

Fig. 15: Assemble bracket

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

Optionally with support bracket

The support bracket is not included in the scope of delivery ↳ 13.2 “Accessories”.

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. Screw support bracket onto the console. Refer to the assembly bores of the console, Fig. 15.

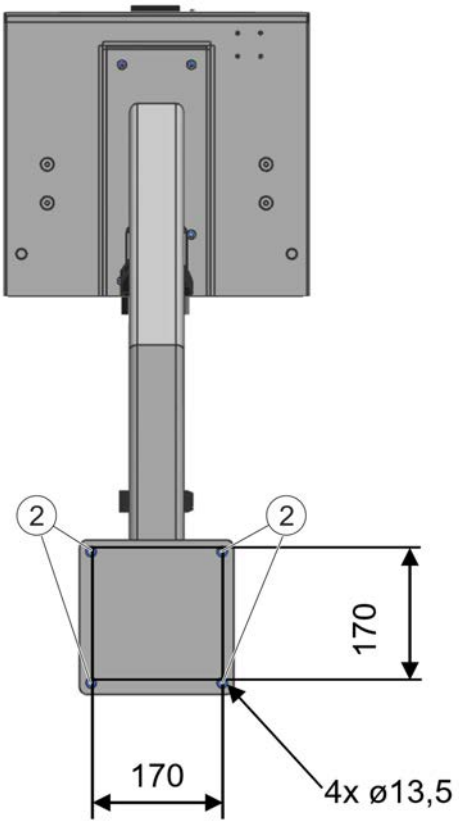

Fig. 16: Assembling bracket

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), ∅13.5mm.

5.6 Connecting

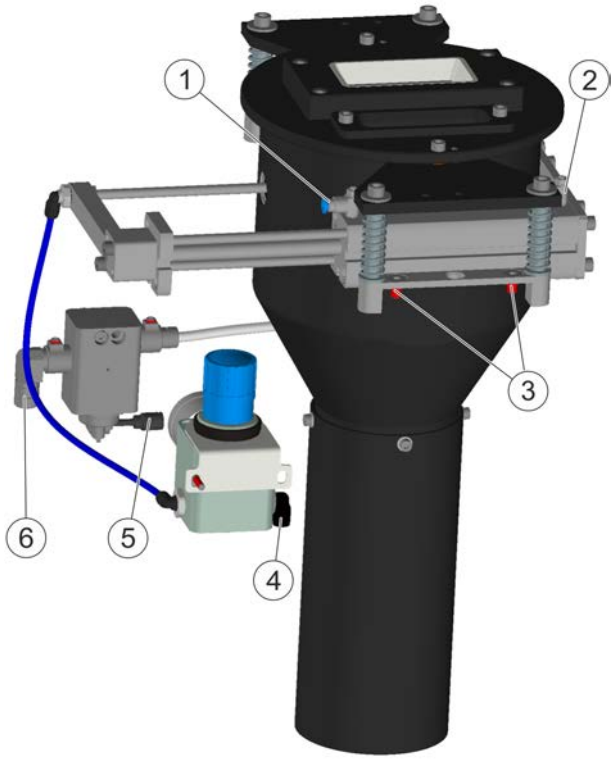

Fig. 17: Connections (shown without console)

1 Move in blowing air connection for pneumatic cylinder
2 Move out blowing air connection for pneumatic cylinder
3 Position of end position sensors (cable not shown)
4 Compressed air connection on the compressed air controller
5 Control air conduit connection on the cleaning agent valve
6 Cleaning medium connection on the cleaning agent valve

The cleaning device is spring-mounted on a bracket.
The end position sensors of the pneumatic cylinder are connected to a M12 Y plug. Optionally, the M12 plug can be connected to the control system.

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:

- Electrician

Protective equipment:

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

- Ensure a non-explosive atmosphere.
- Power supply is switched off and secured against being switched on again.

NOTICE!

Production disruption

Wrongly routed lines can cause damages to the lines and to a blocking of the upward movement.

- Do not route the hose through the pneumatic cylinder. The pneumatic cylinder must be able to move freely.
- Observe hose guide.

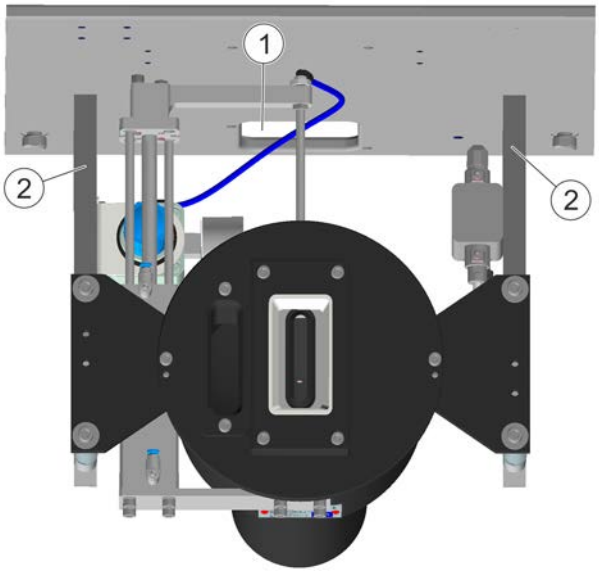

Fig. 18: Hose guide

1. Route all hoses through the opening of the console (1) along the support bracket (2) to the connection.
2. Connect material supply to the valve for the cleaning medium (5).
3. Connect control air conduit to the cleaning agent valve (4).

Optional:

4. Connect M12 plug to the connection for end position sensors (3) and to the control system.
5. Connect compressed air to the compressed air controller (3).
6. Connect blow air to the pneumatic cylinder (1+2).

7. Check if the hose guide affects the upward movement.
8. Fasten hoses with cable ties to the console.

5.7 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

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

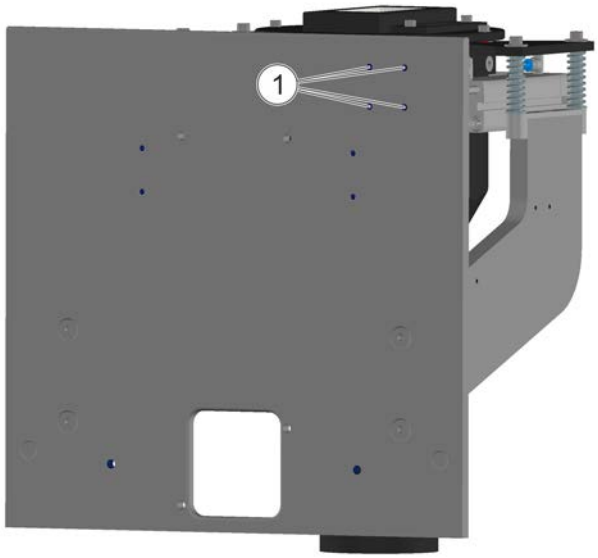

Fig. 19: Ground connection on the console

1. Connect one of the ground connections (1) of the console with the external potential equalization.
2. Measure volume resistivity.

6 Commissioning

6.1 Safety Instructions

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 cleaning agent is at least 15K above the ambient temperature or clean Cleaning Device at the cleaning areas with active technical ventilation, in painting booths, according to EN 16985.
- 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!

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.

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!

Missing personal protective equipment

Personal protection equipment protects the person from dangers. Carrying out work without using the specified personal protection equipment can cause serious injuries or death.

- Wear the specified personal protective equipment during all work.

WARNING!

Crushing hazard due to pneumatic cylinder

Moving the pneumatic cylinder poses the risk of crushing limbs. Serious injuries can be the consequence.

Replacing the throttles or the cylinder requires the throttles to be re-adjusted ↳ 10.5 “Adjust throttle valve”.

NOTICE!

Objects in the system

Objects in the system can cause property damage and production disruption.

- Before switching on, make sure that there are no objects, e.g. ladders or tools, are present in the system.

6.2 General notes

The cleaning device with its spring suspension can balance only minor positional deviations of the applicator. 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.

6.3 Protect cleaning device

During operation, the cleaning device is exposed to various factors, e.g. cleaning media, paint splashes upon the spray check. To increase the life of the cleaning device, a cover hood can be used.

The cover hood is available as accessory, ↳ 13.2 “Accessories”.

Cover the cover hood with an electrically conductive foil. Leave out openings.

- Ensure that the foil is laid out without tension or pressure and that the functionality of the spring-loaded bearing is not affected.
- Ensure that media and air can escape on the underside of the cleaning device.

6.4 Check safety devices

- Integrate the product into the safety devices of the complete system.

6.5 Check earthing

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.

   Console and bracket are connected to the ground connection with external potential equalization.
2. Measure volume resistivity.

6.6 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”.

6.7 Positioning

The correct positions of the applicator must be checked and adjusted if necessary.

NOTICE!

Collisions due to wrong positions

If the applicator collides with the cleaning device due to wrongly adjusted positions, the plastic surface of the applicator and the centering unit become damaged.

- Movements may only be set by trained staff.
- Use intended setting tool.
- The applicator must be linear during inserting and retracting.

Personnel:

- Robot programmer
- + additional qualification explosion protection

Protective equipment:

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

Check cleaning position

1. Move applicator slowly into the calibrated cleaning position.
2. When moving into the applicator mount, check visually whether applicator and applicator mount are centrically, symmetrically and in parallel to each other. If necessary, correct the position.

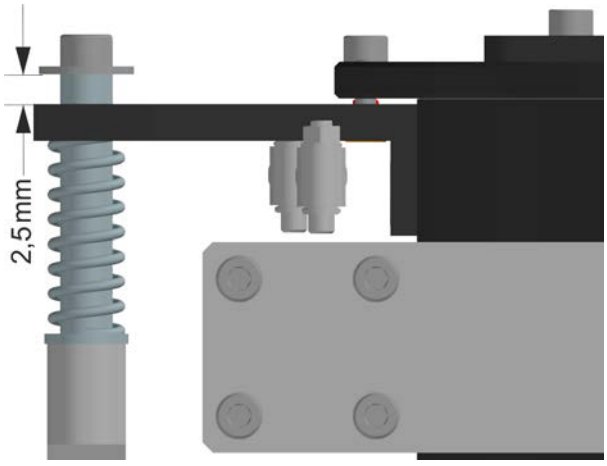

Fig. 20: Springs are deflected

3. Move applicator vertically downwards. With correctly adjusted cleaning position, the springs are deflected by 2.5mm. Check position, e.g. with an allen wrench SW 2.5mm, Fig. 20.

Check drying position

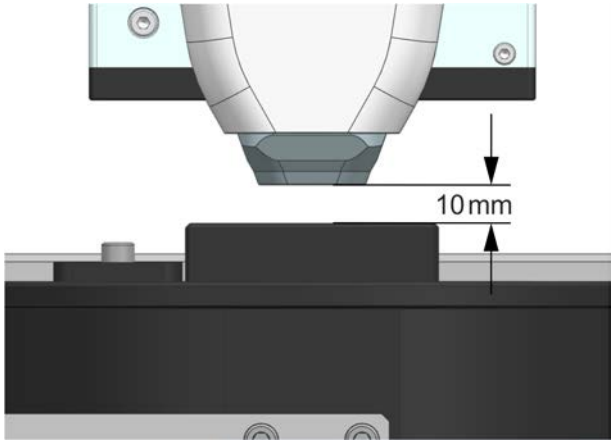

Fig. 21: Drying position

4. Move applicator slowly upwards out of the cleaning position. The drying position is reached if the distance between lower edge of the applicator and upper edge of the applicator mount is 10mm, Fig. 21.

Check spray check position

5. Move applicator slowly into the calibrated spray check position.
6. Check visually whether the applicator is oriented coaxially to the check opening. If necessary, correct the position.
7. Check distance between applicator and cleaning device, and correct if necessary.

6.8 Recommissioning

1. Perform the following checks after longer operation breaks:
   - Correct hose connection of the cleaning device
   - Tightness
   - The displays and signals of the cleaning device in the visualizer
   - Approached positions of the applicator during the cleaning process

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 cleaning agent is at least 15K above the ambient temperature or clean Cleaning Device at the cleaning areas with active technical ventilation, in painting booths, according to EN 16985.
- 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.
- Check grounding.

NOTICE!

Production disruption due to faulty processes

If the applicator is moved out of the cleaning device between the processes, both cleaning device and applicator become contaminated. Proper functioning of cleaning device and applicator is affected. Application result is deficient.

- Have processes changed by trained staff only.
- Applicator remains in cleaning position while the processes are performed without any change of position inside of the cleaning device.
- After purging and loading, the applicator must be cleaned by the cleaning device.

NOTICE!

Poor painting results and process disruptions

If the applicator is contaminated or has a residual moisture, the painting result may be affected. This may lead to process disruptions.

- Ensure that the applicator is clean and dry after the cleaning.

7.2 Switching on

The cleaning device is switched on and off during operation by using the super-ordinated control. Intervention in the operation is not required.

7.3 Timer programs

The timer programs of the cleaning device are invoked via a parent control, e.g. the purging program.

The duration of the purging program and the number of the impulses depend on the installation, the set pressures, the media used and the degree of contamination.

Check purging program with the coating material used. Adjust, if necessary. Typically, 3 to 10 impulses are run.

The separate steps of the cleaning program can be visualized via the control system. Bits in various colors represent the statuses within the program:

- Pink bit: Repetition group
- Dark gray bit: Time steps
- Yellow bit: Event steps
- Blue bit: Component is opened or position request.
- White bit: Component is closed.
- Green bit: Component is opened with nominal value specification.
- Light gray bit: Position check

Example for rinsing program

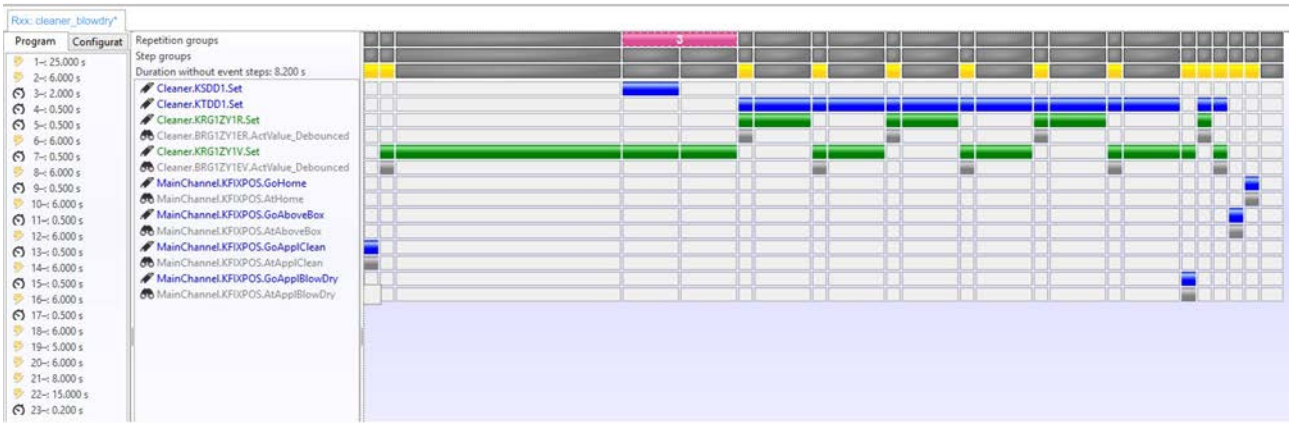

Fig. 22: Purging program (example)

Steps in the purging program

Step	Function
GoApplClean	Move into the cleaning device (cleaning position)
Repetition group Impulse SDD1	Cleaning (3 to 10 impulses)
TDD1	Drying
GoApplBlowDry	Move out of cleaning device (drying position)
TDD1	Subsequent drying
GoHome	Move into home position

NOTICE!

Wrong home position of the application device

When the application device starts emergency purging via the cleaning device or if coating material escapes due to improper operation, the cleaning device is contaminated. The desired cleaning result can no longer be ensured. Application device is contaminated during the cleaning.

- Select home position next to the cleaning device, never above the cleaning device.

Adjustments

Depending on the coating material used, different values are required. To adjust the purging program to a different coating material, the parameters of the cleaning process must be adjusted and checked in 3D-OnSite.

NOTICE!

Poor painting results and process disruptions

If the applicator is contaminated or has a residual moisture, the quality of the paint may be affected. This may lead to process disruptions.

- Ensure that the applicator is clean and dry after the cleaning.

Repetition group Impulse SDD1

The repetition group contains the cleaning impulse. The figure shows the repetition group in pink. The “3” in the figure indicates that the cleaning impulse is repeated three times.

To adjust the cleaning impulses, click on the repetition group. Adjust repetition group.

8 Cleaning

8.1 Safety recommendations

WARNING!

Sparks due to electrostatic discharge

If the cleaning device is not grounded, there can be an electrostatic charge on the the cleaning device. Electrostatic discharge can cause sparks that in explosive atmosphere can cause a fire or an explosion. Serious injury and death could be the consequence.

- Ground Cleaning Device as specified.
- Before carrying out any work, make sure that there is no explosive atmosphere.

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Cleaning Device Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

WARNING!

Moving pneumatic cylinder

Moving the pneumatic cylinder during work poses the risk of crushing limbs. Serious injuries can be the consequence.

Before carrying out any work:

- Switch off the compressed air supply and secure it against being switched on again.

WARNING!

Hot surface

The surfaces of the product can heat intensely during operation, which is caused by hot media. Contact can cause burn injuries.

- Keep maximum media temperature of the 50°C.

Before working on the product:

- Let the product cool down.

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!

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.

NOTICE!

Leakage on gasket or centering frame

If the gasket or the centering frame are not properly sealing anymore due to damages, drops on the applicator may cause production disruptions.

- Ensure that the applicator is dry after the cleaning.

NOTICE!

Gasket is swelling

If the gasket is soaked into thinner, the material will swell. The sealing lip is not properly seated anymore. This could cause production disruptions.

- Do not soak the gasket in thinner.

NOTICE!

Contaminated flat spray nozzles

Flat spray nozzles may become contaminated during the cleaning. This may affect the function.

- Ensure that no material is entering the openings of the flat spray nozzles.

8.2 General notes

Before conducting any work, verify the following:
- Station is in the “Cleaning” station operating mode and secured against being switched on again.
- 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.
- 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 by an electrician ↳ 6.5 “Check earthing”.
- 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

Clean lid

Personnel:
- Cleaning staff

Protective equipment:
- Protective workwear
- Anti-Static Safety Boots
- Protective gloves
- Eye protection
- Respirator mask

Requirements:
- “Cleaning” station operating mode is active.
- Station is secured against reconnection.

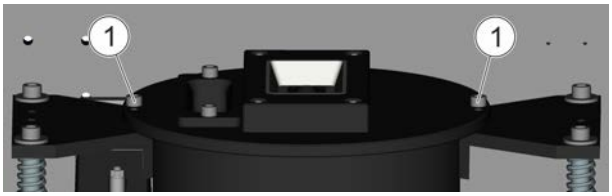

Fig. 23: Removing lid

1. Loosen two screws (1) on the lid.
   ⇨ Remove the lid.
2. Clean the lid using a moist, lint-free cloth or a fine brush.
3. Wipe down applicator mount, centering unit and gasket using a moist, lint-free cloth.
   If heavily contaminated, screw off the applicator mount for cleaning.
4. Clean the purging tube for the spray check using a moist, lint-free cloth or a plastic brush.

Clean cleaning container

Personnel:
- Cleaning staff

Protective equipment:
- Protective workwear
- Anti-Static Safety Boots
- Protective gloves
- Eye protection
- Respirator mask

Requirements:
- “Cleaning” operating mode is active.
- Station is secured against reconnection.
- Lid is removed.

1. Wipe down all sides of the cleaning container using a moist, lint-free cloth.

NOTICE!

Hardening coating materials

2K-coating materials hardening inside of the cleaning device will damage the cleaning device.
- Coat cleaning container and drainpipe with a thin layer of petroleum jelly.
- Do not grease flat spray nozzles.

2. Coat cleaning container and drainpipe with a thin layer of petroleum jelly.

Clean suspension

Personnel:

- Cleaning staff

Protective equipment:

- Protective workwear
- Anti-Static Safety Boots
- Protective gloves
- Eye protection
- Respirator mask

Requirements:

- “Cleaning” operating mode is active.
- Station is secured against reconnection.

1. **NOTICE!**

   Suspension is very soft; clean carefully.
   Check position of the cleaning device, correct if necessary.

   Clean suspension and sleeve using a moist, lint-free cloth.
2. Coat suspension and sleeve with a thin layer of petroleum jelly.

Clean flat spray nozzles

Personnel:

- Cleaning staff

Protective equipment:

- Protective workwear
- Anti-Static Safety Boots
- Protective gloves
- Eye protection
- Respirator mask

Requirements:

- “Cleaning” operating mode is active.
- Pneumatic cylinder is moved out.
- Station is secured against reconnection.
- Lid is removed.

NOTICE!

Contaminated flat spray nozzles

Flat spray nozzles may become contaminated during the cleaning. This may affect the function.

- Ensure that no material is entering the openings of the flat spray nozzles.

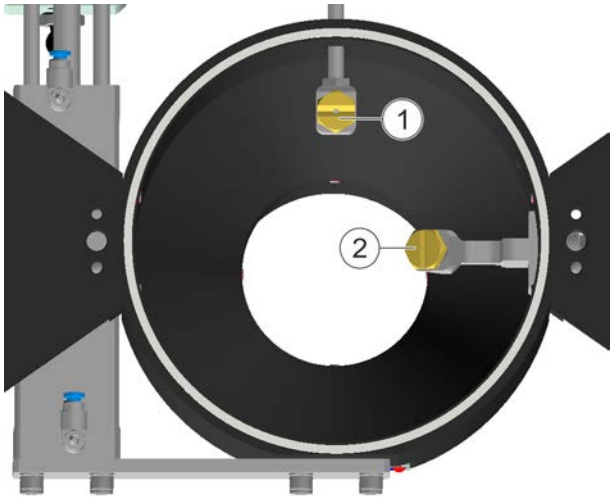

Fig. 24: Flat spray nozzles

1. Hold tight the nozzle holder. Clean the cleaning nozzle (2) with the other hand using a moist, lint-free cloth or a fine brush.
2. **Blow dry nozzle**

   The pneumatic cylinder must be moved out before cleaning in order to prevent the sensitive air tube from being damaged.

   Fix blow dry nozzle (1) from the bottom using an open-end wrench (wrench size 15).
3. After that, clean the blow dry nozzle using a moist, lint-free cloth or a fine brush.

If the nozzles are clogged, screw out the nozzles for cleaning. Blow out nozzles, e.g. by using compressed air.

9 Maintenance

9.1 Safety notes

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Cleaning Device Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

WARNING!

Risk of injury from whipping hoses

If hoses under pressure come off loose, the hoses can lash around and cause injuries.

- Check that the hose connections are seated tightly.
- Check hoses for damage.
- Before carrying out any work:
  - Depressurize hoses.
  - Secure the system against reconnection.

WARNING!

Moving pneumatic cylinder

Moving the pneumatic cylinder during work poses the risk of crushing limbs. Serious injuries can be the consequence.

Before carrying out any work:

- Switch off the compressed air supply and secure it against being switched on again.

WARNING!

Crushing hazard due to pneumatic cylinder

Moving the pneumatic cylinder poses the risk of crushing limbs. Serious injuries can be the consequence.

Replacing the throttles or the cylinder requires the throttles to be re-adjusted ↳ 10.5 “Adjust throttle valve”.

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.

WARNING!

Hot surface

The surfaces of the product can heat intensely during operation, which is caused by hot media. Contact can cause burn injuries.

- Keep maximum media temperature of the 50°C.

Before working on the product:

- Let the product cool down.

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:

- Station is in the “Maintenance” station operating mode and secured against being switched on again.
- 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.
- Use only approved replacement parts and accessories, ↳ 13 “Replacement parts 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 by an electrician ↳ 6.5 “Check earthing”.
  - Volume resistance test was carried out successfully.
- Technical ventilation is in operation.
- No aids (e.g. tools) are lying around in the danger zone

9.3 Maintenance schedule

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

The specified maintenance intervals are recommendations only. Depending on the operating conditions and the coating material use, these intervals may vary.

Interval	Maintenance work
daily	Clean applicator mount, centering insert and gasket. ↳ 8.3 “Cleaning”
weekly	Check cleaning nozzle for contamination, clean if necessary ↳ “Clean flat spray nozzles”.
	Check blow dry nozzle for contamination, clean if necessary ↳ “Clean flat spray nozzles”.
	Check lid for contamination, clean if necessary ↳ “Clean lid”.
	Check interior of the cleaning container for contamination, clean if necessary ↳ “Clean cleaning container”.
	Check purging tube for contamination, clean if necessary ↳ 8.3 “Cleaning”.
monthly	Check suspension for contamination, clean and grease if necessary ↳ 8.3 “Cleaning”.
semi-annually	Compressed air controller and cleaning agent valve: ▪ Check hoses for damage, replace hoses if necessary ↳ 9.4 “Replace hoses”. ▪ Check settings, correct on the visualizer if necessary ↳ 6.6 “Setting operating parameters ”.
annually	Regular checks in accordance with local regulations, such as according to BetrSichV in Germany

9.4 Replace hoses

Personnel:
- Mechanic

Protective equipment:
- Protective workwear
- Protective gloves
- Anti-Static Safety Boots
- Eye protection

Requirements:
- All lines have been rinsed and de-pressurized.
- Connections are disassembled.
- New chemical-resistant hoses, acc. to parts list

1. Release hoses from the single screw plug connections of the supply lines.
2. Measure new hoses and cut for correct lengths; for lengths, see table ↳ “Hose lengths”.
3. Connect new hoses.

Hose lengths

Hose for:	Length:
Cleaning agents	160mm
Air	270mm

9.5 Dismantling

Dismount cleaning device

Smaller tasks may be performed while it is assembled in the booth. Single parts may get lost when falling down. Place an electrically conductive foil or a cardboard beneath the cleaning device.

Personnel:
- Mechanic

Protective equipment:
- Protective workwear
- Protective gloves
- Anti-Static Safety Boots
- Eye protection

Requirements:
- Pneumatic cylinder is moved out.
- All lines have been rinsed and de-pressurized.
- Connections are disassembled.

1. Release hoses from the single screw plug connections of the supply lines.
2. Loosen four screws on the console. Remove cleaning device.
3. Clamp the bracket in a vise.

   Use protective jaws.

Dismantle cleaning device

Personnel:
- Mechanic

Protective equipment:
- Protective workwear
- Protective gloves
- Anti-Static Safety Boots
- Eye protection

Disassembling lid

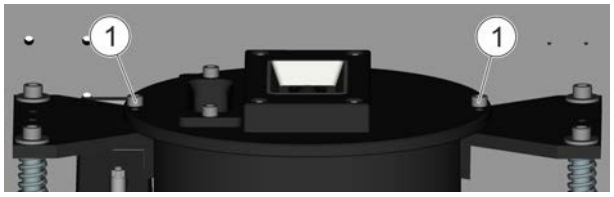

Fig. 25: Removing lid

1. Unscrew two captive screws (1).
   ⇨ Remove the lid.

Remove flat spray nozzles

WARNING!

Moving pneumatic cylinder

Moving the pneumatic cylinder during work poses the risk of crushing limbs. Serious injuries can be the consequence.

Before carrying out any work:
- Switch off the compressed air supply and secure it against being switched on again.

NOTICE!

Damage to the springs

The suspension is very soft. If, during the removal or installation of the flat spray nozzles, too much force is applied to the suspension, the suspension of the cleaning device may be damaged.
- Remove or install the flat spray nozzles carefully.

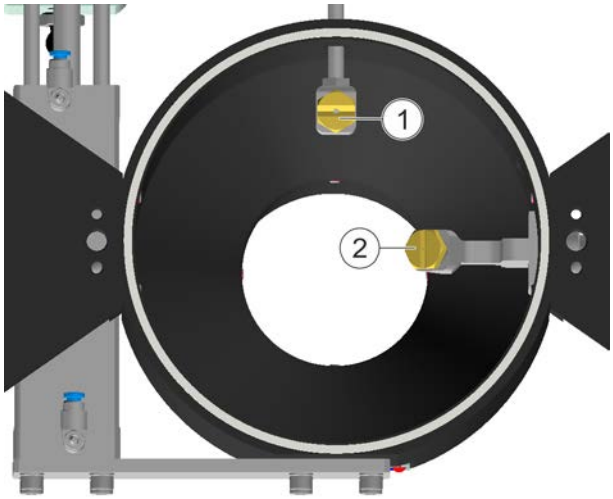

Fig. 26: Flat spray nozzles

2. Unscrew blow dry nozzle (1). Counterhold the nozzle holder using a open-end wrench SW15.
   ⇨ Blow dry nozzle is disassembled.
3. Hold tight the cleaning device. Unscrew cleaning nozzle (2).
   ⇨ Cleaning nozzle is disassembled.
4. Pull off Teflon seals from the nozzle holders.
5. Clean flat spray nozzles (1) and (2) ↳ 8.3 “Cleaning”.

6. Clean cleaning container ↳ 8.3 “Cleaning”.

Remove hoses

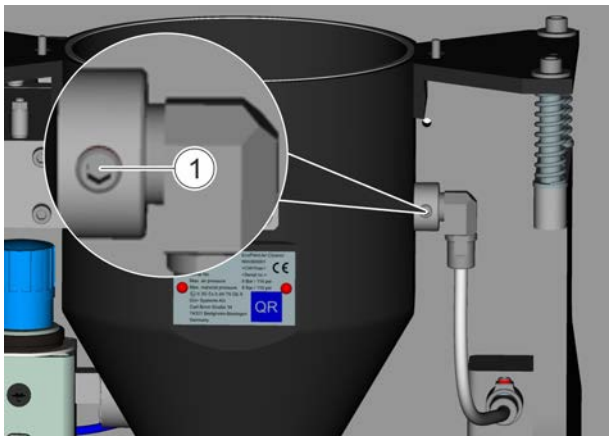

Fig. 27: Remove cleaning agent hose

7. Loosen screws (1). Pull off cleaning agent hose.

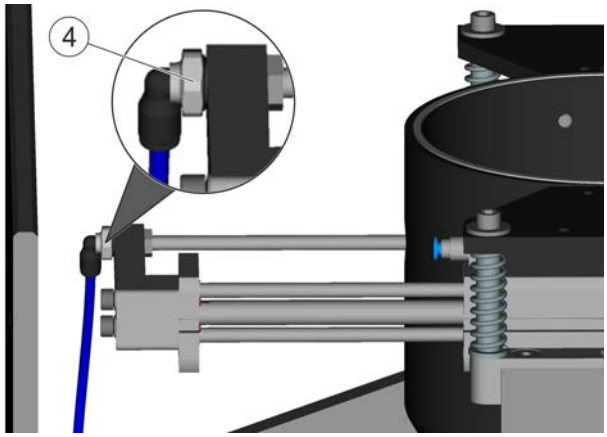

Fig. 28: Drying air hose

8. Remove drying air hose (3) from plug connection.

Remove pneumatic cylinder

Personnel:

- Mechanic

Protective equipment:

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

Requirements:

- Conduct work with two persons present.

1. Mark position of the locknuts on the air tube (3).

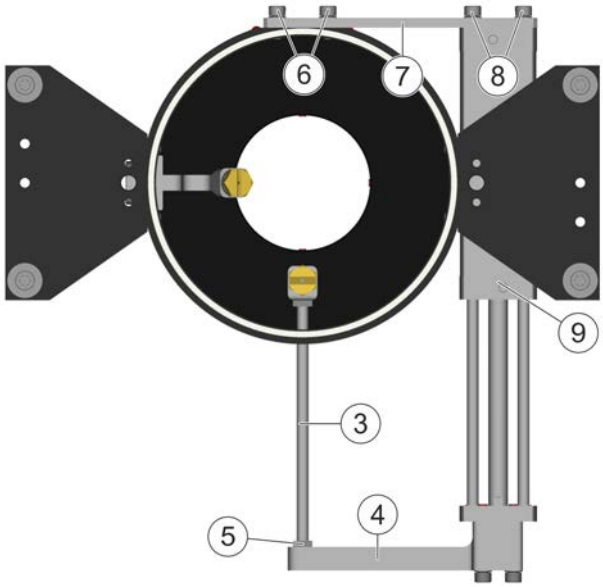

Fig. 29: Locknut on the air tube

2. Loosen locknut (5) on the connection plate (4). Counterhold the blow dry nozzle and the nozzle holder using a open-end wrench SW15.
3. Remove air tube (3) along with the blow dry nozzle towards the inside.
4. **Person 2:** Hold tight the pneumatic cylinder (7). **Person 1: Unscrew four** screws (8) on the mounting plate.

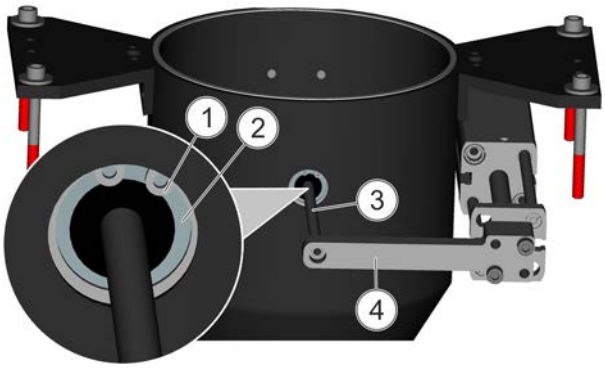

Fig. 30: Retainer ring and ring brush

5. **Optional:** Remove retainer ring (1) using pliers. Remove ring brush (2).
   ⇨ Pneumatic cylinder is disassembled.

Dismantle lid

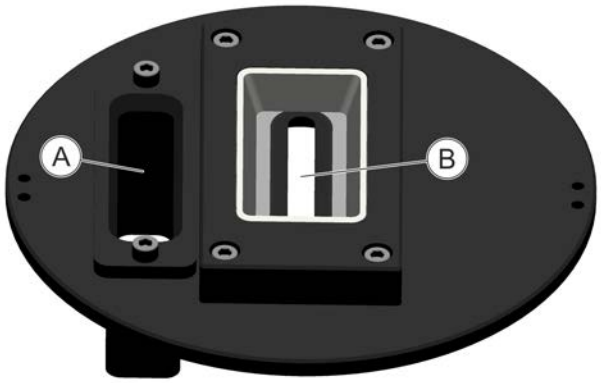

Fig. 31: Dismantle lid

A Check opening
B Applicator mount

Dismantle applicator mount

Personnel:

- Mechanic

Protective equipment:

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

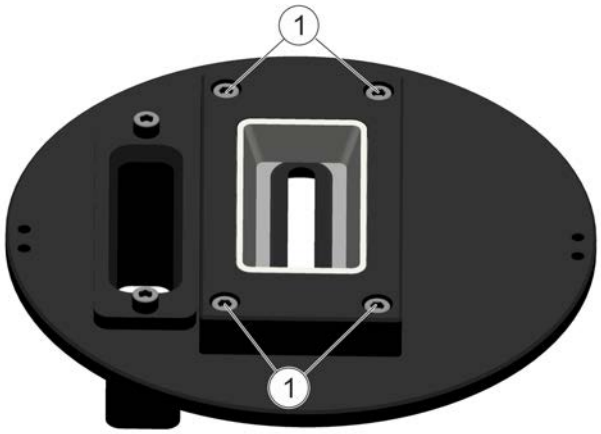

Fig. 32: Applicator mount

1. Loosen four screws (1) on the lid.

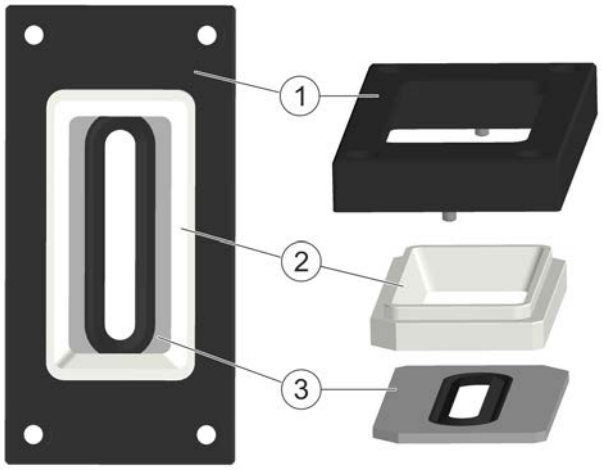

Fig. 33: Design of the applicator mount

2. Remove applicator mount (1), (2) and (3).

3. Place applicator mount (1) onto the rear.

NOTICE!

Damage to the sealing lip

Trying to separate the gasket and the sealing lip will cause damage to the components.
Do not separate the gasket and the sealing lip.

4. Remove centering insert (2) by pulling it upwards.
   ⇨ Applicator mount is dismantled.

Remove purging tube

Personnel:

- Mechanic

Protective equipment:

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

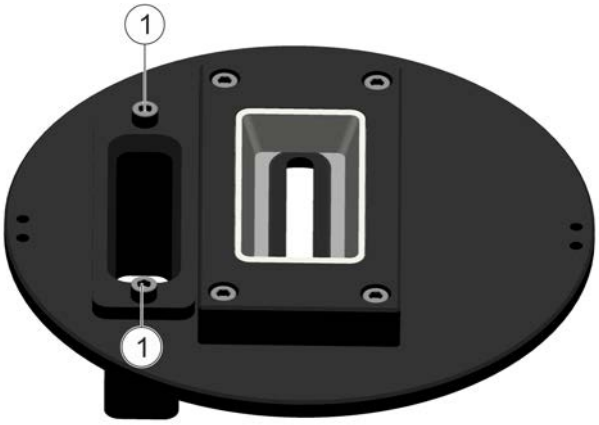

Fig. 34: Purging tube for spray check

1. Loosen two screws (1) on the lid.

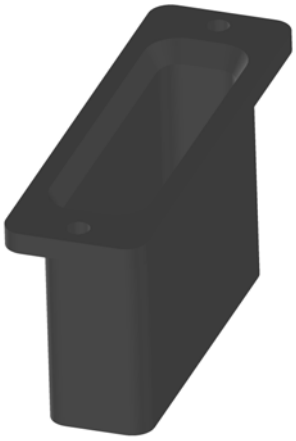

Fig. 35: Purging tube, single part

2. Remove purging tube (A) for spray check by pulling it upwards.
   ⇨ Purging tube is removed.

9.6 Assembly

Assemble lid

Personnel:

- Mechanic

Protective equipment:

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

To make the assembly easier, the centering insert and the gasket have different bevels on the corners.

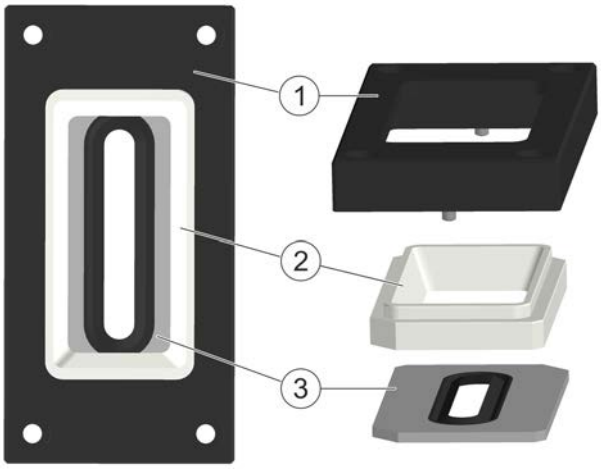

Fig. 36: Design of the applicator mount

1. Turn support bracket (1) around (top side to the bottom).
2. Insert centering insert (2) into the support bracket (1).
3. Insert gasket (3).

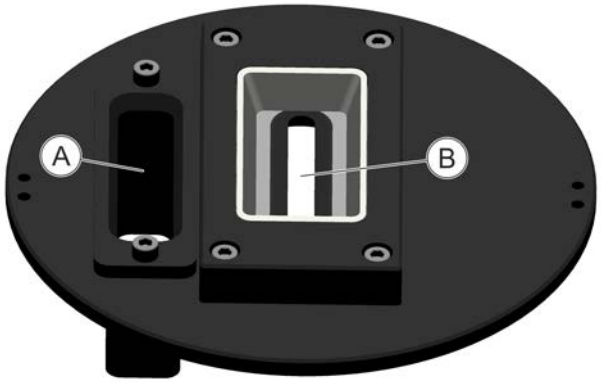

Fig. 37: Applicator mount

4. Place the lid upside down with the centering pins onto the applicator mount (B).
5. Check components for correct seating. If applicable, replace parts ↳ 13.1 “Spare part”.
6. Fasten with four screws.
7. Insert purging tube (A) for the spray check from above in the lid.
8. Fasten with two screws.
   ⇨ Lid is assembled.

Insert flat spray nozzles

Personnel:

- Mechanic

Protective equipment:

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

WARNING!

Moving pneumatic cylinder

Moving the pneumatic cylinder during work poses the risk of crushing limbs. Serious injuries can be the consequence.

Before carrying out any work:

- Switch off the compressed air supply and secure it against being switched on again.

NOTICE!

Damage to the springs

The suspension is very soft. If, during the removal or installation of the flat spray nozzles, too much force is applied to the suspension, the suspension of the cleaning device may be damaged.

- Remove or install the flat spray nozzles carefully.

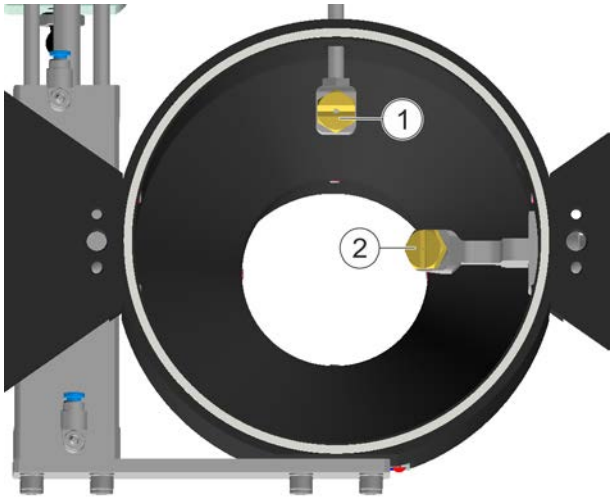

Fig. 38: Flat spray nozzles

Requirements:

- Pneumatic cylinder is moved out.

1. Place new Teflon seals onto both nozzle holders ↳ 13.1 “Spare part”.
2. Screw in blow dry nozzle (1) using an open-end wrench (wrench size 14). Counterhold the nozzle holder using a open-end wrench SW15.
   ⇨ Orientation of the blow dry nozzle slot is 90° to the direction of the stroke

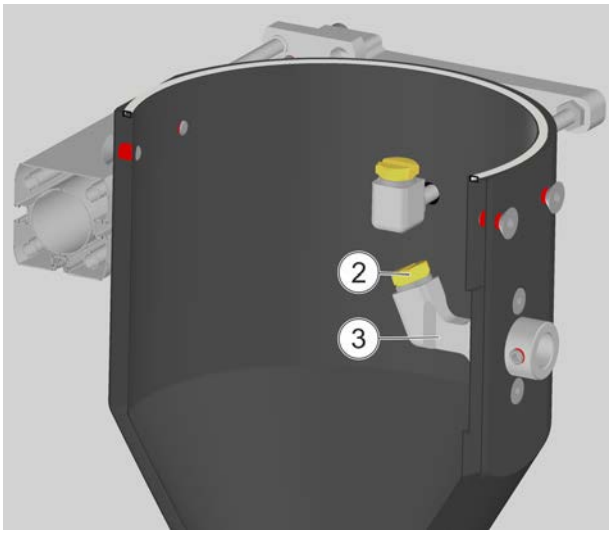

Fig. 39: Assemble cleaning nozzle

3. Hold tight the cleaning device. Screw in cleaning nozzle (2) into the nozzle holder (3) using an open-end wrench (wrench size 14).
   Orientation of cleaning nozzle is horizontal

Assemble cleaning device on the console

Personnel:

- Mechanic

Protective equipment:

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

NOTICE!

Wrong assembly of the brackets

The cylinder pins are pre-assembled in the brackets of the console. For the correct orientation of the lid, the centering pins are installed in an offset position into the bores.

During the disassembly, mark which bracket was installed on which side.

Requirements:
- Two persons are needed for this task.

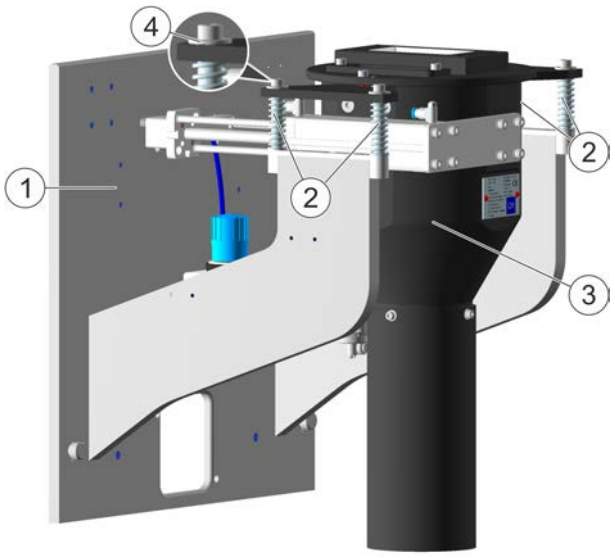

Fig. 40: Assemble cleaning device on the console

1. **Person 1:** First, place one side of the cleaning device (3) onto the springs (2) with internal guiding sleeve, and then the next side. Next, hold tight the cleaning device until the assembly is completed.
2. **Person 2:** First, screw on one side of the cleaning device with large washers and screws (4), and then the next side.
   ⇨ **Person 1:** Release cleaning device.
3. Check if the cable can be joined without tension in the Y plug.

Install pneumatic cylinder

Personnel:
- Mechanic

Protective equipment:
- Protective workwear
- Protective gloves
- Anti-Static Safety Boots
- Eye protection

Requirements:
- Place cleaning container without lid upside down.
- Pneumatic cylinder und connection plate are pre-assembled.
- Two persons are needed for this task.

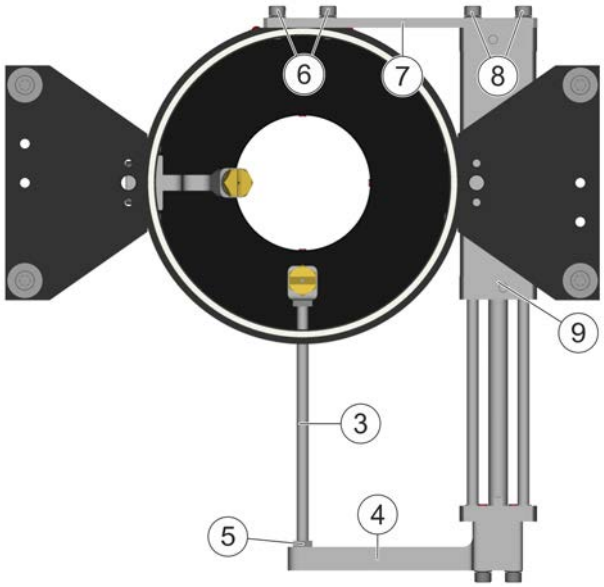

Fig. 41: Fasten locknuts

1. **Optional:** If the ring brush was removed, insert ring brush (2) and secure using a retainer ring (1).
2. **Person 1:** Hold tight the cleaning container until the assembly is completed.
3. **Person 2:** Screw the mounting plate (7) with four screws (8) onto the pneumatic cylinder (9).
4. Guide air tube (3) with pre-assembled nozzle holder and nozzle from inside through the opening of the cleaning container and the ring brush.
5. Position air tube (3).

> Screw the air tube on both sides 6.5mm into the connection plate (4) and the nozzle holder so as to have a distance of 126mm between connection plate and nozzle holder.
>
> Observe nozzle orientation: Jet orientation in installation position is vertically upwards.

6. Secure air tube (3) with locknut (5) on the connection plate (4).
   ⇨ Pneumatic cylinder is disassembled.

WARNING!

Crushing hazard due to pneumatic cylinder

Moving the pneumatic cylinder poses the risk of crushing limbs. Serious injuries can be the consequence.

Replacing the throttles or the cylinder requires the throttles to be re-adjusted ↳ 10.5 “Adjust throttle valve”.

7. Adjust throttles ↳ 10.5 “Adjust throttle valve”.

Usage of the end position sensors is optional.

8. Join cables without tension. Screw into the Y plug (observe channel A/B) ↳ 12.2 “Connections”.
9. Check if the end positions are detected. If necessary, correct the position.
   ⇨ The position of the end positions is 7mm, measured from the separation point of the pneumatic cylinder to the installed position.

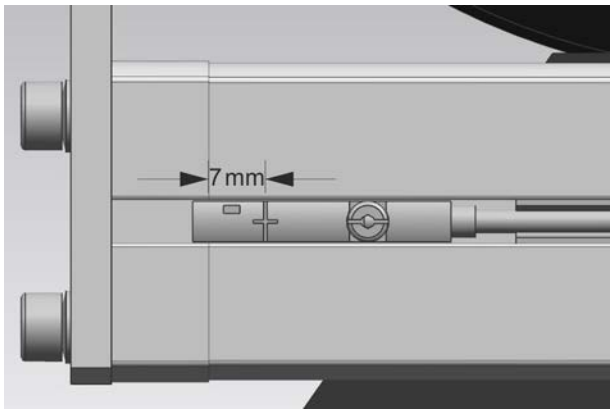

Fig. 42: Position of end positions

10. Fix cable und Y part in the area of the console with cable ties.

Fasten hoses

Personnel:

- Mechanic

Protective equipment:

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

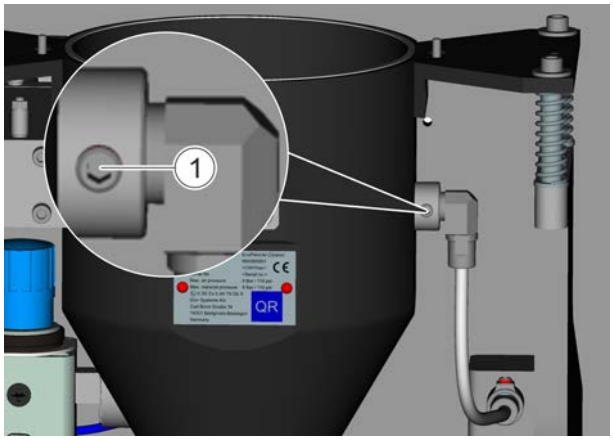

Fig. 43: Install cleaning agent hose

1. Insert cleaning agent hose into the connection. Fasten with screw (1).

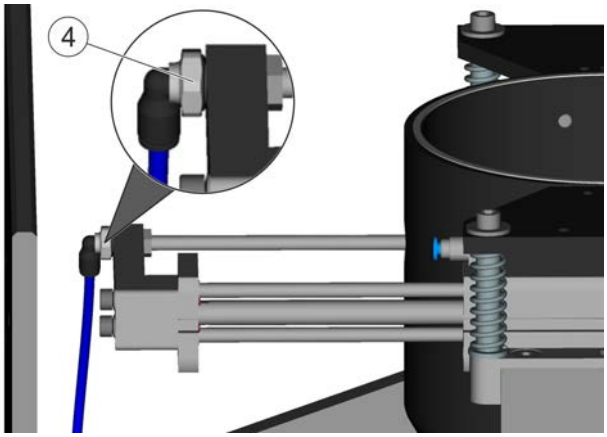

Fig. 44: Drying air hose

2. The hose must be freely movable over the entire stroke length of the pneumatic cylinder.

   Insert drying air hose (4) into the plug connection of the mounting plate.

Fit lid

Personnel:

- Mechanic

Protective equipment:

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

1. Set lid on the cleaning device. Observe orientation with cylinder pins.

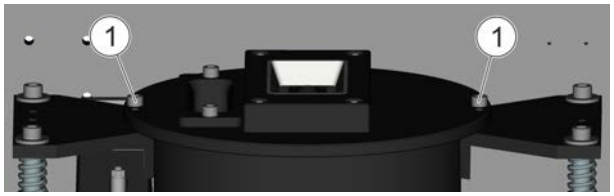

Fig. 45: Fasten lid

2. Fasten the pre-assembled lid using two screws (1) onto the cleaning device.
   ⇨ Cleaning device is assembled.

10 Faults

10.1 Safety recommendations

WARNING!

Risk of injury from whipping hoses

If hoses under pressure come off loose, the hoses can lash around and cause injuries.

- Check that the hose connections are seated tightly.
- Check hoses for damage.
- Before carrying out any work:
  – Depressurize hoses.
  – Secure the system against reconnection.

WARNING!

Moving pneumatic cylinder

Moving the pneumatic cylinder during work poses the risk of crushing limbs. Serious injuries can be the consequence.

Before carrying out any work:

- Switch off the compressed air supply and secure it against being switched on again.

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Cleaning Device Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

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.

10.2 Behavior during faults

General procedure

If faults occur:

1. Stop the system.
2. Switch the station to the “Maintenance” operating mode.
3. Secure operating mode switch against switching on again.
4. Follow the defects table to correct the fault.

If the fault cannot be rectified by using the Faults table, please contact Dürr Systems ↳ “Hotline and Contact”. Put the system back into operation only after successful trouble-shooting.

Activities in the workshop

If possible, conduct activities on the Cleaning Device outside of the Station:

- Tools and parts cannot fall through the grating.

10.3 Fault Indicator

Fig. 46: Fault display visualizer (example)

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

10.4 Defects table

Fault description	Cause	Remedy
Applicator is contaminated or wet after purging.	Wrong parameters	Adjust timer program, ↳ 7.3 “Timer programs”.
	Wrongly set positions	Check positions, ↳ 6.7 “Positioning”.
	Throttles are wrongly adjusted.	Adjust throttles, ↳ 10.5 “Adjust throttle valve”.
	Wrongly set pressure	Check operating pressure, ↳ 6.6 “Setting operating parameters ”.
	Flat spray nozzles are clogged.	▪ Clean flat spray nozzles, ↳ “Clean flat spray nozzles”. ▪ If the flat spray nozzles can no longer be cleaned, replace flat spray nozzles, ↳ 9.5 “Dismantling”. Insert new Teflon seal.
Cleaning agent sprays out.	Wrongly set positions	Check positions, ↳ 6.7 “Positioning”.
	Centering unit is disassembled.	Replace centering unit, ↳ 9.5 “Dismantling”.
	Seal in the centering unit is worn.	Replace seal, ↳ 9.5 “Dismantling”.
Blow dry nozzle does not move.	Cylinder is defective.	Replace cylinder, ↳ 9.5 “Dismantling”.

10.5 Adjust throttle valve

Personnel:

- Mechanic

Protective equipment:

- Protective gloves

When creating the test program, use the timer program example as orientation.

Fig. 47: Adjust test program for throttles

1. Create test program.
   The test program contains the following:
   - Three double strokes
   - Nominal time: 15-20s
2. Close throttle at the beginning.

Stop the times of the stroke movement manually during the setting. Move-in speed and move-out speed must be equal.

3. Use a small screwdriver to open the throttles gradually and manually.
4. Stop cycle time manually.
   ⇨ If stroke movements and nominal time match, the throttles are set.

11 Disassembly and Disposal

11.1 Safety recommendations

WARNING!

Unsuitable tools in explosive areas

Tools that do not have Ex approval can generate sparks and cause a fire or an explosion in Ex zones. It can cause serious injuries or death.

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

WARNING!

Danger from harmful or irritant substances

Serious injuries or death can result if you come into contact with dangerous fluids or steam.

- Cleaning Device Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the safety data sheet.
- Wear specified protective clothing.
- Avoid contact (e.g. with eyes, skin).

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.

WARNING!

Hot surface

The surfaces of the product can heat intensely during operation, which is caused by hot media. Contact can cause burn injuries.

- Keep maximum media temperature of the 50°C.

Before working on the product:

- Let the product cool down.

11.2 Disconnecting connections

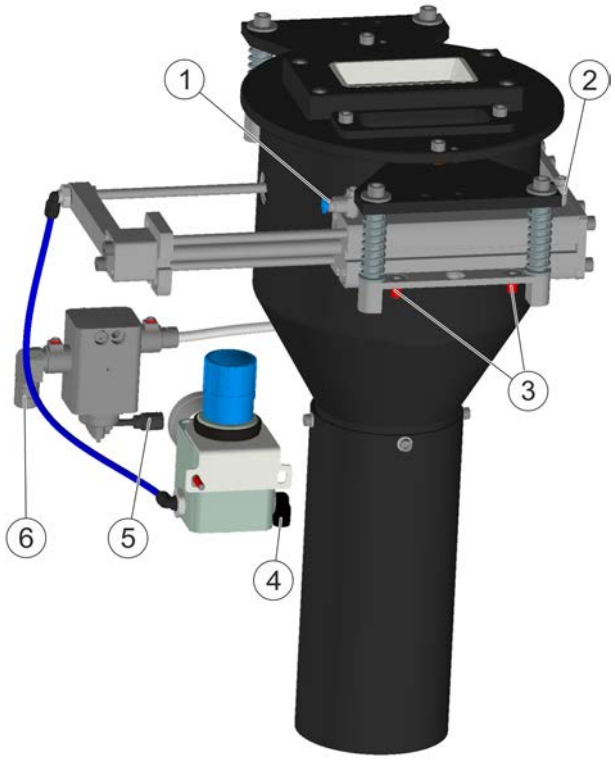

Fig. 48: Connections

1 Move out blowing air connection for pneumatic cylinder
2 Move in blowing air connection for pneumatic cylinder
3 End position sensors connections
4 Compressed air connection on the compressed air controller
5 Control air conduit connection on the cleaning agent valve
6 Cleaning medium connection on the cleaning agent valve

Personnel:

- Electrician

Protective equipment:

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

Requirements:

- Ensure a non-explosive atmosphere.
- Power supply is switched off and secured against being switched on again.
- Compressed air supply is switched off and secured against being switched on again.
- Detergent supply is switched off and secured against reconnection.
- Lines are depressurized.

1. Disconnect blow air from pneumatic cylinder (1+2).
2. Disconnect compressed air supply from compressed air controller (4).
3. Disconnect M12 plug from the connection for end position sensors (3).
4. Disconnect control air conduit from cleaning agent valve (5).
5. Disconnect material supply from the valve for the cleaning medium (6).
6. Disconnect grounding cables from the on-site grounding point.

11.3 Disassembly

Personnel:

- Mechanic

Protective equipment:

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

Requirements:

- Cleaning device is cleaned of all residues, ↳ 8.3 “Cleaning”.
- Power supply is switched off and secured against being switched on again.
- Lines are disconnected, ↳ 11.2 “Disconnecting connections”.

1. Place anti-static tarp underneath the cleaning device to prevent small parts from getting lost.
2. Secure cleaning device against falling down.
3. Unscrew screws from the console.
   ⇨ Cleaning device is disassembled.

11.4 Disposal

ENVIRONMENT!

Improper waste disposal

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

- Clean components before their disposal.
- Always dispose of components in accordance with their characteristics.
- Collect leaked out utilities and auxiliaries completely.
- Dispose of work equipment soaked in coating materials or operating substances according to the disposal provisions in force.
- Dispose of utilities and auxiliaries 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
Width	390mm
Height	411 mm
Depth	335mm
Weight	approx. 12kg

Positions

Detail	Value
ApplClean	Springs, deflected by 2.5mm
ApplBlowDry	10mm between lower edge of applicator and upper edge of applicator mount
Max. Speed between ApplClean and ApplBlowDry	30mm/s

12.2 Connections

Detail	Value
Cleaning agents	6 x 9
Compressed air	4 x 6
Blow air for cylinder, 2 times	4 x 6
Control air conduit (STL) for cleaning agent valve	2.7 x 4
Internal diameter of disposal tube	Ø84mm
End position sensors	M12 plug, A-coded ▪ Pin 1: plus 24V ▪ Pin 2: minus 0V ▪ Pin 3: Signal 24V Switching function: close.

12.3 Operating conditions

Detail	Value
Ambient temperature, min.	15°C
Ambient temperature, max.	40°C
Operating temperature, min.	10 °C
Operating temperature, max.	40°C
Relative humidity, min.	25%
Relative humidity, max.	70%

The flashpoint of the media must be at least 15K above the ambient temperature.

12.4 Operating values

Cleaning	
Detail	**Value**
Cleaning agent pressure, min.	1.5bar
Cleaning agent pressure, max.	3bar dyn.
Cleaning agent per cleaning sequence	20 to 50mL
Cleaning duration	35 to 50s

Spray angle	
Detail	**Value**
Cleaning nozzle	60°
Blow dry nozzle	75°

Compressed air	
Detail	**Value**
Compressed air	2bar dyn.
Volume flow	30 to 35Nl

12.5 Type plate

The type plate is placed on the Cleaning Device and features the following details:

- Product name
- Material number
- Year of manufacture
- Serial number
- Maximum air pressure
- Maximum material pressure
- Manufacturer
- CE labeling
- QR Code
- Ex labeling

12.6 Compressed air quality

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

12.7 Operating and auxiliary materials

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

12.8 Material specification

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 flash-point of the media

13 Replacement parts and accessories

13.1 Spare part

Denomination	Material number
Gasket	M08170008
Centering insert JET	M05100054
Centering insert PRO	M05100056
Blow dry nozzle	M09100153
Cleaning nozzle	M09100046
Teflon seal	M08010028

13.2 Accessories

Denomination	Material number
Assembly support bracket	M19023576
Control unit for cleaning device	N32220006
Cover hood	M59020905

13.3 Order

WARNING!

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 injury and death could be the consequence.

- Use exclusively original replacement parts.

WARNING!

Unsuitable replacement parts

Replacement parts of third-party suppliers may possibly not be able to hold the loads. Serious injury and death could be the consequence.

- Use exclusively 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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LEADING IN
PRODUCTION
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