LEADING IN
PRODUCTION
EFFICIENCY

EcoGun AS AUTO pro HD

Automatic Air Spray Gun

Operation manual

MSG00009EN, V06

N36210013V

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:

N36210013V **Eco**Gun AS AUTO pro HD	

Hotline and Contact

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

TABLE OF CONTENTS

1 Product overview

1.1 Overview

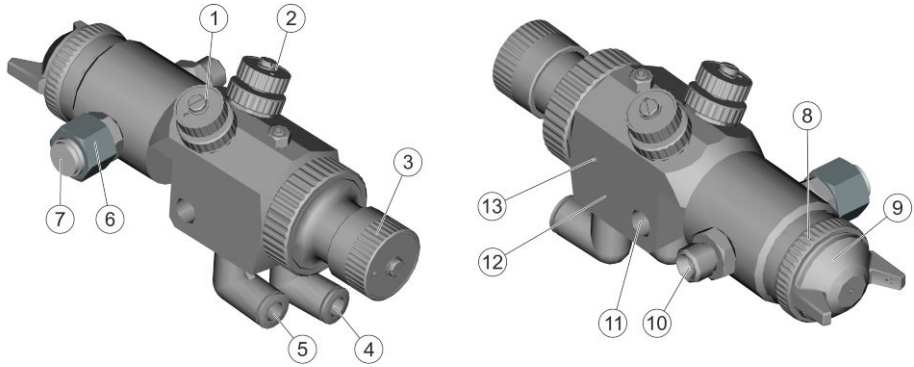


Fig. 1: Product overview (ACV spray gun variant)

1	Atomizer air control (R)	8	Cap nut
2	Horn air control (F)	9	Air cap
3	Material flow control	10	Material connection
4	Control air connection (C)	11	Fastening bore
5	Spraying air connection (A)	12	Housing
6	Custom nut G3/8” (mountable on both sides)	13	Leakage bore
7	Plug (mountable on both sides)		

1.2 Short description

The spray gun is intended for surface coating. Compressed air is used to apply material. The coating material is fed through lines. The operation can be done with paint circulation or tap line.

Use a suitable nozzle set with air cap, depending on the requirement ↳ 6.3 “Selecting air cap”.

The following factors influence the spray jet and therefore the result:

- Alignment of the air cap (only if using a flat jet nozzle set)
  The alignment of the air cap determines the alignment of the spray jet.
- Atomizer air pressure
  The higher the atomizer air pressure, the higher the atomizing and the finer the spray jet.
- Horn air pressure (only if using a flat jet nozzle set)
  The higher the horn air pressure, the more oval is the spray jet.
- Control air pressure
  Opens the needle and controls the material outflow.
- Material pressure

The higher the material pressure, the higher the material flow.

Control air pressure is controlled externally via valves.

The horn air pressure and the atomizer air pressure can be adjusted on the ACV spray gun version (with regulating screws) via the horn air control (F) and the atomizer air control (R). The spraying air pressure (A) is controlled externally via valves. The spraying air flow is controlled internally in the spray gun.

In the RC spray gun version (with push-in connections for horn air (F) and atomizer air (R)), both the air pressure and the air flow are controlled externally via valves. The spraying air connection (A) is not used or not required.

You can also regulate the material flow via the material flow control, if it is not controlled externally ↳ 5 “Commissioning”.

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 **Eco**Gun AS AUTO pro HD spray gun is solely intended for automatic coating of surfaces by one of the following operating methods:

- As independent, not hand guided device
- As part of a semi- or fully automated paint booth
- As part of a paint robot

The material feed can be effected optionally via the pressure line or under gravitation (flow beaker).

The product is only intended for use in industry and craftmanship.

The use is only permitted within the specified technical data ↳ 11 “Technical data”.

The spray gun is approved for use in explosive areas of Ex zones 1 and 2.

Misuse

If used incorrectly, it can cause serious injuries or death.

Examples of wrong use are:
- Aiming the spray gun at humans or animals.
- Atomization of fluid nitrogen
- Use of unapproved materials
- Combination of the spray gun with components that are not approved by Dürr Systems for operation.
- Unauthorized modifications
- Use in explosive areas Ex zone 0

EX labeling

Ex II 2G T6 X

II - Device group II: all areas except mining

2G - Device category 2 for gas

T6 - Temperature class T6: Surface temperature, max. 85°C

X - Specific conditions for safe operation

The following conditions must be observed for safe operation:
- Ground spray gun and work piece.
- Only use conductive lines.
- Ensure that static electricity can be discharged.

2.3 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.

The following describes the different qualifications required for the work in this document. The required qualification is presented prior to the individual tasks in the appropriate chapters.

Operator

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

Furthermore, the operator possesses the following knowledge:
- Technical Measures for occupational safety and health

The operator is responsible for the following work:
- Operate and monitor the system/ product.
- Introduce measures in the event of faults.
- Clean system/ product.

+ 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”.

2.4 Personal protective equipment

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

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.

Respiratory protection device
The respiratory protection device protects from hazardous gases, vapors, dust and similar materials and media. The version of the respiratory protection device must be suitable for the media used as well as their usage.

Use ear protection
Protects from auditory damage due to noise.

2.5 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, make sure that there is no explosive atmosphere.
- Do not use sources of ignition and open light.
- Do not smoke.
- Ground the spray gun.
- Ground the work piece.
- Only use conductive lines.

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 Spray gun 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.
- Ground the spray gun.

Danger from harmful or irritant substances

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

- Spray gun Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the relevant safety data sheets.
- Wear specified 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 compressed air and material supply.
- Secure system personalized from being switched on again.
- Depressurize the lines.

Moving parts

There is a risk of death if system components in the vicinity move unexpectedly.

- Switch off and lock out all system components personalized against being switched on again before working on the product.

Noise

The sound pressure level during operation may cause severe hearing damage.

- Wear ear protection.
- Do not spend more time then necessary in the work area.

Hot surfaces

During operation, the surfaces of components can get extremely hot. Contact with it can cause burns.

- Do not touch hot surfaces.
- Before carrying out any work:
  - Let components cool down.
  - Wear protective hand gloves.

3 Transport, scope of supply and storage

3.1 Scope of delivery

The scope of supply includes the following components:

- Spray gun
- Allen key ↳ 12.2 “Tools”

Inspect delivery on receipt for completeness and integrity.

Report defects immediately ↳ “Hotline and Contact”.

3.2 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.

3.3 Storage

Storage provisions:

- Do not store outdoors.
- Spray gun only store when in a clean and dry condition.
- Store in a dust-free place.
- Do not expose to aggressive media.
- Protect from solar radiation.
- Avoid mechanical vibrations.
- Storage temperature: 10°C to 40°C
- Relative humidity: 35% to 90% (non-condensing)

4 Assembly

4.1 Requirements for the Installation point

- The control air supply and the material feed to the spray gun must be interrupted and secured against reconnection.
- Lines, seals and screw connections must be designed to conform to the requirements of the spray gun ↳ 11.5 “Operating values”.
- A support bracket capable of securing the spray gun is required.
- The control air supply must be adjustable.
- The control air supply must have venting.

4.2 Assembly

Spray gun variant ACV

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

Observe the following at assembly:

- Diameter of the fastening bore: 10mm
- Nominal diameters: ↳ 11.2 “Connections”

1. **WARNING!**

   Sources of ignition may cause explosions!

   Ensure a non-explosive atmosphere.

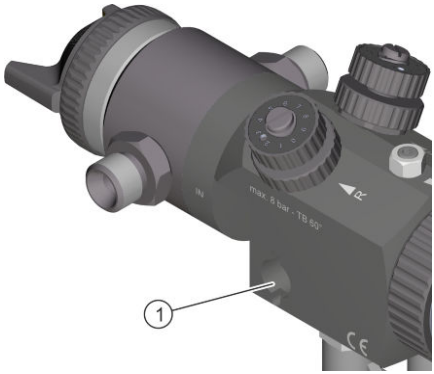


Fig. 2: Assembly

2. Push spray gun with the fastening bore (1) on the support bracket.

Alignment is arbitrary. Distance to the work piece: 15 to 25cm

3. **WARNING!**

Statically charges components may cause explosions during operation!

Ground the spray gun through the fastening bore or material connection lines, if the support bracket itself is non-conductive or is not grounded. Ensure housing contact.

- Resistance between housing and grounding terminal ≤ 1MΩΩ.

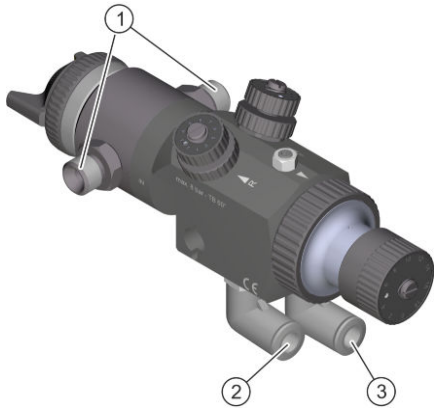


Fig. 3: Connect

4. The spray gun does not work when the lines are not connected correctly.

Connect lines. Ensure correct assignment.

1 - Material (M)

2 - Spraying air (A)

3 - Control air (C)

Paint circulation mode:

- Disassemble plug and custom nut.
- Connect material lines to both material connections.

Tap line operation:

- Disassemble plug and custom nut.
- Connect material line to the left or right material connection, depending on the installation situation.
- Assemble plug and custom nut to the material connection that is not required.

RC Spray gun variant

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

The following describes the conversion and connection of the RC spray gun variant.

1. **WARNING!**

Sources of ignition may cause explosions!

WARNING!

Statically charges components may cause explosions during operation!

Attach spray gun on the support bracket as with the ACV spray gun variant and ground it properly 4.2 “Assembly”.

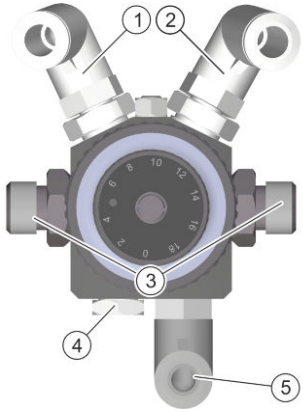


Fig. 4: Assembling robot accessories

2. Lock spraying air connection (A) with the blind plugs of the robot kits (4).
3. Replace regulating inserts of the atomizer air control (R) and the horn air control (F) by the regulating inserts and the screw-in plug connections of the robot kits (1 and 2) ↳ 11.9 “Operating and auxiliary materials”.
4. The spray gun does not work when the lines are not connected correctly.

   Connect lines. Ensure correct assignment.

   1 - Atomizer air (R)

   2 - Horn air (F)

   3 - Material (M)

   4 - Unused

   5 - Control air (C)

Paint circulation mode:

- Disassemble plug and custom nut.
- Connect material lines to both material connections.

Tap line operation:

- Disassemble plug and custom nut.
- Connect material line to the left or right material connection, depending on the installation situation.
- Assemble plug and custom nut to the material connection that is not required.

4.3 Setting the spray jet

Air cap FLRD

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

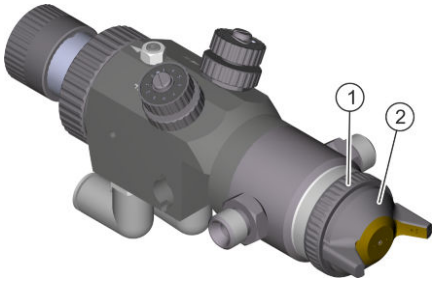


Fig. 5: Adjust spray jet

The orientation of the spray jet can be changed to any direction by rotating the air cap (2).

1. Lightly loosen the cap nut (1).

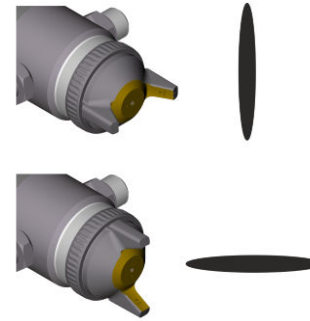


Fig. 6: Align air cap

2. Turn the air cap (2) as required for the desired jet pattern.
3. Tighten cap nut (1).

Air cap Rd. and Dr.

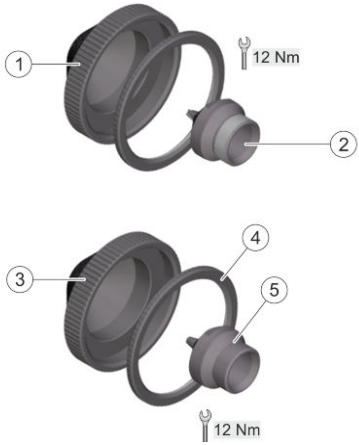


Fig. 7: Align air cap

1. Loosen cap nut (4).
2. Turn the air cap (1/3) until the nozzle (2/5) protrudes approx. 0.2 - 0.3 mm above the front of the air cap.
3. Counter/secure the air cap position with a cap nut.

5 Commissioning

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Use ear protection
- Eye protection
- Respiratory protection device
- Protective workwear
- Protective gloves

Depending on the design of the application system, two technicians must be present to execute the commissioning:

- Technician 1: Operates the controls.
- Person 2: Check on the spray gun.

1. Actuate the spray gun without material via the control unit or the visualizer.
2. Check the switching behavior.
   - Does the needle open and close as required?
   - Are all types of air supply connected?
3. Purge spray gun ↳ 6.4 “Purging”.
4. Connect material.
5. Create a trial spray pattern on a test work piece.

Setting the spray pattern

NOTICE!

Wrong handling of the material flow control

If the material quantity is set using the material flow control, it must not be used for closing the material nozzle. Otherwise, cracks and fractures can occur on the material nozzle, ultimately leading to the failure of the spray gun.

- Do not use the material flow control for closing the nozzle.
- Close the material flow control by turning it only with slight force (two fingers). Do not continue turning it if resistance is increasing.

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Use ear protection
- Eye protection
- Respiratory protection device
- Protective workwear
- Protective gloves

Depending on the nozzle set used, you can influence the spray pattern through various factors.

- You can set the spray pattern for any pattern between round and flat by using a flat jet nozzle set, by using horn air. You can vary the size by adjusting the distance between the spray gun and the work piece.
- You can set the spray pattern for any pattern between round and flat by using a flat jet nozzle set, by using horn air. You can vary the size by adjusting the distance between the spray gun and the work piece and the screw depth of the air cap. The size of droplets of the medium to be applied can be influenced through the screw depth of the air cap.

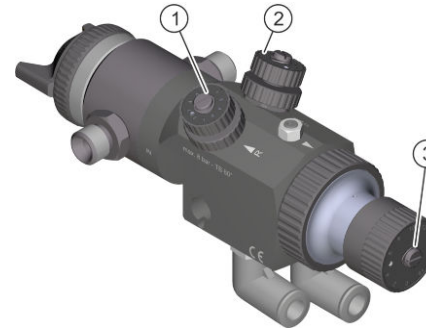


Fig. 8: Setting the spray pattern

1. Set material quantity via valves in control cabinet or at material flow control (3).

   Open the material flow control on the spray gun when controlling via the regulation cabinet.

2. Set atomizer air using valves in the control cabinet or on the atomizer air control (R) (1).

   Observe the following characteristic curve.

3. Set horn air using the horn air control (F) (2) or using valves in the control cabinet.

   When using a round jet nozzle or rotary jet nozzle, close the horn air control.
   - Replace control screw by locking set ↳ 12.3 “Accessories”.

   ⇨ When the horn air is blocked, the spray pattern is round.

Characteristic curve

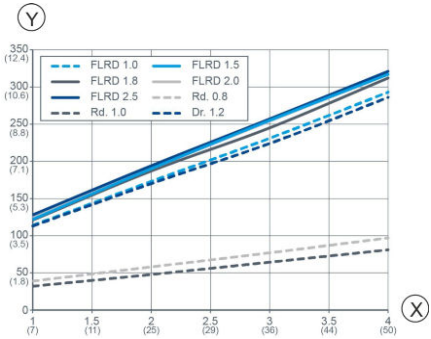


Fig. 9: Characteristic curve

X Input air pressure in bar (psi)
Y Air consumption in Nl/min (CFM)

The characteristic curves show the air flow dependent on the air pressure.

6 Operation

6.1 Safety recommendations

WARNING!

Danger of explosion due to chemical reactions

Material, halogenated hydrocarbon-based rinsing agent or cleaning agent can chemically react with aluminum components of the product. Chemical reactions can cause explosions. Serious injury and death could be the consequence.

- Only use purging agents and cleaning agents that do not contain any halogenated hydrocarbons.

NOTICE!

Material damage due to dried material residues

If material residues dry in the product, that can harm components.

- Purge product immediately after each use.

6.2 General notes

1. Perform the following checks during operation:
   - Check air connections and material connections for correct seating and tightness.
   - Check fastening of the gun.
   - Check gun for tightness.
   - Check air car for cleanliness.
   - Check nozzle for cleanliness.

6.3 Selecting air cap

Fig. 10: Air cap overview for different nozzle sets

1 Air cap for round jet (Rd.)
2 Air cap for rotary jet (Dr.)
3 Air cap for flat jet (FLRD)

Use a suitable nozzle set, depending on the requirement.

- Flat jet nozzle set: Generates round and flat spray patterns (spray pattern width up to 35 cm). Flat jet nozzle set also available as CHD sets for highly abrasive coating materials.
- Round jet nozzle set: Generates round spray patterns, marking painting and painting with a directed fine jet. Suitable for narrow surfaces (up to about 4 cm) with very low over-spray component e.g. for glass industry, over-painting of weld and solder seams.
- Rotary jet nozzle set: Generates round spray pattern. Applies materials with a very high viscosity (e.g. glue) with high spraying air requirement. Coated parts with difficult-to-access shapes and recesses, for which the dense misting creates a cover.

6.4 Purging

6.4.1 Safety recommendations

NOTICE!

Material damage due to unsuitable rinsing agent

If the rinsing agent reacts chemically with the components or the material, components get damaged.

- Use only the rinsing agents that are compatible with the components and the material.
- Refer to safety data sheet of material manufacturer.

6.4.2 General notes

When purging, use fluid to remove inner soiling from components.

6.4.3 Purging

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Use ear protection
- Eye protection
- Respiratory protection device
- Protective workwear
- Protective gloves

The spray gun must be purged:

- After end of work
- Before every change of material
- Prior to cleaning
- Prior to dismantling
- Before a long time of non-use
- Before placing in storage

Additional purging intervals depend on the material used.

1. Purge the spray gun with an appropriate rinsing agent until the rinsing agent runs clean without any material residue.

7 Cleaning

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 product at the cleaning areas with active technical ventilation, in painting booths, according to EN 16985.
- Note explosion group of the fluid.
- Observe the security data sheets of the media being used.
- 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.

WARNING!

Danger from harmful or irritant substances

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

- Spray gun Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the relevant safety data sheets.
- Wear specified protective equipment.
- Avoid contact (e.g. with eyes, skin).

WARNING!

Escaping material and compressed air

Escaping material under pressure can cause serious injuries.

Before carrying out any work:

- Disconnect the system, in which the spray gun is installed, from compressed air and material supply.
- Secure system personalized from being switched on again.
- Depressurize the lines.

WARNING!

Danger of explosion due to chemical reactions

Material, halogenated hydrocarbon-based rinsing agent or cleaning agent can chemically react with aluminum components of the product. Chemical reactions can cause explosions. Serious injury and death could be the consequence.

- Only use purging agents and cleaning agents that do not contain any halogenated hydrocarbons.

NOTICE!

Unsuitable cleaning agents

Unsuitable cleaning agents can damage the product.

- Only use cleaning agents approved by the material manufacturer.
- Follow safety data sheets.
- Place heavily soiled components in a cleaning bath.
  - Only place those parts in the cleaning bath, which are suitable for the cleaning bath.
  - Use only electrically conductive containers.
  - Ground the container.
  - Do not use ultrasound baths.

- Use alcohols (isopropanol, butanol) for non-flammable coating materials.
- Remove dried non-flammable coating materials using a material manufacturer-approved organic thinner.

NOTICE!

Damage due to unsuitable cleaning tools

Unsuitable cleaning tools can damage the product.

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

7.2 Cleaning

Clean spray gun

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Use ear protection
- Eye protection
- Respiratory protection device
- Protective workwear
- Protective gloves

1. Purge spray gun ↳ 6.4.3 “Purging”.
2. Use a cleaning agent to carefully clean the spray gun. Dry with a soft cloth.

Cleaning the air cap und nozzle

For a thorough cleaning you can remove the air cap.

Disassembly

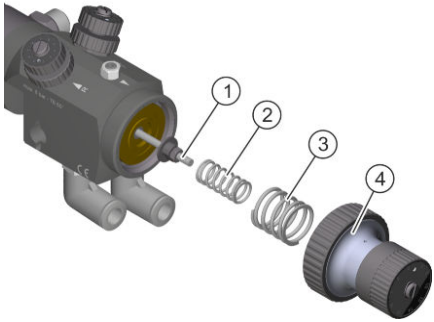


Fig. 11: Disassemble needle

1. Thread off and remove nozzle (4) with end cap.
2. Remove needle spring (2) and plunger spring (3).
3. Pull back complete needle (1) out of the housing.

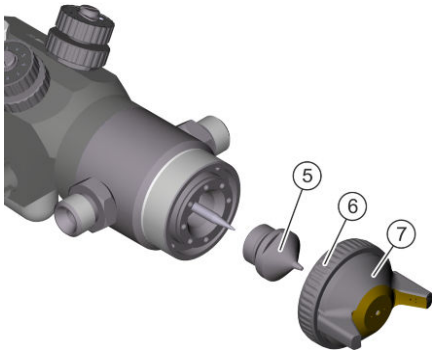


Fig. 12: Disassemble nozzle (with flat jet nozzle set)

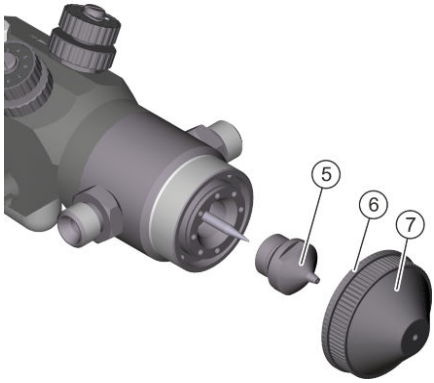


Fig. 13: Disassemble nozzle (with round jet nozzle set or rotary jet nozzle set)

4. Loosen the cap nut (6).
5. Remove cap nut (6) and air cap (7).
6. Remove the nozzle (5) with an open-end wrench (SW15).
7. Clean air cap using cleaning agent and cleaning brush ↳ 12.2 “Tools”.
8. Wipe the cleaned air cap dry with a cloth.
9. Clean the nozzle in the cleaning bath.

Assembly

10. Insert and tighten nozzle (5).
    - Tightening torque: 12 to 15Nm
11. Fit the cap nut (6) and air cap (7).
12. Align air cap (7).
13. Hand-tighten cap nut (6).
14. Lubricate needle shank lightly with silicone-free oil. Push in needle (1) carefully into the housing from the back.
15. Insert needle spring (2) and plunger spring (3).
16. Hand-tighten end cap (4).

8 Maintenance

8.1 Safety notes

WARNING!

Unsuitable spare parts in explosive areas

Spare parts not compliant with the specifications on explosion protection can cause explosions in an explosive atmosphere. Serious injury and death could be the consequence.

- Use exclusively original spare parts.

WARNING!

Danger from harmful or irritant substances

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

- Spray gun Check regularly for leakage. Observe local regulations and maintenance schedule.
- Ensure that the forced ventilation is operational.
- Follow the relevant safety data sheets.
- Wear specified protective equipment.
- Avoid contact (e.g. with eyes, skin).

WARNING!

Escaping material and compressed air

Escaping material under pressure can cause serious injuries.

Before carrying out any work:

- Disconnect the system, in which the spray gun is installed, from compressed air and material supply.
- Secure system personalized from being switched on again.
- Depressurize the lines.

CAUTION!

Risk of injury due to spring tension

The end cap of the spray gun is under spring tension. If you remove the end cap, the spring tension could cause the end cap to jump out unexpectedly and cause light injuries.

- Removing and installing end cap

8.2 Maintenance schedule

The maintenance intervals given below are based on experiential values. Maintenance intervals, adjust individually if necessary.

Interval	Maintenance work
daily	Check condition and tightness (also of the connections and lines).
	Check fastening.
before every change of material	Clean ↳ 7 “Cleaning”.
after each alteration	Check grounding ↳ 4.2 “Assembly”.

9 Faults

9.1 Safety recommendations

CAUTION!

Risk of injury due to spring tension

The end cap of the spray gun is under spring tension. If you remove the end cap, the spring tension could cause the end cap to jump out unexpectedly and cause light injuries.

- Removing and installing end cap

NOTICE!

Property damage due to improper replacement of needle and nozzle

Replacing only the needle or only the nozzle could damage spray gun components. This can compromise the tightness of the spray gun. The spray pattern deteriorates.

- Observe order of replacement steps (needle – nozzle).
- Observe order of assembly steps (nozzle – needle).
- Always replace nozzle and needle at the same time.

NOTICE!

Property damage due to improper handling

Mechanical load can damage needle and nozzle.

- Handle with care during installation and dismantling.
- Do not subject the needle to any mechanical pressure.
- Avoid collisions of components to be assembled and disassembled with the needle.
- Do not excessively tighten components.

NOTICE!

Improper setting causes damage

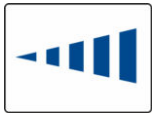
The delay time is factory-set. Setting a wrong delay time can damage the nozzle and the needle.

- You should only change the delay time upon inserting a new needle or in case there are problems with the spray pattern.
- If in doubt, contact Dürr Systems ↳ “Hotline and Contact”.

9.2 Defects table

Faults

Fault description	Cause	Correction
No material	Line pinched or broken	Check the line.
	Needle does not open.	Check Control air.
Material leaking when needle is closed.	Needle does not close correctly.	Check control air venting.
		Check operation of needle. Replace needle, if defective, together with the nozzle ↳ 9.3.1 “Replace needle and nozzle.”.

Fault description	Cause	Correction
	Nozzle soiled or defective	Clean and check the nozzle. If nozzle is defective, replace it along with the needle ↳ 9.3.1 “Replace needle and nozzle.”.
Air leaks from the material flow control	Piston sleeve worn out	Replace piston sleeve ↳ 9.3.4 “Replace piston seals.”.
Air leak from the leakage bore	O-rings of the piston worn out	Replace O-rings ↳ 9.3.4 “Replace piston seals.”.
	Sealing rings are worn out.	Have the sealing rings replaced by Dürr Systems. Or replace quad rings ↳ 9.3.4 “Replace piston seals.”.
Air leak between piston axis and housing	Piston axis seal worn out	Have the piston axis seal replaced by Dürr Systems. Or replace piston axis seal using an assembly tool for piston axis seals (↳ 12.2 “Tools”) ↳ 9.3.4 “Replace piston seals.”.
Air outlet between bushing and adjusting screw of the control screw	Seal of the control screw worn out	Replace seal ↳ 9.3.5 “Replace control screw or control screw seal”
Material leak between needle shank and needle gland	Needle gland loose and needle seat worn out	Re-tighten needle gland slightly, Replace needle seal
Uneven spray jet 	Nozzle soiled or defective	Clean and check the nozzle. If nozzle is defective, replace it along with the needle ↳ 9.3.1 “Replace needle and nozzle.”.
	Material pressure too low.	Increase material pressure.
	Infeed line pinched or broken	Check infeed line.
	Needle does not open.	Check Control air.
		Check operation of needle. Replace needle, if defective, together with the nozzle ↳ 9.3.2 “Replace needle seal und connecting piece seals”.
	Cap nut or nozzle is not properly tightened	Tighten cap nut and nozzle ↳ 7 “Cleaning”.

Fault description	Cause	Correction
	Needle seal worn out	Replace needle seal ↳ 9.3.2 “Replace needle seal und connecting piece seals”.
Formation of large drops	Delay time too short	Set delay time ↳ 9.3.3 “Set delay time”.

Special faults in flat jet nozzle set

Fault description	Cause	Correction
Spray jet misaligned 	Air cap is misaligned	Rotate air cap into the required position ↳ 4.3 “Setting the spray jet”.
Spray jet too strong in center 	Too much material	Reduce material feed.
		Increase spraying air pressure (A).
	Material too viscous	Change material consistency.
	Horn air pressure too low	Raise horn air pressure using the horn air control (F).
Split spray jet 	Not enough material	Increase material feed.
		Reduce spraying air pressure (A).
	Material too thin	Change material consistency.
	Horn air pressure too high	Raise horn air pressure using the horn air control (F).
Cone-shaped spray jet 	Bores in air cap are soiled	Clean and check air cap. Replace air cap if defective ↳ 7.2 “Cleaning”.
	Nozzle soiled or defective	Clean and check the nozzle. If nozzle is defective, replace it along with the needle ↳ 9.3.1 “Replace needle and nozzle.”.
Sickle-shaped spray jet 	Bores in air cap are soiled	Clean and check air cap. Replace air cap if defective ↳ 7.2 “Cleaning”.

Fault description	Cause	Correction
	Nozzle soiled or defective	Clean and check the nozzle. If nozzle is defective, replace it along with the needle ↳ 9.3.1 “Replace needle and nozzle.”.
	Cap nut or nozzle is not properly tightened	Tighten cap nut and nozzle ↳ 7 “Cleaning”.

Special faults in round jet nozzle set or flat jet nozzle set		
Fault description	**Cause**	**Correction**
Spray jet too strong in center 	Too much material	Reduce material feed.
		Increase spraying air pressure (A).
	Material too viscous	Change material consistency.
Split spray jet 	Not enough material	Increase material feed.
		Reduce atomizer air pressure by means of the atomizer air control (R)
	Material too thin	Change material consistency.
	Atomizer air pressure too high	Reduce atomizer air pressure by means of the atomizer air control (R)
Sickle-shaped spray jet 	Nozzle soiled or defective	Clean and check the nozzle. If nozzle is defective, replace it along with the needle ↳ 9.3.1 “Replace needle and nozzle.”.
	Cap nut or nozzle is not properly tightened	Tighten cap nut and nozzle ↳ 7.2 “Cleaning”.

9.3 Troubleshooting

9.3.1 Replace needle and nozzle.

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

Disassembly

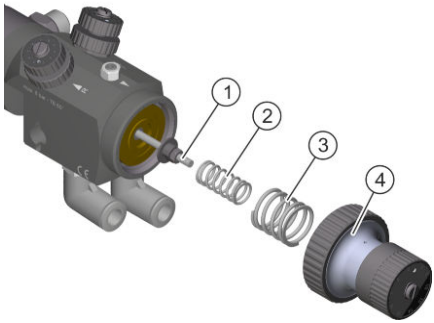


Fig. 14: Disassemble needle

1. Thread off and remove nozzle (4) with end cap.
2. Remove needle spring (2) and plunger spring (3).
3. Pull back complete needle (1) out of the housing.

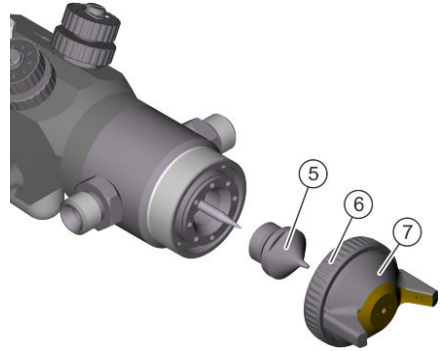


Fig. 15: Disassemble nozzle (with flat jet nozzle set)

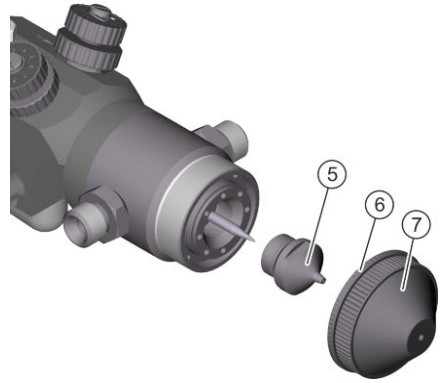


Fig. 16: Disassemble nozzle (with round jet nozzle set or rotary jet nozzle set)

4. Loosen the cap nut (6).
5. Remove cap nut (6) and air cap (7).

6. Remove the nozzle (5) with an open-end wrench (SW15).
7. Replace worn out or defective components.

Assembly

8. Insert and tighten nozzle (5).
   - Tightening torque: 12 to 15Nm

   Depending on the use case, use a nozzle with a suitable diameter.
9. Fit the cap nut (6) and air cap (7).
10. Align air cap (7).
11. Hand-tighten cap nut (6).
12. Lubricate needle shank lightly with silicone-free oil. Push in needle (1) carefully into the housing from the back.
13. Insert needle spring (2) and plunger spring (3).
14. Hand-tighten end cap (4).

9.3.2 Replace needle seal und connecting piece seals

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

Disassembly

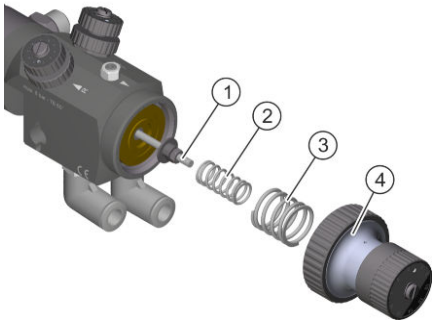


Fig. 17: Disassemble needle

1. Thread off and remove nozzle (4) with end cap.
2. Remove needle spring (2) and plunger spring (3).
3. Pull back complete needle (1) out of the housing.

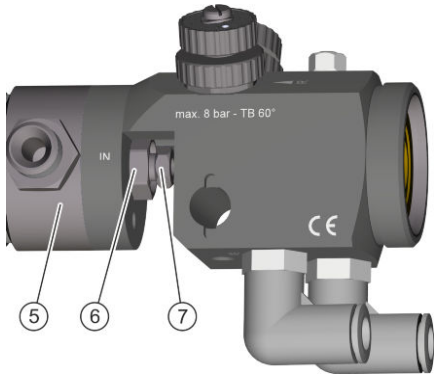


Fig. 18: Disassemble needle seal

4. Unscrew custom nut (6) using open-end wrench (14mm).
5. Pull out connector (5). Collect custom nut (6).
6. Remove connecting piece seals from the housing ↳ 12.1 “Spare parts” (25).
7. Screw off needle plug (7).

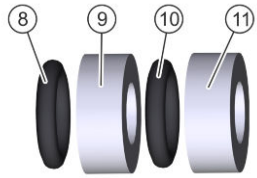


Fig. 19: Remove seals

8. Remove needle seals (9 and 11) and O-rings (8 and 10).
9. Use a cleaning agent to clean the contact face of the needle seal (9 and 11).

Assembly

10. Insert needle seals (9 and 11) and O-rings (8 and 10) in the illustrated sequence.
11. Insert connecting piece seals into the housing ↳ 12.1 “Spare parts” (25).
12. Screw-on needle plug (7) loosely.
13. Insert connecting piece (5).
14. Thread in and screw custom nut (6).
15. Lubricate needle shank lightly with silicone-free oil. Push in needle (1) carefully into the housing from the back.
16. Insert needle spring (2) and plunger spring (3).
17. Hand-tighten end cap (4).
18. Tighten needle gland (7) carefully.

9.3.3 Set delay time

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

Disassembly

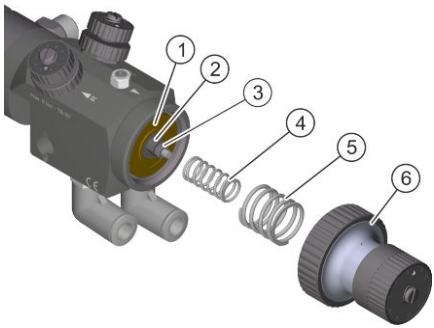


Fig. 20: Set delay time

1. Thread off and remove nozzle (6) with end cap.
2. Remove needle spring (4) and plunger spring (5).
3. Loosen locknut (3).

Setting

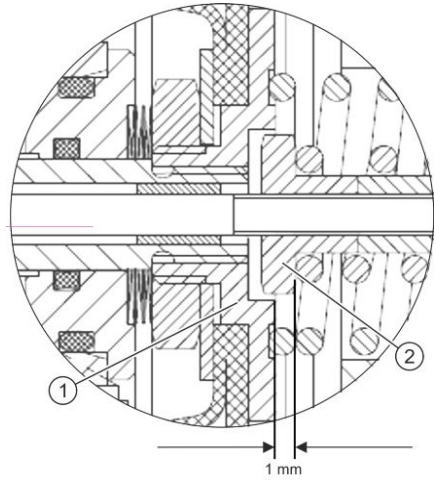


Fig. 21: Adjust distance from piston holder to pre-air stop nut.

4. Rotate pre-air stop nut (2).
   - Turn it to the right to reduce the delay time.
   - Turn it to the left to increase the delay time.

   The recommended distance from the pre-air stop nut (2) to the piston holder (1) is about 1mm.

   If a longer delay is needed, the distance must be increased.

5. Tighten the locknut (3).

Assembly

6. Insert needle spring (4) and plunger spring (5).
7. Hand-tighten end cap (6).

9.3.4 Replace piston seals.

> When the piston axis is disassembled, the piston axis seal can be replaced.

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Protective workwear
- Protective gloves

Tool:

- W02020358 - Assembly tool, sealing ring assembly

Disassembly

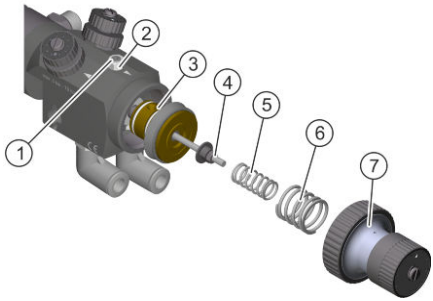


Fig. 22: Disassembling Piston

1. Thread off and remove nozzle (7) with end cap.
2. Pull out needle spring (5) and plunger spring (6) towards the back.
3. Pull out complete needle (4) towards the back.
4. Loosen hex nut (2).
5. Thread off and remove screw (1).
6. Pull out the complete piston axis (3).

> For simpler disassembly, a M5 screw can be screwed into the piston axis (3).

Replace piston axis seal

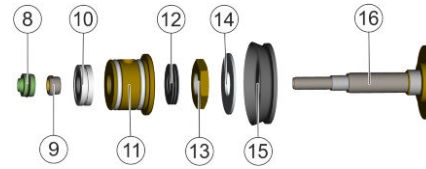


Fig. 23: Replace piston seals

7. For disassembling the piston axis seal (8), thread a M5 tap into the piston axis seal (8).
8. Pull out the tap with the piston axis seal (8).
9. Loosen locknut (9).
10. Pull out sealing body (10) from piston axis (16).
11. Pull off stop bush (11).
12. Pull off ball bearing plate springs (12).
13. Loosen bracket nut (13).

14. Pull off counter-washer (14).
15. Pull off piston sleeve (15).
16. Replace seals of the stop bush (11), sealing body (10) and piston sleeve (15).
17. Check the quad rings located in the stop bushing for wear. Replace worn out quad rings or have them replaced by Dürr Systems.

Assembly

18. Push piston sleeve (15) and counter-washer (14) on to the piston axis (16).
19. Insert and tighten bracket nut (13). Secure with Loctite TYPE 290.
20. Push ball bearing plate springs (12) and stop bush (11) on to the piston axis (16).
21. Push sealing body (10) on to the piston axis (16).
22. Insert and tighten locknut (9).
23. Apply a thin layer of suitable lubricant onto the outer surfaces of the piston axis seal (e. g. Syntheso GLEP 1).
24. Slightly press in the piston axis seal using an assembly tool.
25. Lubricate piston sleeve (15) and piston glide surface in the housing lightly with silicone-free oil.
26. **NOTICE!**

    Damage to the piston axis seal

    If the piston axis is pushed into the housing by applying too much force, the piston axis seal may become damaged.
    - Thread the piston axis carefully and push it into the housing.
    - If the piston axis is stuck, use assembly tool if appropriate.

    Push complete piston axis carefully from behind into the housing.
27. If the piston axis is stuck, use assembly tool (W02850018) if appropriate:
    - Prior to that, dismantle connecting piece (24) ↳ 12.1 “Spare parts”.
    - Use assembly tool (W02850018).
28. Thread-in the screw (1).
29. Screw-on hex nut (2) and tighten it.
30. Lubricate needle shank lightly with silicone-free oil. Push in needle (4) carefully into the housing from the back.
31. Insert needle spring (5) and plunger spring (6).
32. Hand-tighten end cap (7).

9.3.5 Replace control screw or control screw seal

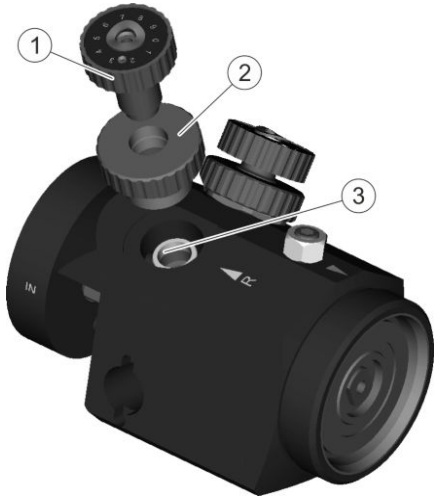


Fig. 24: Control screw

Personnel:
- Operator
- + additional qualification explosion protection

Protective equipment:
- Protective workwear
- Protective gloves

1. Unscrew control screw (1).
2. Pull off safety washer.
3. Unscrew adjusting screw (2).
4. Remove bushing and seal (3).
5. Insert new seal.
6. Insert bushing. Screw in adjusting screw (2).
7. Clip on safety washer.
8. Wet thread with thread sealant ↬ 11.9 “Operating and auxiliary materials”.
9. Assemble control screw (1).

10 Disassembly and Disposal

10.1 Safety recommendations

WARNING!

Escaping material and compressed air

Escaping material under pressure can cause serious injuries.

Before carrying out any work:
- Disconnect the system, in which the spray gun is installed, from compressed air and material supply.
- Secure system personalized from being switched on again.
- Depressurize the lines.

10.2 Disassembly

Personnel:

- Operator
- + additional qualification explosion protection

Protective equipment:

- Use ear protection
- Eye protection
- Respiratory protection device
- Protective workwear
- Protective gloves

1. Purging ↳ 6.4.3 “Purging”.
2. Disconnect the compressed air supply and material feed. Secure against reconnection.
3. Disconnect all lines.
4. Disassemble the spray gun from the support bracket.

10.3 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. ↳ 11.8 “Materials used”
- 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.

11 Technical data

11.1 Dimensions and weight

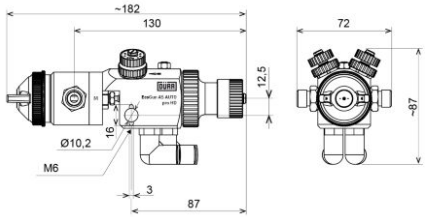


Fig. 25: Dimensions

Detail	Value
Length	approx. 182mm
Width	72mm
Height	approx. 87mm
Weight (ACV spray gun variant)	895g
Weight (RC spray gun variant)	864g

11.2 Connections

Connection	Nominal width
Material (2x)	3/8” thread
Control air and spraying air (version-dependent)	Control air Ø 6mm or Ø 1/4" Spraying air: Ø 8mm or Ø 3/8"

11.3 Operating conditions

Detail	Value
Ambient temperature, minimum	2°C
Ambient temperature, maximum	55°C

11.4 Emissions

Detail	Value
Emission sound pressure level L_{pA}, A – according to EN 14462	78dB
Uncertainty K_{pA}	5dB
Sound power level L_{WA}, A – according to EN14462	-
Uncertainty K_{WA}	-

11.5 Operating values

Detail	Value
Spraying air pressure, maximum	8bar
Spraying air pressure, optimum	2 to 3.5 bar
Control air pressure	3.5 to 6bar
Material pressure, maximum	4bar
Material temperature, maximum	60°C

11.6 Compressed air quality

- Purity classes in accordance with ISO 8573-1: 1:4:2
- Limitations for purity class 4 (pressure dew point max.):
  - ≤ -3°C at 7bar absolute
  - ≤ +1°C at 9bar absolute
  - ≤ +3°C at 11bar absolute

11.7 Type plate

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

- Product name
- Material number
- Year of manufacture
- Serial number
- Ex labeling
- Manufacturer
- CE labeling

11.8 Materials used

Component	Material
Housing	nickel-plated or anodized aluminum
Compression springs	Stainless steel
Materials in contact with material	Stainless steel, POM
Seals in contact with material	PTFE, FEPM, FFKM
Seals without material contact	NBR, PU, PTFE, PE-UHMW, FKM, NR/SBR, FEPM

11.9 Operating and auxiliary materials

Designation	Material number
Grease Klüber Syntheso GLEP 1, 100g (for seals and threads)	W32020010
Thread sealant Loctite 577	W31010005
Screw locking, intermediate strength, green	Loctite 290

11.10 Material specification

Suitable Material:

- Flammable and non-flammable fluid coating materials

Do not use halogen - hydrocarbon based material.

12 Spare parts, tools and accessories

12.1 Spare parts

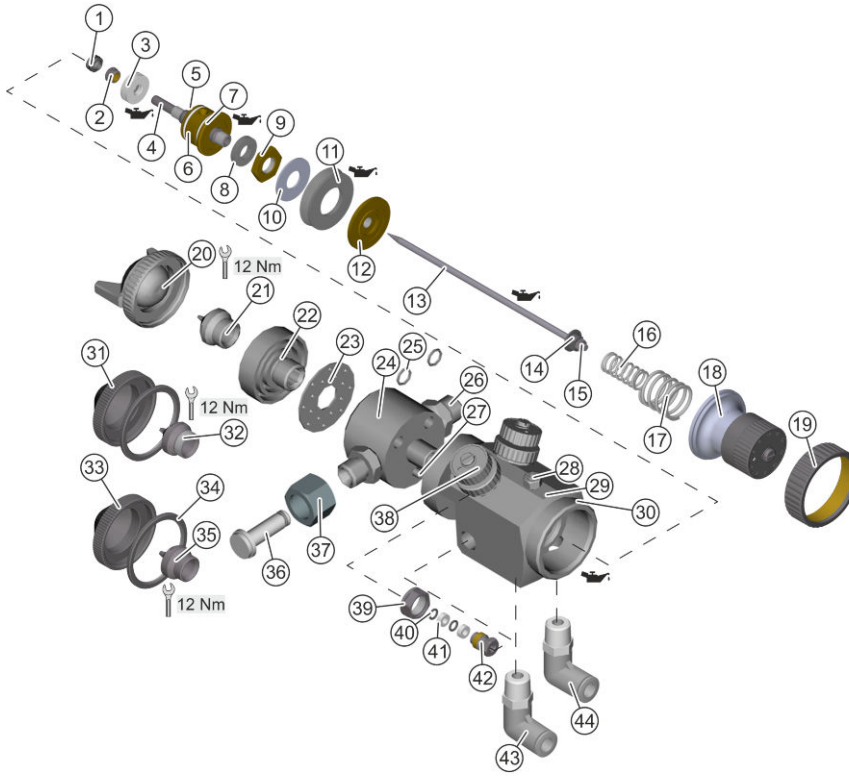


Fig. 26: Exploded view

Klüber Syntheso GLEP 1

Item	Denomination	Quantity	Material number
1	Piston axis seal	1	M08130071
2	Locknut	1	M67010082
3	Sealing body	1	

Item	Denomination	Quantity	Material number
4	Piston axis	1	
5	Sealing ring	2	
6	Stop bush	1	
7	O-ring 16.0 x 2.0	2	
8	Ball bearing plate spring	6	
9	Bracket nut	1	
10	Counter-washer	1	
11	Piston sleeve	1	
12	Piston holder	1	
13	Needle	1	↳ “Overview - Air caps and nozzles”
14	Pre-air stop nut	1	↳ “Overview - Air caps and nozzles”
15	Locknut	1	
16	Needle spring	1	M68010223
17	Plunger spring	1	M68010224
18	End cap	1	M25010065 (Standard) M25010137 (Micro regulation)
19	Cap nut	1	
20	Air cap FLRD (Flat jet)	1	↳ “Overview - Air caps and nozzles”
	Cap nut for air cap FLRD	1	M30010408
	Seal for air cap FLRD	1	M08280030
21	Nozzle (Flat jet)	1	↳ “Overview - Air caps and nozzles”
22	Nozzle seat	1	M03030048
23	Seal	1	M08280032
24	Connecting piece	1	M01010204
25	Seal 9.0 x 7.5 x 1.0	2	M08010522
26	Double nipple 3/8“ Double nipple 1/4“	2	M01220004 M56110426
27	Cylinder pin Ø 4 x 20	1	D00070069
28	Threaded pin	1	D09140095

Item	Denomination	Quantity	Material number
29	Hex nut	1	D09340024
30	Housing	1	-
31	Air cap Dr. (Rotary jet)	1	↳ “Overview - Air caps and nozzles”
32	Nozzle (rotary jet)	1	
33	Air cap Rd. (Rotary jet)	1	
34	Cap nut (rotary jet and rotary jet)	1	M30010316
35	Nozzle (rotary jet)	1	↳ “Overview - Air caps and nozzles”
36	Plug complete (mountable on both sides)	1	N36960287
37	Custom nut G3/8” (mountable on both sides)	1	M30010327
38	Control screw Control screw, adjustable with tool	2	M57930010 M57930028
39	Tightening nut	1	M30050073
40	O-ring 4.0 x 1.2	2	M08220019
41	Needle seal	2	
42	Needle gland	1	M08320002
43	Elbow (spraying air A)	1	M57310058 (Ø 8) or M55170052 (Ø 3/8")
44	Elbow (control air C)	1	M57310033 (Ø 6) or M57310085 (Ø 4) or M55170051 (Ø 1/4")

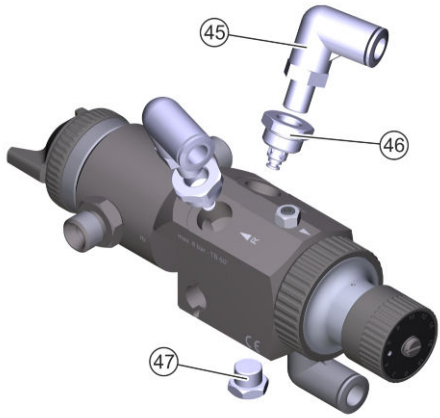


Fig. 27: Exploded view robot accessories (RC spray gun variant)

Item	Denomination	Quantity	Material number
45	Elbow plug-in connection	2	↳ 12.3 “Accessories”
46	Regulator insert	2	
47	Sealing screw 1/4"	1	

Overview - Air caps and nozzles

Nozzle sets flat jet (FLRD)			
Nozzle diameter	Item	Material number (tested nozzle sets consisting of air cap, nozzle and needle)	Material number (nozzle sets consisting of nozzle and needle)
1.0mm	13, 14, 15, (20), 21	M09800203	M09800358
1.5mm		M09800205	M09800360
1.8 mm		M09800206	M09800361
2.0mm		M09800207	M09800362
2.5mm		M09800208	M09800363
1.5mm			M09800455 *

Nozzle diameter	Item	Material number (tested nozzle sets consisting of air cap, nozzle and needle)	Material number (nozzle sets consisting of nozzle and needle)
1.8 mm			M09800456 *
2.5mm			M09800458 *

* Heavy Duty (CHD) nozzle and needle for highly abrasive coating materials to increase tool life

Nozzle sets rotary jet (Rd.)

Nozzle diameter	Item	Material number (tested nozzle sets consisting of air cap, nozzle and needle)	Material number (nozzle sets consisting of nozzle and needle)
0.8mm	13, 14, 15, (33, 34), 35	M09800238	M09800379
1.0mm		M09800239	M09800380
1.2mm		M09800240	M09800381

Nozzle sets rotary jet (Dr.)

Nozzle diameter	Item	Material number (tested nozzle sets consisting of air cap, nozzle and needle)	Material number (nozzle sets consisting of nozzle and needle)
1.2mm	13, 14, 15, (31, 32), 34	M09800261	M09800389
1.5mm		M09800262	M09800390

Air cap flat jet (FLRD)

Nozzle diameter	Item	Material number
1.0mm	20	M35030107
1.5mm		M35030110
1.8 mm		M35030111

Nozzle diameter	Item	Material number
2.0mm		M35030112
2.5mm		M35030113

Air cap for round jet (Rd.)

Nozzle diameter	Item	Material number
0.8mm	33	M35030088
1.0mm		M35030145
1.2mm		M35030146

Air cap for rotary jet (Rot.)

Nozzle diameter	Item	Material number
1.2mm	31	M35030128
1.5mm		M35030129

Spare part sets

Seal set N36960097

Denomination	Item	Quantity
Sealing ring 9.2 x 7.0 x 2.5 for control screw	-	2
Sealing ring (for EcoGun AS AUTO pro/pro LVLP)	-	1
Piston axis seal*	1	1
Locknut	2	1
Sealing body	3	1
Sealing ring	5	2
O-ring 16.0 x 2.0	7	2
Piston sleeve	11	1
Sealing ring 9.0 x 7.5 x 1.0	25	2
O-ring 4.0 x 1.2	40	2
Needle seal	41	2

* Tool W02020358 is required for disassembling a worn out piston axis seal. The seal must be lubricated lightly externally before assembly with a suitable lubricant (e.g. Syntheso GLEP 1).

Repair kit N36960098		
Denomination	**Item**	**Quantity**
Seal set N36960097	-	1
Piston with piston axis, complete	2 to 12	1
Pre-air stop nut	14	1
Locknut	15	1
Needle spring	16	1
Plunger spring	17	1
Control screw	38	1
Needle gland	42	1

Piston axis complete, pre-assembled M67010082		
Denomination	**Item**	**Quantity**
Locknut	2	1
Sealing body	3	1
Piston axis	4	1
Sealing ring	5	2
Stop bush	6	1
O-ring 16.0 x 2.0	7	2
Ball bearing plate spring	8	6
Bracket nut	9	1
Counter-washer	10	1
Piston sleeve	11	1
Piston holder	12	1

Sealing collar set M08220019		
Denomination	**Item**	**Quantity**
O-ring 4.0 x 1.2	40	2
Needle seal	41	2

12.2 Tools

Description	Material number
Assembly tool for piston axis	W02850018
Assembly tool for piston axis seal	W02020358
Assembly tool for sealing ring	W02020226
Allen key SW9	W11010016

12.3 Accessories

An overview of the accessory is available at Dürr webshop or upon request, ↳ “Hotline and Contact”.

Designation	Material number
Cleaning set (21 parts)	N36960038
Flexible protective sleeve for spray gun	W20910224
Plastic cover for needle and needle seal, protection for snap-in attachment	M59012317
Connection set FLUID G1/4"i- 6x8 hose	N36960300
Cleaning set 17 parts	N36960037
DIN cup 4mm	N08010047
DIN cup 2 mm	N08010053
DIN cup 6 mm	N08010054

Robot kit EU N36960141

Denomination	Item	Quantity	Material number
Elbow plug-in connection for air hose Ø 8	45	2	M57310037
Regulator insert	46	2	
Sealing screw 1/4"	47	1	

Robot kit US N36960142

Denomination	Item	Quantity	Material number
Elbow plug-in connection for air hose Ø 3/8"	45	2	M55170054
Regulator insert	46	2	
Sealing screw 1/4"	47	1	

Sealing screw for tap line mode

Designation	Material number
Sealing screw G1/4" SW 17 L19.5	M41090178

Closure set for operation without horn air

Designation	Material number
Closure set	N36960148

Support bracket

Designation	Material number
Support bracket for stand tube Ø 26	N66030005
Gun support bracket with angular gauge	M33120007

12.4 Order

WARNING!

Unsuitable spare parts in explosive areas

Spare parts not compliant with the specifications on explosion protection can cause explosions in an explosive atmosphere. Serious injury and death could be the consequence.

- Use exclusively original spare parts.

WARNING!

Unsuitable spare parts

Spare 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 spare parts.

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

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