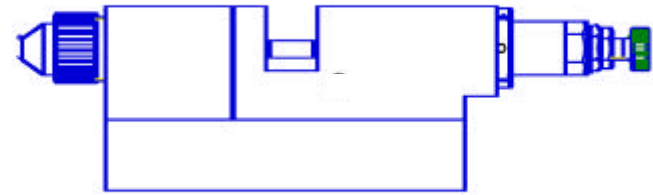


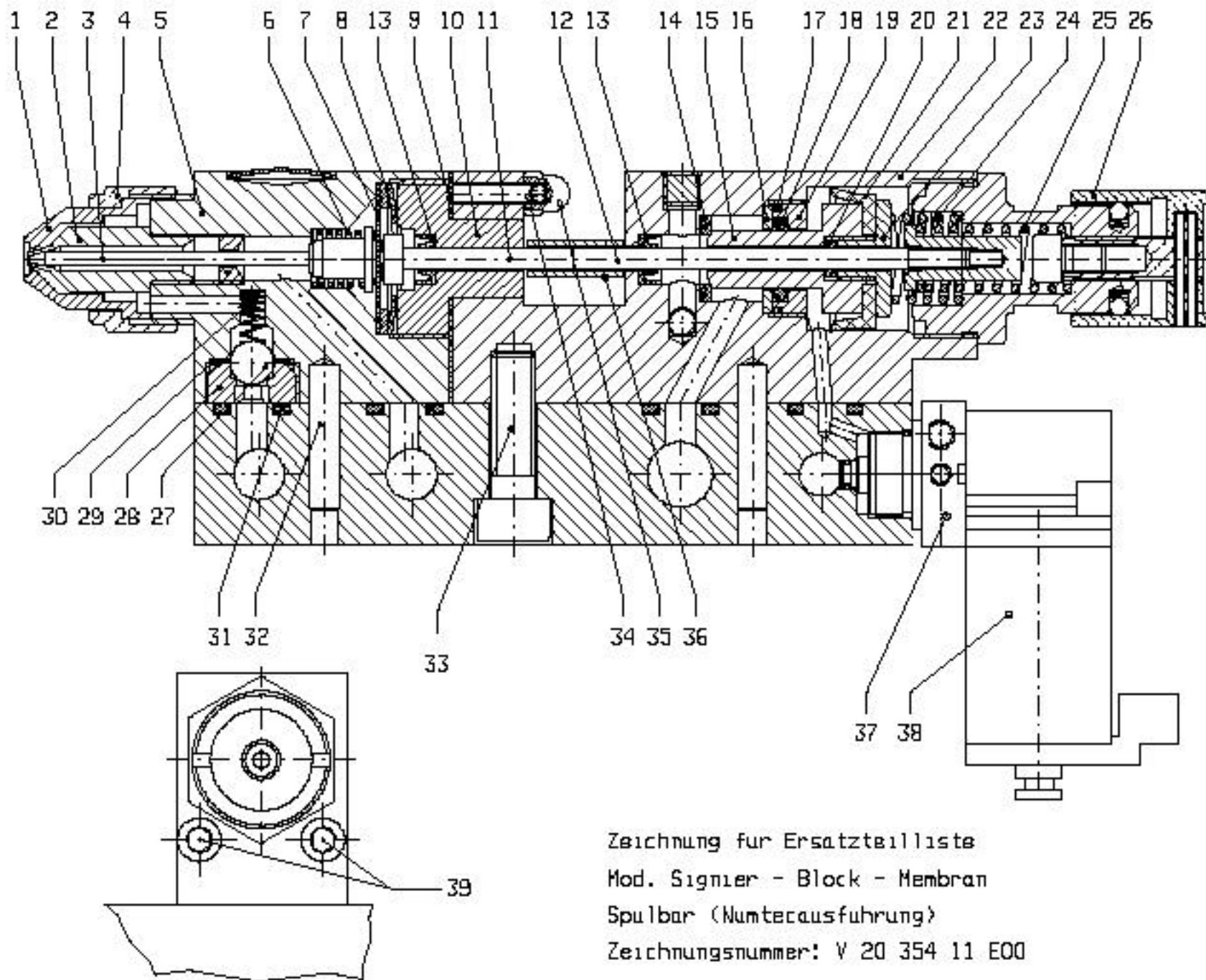
# Operating instruction

20 354 11

## Marking-Block-Diaphragm Special edition



CE



## Listing of Replacement Part

### Marking-block-diaphragm special edition Fa.Numtec Type: V 20 354 11 with notch-type adjustment

Item	Part number	Name	noozle - dimensions
1	<b>optional</b> V 20 339 13 123	<b>Round-Jet air head</b>	VA 0.8 / 1.0 mm
2	<b>optional</b> V 20 336 23 ..3*	<b>Material noozle</b>	stainless speciality steel
3	<b>optional</b> V 20 355 11 ..3*	<b>Material needle</b>	stainless speciality steel
	<b>optional</b> V 20 355 11 ..6*	<b>Material needle</b>	carbide metal material
4	V 20 335 15 003	air cap nut	
5	V 20 355 02 000	front part	
6	<b>V 20 355 17 003</b>	<b>pressure spring</b>	
7	<b>V 09 230 03 000</b>	<b>diaphragm</b>	
8	V 20 355 15 004	support washer	
9	<b>V 09 002 44 000</b>	<b>seal</b>	
10	V 20 355 03 004	clamping sleeve	
11	V 20 355 12 003	pressure bar	
12	V 20 355 08 000	piston rod	
13	<b>V 09 220 25 000</b>	<b>2x lip seal</b>	
14	<b>V 09 230 04 000</b>	<b>piston cylinder seal</b>	
15	V 20 355 06 004	piston	
16	V 20 355 14 004	washer	
17	<b>V 09 103 36 001</b>	<b>O - ring</b>	
18	<b>V 09 102 09 001</b>	<b>O - ring</b>	
19	V 20 355 13 004	piston guide	
20	<b>V 09 102 08 000</b>	<b>O - ring</b>	
21	<b>V 09 210 11 000</b>	<b>rubber packing ring</b>	
22	V 20 355 01 000	body complete	
23	V 20 355 07 004	piston screw	
24	<b>V 20 355 19 003</b>	<b>piston spring</b>	
25	<b>V 20 355 18 003</b>	<b>needle spring</b>	
26	V 20 355 31 003	notch-type adjustment	
27	<b>V 20 353 13 003</b>	<b>ball</b>	
28	V 20 353 11 005	ball seat	
29	<b>V 09 102 41 000</b>	<b>O - ring</b>	
30	<b>V 20 353 12 000</b>	<b>spring</b>	
31	<b>V 09 102 33 001</b>	<b>4x O - ring</b>	

Item	Part number	Name
32	V 20 350 05 001	2x parallel pin
33	V 20 353 16 000	cylinder srew
34	V 20 355 32 003	threated rod
35	V 20 355 30 003	cap nut
36	V 20 355 05 005	coupling
37	V 20 355 27 000	adapter complete
38	V 02 402 25 024	armature solenoid 3/2 16 Watt
39	V 20 355 21 003	2x screw

\* . When ordering parts, please state the corresponding dimensions.

Repair Sets no. : **V 16 354 11 . . 3**  
(for Type V 20 354 F.Numtec )

We recommend that all parts printed in bold type (wearing parts) are kept in stock.

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## 1 General

### 1.1 Identification of Model Version

**Model:** PILOT Marking - Block - Diaphragm Special Edition Fa.Numtec

**Type Series:** 20-354 11 with notch-type adjustment

#### 1.1 Normal use

The PILOT Marking - Block - Diaphragm must be used only for processing sprayable materials, in particular:

- lacquers and paints
- grease, oil and anti-corrosion agents
- adhesives, grease, oil and anti-corrosion agents
- ceramic glazes
- stains

If you intend to spray materials that are not listed here, please contact us.

The sprayable materials must be sprayed only on workpieces or objects. The model PILOT Marking - Block - Diaphragm is not a hand - held spray gun and must therefore be mounted in a suitable bracket. The spray gun is mounted to an adapter plate.

The temperature of the material to be sprayed must not exceed 42°C.

Proper use of the spray gun also includes the fact that you have read, understood and observed all information, advice and safety requirements presented in this instruction manual.

#### 1.2 Improper use

The spray gun must not be used in any other way than as described above in the section "Proper use".

Any other use is improper.

Improper use includes:

- spraying materials onto persons or animals
- spraying liquid nitrogen

## 2 Technical description

The model PILOT Marking - Block - Membran is operated automatically by compressed air and is controlled via 3/2-way control valves. Hand-operated, foot-operated or solenoid-valve-operated valves can be used for this purpose.

After actuating the 3/2-way control valve, the compressed air required for controlling enters the cylinder chamber of the spray gun and opens the spraying air and material feed. If the control air is interrupted by the 3/2-way valve, the compressed air in the cylinder chamber is allowed to escape. The spring pressure of the piston and needle spring shuts off the material feed to the material nozzle and then the spraying air feed.

The material inlet duct of the PILOT Marking - Block - Diaphragm can be opened manually so as to permit, for example, cleaning of a clogged material outlet nozzle.

In the flushing version of the 20-354 11 can the air control head clean after each spraying process with the convenient washingup liquid.

## 3. Safety Warnings

### 3.1 Safety Warning Symbols



#### Warning

This pictograph and the accompanying warning note „Warning“ indicate possible risks and dangers for yourself.

Possible consequences: Injuries of any kind.



#### Caution

This pictograph and the accompanying warning note „Caution“ indicate possible damage to equipment.

Possible consequences: Damage to equipment, workpieces, etc.



#### Notice

This pictograph and the accompanying note „Notice“ indicate additional and useful information to help you handling the marking block with even greater confidence and efficiency.

### 3.2 Generally Applicable Safety Precautions

It is important that all applicable accident prevention directives as well as industrial safety and health rules and regulations are duly complied with.

The regulations for spray gun and the regulations for accident prevention have to be strictly observed.

Use this marking block in well ventilated rooms. Open fires, naked lights and smoking are prohibited in the working area. Spraying of readily flammable media such as paints, lacquers, cleaning agents, etc., causes a potential health, explosion and fire risk.

The marking block have to adequate earthed (grounded).

Prior to any servicing and repair work: Make sure that the spray gun is in unpressurized condition, i.e. all air and material inputs must be shut off - if not, imminent risk of injury.

Keep your hands and other extremities away from the front of the spray gun - imminent risk of injury.

Never point the spray gun at persons or animals - imminent risk of injury.

It is important that all processing specifications and safety warnings issued by the manufacturers of spraying and cleaning media are duly complied with. Especially aggressive and corrosive media can cause personal health problems.

Wear suitable hearing protections while working with the spray gun. Spray guns produce sound levels of up to 86 dB (A), which may cause hearing defects.

Air-borne particles must be kept away from the working area and personnel. Wear proper respiratory protection masks and protective overalls when working with spraying media. Air-borne particles represent a health hazard.

Check that nuts and screws are tightened properly after performing servicing and repair work.

Make sure you use original producer replacement parts designed for functional reliability and efficiency.

For further information on the safe use of the spray gun please contact us.

## 4 Assembly / Installation

The spray gun is delivered in completely assembled condition. Before taking the spray gun into operation perform the following preparations:

### 4.1 Mounting of Spray Gun

Mount the Spray gun on the bracket provided in the marking system using four M6 cylinder screws.

### 4.2. Connection of Input Lines



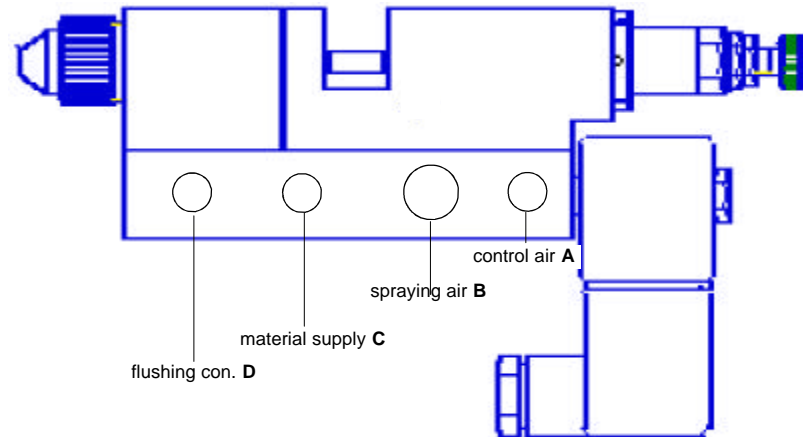
#### Warning

Make sure not to confuse the control and atomizing air connections -**risk of injury**.

1. Connect the input lines for

- the control air in to the inlet fitting of the adapter plate, marked with **A**.
- the spraying air to the inlet fitting of the adapter plate, marked with **B**.
- the material supply to the inlet fitting of the adapter plate, marked with **C**.
- the washingup liquid to the inlet fitting of the adapter plate, marked with **D**.

2. Check the hoses for tightness.



## 5 Operational Handling

### 5.1 Safety Warnings

Please pay special attention to the following safety warnings prior to taking this spray gun into operation!

- Wear proper respiratory protection masks and protective overalls, whenever you are operating this spray gun. Air-borne particles represent a health hazard.
- Make sure to wear suitable hearing protectors. The gun produces sound levels of up to 86 dB (A) may cause hearing defects.
- Open fires, naked lights and smoking prohibited in the working area. Spraying of readily flammable media such as paints and adhesive compounds is always accompanied by the risk of fire and explosion.

### 5.2 Starting / Stopping Requirements

The following requirements must be met before taking this spray gun into operation:

- Before using the spray gun, ensure that all hose connections, nuts, screws and quick-fit material couplings are fitted tightly and are sealed. Furthermore, carry out a visual check to ensure that there are no leaks.
- Ensure that the atomising air pressure is applied to the spray gun.
- Ensure that the material pressure is applied to the spray gun.



#### Caution

The material pressure depends on the equipment being used and on the material being sprayed. The pressure should not be set higher than

- 2.5 bar, as functional reliability of the spray gun will suffer.

Adjust the control air pressure to at least

- 4 bar, in order to operate the spray gun.

The operation of the spray gun can be started / stopped by way of the 3/2-way control valve (see the Operating Instructions of the plant systems manufacturer).



#### **Warning**

It is important to remember that the spray gun must be relieved of all pressure whenever work is terminated. Lines left in pressurized condition could burst, with their contents likely to injure anybody present nearby.

### **5.3. Spray Pattern Test**

A test spray pattern should always be made whenever:

- the spray gun is used for the first time
- the spraying material is changed
- the spray gun has been disassembled for maintenance or servicing.

The test pattern can be sprayed on a test workpiece, panel, cardboard or paper.



#### **Warning**

Keep away from the front of the marking block - imminent risk of injury.



#### **Warning**

Make sure that nobody is present in the spraying zone when the gun is started - imminent Risk of Injury.

1. Start the gun to produce a spray pattern sample (see *5.2 Starting/Stopping Requirements*).
2. Inspect the sample and readjust the settings of the gun if necessary.

#### **Setting the Material Flow Rate**

The material flow rate is adjusted by the gradate adjustment, Item 26. The material flow is reduced by screw in the gradate adjustment and is stepped by screw out. Turn carefully the notch-type adjustment (24 steps per rotation) to prevent a damage of the material needle.

#### **Regulating the Material Pressure**

The material pressure is regulated by the regulator on the pressure container and by the control unit of the equipment (refer to the Operating Instructions supplied by the manufacturer of the equipment).

#### **Regulating the Atomising Air Pressure**

The atomising air pressure is regulated by a compressed air regulator and by the control unit of the equipment (refer to the Operating Instructions supplied by the manufacturer of the equipment).

### **5.5 Retooling of Spray Gun**

Combinations of air control head, material control nozzle and needle, designed to match specific spraying media types and grades, form a unit - namely the nozzle insert assembly. In order maintain the desired spray-finish quality standard always replace the complete nozzle insert assembly.



#### **Warning**

Before carrying out any retooling, ensure that the atomising air, control air and the material supply are relieved of pressure, and check this.



#### **Notice**

To carry out the procedures described in the following, please refer to the exploded diagram at the beginning of these Operating Instructions.

#### **Changing the material nozzle**

1. Unscrew the air cap nut, item 4.
2. Remove the air cap, item 1.
3. Unscrew the material nozzle, item 2, from the spray gun head.

#### **Changing the material needle**

1. Unscrew the spray gun from the adapte plate.
2. Release the front part, item 5, of the body, item 22.
3. Unscrew the clamping sleeve, item 10, from the front part.
4. Remove the spring washer, the support washer, item 8, and the diaphragm, item 7
5. Take the material needle, item 3, together with the pressure spring, item 6, out of the front part.

The installation of material nozzle and material needle takes place in reverse order. When reinstalling the diaphragm, ensure that the teflon-coated side is facing towards the material channel.

#### **Changing the diaphragm**

1. Unscrew the spray gun from the adapte plate.
2. Release the front part, item 5, of the body, item 22.
3. Unscrew the clamping sleeve, item 10, from the front part.
4. Remove the spring washer, the support washer, item 8, and the diaphragm, item 7

Installation takes place in reverse order.

When reinstalling the diaphragm, ensure that the teflon-coated side is facing towards the material channel.



#### **Notice**

Apply a thin film of grease to the following components during the assembly: material needle, item 3, pressure spring, item 6.

## 6. Cleaning

### 6.1. Safety Warnings

- Before carrying out any maintenance work, ensure that the atomising air and the material supply to the marking block are relieved of pressure, and check this.
- No open fires, naked light and smoking allowed in the work area. When spraying readily flammable media such as cleaning solutions, there is an increased risk of fire and explosion.
- Observe the safety warnings issued by the manufacturer. Aggressive and corrosive media represent risks and hazards to personal health.

### 6.2. Cleaning - Complete

Regular cleaning of the spray gun has to be performed, in order to increase the service life and the function of the spray gun.

Clean the gun only with cleaning solutions recommended by the manufacturer of the spraying material used at the time. It is important to make sure that cleaning solutions do not contain any of the following constituents:

- halogenated hydrocarbons  
(e.g. 1,1,1-trichloroethane, methylene chloride, etc.)
- acids and acidiferous cleaning solutions
- regenerated solvents (so-called cleaning dilutions)
- paint removers.

The above constituents cause chemical reactions with the electroplated components resulting in corrosion damage. The manufacturer is not responsible for any damages resulting from such treatment.

Clean the spray gun

- prior to each change of the spraying medium
- at least once a week
- as often as may be required by the spraying medium handled and the resultant degree of fouling.



#### Caution

Never immerse the spray gun in solvent or any other cleaning solution. The functional reliability and efficiency of the spray gun can otherwise not be guaranteed.



#### Caution

Do not use any hard, pointed or sharp-edged objects when cleaning the spray gun. Any damage of the precision-made parts are likely to affect your spraying results.

1. Dismate the spray gun according to 5.4 *Replacement of material nozzle and -needle*.
2. Use a soft brush together with a compatible cleaning solution to clean the air control head and nozzle.
3. Use a suitable cloth with a compatible cleaning solution to clean the gun body and all remaining parts.
4. Apply a thin layer of grease to the following parts:
  - rubber packing ring, item 21
  - piston spring, item 24
  - needle spring, item 25
  - pressure spring, item 6

Make sure to use a non-acidic, non-resinogenic grease and apply this with a soft brush.

Assemble the spray gun in reverse order.

### 6.3 Cleaning - Routine

The spray gun need not necessarily be dismantled for cleaning if and when the spraying medium is changed in regular intervals or upon termination of work (depending on the material used).



#### Note

Clean and lubricate the spray gun frequently in accordance with Chapter 6.2 *Cleaning - Complete*. This will ensure functional reliability of the spray gun.

The following requirements must be met before the routine cleaning work can be performed:

1. The material tank must be cleaned and then be filled with a compatible cleaning solution. Material pressure has to be available at the spray gun. The cleaning solution should not be sprayed.
2. Take the spray gun into operation (see 5.2 *Starting the Spray Gun*).
3. Do not stop the spray gun until clear cleaning solution emerges from the nozzle.

All pressures should then be removed from the complete spraying system until the next operation.

## 7 Repairs / Replacements



### Warning

Before carrying out any repair or replacement work, ensure that the atomising air and the material supply to the spray gun are relieved of pressure, and check this at the air pressure manometer - risk of injury.



### Notice

To carry out the procedures described in the following, please refer to the exploded diagram at the beginning of these Operating Instructions.

### 7.2 Replacing the Material Nozzles, Springs and Seals

Dismantle the spray gun as described in 5.4 *Replacing the material nozzle and needle* if the following components are to be replaced:

- Material nozzles
- Piston spring\*
- Pressure spring\*
- Material needle\*
- Needle spring\*
- Rubber packing seal\*
- O-ring



### Notice

Parts marked with \* must be lubricated with a non-acidic, non-resinogenic grease prior to installation.



### Notice

All wearing parts of the PILOT Marking-block-diaphragm are marked in bold-face in the Listing of Replacement Parts.

## 8. Troubleshooting and Corrective Action



### Warning

Before carrying out any maintenance or repair work, ensure that the atomising air and the material supply to the marking block are relieved of pressure, and check this.

Fault	Cause	Corrective Action
Gun drips	Material needle or nozzle dirty Material needle or nozzle damaged	see 5.4 Change material nozzle or - needle replace and clean
Gun does not open	Control air pressure too low	Increase control air pressure to min. 5 bar
Irregular or splattering spray	Insufficient material in container Material nozzle is loosen	Fill up with material (see instructions from material manufacturer)  Replace
Gun sprays when switched off	Lip seal item 13 or Rubber packing ring Item 21 damaged  Diaphragm item 7 damaged	Clean the parts, tighten or replace

### 9 Disposal of Cleaning / Servicing Substances

Disposal of any such substances must be in accordance with all applicable local and national regulations, directives and laws.



### Warning

Pay special attention to all processing specifications and safety warnings issued by the manufacturers of spraying and cleaning media. The improper disposal of any toxic waste material represents a serious threat to the environment, i.e. to the health of mankind and animal life.

