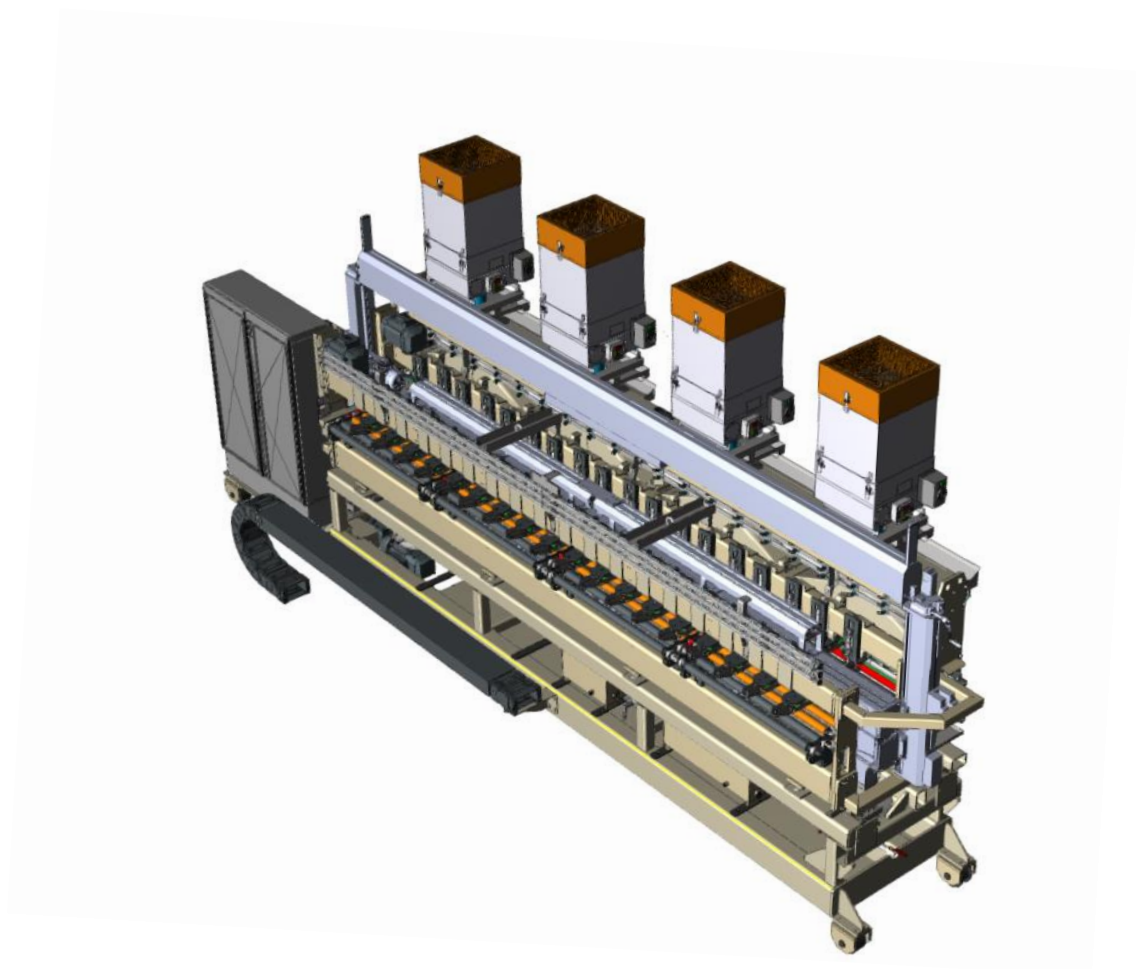


# *INSTALLATION INSTRUCTIONS*

## *Partly Completed Machinery*

COMBI LB 4000 mm



ORIGINAL INSTRUCTIONS  
KEEP THEM FOR FUTURE REFERENCES



## REVISION MATRIX

MANUAL	Review	Date	Review	Date	Review	Date
Index	0.0	02/03/2020				
Chapter 0	0.0	02/03/2020				
Chapter 1	0.0	02/03/2020				
Chapter 2	0.0	02/03/2020				
Chapter 3	0.0	02/03/2020				
Chapter 4	0.0	02/03/2020				
Chapter 5	0.0	02/03/2020				
Chapter 6	0.0	02/03/2020				
<b>Date</b>	07/09/2022					
<b>Signature</b>						

|

The customer is responsible for ensuring that only the updated versions of the manual are present in the points of use, in case this document is modified by the Manufacturer.

|

THE OFFICIAL LANGUAGE CHOSEN BY THE MANUFACTURER IS [ITALIAN](#).

We are not responsible for the translations in other languages that are not in compliance with the original meaning.

## MASTER TASK LIST

<b>0</b>	<b>INTRODUCTION .....</b>	<b>5</b>
0.1	PURPOSE OF THE USE AND MAINTENANCE MANUAL .....	5
0.2	SUBJECTS.....	5
0.3	USER MANUAL PRESERVATION .....	5
0.4	USER MANUAL UPDATE .....	6
0.5	HOW TO READ THE USER MANUAL .....	6
0.6	DEFINITIONS.....	8
0.7	PICTOGRAMS.....	10
<b>1</b>	<b>GENERAL INFORMATION .....</b>	<b>12</b>
1.1	MANUFACTURER IDENTIFICATION DATA .....	12
1.2	DECLARATIONS.....	13
1.3	SAFETY REGULATIONS.....	15
1.4	TECHNICAL ASSISTANCE INFORMATION .....	15
1.5	PREPARATIONS BY THE CLIENT.....	15
<b>2</b>	<b>ASSEMBLY .....</b>	<b>17</b>
2.1	TRANSPORT AND HANDLING.....	17
2.2	STORAGE.....	17
2.3	PREPARATIONS.....	17
2.4	CONNECTIONS.....	18
2.5	HANDLING THE LUBRICATION MACHINE .....	19
2.6	How To Reassemble the Machine .....	20
2.6.1.	LUBRICATION UNIT SUCTION SYSTEM.....	20
2.6.2.	BRUSH CLEANER POSITIONING .....	21
2.6.3.	PHOTOCELLS AND REFLECTORS .....	24
2.6.4.	PIPE PASSAGE CHAIN .....	29
2.6.5.	POSITIONING OF THE AUTOMATIC REFILL PUMPS.....	31
2.6.6.	REMOVE THE TRANSPORT BRACKETS INSIDE THE BRUSHING MACHINE .....	32
2.6.7.	REASSEMBLING CYCLONES.....	33
2.7	CONNECTIONS TO THE LINE .....	35
2.7.1.	POSITIONING OF THE MAIN AIR REGULATOR .....	36
2.8	SETTINGS.....	37
2.9	VACUUM TESTS .....	39
2.10	LADEN TESTS .....	39
2.11	PRELIMINARY CHECKS.....	39
2.12	ADJUSTMENTS.....	39
2.13	NO-LOAD TEST.....	39
2.14	LOAD TEST.....	39
<b>3</b>	<b>PARTLY COMPLETED MACHINERY DESCRIPTION .....</b>	<b>40</b>
3.1	OPERATING PRINCIPLE.....	40
3.2	MAIN COMPONENTS .....	40
<b>4</b>	<b>STRUCTURE AND DESCRIPTION .....</b>	<b>45</b>
4.1	STRUCTURE OF THE MACHINE .....	45
4.2	INFEED, OUTFEED AND TRANSPORT DIRECTION .....	46
4.3	PRODUCT-CONTACT AREA, NON PRODUCT-CONTACT AREA AND WIPING DIRECTION.....	47
4.4	GUIDE RAIL SIDE .....	47
4.5	CLEANING MODULE .....	48
4.6	LINEAR BRUSH.....	49
4.7	PRESSURE BUFFER .....	50
4.8	SELF-CLEANING UNIT .....	50
4.9	DT BR CLEANER SYSTEM.....	51

4.10	DT BR CLEANER CONTROL AND FILTER UNIT IR 100/IX2.....	52
4.11	EXTRACTION SYSTEM.....	53
4.12	HEIGHT ADJUSTER .....	54
4.13	Electric height adjuster (HVE) for the upper cleaning module.....	55
<b>5</b>	<b>TECHNICAL DATA.....</b>	<b>57</b>
5.1	Suction system (Brush Cleaner) .....	61
5.2	Suction system (Oiler) .....	64
5.3	SIZES.....	65
5.4	ENVIRONMENTAL CONDITIONS.....	67
5.5	LIGHTING.....	67
5.6	VIBRATIONS.....	67
5.7	SOUND EMISSIONS .....	67
5.8	TECHNICAL INFORMATION.....	67
5.9	STANDARD SUPPLY .....	68
5.10	ELECTROMAGNETIC ENVIRONMENT .....	68
<b>6</b>	<b>COMMISSIONING .....</b>	<b>69</b>
6.1	ALIGN THE LOWER CLEANING MODULE (BIPU).....	70
6.2	ALIGN THE UPPER CLEANING MODULE (BIPO).....	72
6.3	SET THE POSITION INDICATOR .....	74
6.4	SET THE PRESSURE BUFFER.....	75
6.5	CHECK THE BRUSH PRE-TENSION .....	76
6.6	SET THE DT BR CLEANER FLOW RATE.....	78
<b>7</b>	<b>MAINTENANCE.....</b>	<b>79</b>
7.1	MAINTENANCE- SETTING .....	81
7.2	MAINTENANCE- CHECKLIST BRUSH .....	81
7.3	MAINTENANCE - OILER .....	82
7.4	PERIODIC CLEANING .....	83
7.5	MAINTENANCE STATUS.....	84
7.6	Nozzles cleaning .....	84
7.7	Valve replacement.....	85
7.8	Comand Valve replacement .....	90
7.9	Valve Regulation.....	93
7.10	Oil Filters Replacement .....	95
7.11	How to change suction filters (Brush) .....	97
7.12	How to change suction filters (Oiler) .....	98
7.13	WIPER REPLACEMENT.....	100
7.14	WHEELS SUBSTITUTION ON PINCH ROLLS.....	102
7.15	PINCH ROLLS BELTS TENSIONING .....	103
7.16	MAINTENANCE BRUSH CLEANER.....	104
7.17	CLEAN CLEANING MODULES .....	104
7.18	REPLACE LINEAR BRUSH AND LINEAR BRUSH GUIDE.....	106
7.19	REMOVING THE LINEAR BRUSH.....	107
7.20	REMOVING THE LINEAR BRUSH GUIDE.....	111
7.21	FITTING THE LINEAR BRUSH GUIDE .....	115
7.22	FITTING THE LINEAR BRUSH.....	117
7.23	RESET THE CLEANING MODULES.....	121
7.24	RESET THE CLEANING MODULES.....	122
7.25	MEASURE AND SET BELT TENSION .....	123
7.26	REPLACE CLEANING MODULE MOTOR.....	124
7.27	DRAIN AND CLEAN THE CYCLONE.....	127
7.28	MAINTENANCE CHECKLIST.....	131
7.29	FUNCTIONAL CHECKS OF THE MACHINE'S ELECTRICAL SYSTEM .....	133
7.30	PARTLY COMPLETED MACHINE INSULATION .....	134
7.31	SPECIAL PRECAUTIONS.....	136
7.32	CLEANING.....	136
7.33	LUBRICATION.....	136
7.34	SCHEDULED ROUTINE MAINTENANCE.....	136



7.35	EXTRAORDINARY MAINTENANCE .....	137
8	ACCESSORIES AND SPARE PARTS.....	139
8.1	ASSISTANCE .....	139
8.2	ACCESSORIES.....	139
8.3	SPARE PARTS .....	139
9	INTERFACE DESCRIPTION.....	141
10	TROUBLESHOOTING .....	145
11	DISPOSAL .....	148

## 0 INTRODUCTION

### 0.1 PURPOSE OF THE USE AND MAINTENANCE MANUAL

This manual was design to provide the user with general information on the machine and to allow its use in safe conditions.

This User Manual is an integral part of the partly completed machinery and provides all the information necessary for:

1. the handling of the packaged and unpacked partly completed machinery in safe conditions;
2. the correct assembly of the partly completed machinery;
3. the knowledge of the technical specifications regarding the partly completed machinery;
4. the in-depth knowledge of its operation and limits;
5. the indication of the qualifications and specific training required of operators and maintenance personnel who use the partly completed machinery;
6. performing correct and safe maintenance operations;
7. technical support and spare parts management.

This document presumes that in the plants prepared for the partly completed machinery, the current safety and hygiene regulations are followed.

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The manager in charge has the obligation, according to current regulations, to carefully read the contents of this User Manual and to inform the assemblers and maintenance personnel regarding their tasks.

This Manual contains classified technical instructions, documentation, and drawings, strictly owned by the Manufacturer, therefore, besides the purposes for which it was designed, any partial or integral duplicate of the content and/or format, must be carried out following the prior consent of the Manufacturer.

### 0.2 SUBJECTS

This User Manual is addressed to the assembler and the maintenance technician of the partly completed machinery.

I

The term QUALIFIED/SPECIALIZED PERSONNEL refers to personnel who, as a result of training and professional experience, have been expressly authorized to carry out the installation, use and maintenance of the partly completed machinery.

### 0.3 USER MANUAL PRESERVATION

The User Manual must be carefully preserved and must accompany the partly completed machinery each time the owner is changed, during the entire life of the machine.

The manual must be carefully handled, with clean hands; do not store it on dirty surfaces.

It must not be removed, torn or arbitrarily altered.

The Manual should be stored in an environment protected from humidity and heat and in the proximity of the partly completed machinery.

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## 0.4 USER MANUAL UPDATE

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The Manufacturer is solely responsible for the written and validated instructions (Original Instructions); any translations MUST always be accompanied by the Original Instructions, in order to check the accuracy of the translation. In any case, the Manufacturer is not responsible for unapproved translations, therefore if an inconsistency is detected, carefully refer to the original language and eventually contact the Manufacturer's sales office, which will make the changes deemed appropriate.

The Manufacturer reserves the right to make changes to the project, variations/improvements to the partly completed machinery and to update the User Manual without sending the prior notice to Customers.

However, in case of performing modifications on the partly completed machinery installed at the Customer's place, in agreement with the Manufacturer and involving the update of one or more chapters of the User Manual, the Manufacturer shall send the Client the updated parts of the User Manual, with the new overall review model. The Customer, following the instructions that accompany the updated documentation, will be responsible to replace the parts no longer valid with the new ones.

---

## 0.5 HOW TO READ THE USER MANUAL

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The Manual is divided into chapters, each of them being dedicated to a specific category of information and therefore addressed to the operators according to the relative tasks.

Terms, abbreviations and pictograms are used in order to facilitate the fast comprehension of the text; their meaning is indicated in Paragraph 7.

### FIGURES NUMBERING

Each figure is numbered progressively.

The numbering is structured as follows:

Example Figure 0.1.2

Figure	0	.	1	.	2
	↓		↓		↓
	Chapter	.	Paragraph	.	Progressive number

The progressive number starts again from 1 for each new paragraph.

### TABLES NUMBERING

Each Table is numbered progressively.

The numbering is structured as follows:

Example Table 0-1.2

Table	0	-	1	.	2
	↓		↓		↓
	Chapter	-	Paragraph	.	Progressive number

The progressive number starts again from 1 for each new paragraph.

## ABBREVIATIONS

Ch.	= Chapter
Par.	= Paragraph
Sec.	= Section
P.	= Page
Fig.	= Figure
Tab.	= Table

## MEASUREMENT UNIT

The measurement units are those provided for by the International System (IS).

Basic Sizes	Measurement unit	Symbol
Time interval	second	s
Length	meter	m
Mass	kilogram	kg
Thermodynamic temperature	kelvin	K
Quantity of substance	mole	mol
Intensity of the electric current	ampere	A
Light intensity	Candela	cd
Temperature	celsius	°C

Mechanical sizes	Measurement unit	Symbol	Conversion
Frequency	hertz	Hz	1 Hz = 1 s <sup>-1</sup>
Force	newton	N	1 N = 1 kg m s <sup>-2</sup>
Pressure	pascal	Pa	1 Pa = 1 N m <sup>-2</sup>
Work, energy, heat quantity	joule	J	1 J = 1 N m
Power	watt	W	1 W = 1 J s <sup>-1</sup>

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## 0.6 DEFINITIONS

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### MACHINERY DIRECTIVE 2006/42/EC (Article 2 Definitions)

#### MANUFACTURER

Natural or legal person designing and/or building a machinery or a partly completed machinery covered by this Directive, responsible for the compliance of the machinery or partly completed machinery with this Directive for the purpose of launching it on the market under its own name or with its own brand or for personal use. In the absence of a manufacturer as defined above, a natural or legal person who launches a machine or partly completed machinery on the market or commissions it, according to this Directive shall be considered the manufacturer.

#### PLACING ON THE MARKET

First making available, within the Community, whether for payment or free of charge, of a machine or a partly completed machinery for distribution or use.

#### COMMISSIONING

First use of a machine covered by this Directive, within the Community, according to its purpose.

#### SAFETY COMPONENT

Component intended to perform a safety function, placed on the market separately, whose failure and/or malfunctioning endangers the safety of people, and is not essential for the purpose of the machine and can be replaced with other components.

### ANNEX I MACHINERY DIRECTIVE 2006/42/EC (p. 1.1.1 Definitions)

#### HAZARD

A potential source of injury or damage to health.

#### HAZARDOUS AREA

Any area inside and/or in the proximity of the machinery where the presence of a person represents a risk for his safety and health.

#### EXPOSED PERSON

Any person who is wholly or partially present in a hazardous area.

#### OPERATOR

The person or people in charge of installation, operation, adjustment, cleaning, repairing and moving the machinery or who performs maintenance operations.

#### RISK

Combination of the probability and severity of an injury or damage to health that may arise in a dangerous situation.

#### GUARD

Part of the machine precisely used to provide protection through a material barrier.

#### PROTECTIVE DEVICE

Device (other than a guard) which reduces the risk, by itself or combined with a guard.

#### INTENDED USE

The use of the machinery according to the use instructions.

**REASONABLY FORSEEABLE MISUSE**

Use of the machine in a manner different than the one indicated in the use instructions, but which may derive from the easily predictable human behavior.

**RESIDUAL RISKS**

Risks that persist despite the integrated protective measures in designing the machinery and in spite of the protections and complementary protective measures adopted.

**OTHER DEFINITIONS****ROUTINE MAINTENANCE**

Type of maintenance interventions during the life cycle, suitable for:

- a) maintain the original integrity of the good;
- b) maintain or restore the efficiency of the assets;
- c) contain regular use degradation;
- d) guarantee the useful life of the asset;
- e) deal with accidental events.

**EXTRAORDINARY MAINTENANCE**

Type of non-recurring and high cost interventions, compared to the replacement value of the asset and the annual ordinary maintenance costs.

## 0.7 PICTOGRAMS

### Generality



The pictograms must be applied in areas where they are easily visible and legible by anyone approaching and at a point where the person can react promptly in order to take the necessary actions to prevent the hazard.

When possible, they must be applied in areas protected from the risk of damage, abrasion, chemical aggression, dust or anything else that affects visibility and reading. The temperature range of use goes from -40° C to +80° C if there is no uneven temperatures distribution that negatively affects the thermal expansion of the material.





The surfaces on which the pictograms are applied must be clean, smooth and free of greases, oils or chemicals that reduce their adherence.

The standard provides that the safety pictograms are regularly checked and cleaned to ensure good readability at a safe distance. When products are subjected to extreme environmental conditions or when the safety pictograms no longer meet the required visibility conditions, they must be replaced.

### PICTOGRAMS RELATED TO HAZARDS




SYMBOL	DESCRIPTION
	Electricity
	Hand crushing
	Moving parts

### PICTOGRAMS RELATED TO PROHIBITIONS

SYMBOL	DESCRIPTION
	The intervention of unauthorized personnel on electrical equipment is forbidden
	Do not remove the safety devices
	It is forbidden to carry out repairs or lubrication operation on moving parts
	The access of unauthorized personnel is forbidden




## PICTOGRAMS RELATED TO OBLIGATIONS

SYMBOL	DESCRIPTION
	Wear protective gloves
	Wear safety footwear
	Wear protective goggles

## 1 GENERAL INFORMATION

### 1.1 MANUFACTURER IDENTIFICATION DATA

MANUFACTURER	DieTronic S.r.l. Lubricating systems
ADMINISTRATIVE LEGAL OFFICE	Via Papa Giovanni XXIII, 23 – 97014 Ispica (RG)
OPERATING OFFICE	Via Madre Teresa di Calcutta 9-13 26866 Sant' Angelo Lodigiano (Lodi)
TELEPHONE	+39 0371 210129
FAX	+39 0371 214321
E-MAIL	<i>info@dietronic.eu</i>
SPARE PARTS AFTER SALES SERVICE	<i>service@dietronic.eu</i> <i>l.midali@dietronic.eu</i>



# DieTronic

lubricating technology

Via Cav. Angelo Manzoni 28 Z.I. Maiano 26866 Sant'Angelo Lodigiano (LO)

ITALIA

ORDER

PROJECT

TOTAL POWER

VOLTAGE

AUX VOLTAGE

FREQUENCY

DATA

## 1.2 DECLARATIONS

### DECLARATION OF INCORPORATION

(Annex B DIR. 2006/42/EC)

#### THE MANUFACTURER

DieTronic S.r.l. Lubricating systems

*Company*

Via Madre Teresa di Calcutta, 9/13

*Address*

26866

*Zip Code*

LO

*Province*

Sant' Angelo Lodigiano

*City*

ITALY

*Country*

#### DECLARES THAT THE PARTLY COMPLETED MACHINERY

COMBI 4000 Partly Completed Machinery

*Partly Completed Machinery*

COMBI LB 4000

*Model*

20241081

*Serial number*

2024

*Year of manufacture:*

COMBI LB 4000 Spray Lubrication  
and Cleaning System width 4000  
mm

*Trade name*

Cleaning and lubrication of metal  
sheet assembled in an automatic  
processing line

*Intended use*

#### IS COMPLIANT WITH DIRECTIVES

**Directive 2006/42/EC** of the European Parliament and of the Council of May 17<sup>th</sup>, 2006 on machinery and amending Directive 95/16/EC.

#### Harmonized Standards references

Standard number	Description
UNI EN ISO 12100: 2010	Machinery safety - General principles of design - Risk assessment and reduction
UNI EN ISO 13849-1	Safety of machinery - Safety-related parts of the control systems - Part 1: General principles of design
UNI EN 1088: 2008	Safety of machinery. Interlocking devices assembled with guards. Design and selection principles.
UNI EN 982: 2009	Machinery safety. Safety requirements related to systems and their components for oil-hydraulic and pneumatic transmissions. Oil-hydraulics
UNI EN 953: 2009	Safety of machinery. Guards: General requirements for the design and construction of fixed and mobile guards.
UNI EN ISO 13857: 2008	Safety of machinery. Safety distances for preventing the access of upper and lower limbs to hazardous areas.
UNI EN 981	Hearing and visual hazards and information signal systems.
UNI EN 983	Safety requirements related to systems and their components for oil-hydraulic and pneumatic transmissions. Pneumatics.

## Technical specifications references

Standard number	Description
IEC 445 (IEC EN 60204-1)	Electrical equipment of the machine part 1: General rules.

## AUTHORIZED TO PREPARE THE RELEVANT TECHNICAL DOCUMENTATION

[Massimo Lissandrello](#)

Name and surname

[Via Madre Teresa di Calcutta, 9/13](#)

Address

[26866](#)

Zip Code

[LO](#)

Province

[Sant'Angelo Lodigiano \(LO\)](#)

City

[Italy](#)

Country

The relevant technical documentation has been compiled in compliance with Annex VII B, and undertakes to transmit, in response to a properly motivated request from the national authorities, relevant information on the partly completed machinery

**FORBIDDEN**

the commissioning, until the final version of the machine to which it must be incorporated, has been declared compliant, where appropriate, with the instructions of this Directive.

## Place and date of the document

Sant'Angelo Lodigiano, 23.09.2024

## Manufacturer

Massimo Lissandrello  
*DieTronic S.r.l.*

## PROHIBITION OF COMMISSIONING

The partly completed machinery cannot be put into service after suffering constructive modifications or additions of other components that are not part of ordinary or extraordinary maintenance without being again declared compliant with the requirements of Directive 2006/42/EC and of the applicable EC/EU Directives.

Place, date

[Sant'Angelo Lodigiano \(LO\), 23.09.2024](#)

Manufacturer

[DieTronic S.r.l.](#)[Massimo Lissandrello](#)

### 1.3 SAFETY REGULATIONS

The partly completed machinery was built in compliance with the Technical Standards listed below.

STANDARD	Title
UNI EN ISO 12100	Machinery safety - General principles of design - Risk assessment and reduction
UNI EN ISO 13849-1	Safety of machinery - Safety-related parts of the control systems - Part 1: General principles of design
UNI EN 1088: 2008	Safety of machinery. Interlocking devices assembled with guards. Design and selection principles.
UNI EN 982: 2009	Machinery safety. Safety requirements related to systems and their components for oil-hydraulic and pneumatic transmissions. Oil-hydraulics
UNI EN 953: 2009	Safety of machinery. Guards: General requirements for the design and construction of fixed and mobile guards.
UNI EN ISO 13857: 2008	Safety of machinery. Safety distances for preventing the access of upper and lower limbs to hazardous areas.
UNI EN 981	Hearing and visual hazards and information signal systems.
UNI EN 983	Safety requirements related to systems and their components for oil-hydraulic and pneumatic transmissions. Pneumatics.
IEC 445 (IEC EN 60204-1)	Electrical equipment of the machine part 1: General rules.

### 1.4 TECHNICAL ASSISTANCE INFORMATION

The Partly Completed Machineries are covered by warranty, as provided for in the general conditions of sale. If malfunctions or faults of the parts are detected during the period of validity and fall under the cases indicated by the warranty, the Manufacturer, after the appropriate checks performed on the machine, will repair or replace the defective parts.

The modifications made by the user, without receiving the explicit written authorization of the manufacturer, will void the warranty and relieve the manufacturer from any liability for the damage caused by a defective product.

This applies in particular when the aforementioned modifications are performed on safety devices, affecting their effectiveness. The same observations apply when using non genuine spare parts or parts other than those explicitly indicated by the manufacturer as "safety devices".

We recommend our customers to contact our Assistance Service before carrying out the aforementioned operations on the partly completed machinery.

Any obvious faults that are visibly present at the time of delivery (aesthetic defects on visible parts, breakages, dents, malfunctions, missing parts, etc.) must be immediately reported to the company.

The Manufacturer is not liable for defects not reported by the customer at the time of delivery.

### 1.5 PREPARATIONS BY THE CLIENT

Subject to various contractual agreements, they are normally the responsibility of the Client:

**USER AND MAINTENANCE MANUAL COMBI LB 4000**

Pag. 15

*This document is the property DieTronic Ltd. and cannot be reproduced or given to third parties without our authorization.*

- a) premises preparation, including any building works and/or channeling required.
- b) power supply of the partly completed machine, in compliance with the Standards in force in the Country of use.
- c) pneumatic supply.

## 2 ASSEMBLY

### 2.1 TRANSPORT AND HANDLING

The partly completed machinery can be transported with a normal vehicle capable of bearing its weight and sizes. It is recommended to always use means able to bear the weight and size of the machine, in order to avoid damages or harming people or objects around.

"Lift the partly completed machinery with a forklift truck that supports the two sides, always checking the correct balance of the weight in order to prevent unexpected movements or falls to the ground."

"For the movements inside the factory, the partly completed machinery can be transported with a gantry crane providing a proper harnessing by using ropes with adequate resistance characteristics depending on the weight of the machine."

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The Manufacturer cannot be held liable for damage caused to people or animals due to the use of lifting systems other than those indicated.

### 2.2 STORAGE

In case of inactivity, the partly completed machinery must be stored using the following preventive measures:

- a) store the partly completed machinery in an enclosed area;
- b) grease the unpainted parts;
- c) protect the partly completed machinery from impacts and stress;
- d) protect the partly completed machinery from moisture;
- e) avoid exposing the partly completed machinery to extreme temperatures and protect it from high temperature ranges;
- f) avoid exposing the partly completed machinery to corrosive substances.
- g) avoid storing the partly completed machinery containing oils or water inside the pipes or tanks

### 2.3 PREPARATIONS

#### Preparations for installation

For the installation it is necessary to provide a maneuvering area suitable for the sizes of the machine and the selected lifting means.

The preparation of the partly completed machine must be carried out in such a way as to optimize the ergonomics and safety of the workplace: leave a sufficient area around the workplace to easily allow the use and handling operations of the material to be processed and the maintenance and adjustment operations.

#### Preparation of the electrical system

The connection to the electrical system that powers and combines the synchrony with other machines must be carried out by specialized and qualified personnel, following the wiring diagram and the provisions prescribed by the Laws and/or Technical Standards in force concerning the safety of the workplace and in the electrical systems field.



To reach a proper level of safety, the customer must prepare, for the electrical system of the partly completed machine, the following:

- a) a grounding system according to the regulations of the user's country;
- b) what is necessary for the correct implementation according to the best working standards, in compliance with the Laws and the Technical Standards regarding the safety of the workplace and in the electrical systems field.

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The user is solely responsible for these preparations.

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The Manufacturer **is not responsible for damage to people, animals and property caused by failure to comply with this regulation.**

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## 2.4 CONNECTIONS

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The internal connections of the partly completed machinery are carried out by the qualified personnel of the manufacturer.

### Electrical connection

The electrical connection between the partly completed machinery panel and the client's power supply line must be carried out by the qualified personnel of the Customer.

## 2.5 HANDLING THE LUBRICATION MACHINE



### WARNING

**Risk of crushing by the system falling over and tipping** Incorrect transporting can result in serious injury or death.

- Transport with a spreader beam.
- Always attach the lifting gear to the crane lugs.
- Avoid sudden, jolting lifting movements.
- Do not stand beneath suspended loads.
- Cordon off the danger area.
- Make sure that there are no people in the danger area.

### Requirements

- **Protective equipment:**

Safety boots, hard hat, gloves.

- **Tools:**

Approved lifting device for 4000 kg.

- **Number of people:**

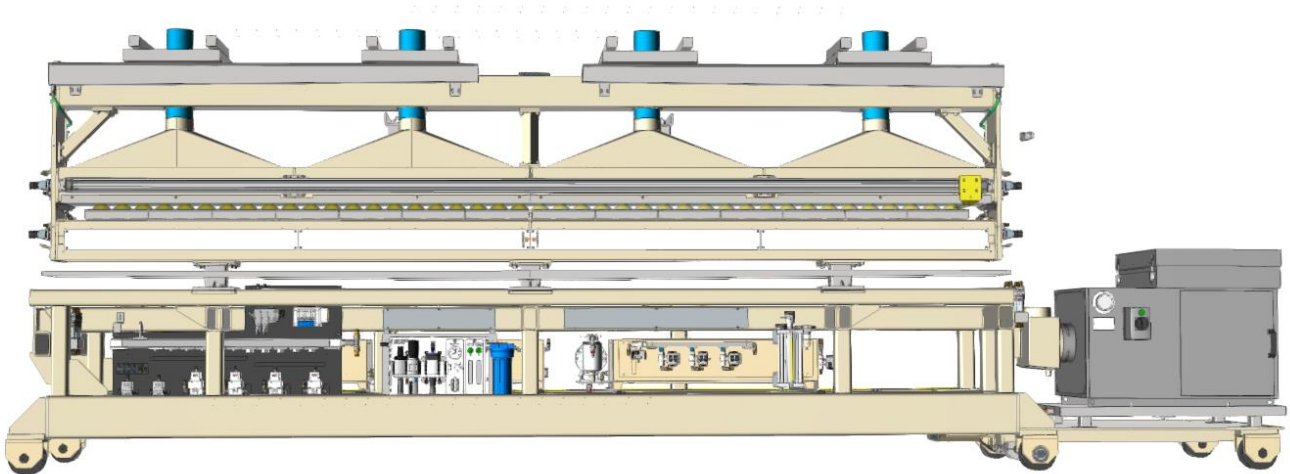
at least two.

Hook the overhead crane to the four eyebolts highlighted in the figure.

## 2.6 How To Reassemble the Machine

The machine will be delivered disassembled. Please follow the instructions below to reassemble it.

### 2.6.1. Lubrication Unit Suction System



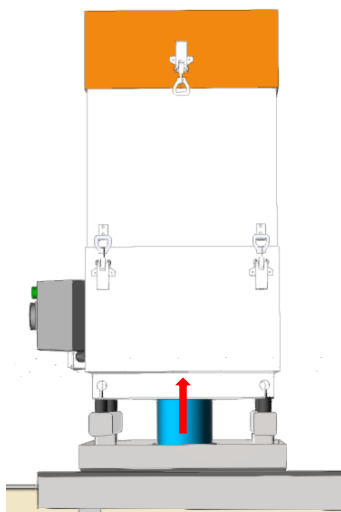
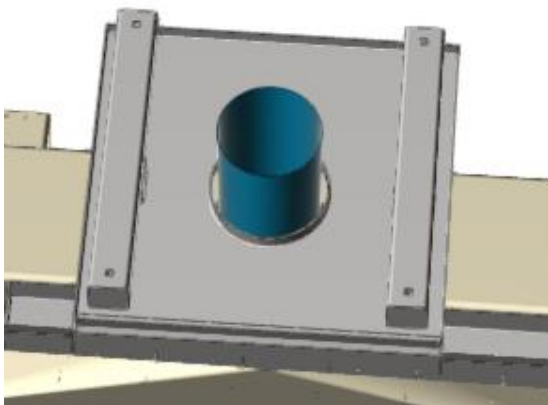
You will receive the machine without the lubrication unit suction system.

The frame has to be moved by picking it up from underneath with the forklift.

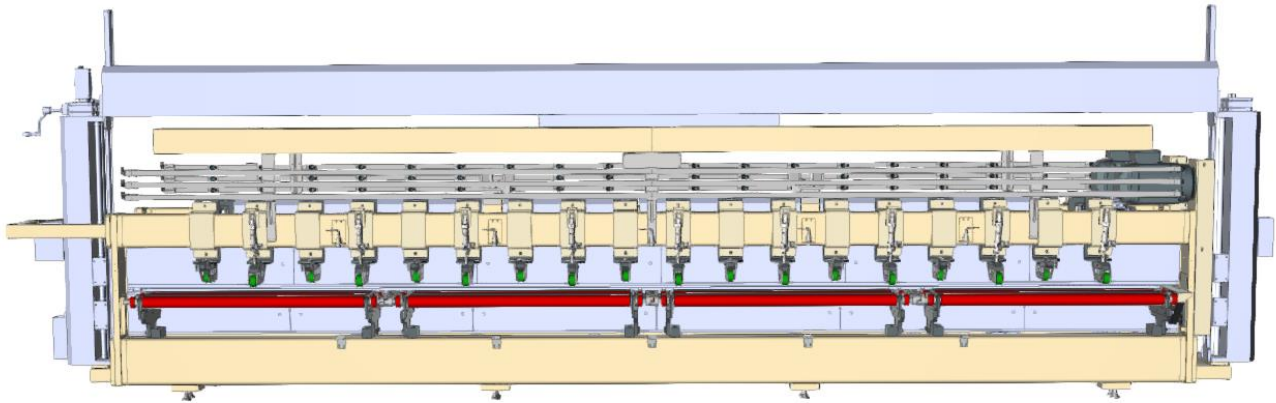
To reassemble the suction system follow these steps:

With a crane put each aspirator in these four holes with their anti-vibration support mounted. Tight the nuts and washers.

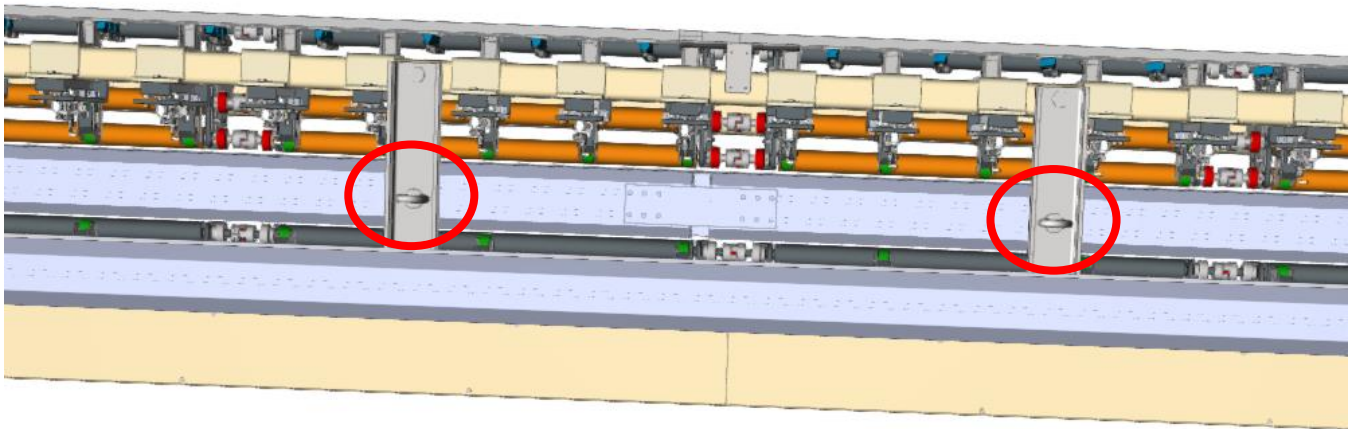
Then connect the tube on the aspirator lower part and the drain tube. Finally, connect the connector.



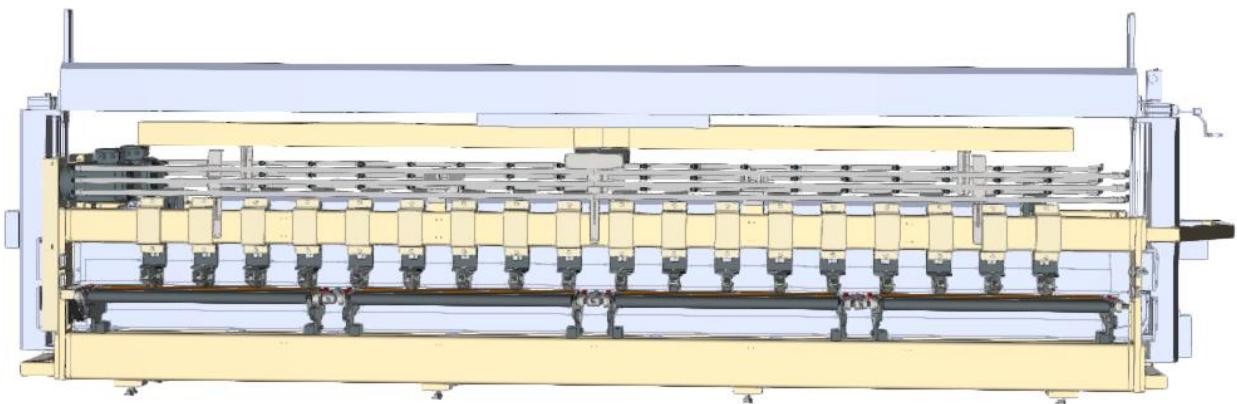
## 2.6.2. Brush Cleaner Positioning

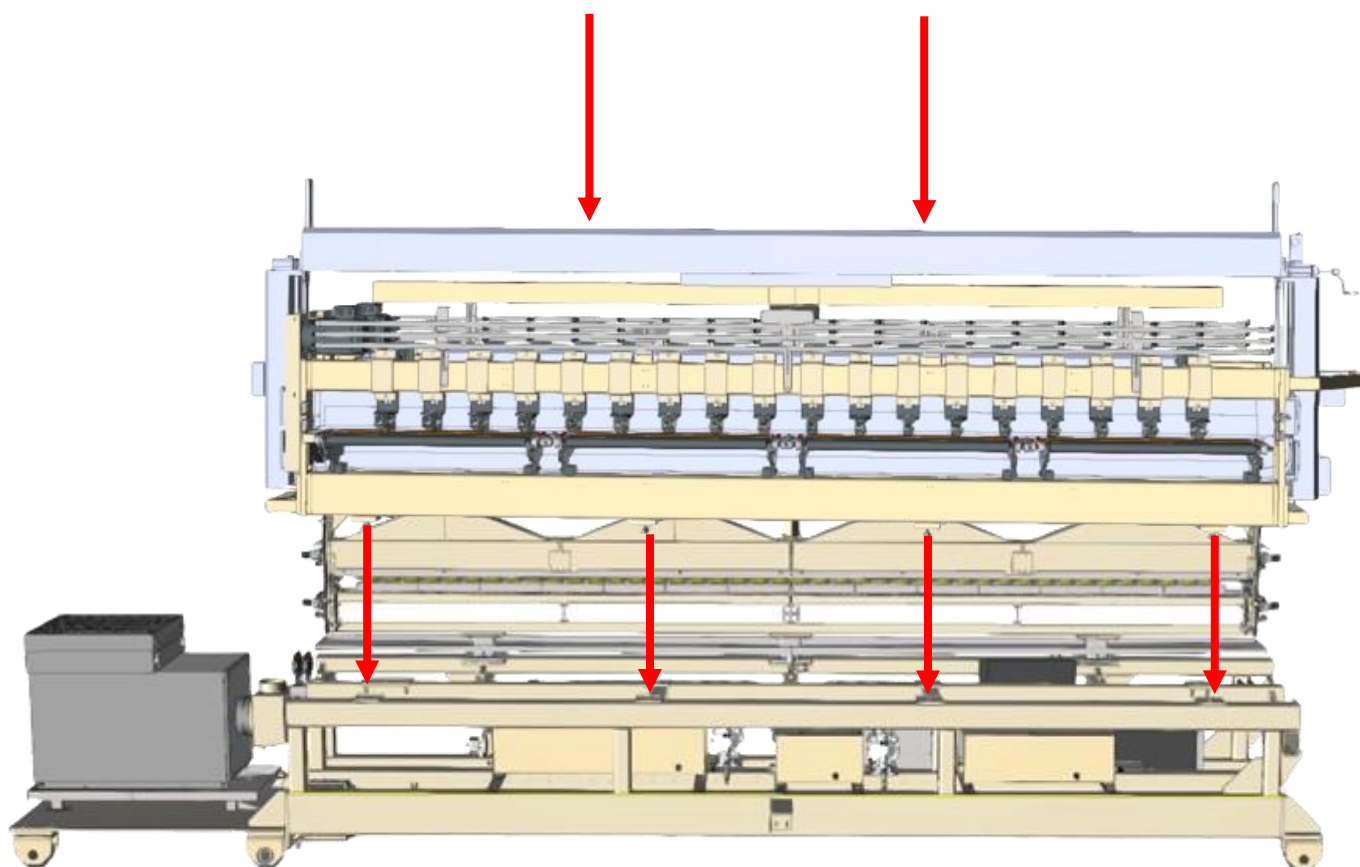


The brush cleaner and Pinch Rolls will be delivered separately. To reassemble them follow these steps:

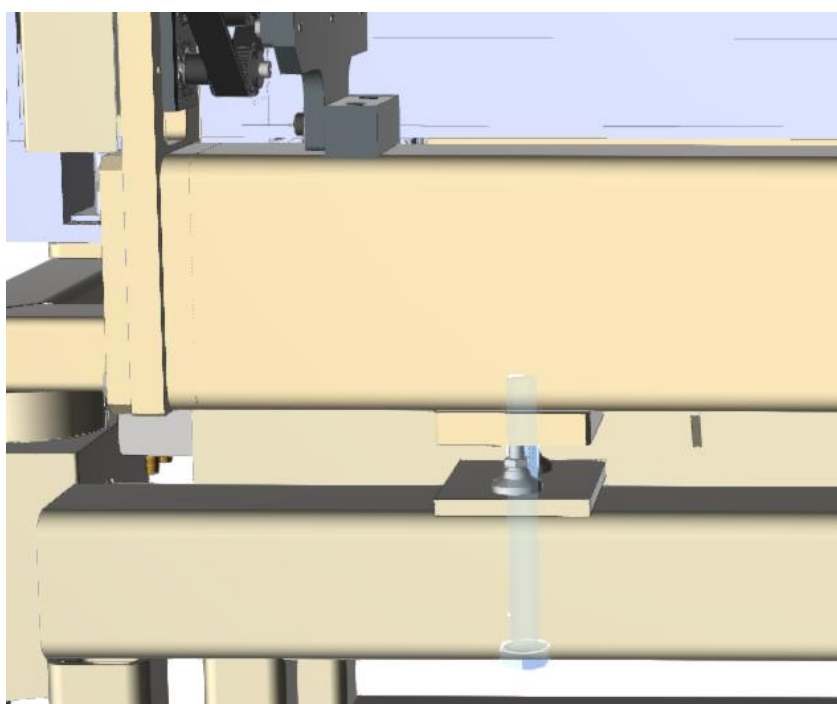


Take with a crane from these two eyebolts and position the brush cleaner unit with the pinch rolls in this position:





Tight the screws





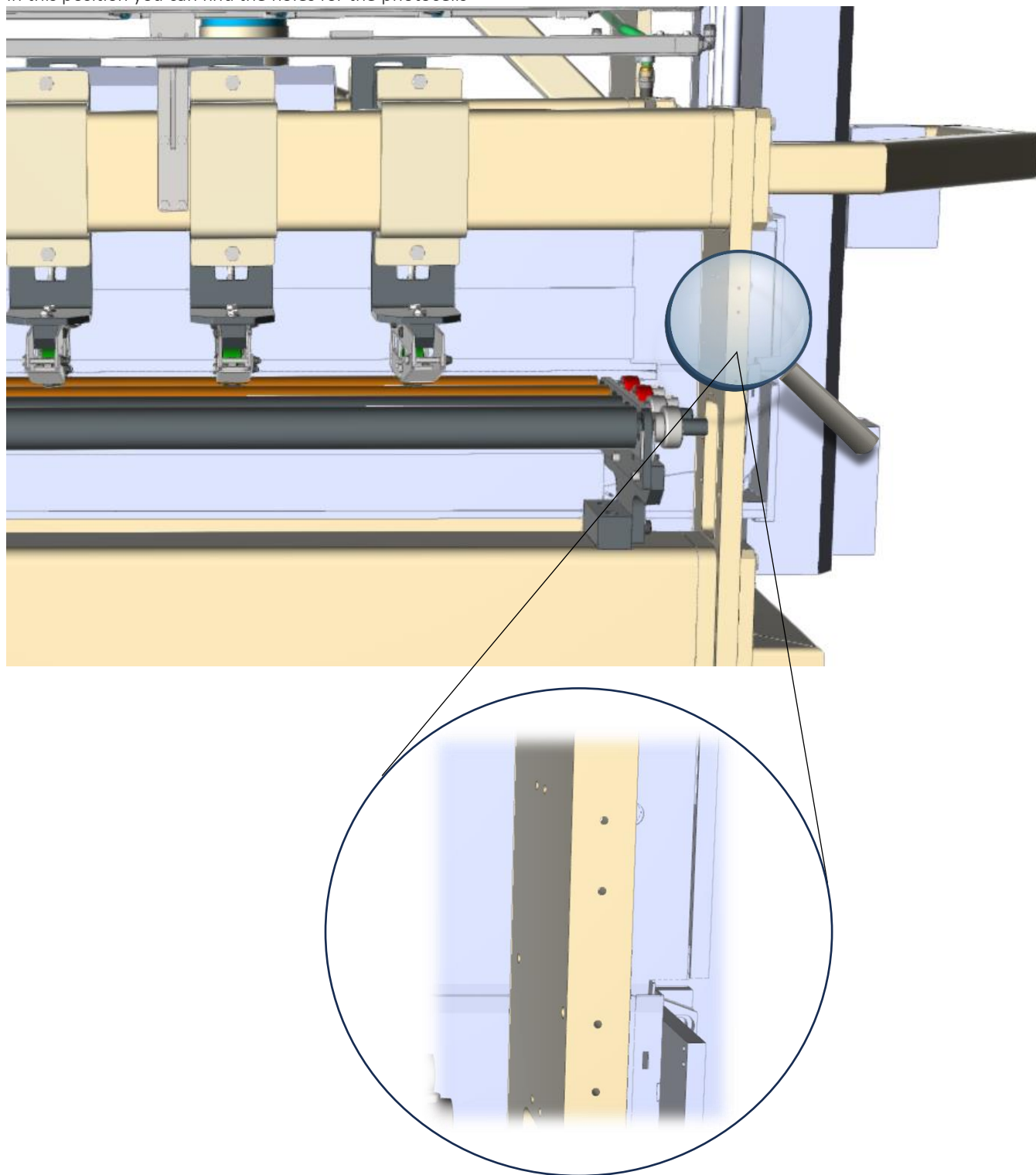
**REMEMBER TO REMOVE THESE PARTS AS SOON AS THE  
BRUSHING MACHINE IS IN PLACE**

**칫솔질 기계가 제자리에 놓이는 즉시 이러한 부품을  
제거하는 것을 잊지 마세요.**



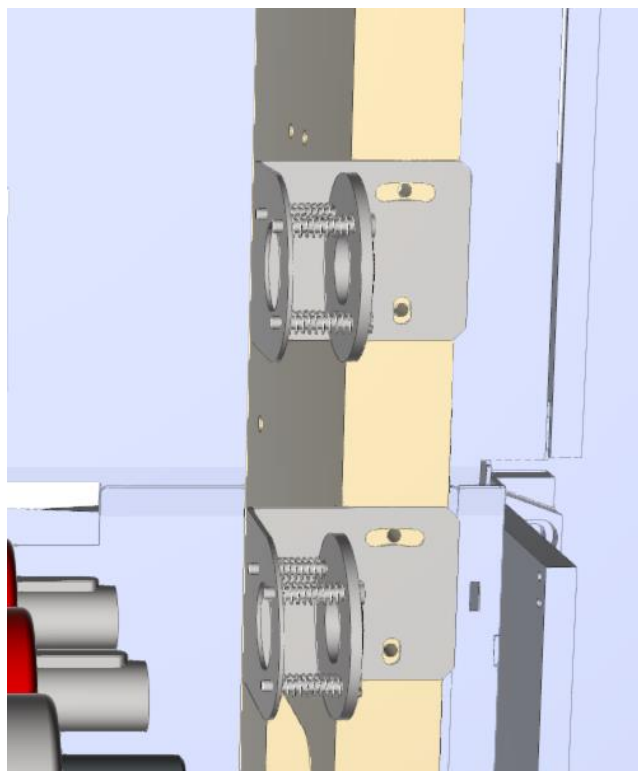
### 2.6.3. Photocells and Reflectors

In this position you can find the holes for the photocells

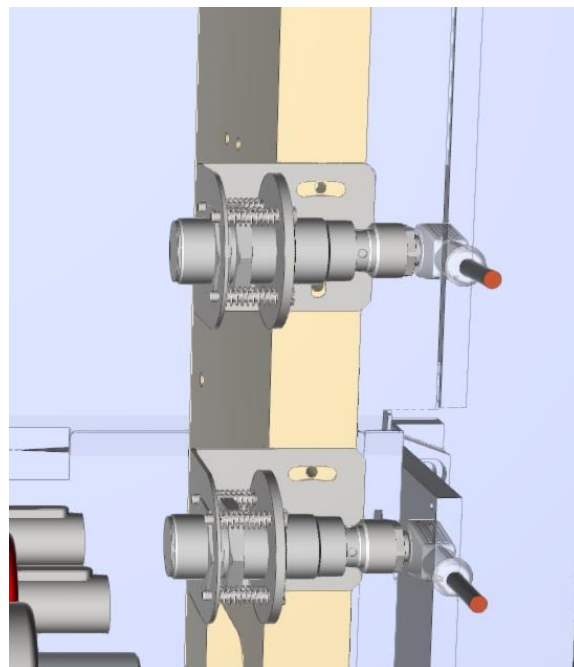
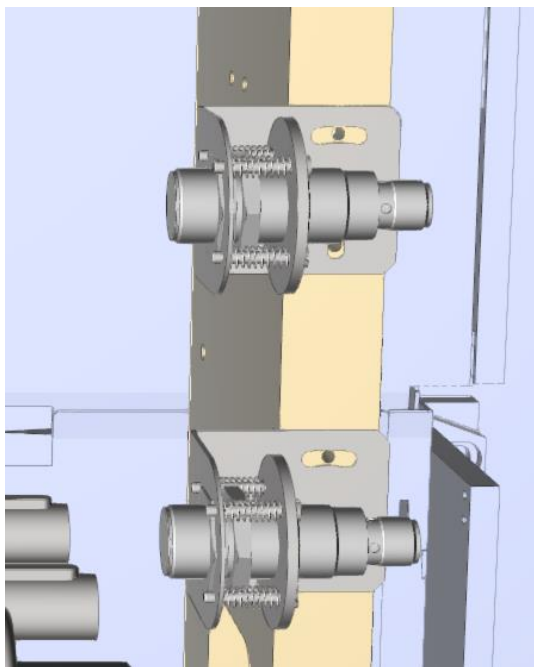




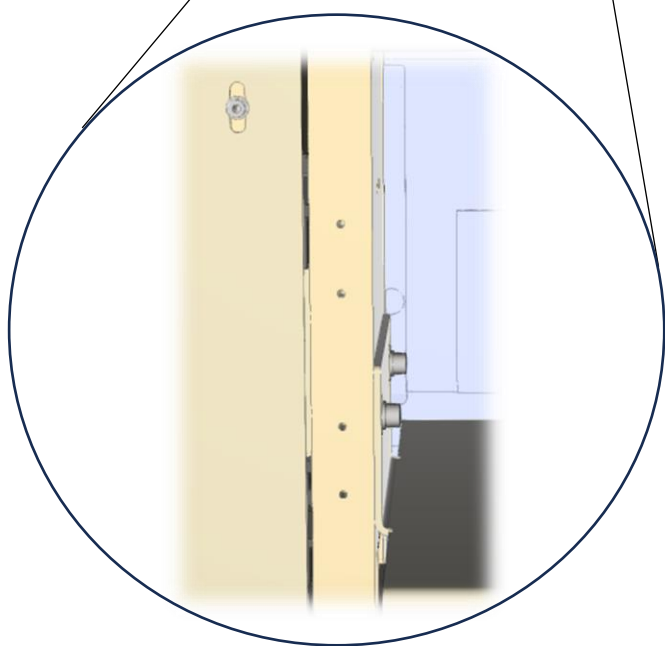
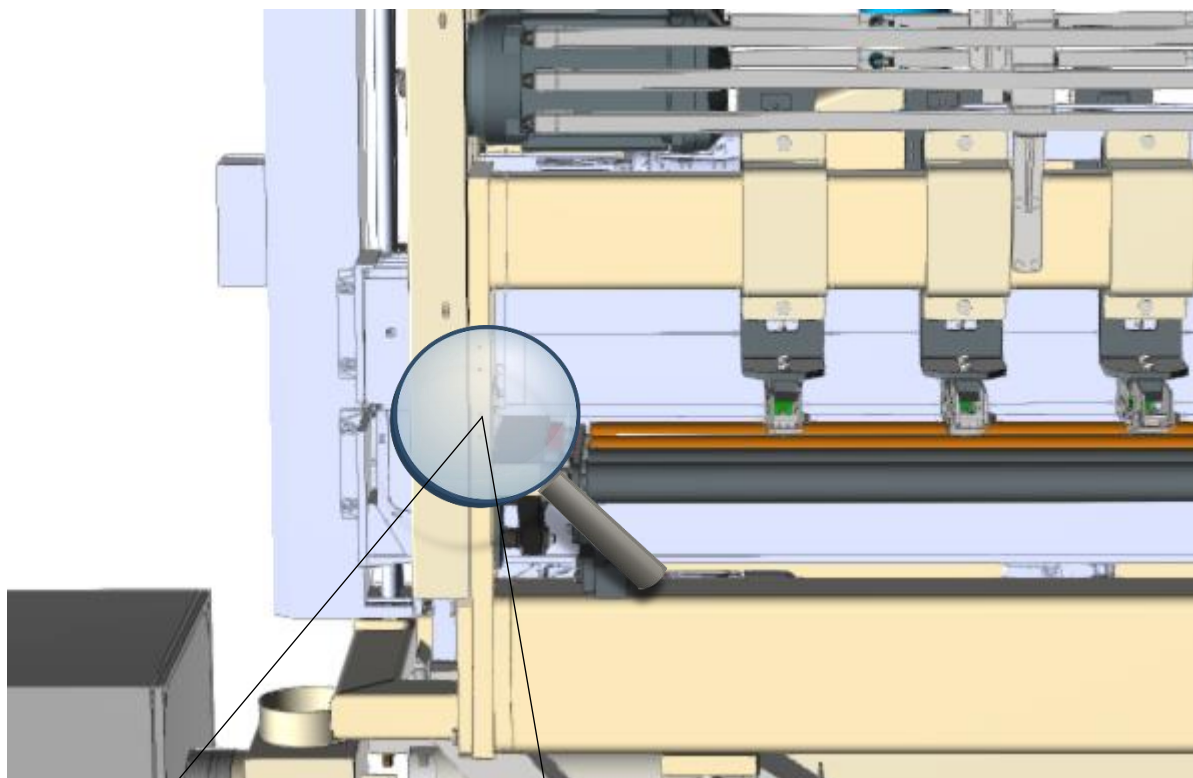
Reassemble the photocells putting on the supports



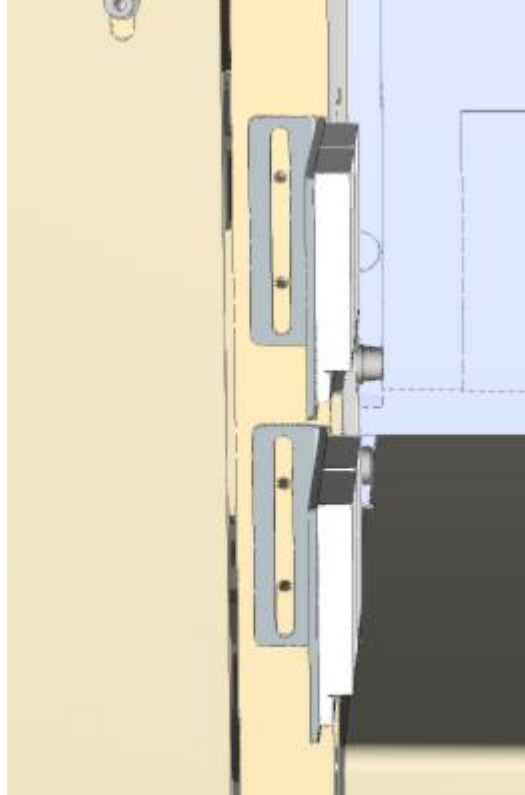
Then mount the sensor and connect them.



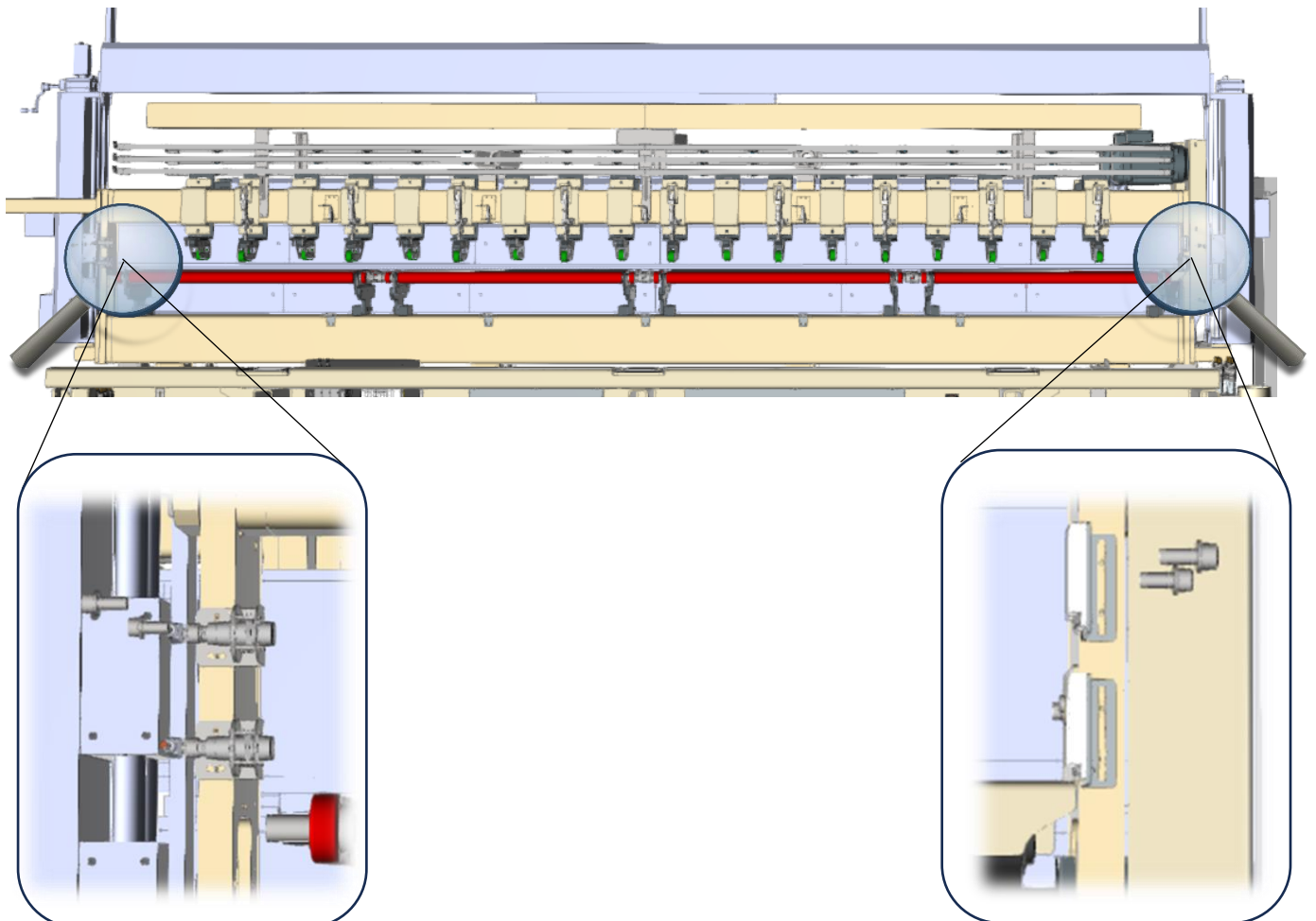
In this position you can find the holes for the reflectors



Fasten them to the holes. For adjustment, the system must be switched on.



There are two other sensors and reflectors on the internal side of the brush which have to be reassembled as the other two.

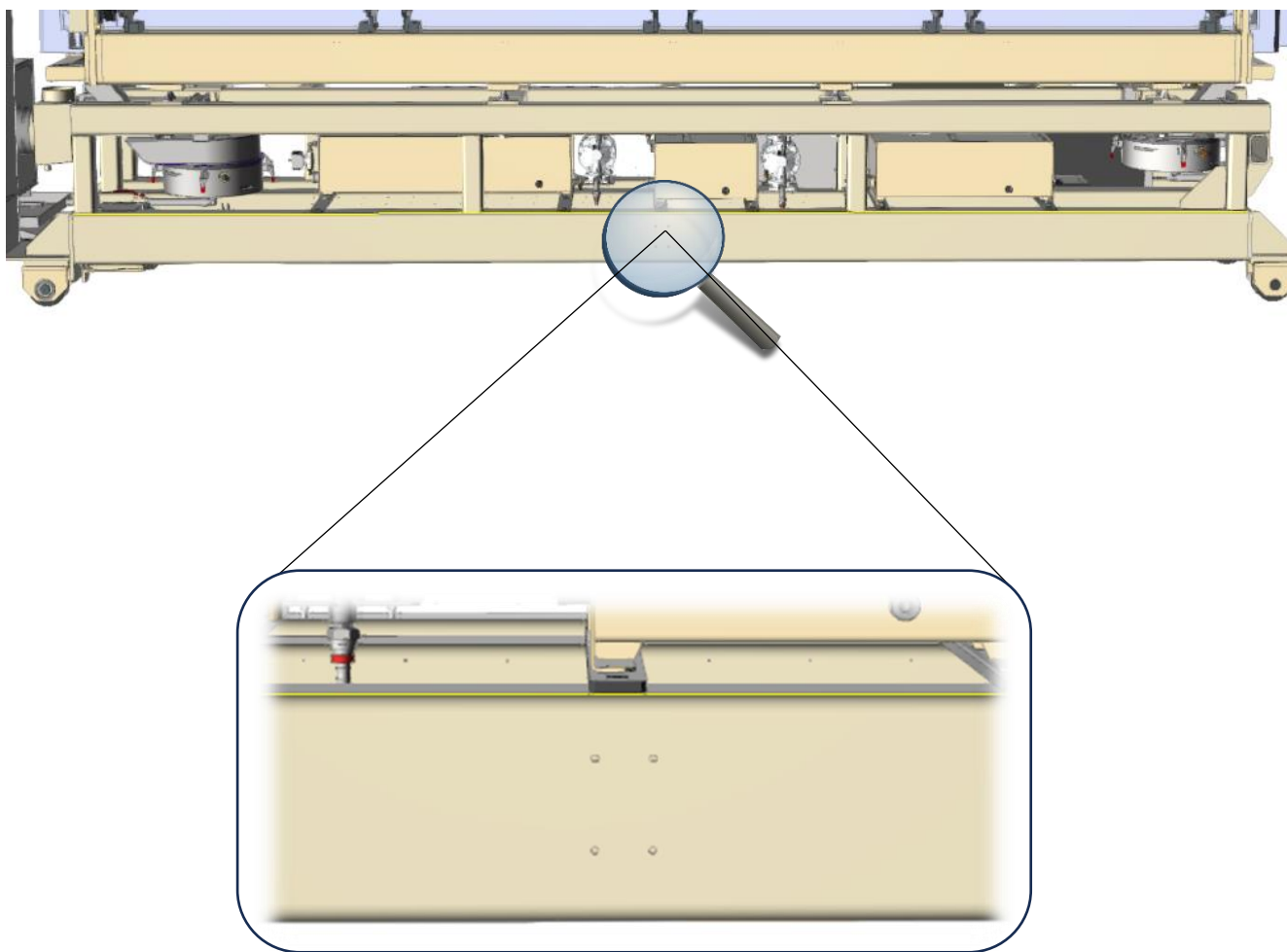




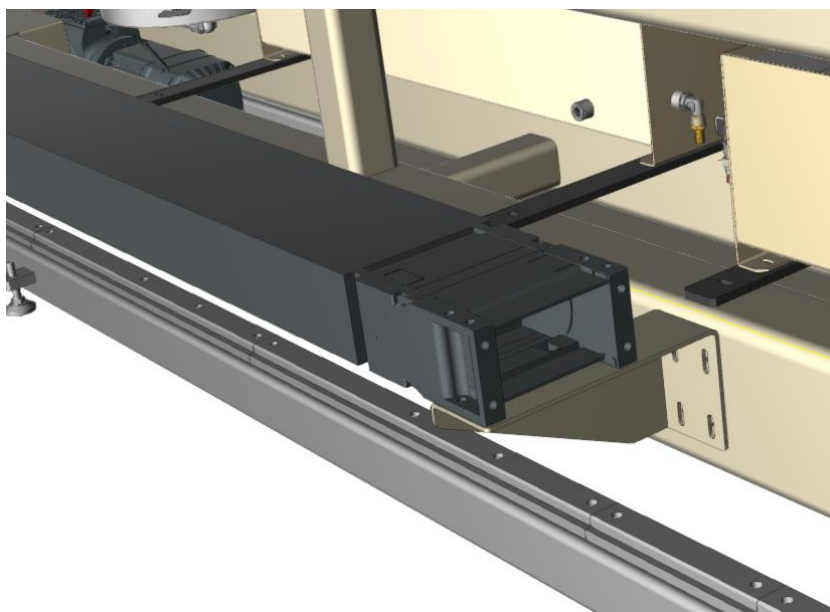
BE CAREFUL DURING THE  
ASSEMBLY

조립하는 동안 주의하세요.

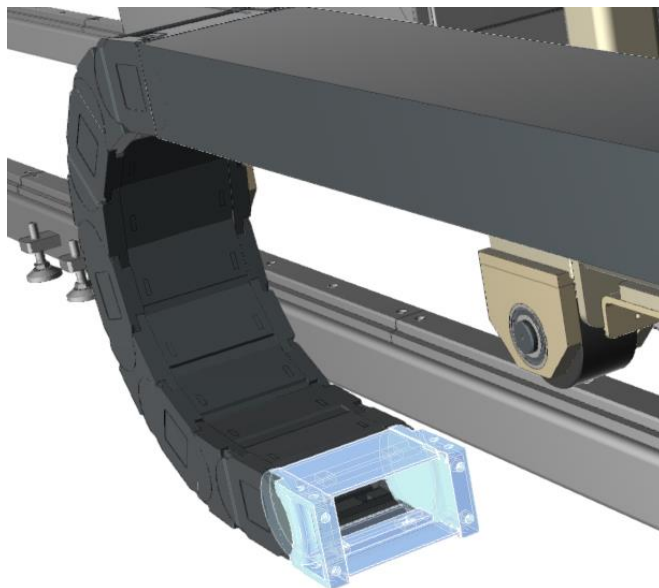
#### 2.6.4. Pipe passage chain



Screw the chain support bracket into this position



If the chain is too long short it by removing one or more of this



Fix to the ground the following guides to allow the chain to move smoothly and after that fix the chain to the ground.

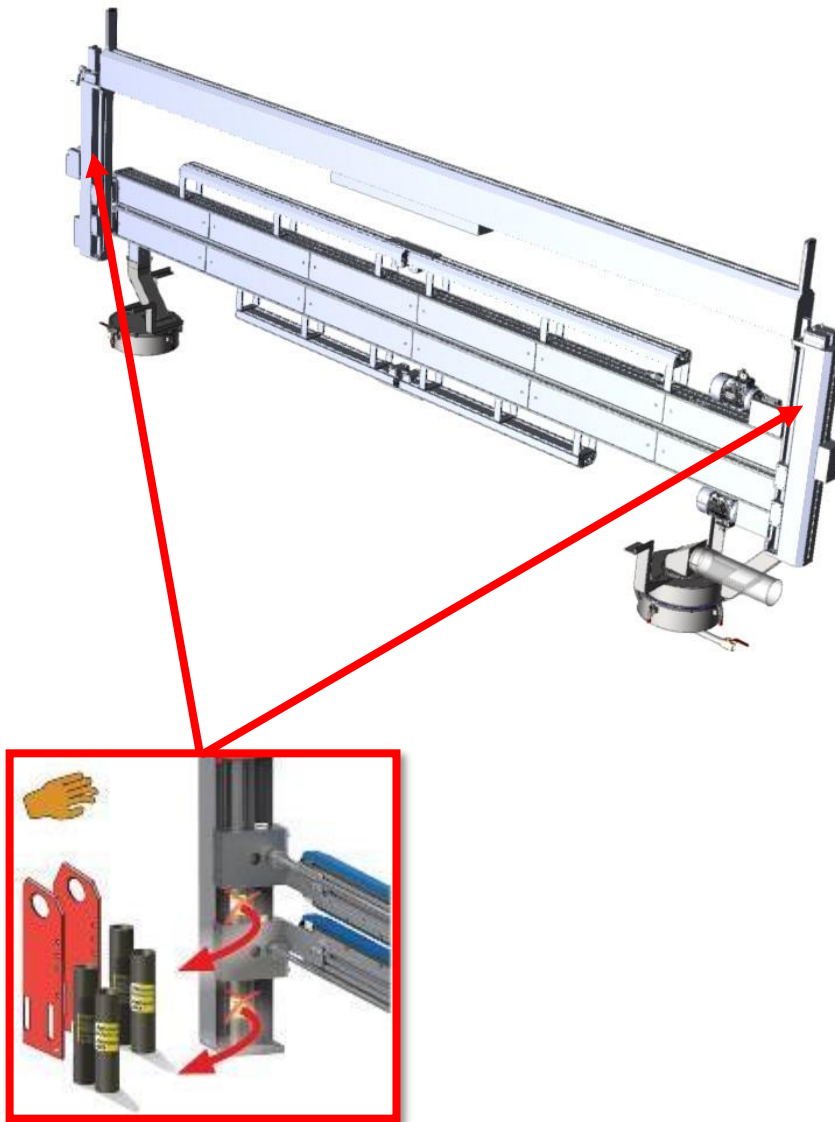




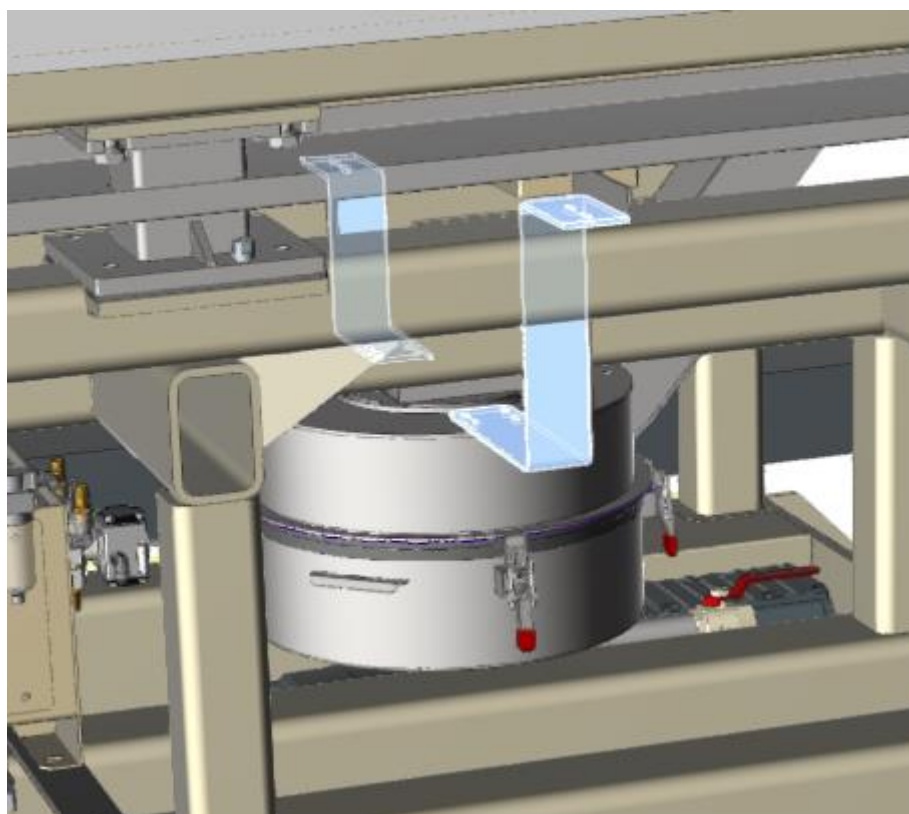


## 2.6.6. Remove the transport brackets inside the brushing machine

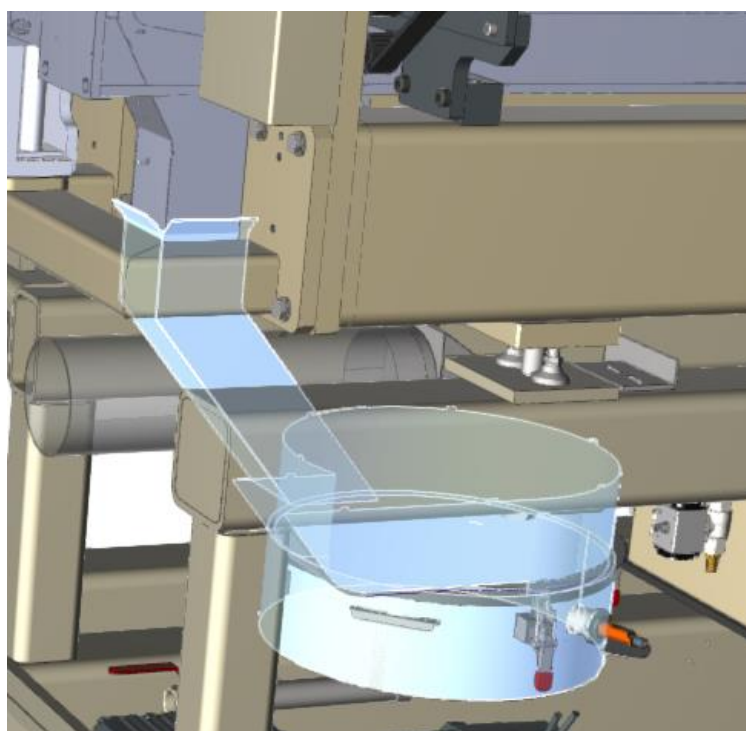
Remove the transport brackets and crane lug plate. Open the carters in the position indicated.



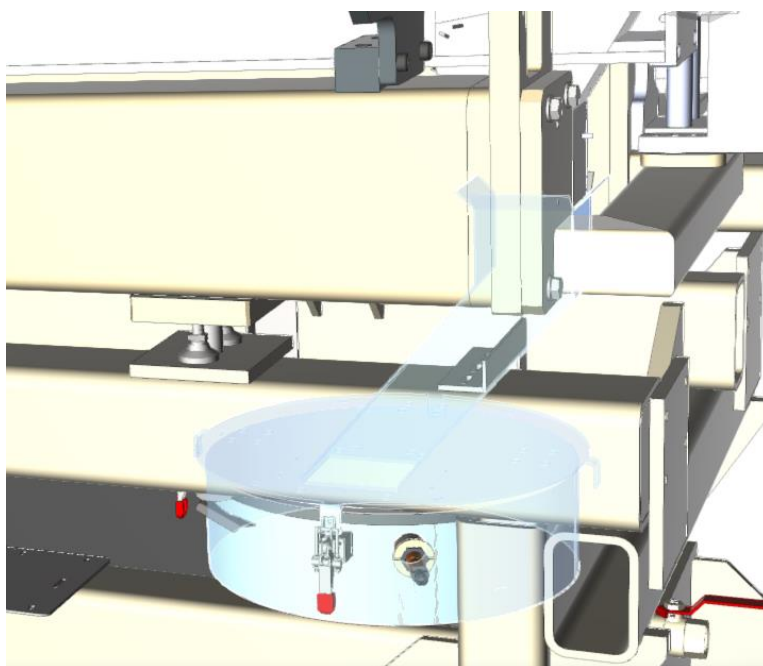
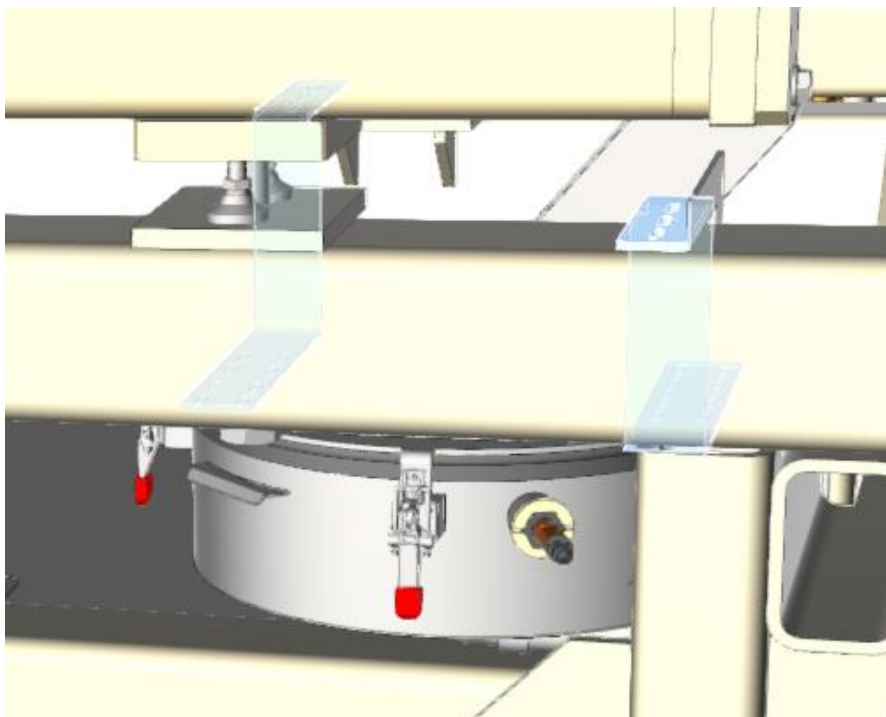
### 2.6.7. Reassembling cyclones



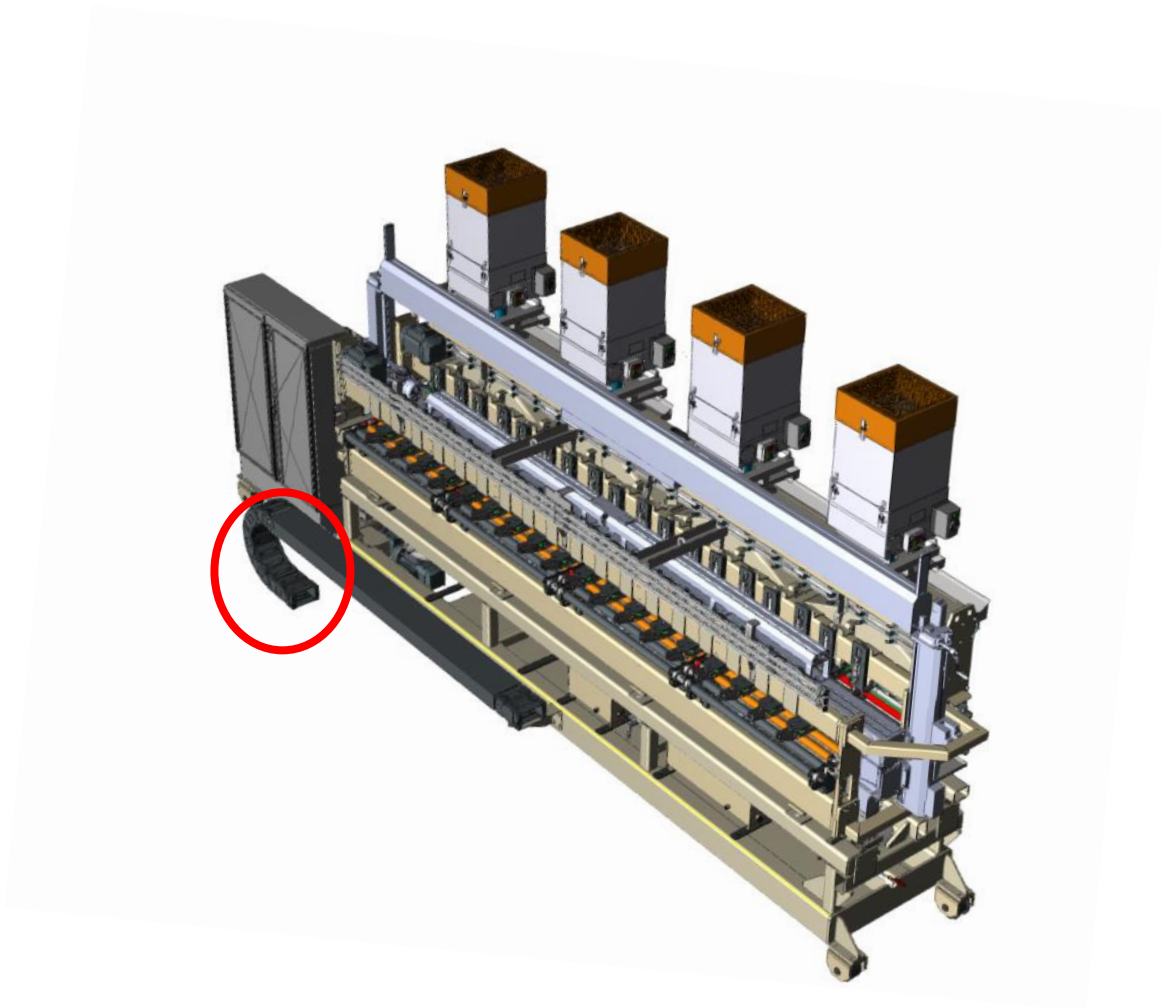
Attach the cyclone to this brackets by inserting it inside the drain of the brushing machine as shown below.



Perform the same operation on the other cyclone



## 2.7 CONNECTIONS TO THE LINE

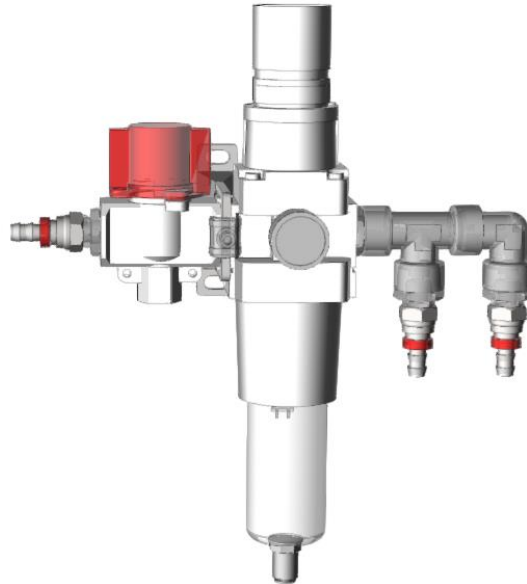


After finding the ideal location within the line so that it does not get in the way of lubricant inlet and outlet, connect main air, Oil and the DTBRE Cleaner tubes.

Connect the air to the Main Regulator provided.

### 2.7.1. Positioning of the Main air regulator

Connect the Main air regulator in the desired position



## Air Quality Specification

Class	Solid particles, max. quantity of particles per m <sup>3</sup>			PDP	Oil content (liquid, aerosol, oil)
	0.1 µm < d ≤ 0.5 µm	0.5 µm < d ≤ 1.0 µm	1.0 µm < d ≤ 5.0 µm	°C	mg/m <sup>3</sup>
1	≤20,000	≤400	≤10	≤-70	≤0.01

---

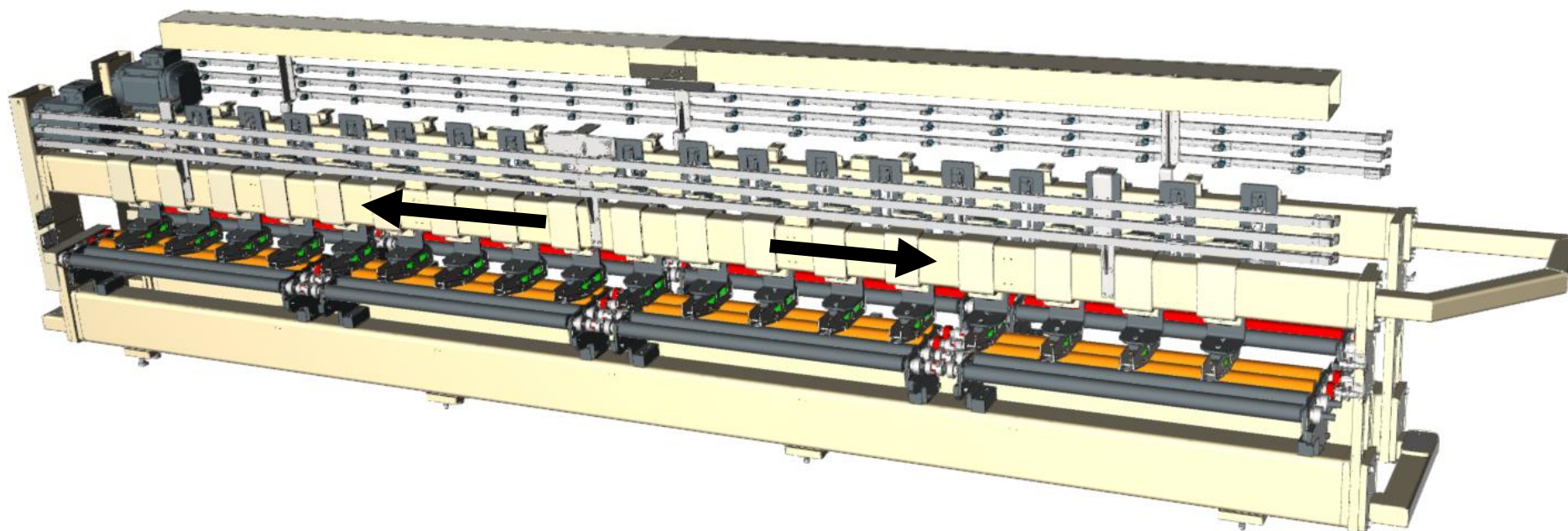
## 2.8 SETTINGS

---

Adjustment of the pressure of the service compressed air through the regulating filters located on the machine. One dedicated to the cleaning system and one dedicated to the lubrication system.

- Adjust the height of the brushes using cranks on the brusher in question.
- Adjust the height of the pinch rolls using cranks on the machine.
- Adjust the pump pressure (main tank filling pump from P3 drum, P1 main tank pump, P2 recovery tank pump and DT BR Cleaner pump).
- Also below are instructions for adjusting pick-rollers.





- Move the pinch rollers to the left or right to adjust the trajectory of the sheet in case of offset problems. To make it loosen the screws that fix the pinch roller you want to move, put it in place and dry the screws again.
- To replace the rubberized shafts remove the adapter that locks the shaft you want to change

---

## 2.9 VACUUM TESTS

---

Before carrying out the laden operations carry out at least one unladen test to verify the absence of anomalies.

Testing of the correct operation of the engines

---

## 2.10 LADEN TESTS

---

Perform at least one loaded test to verify the absence of anomalies.

The operator panel allows you to test each component of the machine.

In the presence of anomalies, a screen page with any alarms in progress will be displayed.

---

## 2.11 PRELIMINARY CHECKS

---

Before commissioning the machine, a series of checks and inspections must be carried out to prevent errors and accidents:

- a) safety systems check;
- b) guards check;
- c) signs check;
- d) check of the correct connection of all external energy sources;
- e) make sure the oil-hydraulic and pneumatic connections are tightened in order not to cause dangerous leaks;
- f) make sure the machine has not been damaged during the assembly phase;
- g) check of the integrity of switchboards, control panels, electrical cables and pipes;
- h) check of free movement and free rotation of all moving parts.

---

## 2.12 ADJUSTMENTS

---

Compressed air pressure adjustment through the adjusting filters placed on the machine. One dedicated to the cleaning system and the other to the lubrication system.

Adjust the height of the brushes by using crank handles.

Adjust the height of the contrast wheels (pinch rolls) using crank handles.

Adjust the pressure of the pumps (main tank filling pump from P3 drum, P1 main tank pump, P2 recovery tank pump and DT BR Cleaner pump).

---

## 2.13 NO-LOAD TEST

---

Before performing the load test carry out at least one no-load test in order to make sure there are no anomalies.

Test the proper functioning of the motors

---

## 2.14 LOAD TEST

---

Carry out at least one load test in order to make sure there are no anomalies.

It is possible to test every component of the machine by operating on the control panel.

In case of anomalies, a screen will appear with any alarms in progress.



## 3 PARTLY COMPLETED MACHINERY DESCRIPTION

### 3.1 OPERATING PRINCIPLE

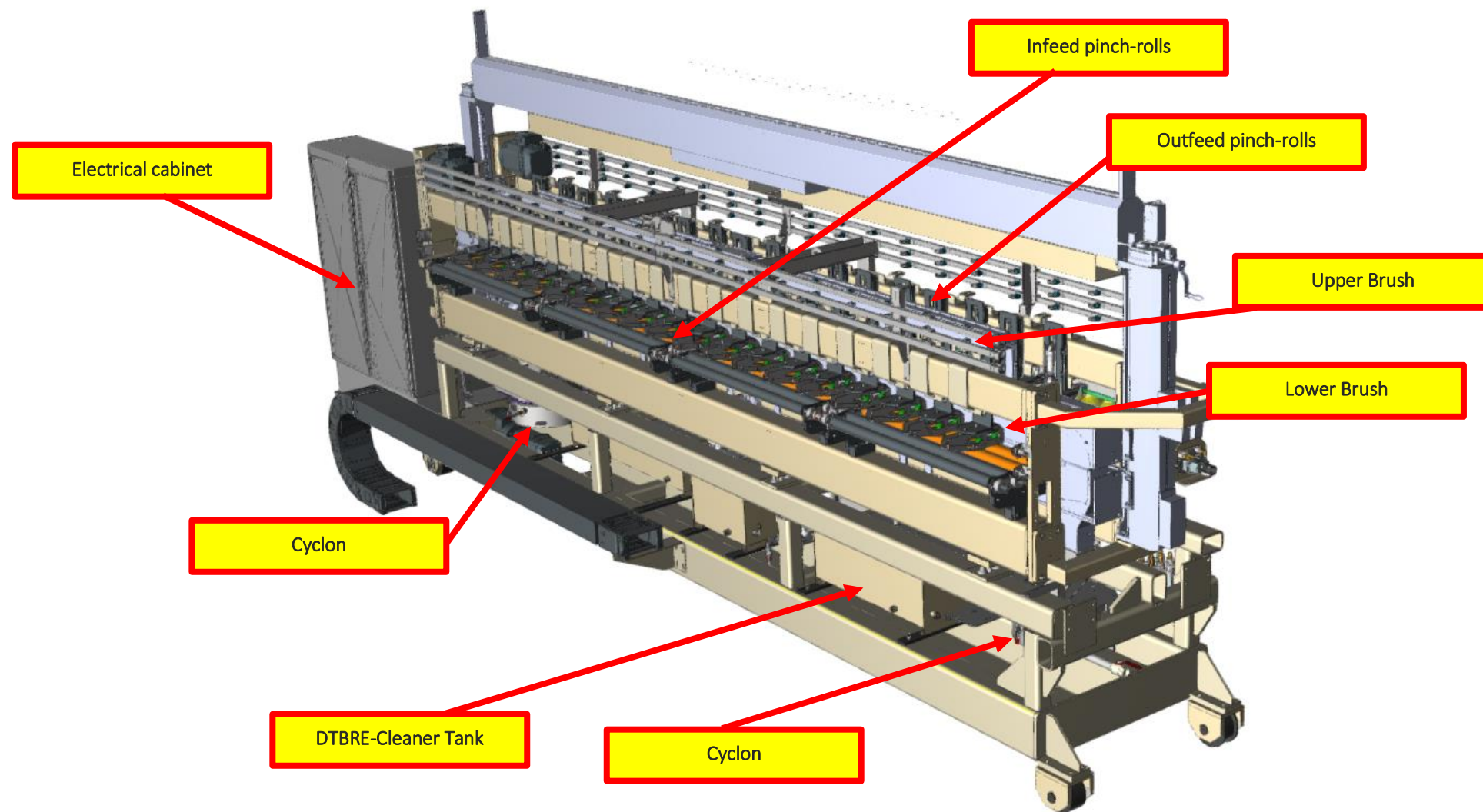
The combined cleaning and lubrication system consists of a frame which supports the brushing machine, the lubricator and the switchboard. The cleaning system removes the dust and/or processes the residues from the metal sheet, leaving the surface clean and ready for lubrication. It consists of 2 linear brushes that move sideways compared to the transport direction, allowing the adherence of the particles to the micro-moistened fibers and removing them from the surface towards an extractor that permanently removes them from brushes. During this stage three different effects act on the particles to remove them from the surface: mechanical effect of the linear brush, capillary adherence between moistened fibers and particles and reduction of the electrostatic charge through the DT BR Cleaner® liquid. The lubrication system has been designed to minimize and optimize the use of lubricating oil. It is also possible to adjust the oil pressure and the atomizing air by controlling proportional valves. Is possible to control the level of the lubricant tank and the speed of the motorized transport system (Pinch Rolls). The lubricant tank is placed on the structure of the spray unit and is provided with a visual minimum electrical level indicator and filters for removing any residuals. The drum refill function also allows you to automatically refill this tank when the oil drops below the maximum level set. A pump takes the oil from the main tank or inserts it in a 3 liters tank under pressure, which automatically controls the volume and pressure of the supplied oil, keeping constant the quantity supplied by the nozzles. The oil and the air arrive at the upper and lower spray heads through the tubes and are inserted into the valves. The machine is equipped with four suction unit to prevent the discharge of oil mists. Furthermore, a system called "Wiper" has been installed to remove any drops that may form on the sprinkling heads frame

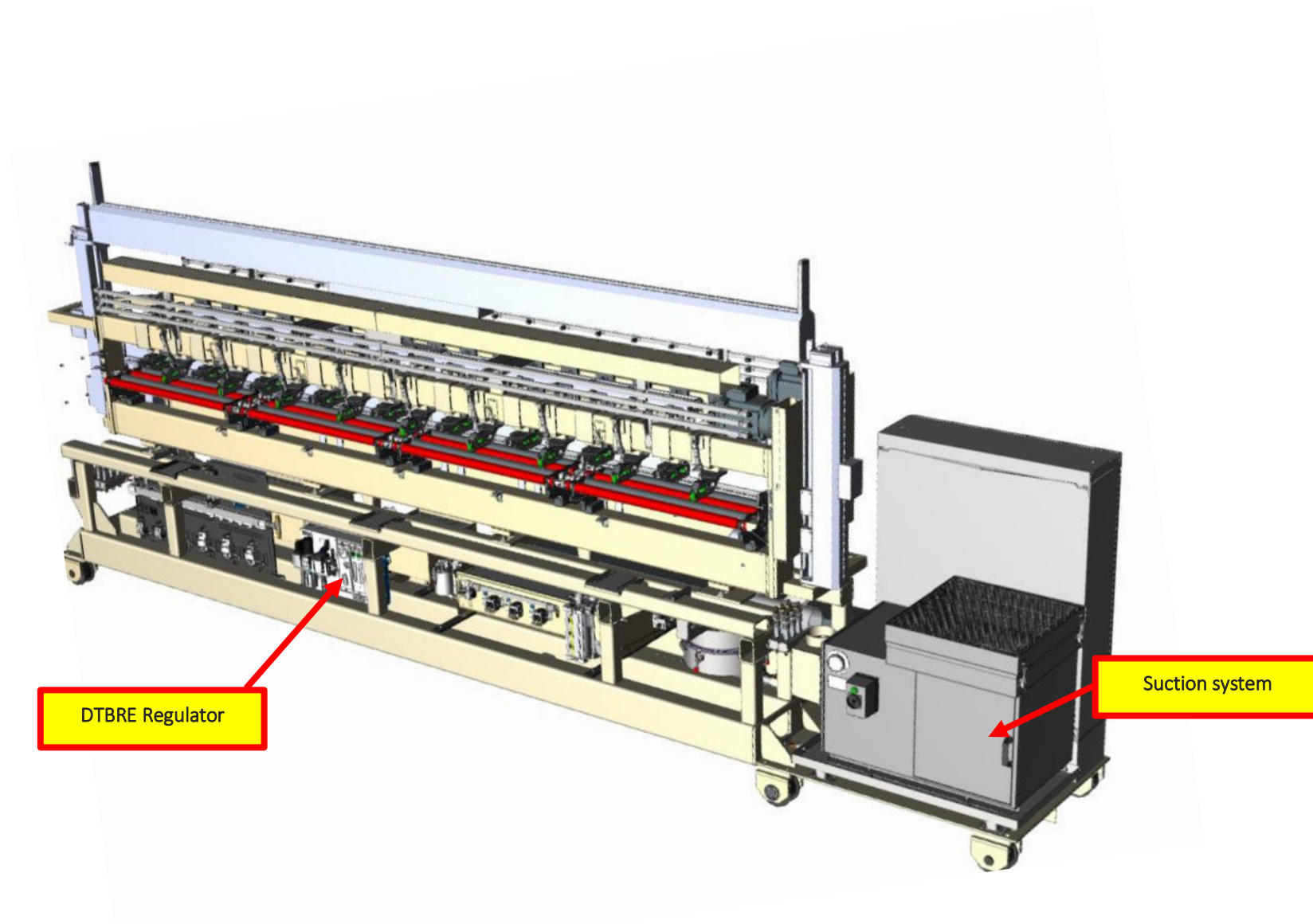
### 3.2 MAIN COMPONENTS

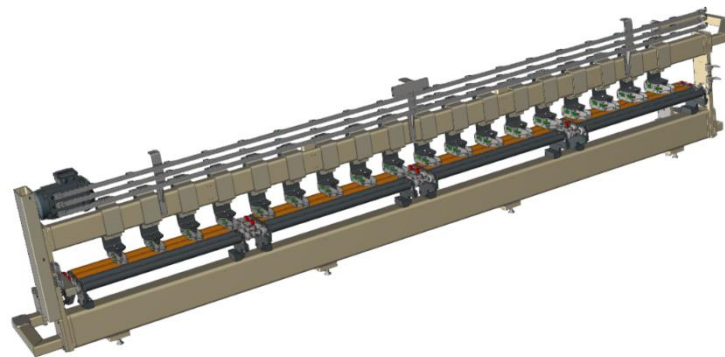
The combined cleaning and lubrication system consist of a frame which supports the brushing machine, the lubricator, the switchboard and the operator panel.

**Brushing machine:** industrial cleaning system of smooth and profiled surfaces for the removal of dust and small particles that could compromise the quality of the final product.

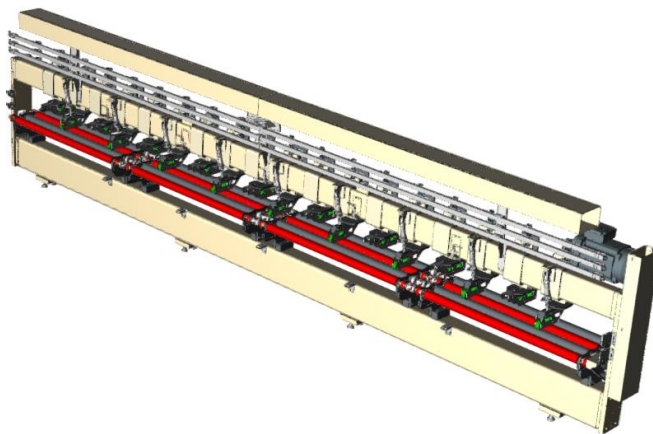
The reliable and gentle removal of dust, fibers and tiny particles is an essential requirement for downstream processes - such as coating, painting, laminating, etc. - in manufacturing fine products.







Infeed pinch-rolls

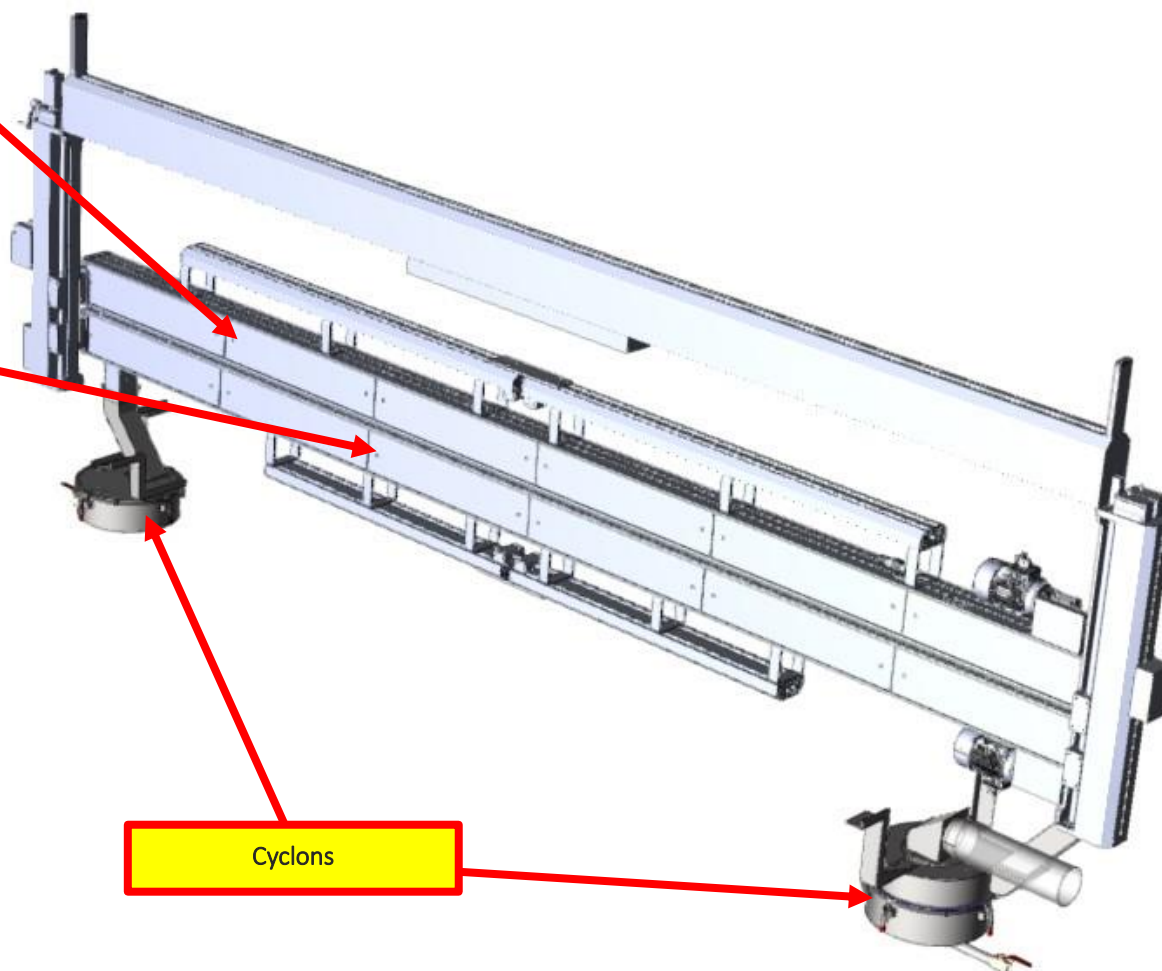


Outfeed pinch-rolls

Upper Brush

Lower Brush

Cyclons





## 4 STRUCTURE AND DESCRIPTION

### 4.1 STRUCTURE OF THE MACHINE

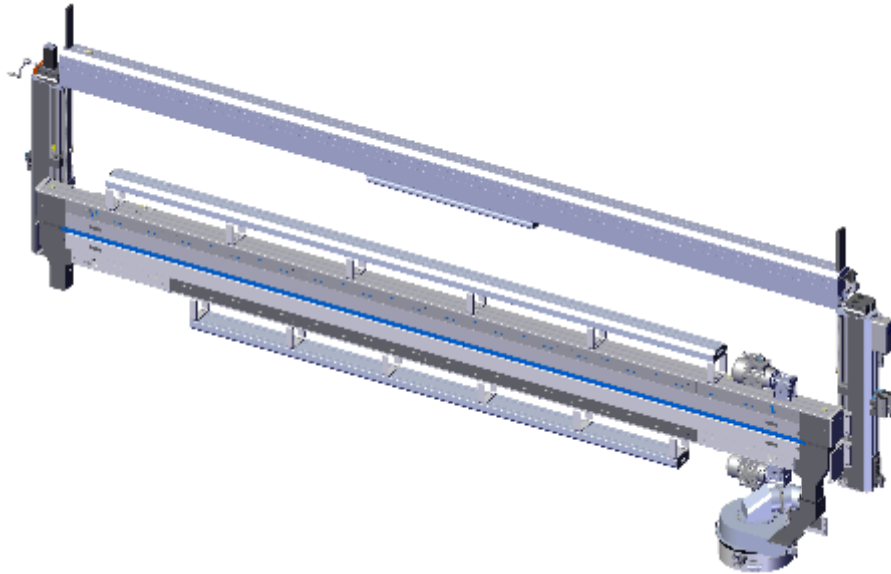


Fig. 1: Machine overview

#### Structure of the machine

The machine consists of the following components:

- Cleaning module
- DT BR Cleaner system
  - with DT BR Cleaner control and filter unit
- Extraction system
- Height adjuster

## 4.2 INFEEED, OUTFEED AND TRANSPORT DIRECTION

The infeed, outfeed and transport relate to the product to be cleaned, see Figure:

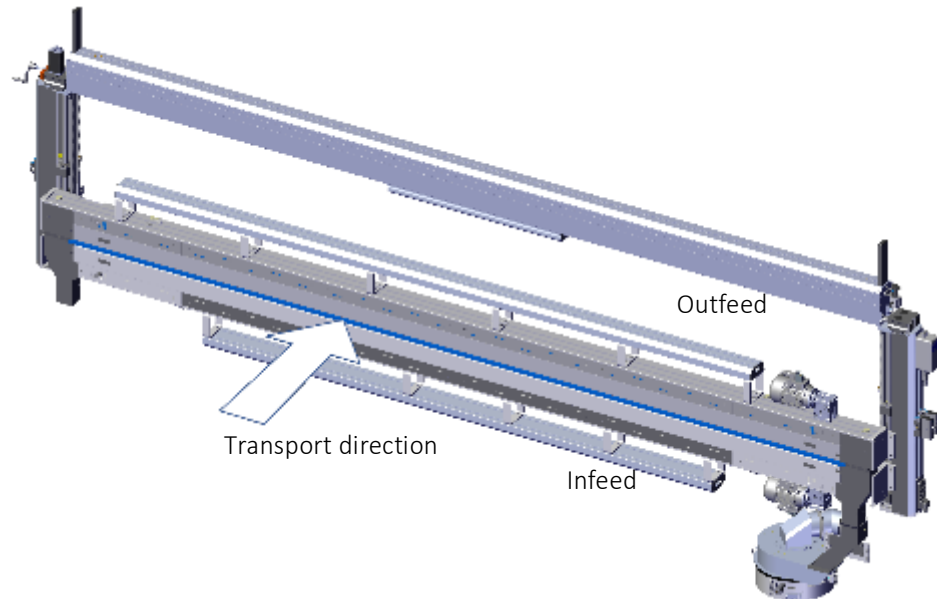


Fig. 2: Transport direction

### Infeed

On this side of the machine, the product is transported **into** the machine.

### Outfeed

On this side of the machine, the product is transported **out of** the machine.

### Transport direction

Direction in which the product is carried from the infeed to the outfeed.

### Operating side

Side in relation to the transport direction, from which the height adjustment is operated

#### 4.3 PRODUCT-CONTACT AREA, NON PRODUCT-CONTACT AREA AND WIPING DIRECTION

A cleaning module can clean both the top and the underside of the product surface. We distinguish between the product-contact area and non product-contact area according to the side of the linear brush:

**Product-contact area (tight side)**

Side of the linear brush **with** contact with the product surface.

**Non product-contact area (slack side)**

Side of the linear brush **without** contact with the product surface.

**Wiping direction**

The direction in which the linear brush wipes on the product-contact area side. The linear brush wipes transversely to the transport direction

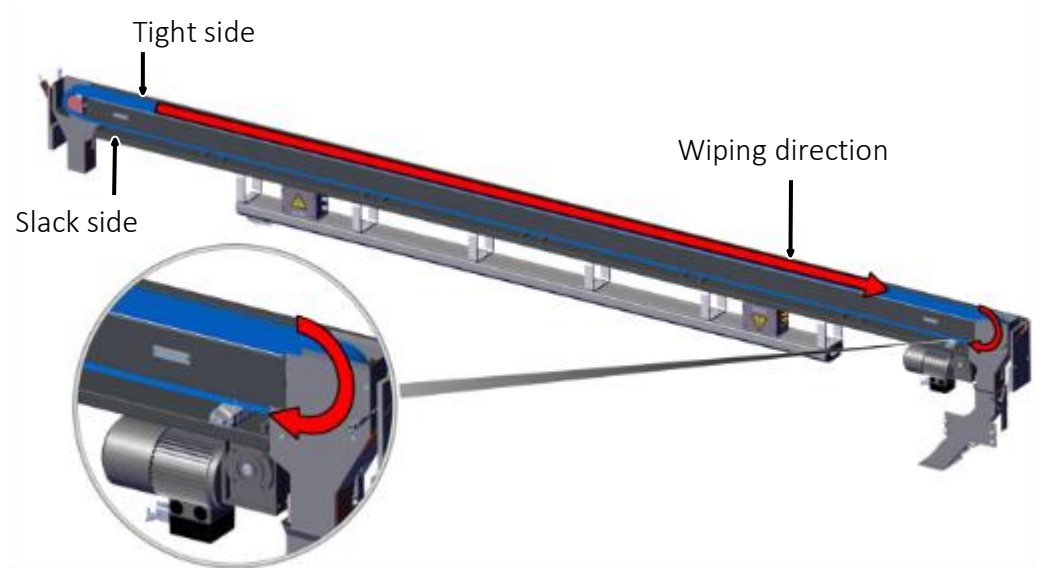


Fig. 3: Product-contact area, non product-contact area and wiping direction

#### 4.4 GUIDE RAIL SIDE

The guide rail side is the side towards which the linear brushes wipe. The customer should fit a material guide here. We distinguish between the left and right guide rail in the transport direction.

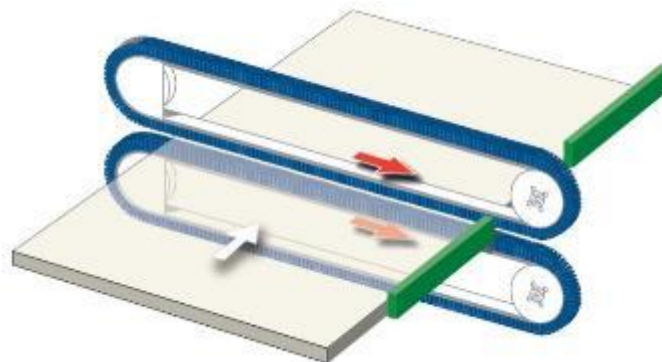


Fig. 4: Guide rail with material guide (green)



## 4.5 CLEANING MODULE

The machine is equipped with an upper cleaning module (BIPO) and a lower cleaning module (BIPU), both of the BIP 155 type. A cleaning module consists of the following components:

- Linear brushes
- Linear brush guides
- Pressure buffer
- DT BR Cleaner valve (part of the DT BR Cleaner system)
- DT BR Cleaner sprayer (part of the DT BR Cleaner system)
- Self-cleaning unit (part of the Extraction system)
- Gear motor with timing belt pulley, drive belt and drive pulley
- Chuck
- Profile
- Covers
- Pneumatic components

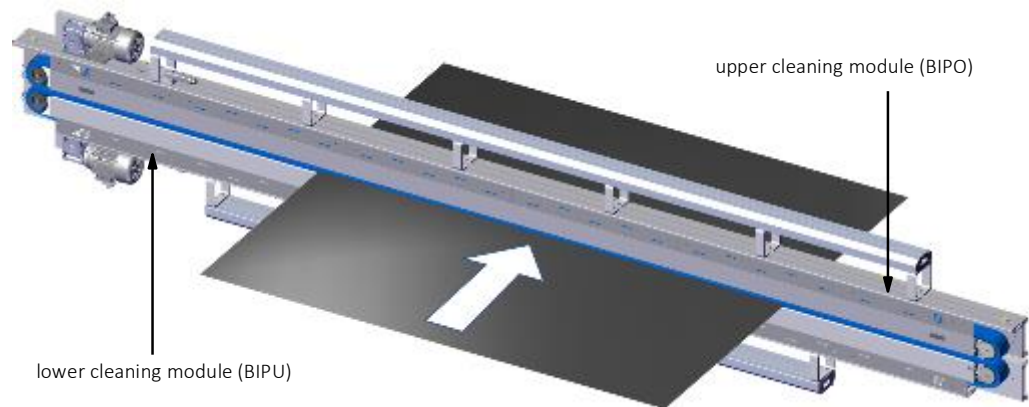


Fig. 5: Cleaning modules

## 4.6 LINEAR BRUSH

A linear brush is a brush that wipes transversely to the transport direction. It consists of a linear brush belt and bundles of filaments.

The linear brushes are driven by a motor and slide in the linear brush guide. On the tight side, the linear brush is flexibly mounted on a pressure buffer which compensates for irregularities and fluctuations.

### Structure

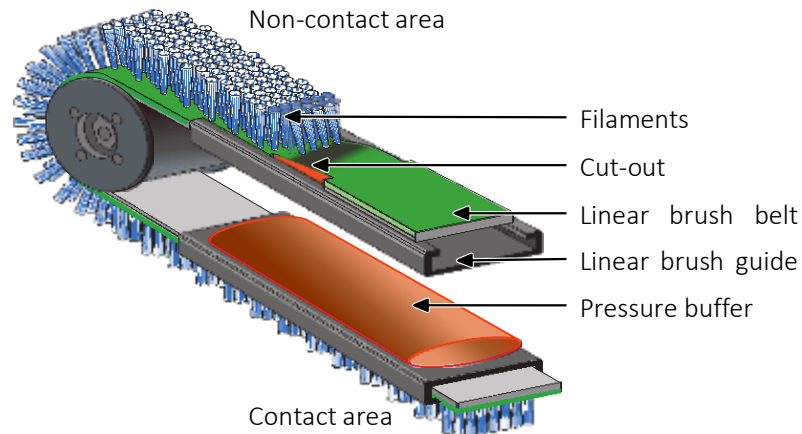


Fig. 6: Structure of the linear brush (schematic)

### Filaments

The filaments of the linear brush have been optimized for cleaning oiled steel panels and aluminum panels that have been oiled or dry lubed. The filaments are anchored in the linear brush belt.

### Linear brush belt

The linear brush wiping direction is identified by an arrow on the reverse of the linear brush belt. The width of the linear brush belt narrows at one point. This cut-out is used to thread the linear brush in and out of the linear brush guide.

### Linear brush guide

The linear brush belt slides in the linear brush guide. The linear brush guide consists of two parts, and latches into the profile on its long side.

## 4.7 PRESSURE BUFFER

The linear brush is flexibly mounted on the pneumatically controlled pressure buffer. This compensates for any unevenness and changes in material thickness up to  $\pm 2$  mm. The pressure buffer is located on the tight side between the linear brush guide and the cleaning module profile.

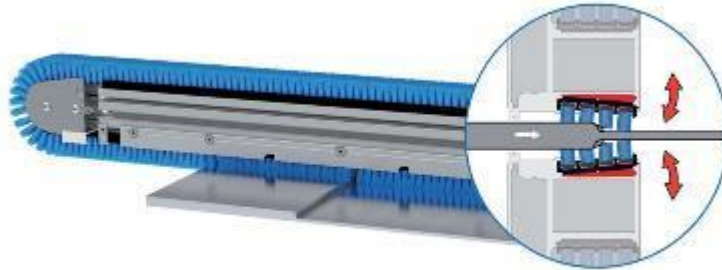


Fig. 7: Pressure buffer

The pressure is factory-set; these **settings** should not be changed. Pressure indicators show the pressure in the pressure buffers. Products cause slight pressure fluctuations as they pass through.

## 4.8 SELF-CLEANING UNIT

The self-cleaning unit is part of the extraction system and consists of self-cleaning nozzles and rotating scrapers.

The rotating scrapers (1) knock out the particles that were picked up by the filaments of the linear brushes. In addition, self-cleaning nozzles (2) clean the linear brushes with compressed air.

The particles detached from the filaments, and surplus lubricants are sucked through a heated downpipe (3) into a cyclone (4).

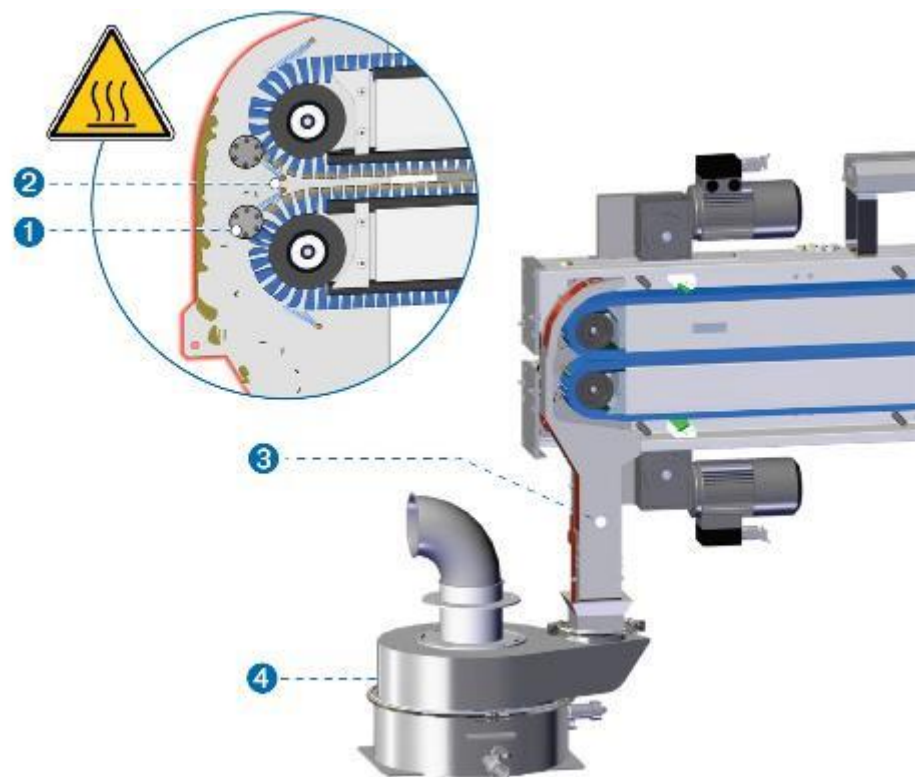


Fig. 8: Self-cleaning

## 4.9 DT BR CLEANER SYSTEM

The DT BR Cleaner system consists of the following components:

- DT BR Cleaner tank with the cleaning and antistatic fluid DT BR Cleaner
- Central supply pump
- DT BR Cleaner control and filter unit IR 100/IX2 (called regulating unit IR 100 below)
- DT BR Cleaner valves
- DT BR Cleaner lines and compressed air lines
- DT BR Cleaner sprayer
- Sensors for monitoring
  - the fill level of the DT BR Cleaner tank
  - the compressed air supply
  - the pressure in the DT BR Cleaner lines.

### Description

The DT BR Cleaner sprayer generates a fine spray mist with a defined spray pattern. In this way, the DT BR Cleaner sprayer evenly wets the filaments of the linear brush (micro moistening). Before starting cleaning, the linear brush must be completely moistened, for which 1 minute (minimum) to 3 minutes (optimum) **lead time** are necessary.

#### DT BR Cleaner method

##### 1. Micro moistening:

The filaments of the linear brush are evenly wetted with DT BR Cleaner cleaning and antistatic fluid.

##### 2. Wiping cleaning of the product surface:

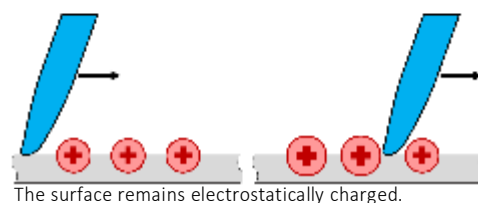
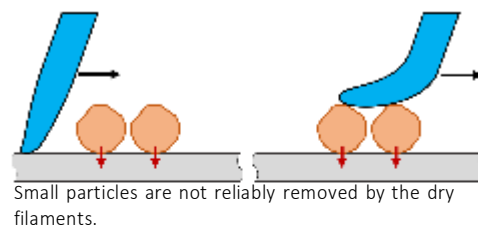
The particles adhere to the filaments and are transported to the self-cleaning unit.

##### 3. Self-cleaning:

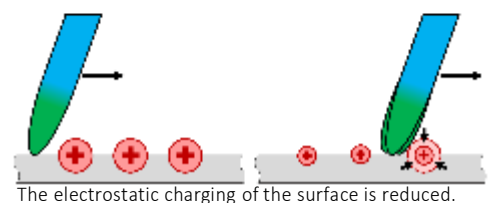
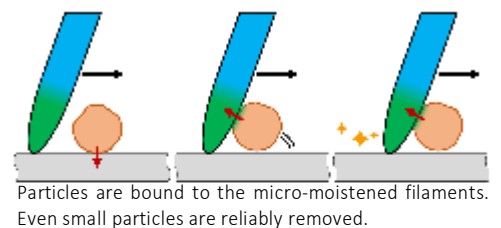
The self-cleaning unit with self-cleaning nozzles and rotating scrapers cleans the linear brush: The removed particles are extracted.

### Comparison of the DT BR Cleaner and conventional methods

#### Without DT BR Cleaner



#### With DT BR Cleaner



#### 4.10 DT BR CLEANER CONTROL AND FILTER UNIT IR 100/IX2

The air pressure in the pressure buffers of the cleaning modules is set and displayed on the pressure gauge on the control unit IR 100/IX2. The flow rate of the DT BR Cleaner cleaning fluid is also set and displayed on the relevant flow rate indicator.

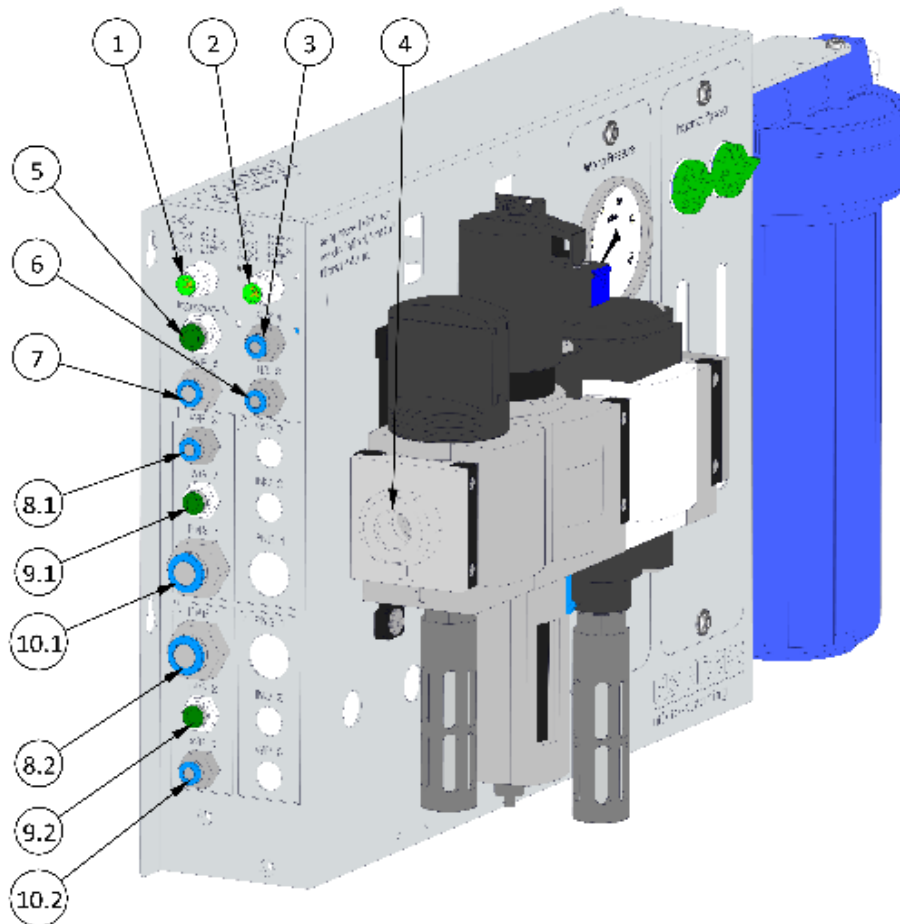


Fig. 9: Connections on the DT BR Cleaner control unit IR 100/IX2

① Voltage input to the solenoid valve, 24 V DC	⑥ Compressed air output to the auxiliary cylinder of the optional HVP
② Voltage input to the optional pressure switch, 24 V DC	⑦ Compressed air output to the main cylinder of the optional HVP
③ Compressed air output to the DT BR Cleaner pump	⑧ Compressed air output to the measuring cable in the pressure buffer DT BR Cleaner output to the DT BR Cleaner
④ Compressed air input, ½"	⑨ sprayer (via the pressure regulating block)
⑤ DT BR Cleaner input	⑩ Compressed air output to the sword brush

## 4.11 EXTRACTION SYSTEM

The extraction system consists of the following components:

- Self-cleaning unit with self-cleaning nozzles, and scrapers with round belts and pulleys
- Downpipe with heating elements and temperature sensors
- Cyclone with collecting container

### Description

The self-cleaning unit cleans the filaments of the linear brushes using self-cleaning nozzles and rotating scrapers.

The particles detached from the filaments and surplus lubricants are sucked out of the self-cleaning unit through a heated downpipe and into a cyclone (thermal self-cleaning). The heat makes viscous lubricants (hot melts) flowable.

The particles and lubricants from the extracted air/particle mixture (aerosol) are separated into a cyclone and collected in a collecting container. The cyclone acts as a pre-separator.

### How a cyclone works

The cyclone is a centrifugal separator for separating solid or liquid particles from aerosols (air/particle mixtures).

- The aerosol is moved in a rotary movement, creating a turbulent vortex flow.
- The centrifugal force accelerates the sluggish particles radially outwards.
- The particles are separated on the wall of the cyclone and collected in a collecting container.

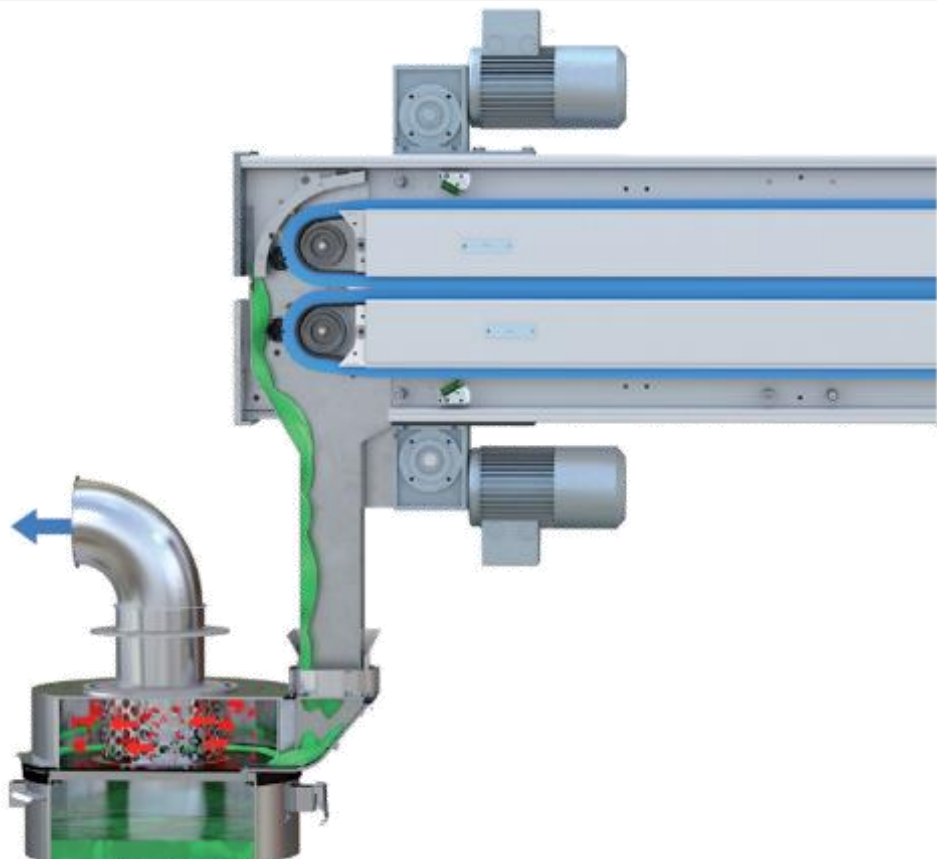


Fig. 10: Cyclone with collecting container

## 4.12 HEIGHT ADJUSTER

The position of the cleaning modules can be changed in the vertical direction using the **VEG 130** adjustment unit. The adjustment unit consists of

- a **manual** height adjuster (HVM) for the **lower** cleaning module,
- an **electric** height adjuster (HVE) for the **upper** cleaning module, and
- a **pneumatic** fast-action adjuster (HVP) for cleaning modules.

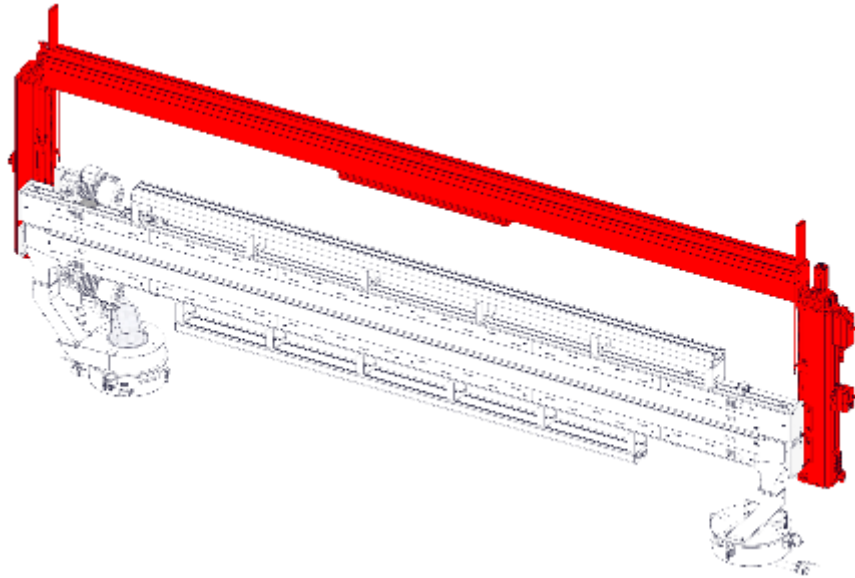


Fig. 11: Position of the adjustment unit

The positions of the cleaning modules are displayed on the associated digital/mechanical position indicator.

### Mechanical height adjuster (HVM) for the lower cleaning module

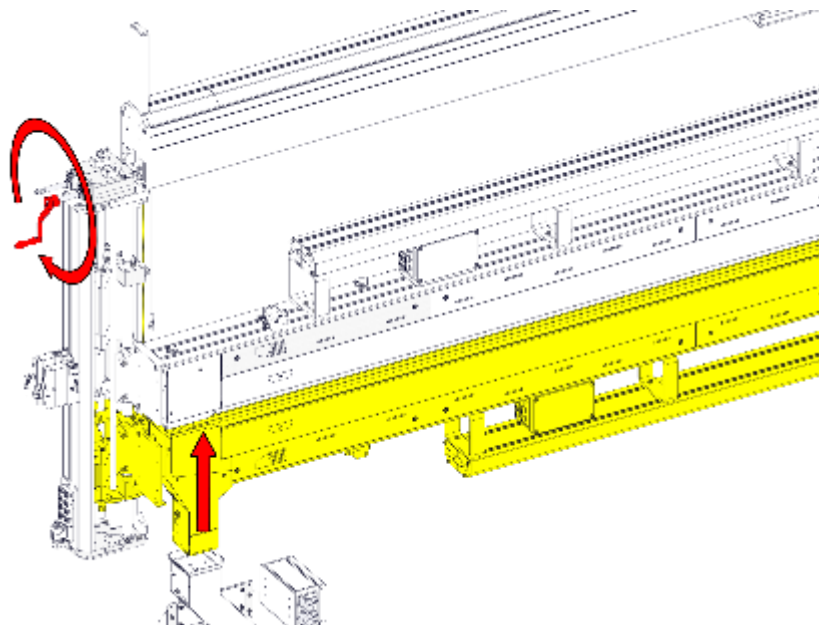


Fig. 12: Mechanical height adjuster (HVM)

The HVM with hand crank is used to **adjust the height of the lower cleaning module** and move the lower cleaning module into the maintenance position.



#### 4.13 Electric height adjuster (HVE) for the upper cleaning module



##### **WARNING**

**Risk of crushing by the cleaning module as it descends due to damaged internal brake!**

There is a risk of crushing when a cleaning module is lowered. An electric height adjuster is fitted with a positioning motor. This has an internal brake that secures the cleaning module. Manual adjustment damages the internal brake, which causes the cleaning module to descend.

- Never use a hand crank to move the electric height adjuster.
- Never use another method to manually move the electric height adjuster.
- Always use the positioning motor to move the electric height adjuster.

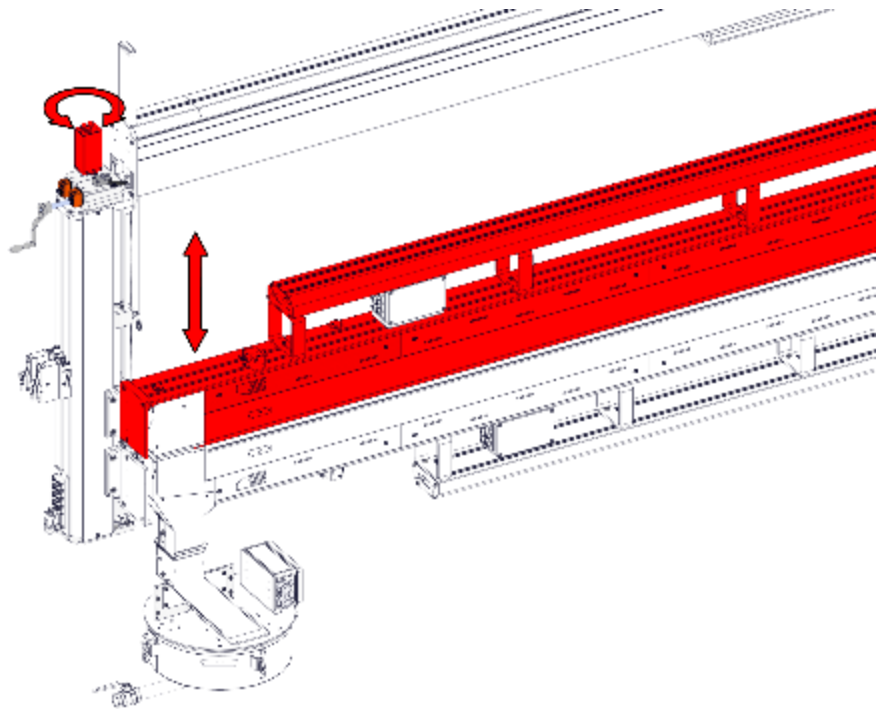


Fig. 13: Electric height adjuster (HVE)

The HVE with electric actuator drive is used to **adjust the height of the upper cleaning module** and move the upper cleaning module into the maintenance position. Follow the instructions in the separate **HVE data sheet**.



## Pneumatic fast-action adjuster (HVP)

The HVP moves the cleaning module out of the cleaning position at a safe distance from the pass line. The upper cleaning module is pulled up and the lower cleaning module is lowered.

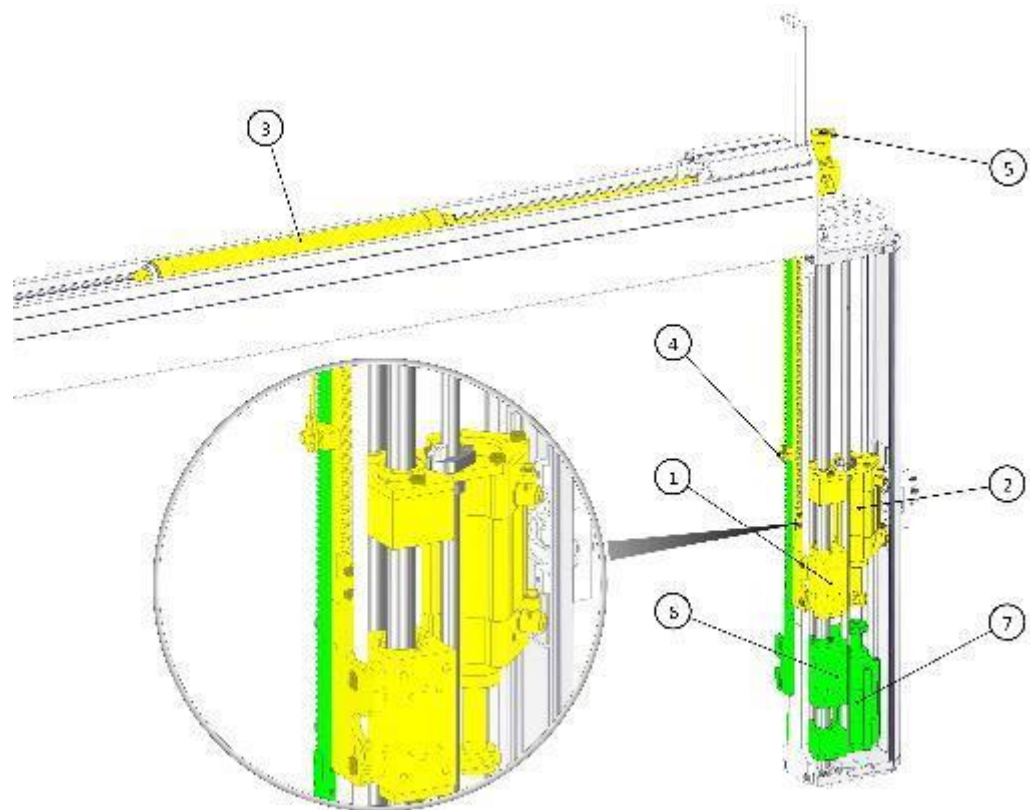


Fig. 14: Pneumatic fast-action adjuster (HVP)

- The cleaning modules are mounted on the guides (1) and (6). The guides are connected to the piston rods of the pneumatic cylinders.
- The positions of the pneumatic cylinders (2) and (7) are adapted to the product thickness with the aid of the HVM and/or HVE.
- Activating the HVP changes the position of the cleaning modules on the guides (1) and (6); the positions of the pneumatic cylinders remain unchanged. Deactivating the HVP changes the position of the cleaning modules on the guides (1) and (6) back to the cleaning position.
- The round cylinders (3) in the crossbeam help the pneumatic cylinders (2) in the height adjustment pillar to lift the upper cleaning module. The air pressure for the round cylinders (3) can be set at the pressure regulating valve (5). A label on the pressure regulating valve indicates the desired machine-specific value

## 5 TECHNICAL DATA

Cleaning module	
Max. recommended cleaning width	78 <sup>47</sup> / <sub>64</sub> in. (4340 mm)
Working height (passline)	11 <sup>59</sup> / <sub>64</sub> in. (303 mm) In
Maintenance side	the infeed
Guide rail side	Right (of the infeed)

Height adjuster	
Type	<ul style="list-style-type: none"> <li>• HVE/O (electric, upper)</li> <li>• HVM/U (mechanical, lower)</li> <li>• HVP/O (pneumatic, upper)</li> <li>• HVP/U (pneumatic, lower)</li> </ul>
Operating side	Left (to infeed)

Compressed air Ratings	
Min. inlet pressure	G <sup>3</sup> / <sub>4</sub> " ; 6 bar (87 psi); filtered (particle size < 40 µm), oil-free (max. residual oil content 1.5 mg/m <sup>3</sup> at 24 °C)
Consumption	6 bar (87 psi) (to be monitored) 0.64 m <sup>3</sup> /min (0.84 yd <sup>3</sup> /min)

DT BR Cleaner	
Connection	ø 8 mm (ø <sup>5</sup> / <sub>16</sub> in) roughly
Consumption	0.6 l/h - 1.6 l/h

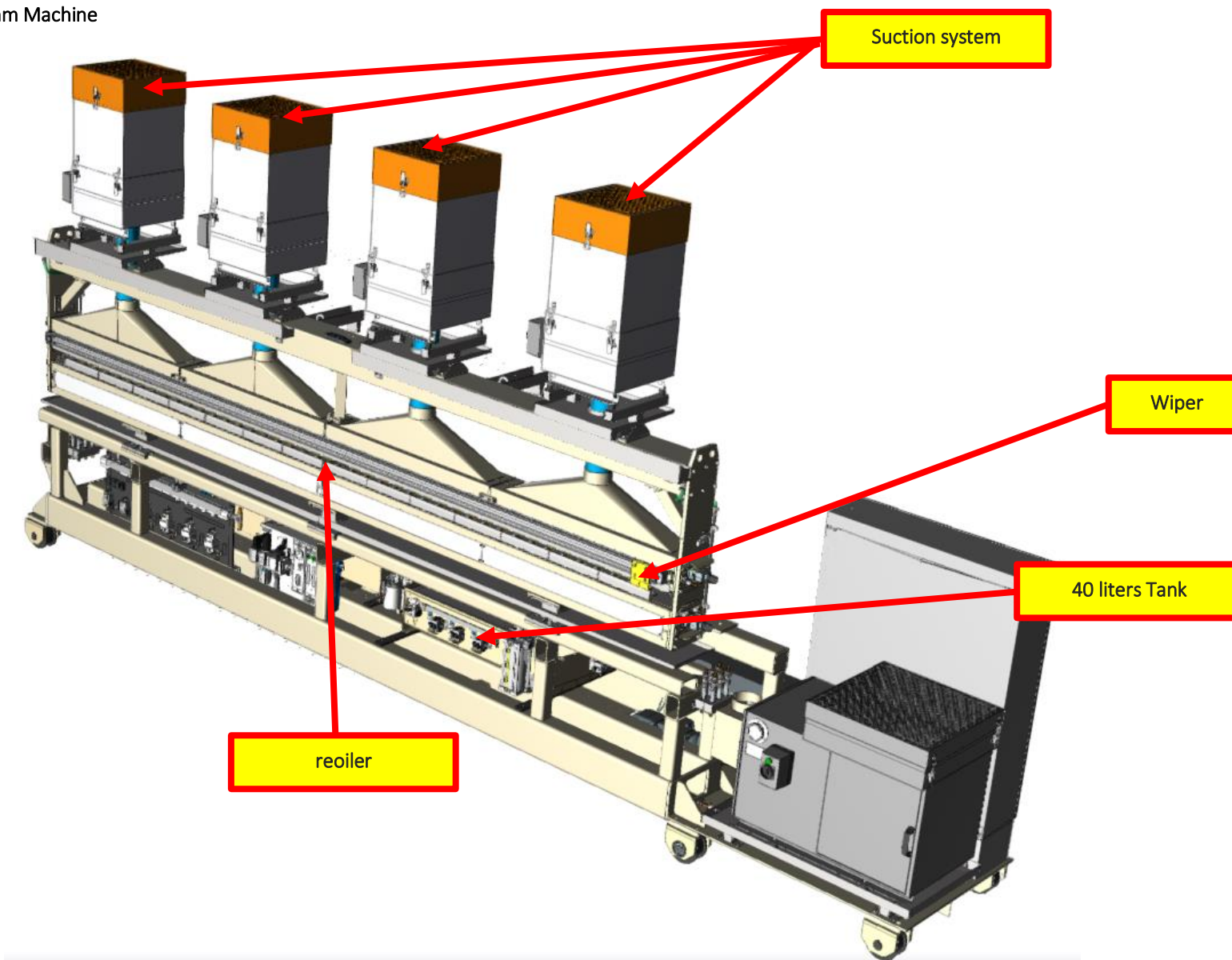
Extraction unit	
Connection Volume	
flow rate	2 x ø 125 mm (ø 4 <sup>59</sup> / <sub>64</sub> in)
Flow speed	2 x 25 - 33 yd <sup>3</sup> /min (19 - 25 m <sup>3</sup> /min) 91 ft/s (28 m/s)
Min. negative pressure	500 Pa

Sound emission	
Sound pressure level LpA	Approx. 85 dB(A)

**Lubricating machine:** system for the lubrication of the metal sheet.

The system allows the application of the proper and desired quantity of product in specific areas for a correct deformation of the metal sheet.

Lubrication reduces excessive lubricant consumption, decreases the number of final product waste and allows a longer life of the deformation mold.





Upper Sprayboxes

Lower Sprayboxes



## 5.1 Suction system (Brush Cleaner)

The suction system of the ARNO K series is suitable for the suction and purification of mists and dusts produced during wet and dry processing. Because of the way they are manufactured, they are great for purifying particles of different grain sizes, simply by using interchangeable filters with different filtration efficiency.

The equipment contains drainage for the recovery of the condensed liquid.

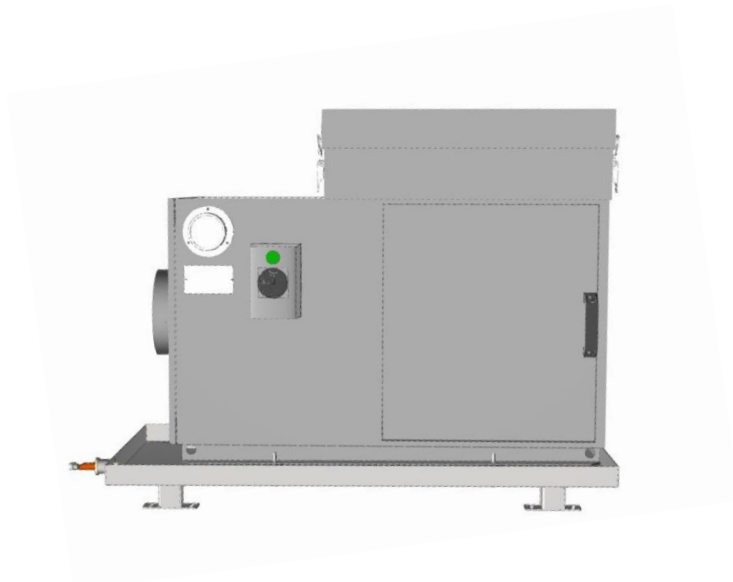


Image 1

### TECHNICAL DATA

Model	Suction port mm (mm)	Maximum airflow speed MC/H	Power HP/KW	Tension- Frequency V - Hz	Noise level Dba	Weight Kg.
ARNO K3 LOWER	200	4000	3/2,2		72	110

Model	Cluttered (mm)									Fixing Step I (mm)
	One	B	C	D	And (like this	F	G	H	H1	
ARNO K3 LOWER	530	1000	600	205	230	460	130	1000	310	360 – 9

## USE OF THE MACHINE

On the machine, you can see the following items:

- Suction hose;
- support and fixing - hole 9 mm;
- Ports for extracting filters **A** and **B**;
- Removable cover for extracting **C** and **D** filters;
- Pressure gauge to monitor the condition of the filter;
- Drainage for the recovery of the recondensed liquid;
- Ports for the extraction of **E** and **F** filters;
- Removable cover for extracting the **X** filter (for ARNO KC only).

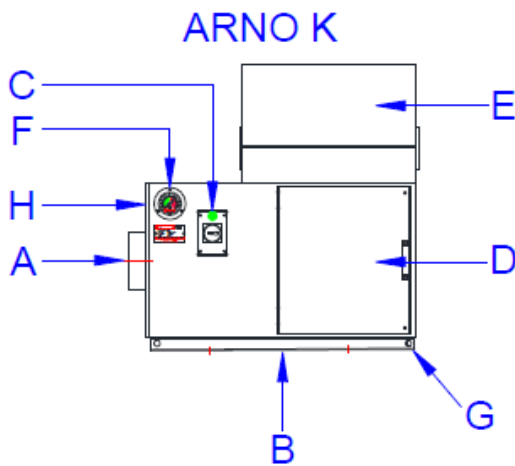


image 3

## HAZARD DISPOSITION AND WARNING PLANS

There are some hazard and warning signs on the machine to complete the directions contained in this manual. In case the plate wears out, you should replace it with a new one.

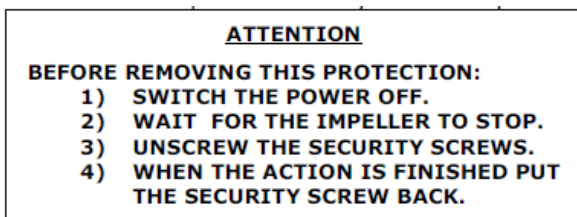


Image 5

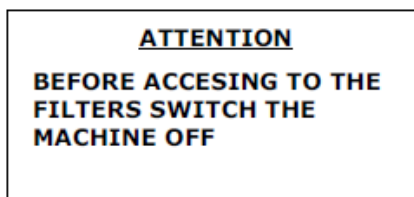


Image 6

**WARNING: IMPORTANT** Check the correct direction of rotation of the impeller.

Please look up on the suction hole in order to check the correct direction of rotation – the impeller must turn clockwise.



Image 7

Dietronic s.r.l. declines any responsibility caused by an electrical connection that does not comply with the regulations for the prevention of accidents.

#### ELECTRICAL LAYOUTS

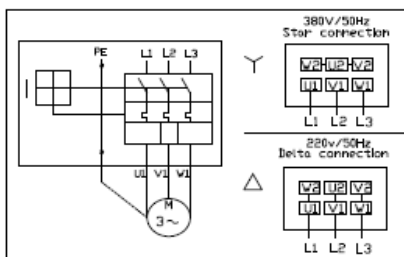


Image 8

#### MEASURE TO MONITOR FILTER CONDITION

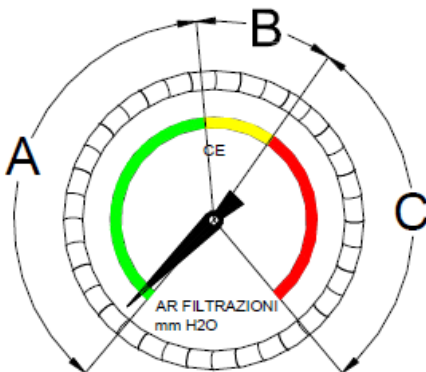


Image 12

How to read the clogging indicator of filters A, B, C, D:

##### Sector A (green):

Optimal efficiency of the extraction system.

##### Sector B (yellow):

Caution sector.

Replace filters **B** and/or **C** and/or **D**.

##### Sector C (red):

Insufficient efficiency of the suction system.

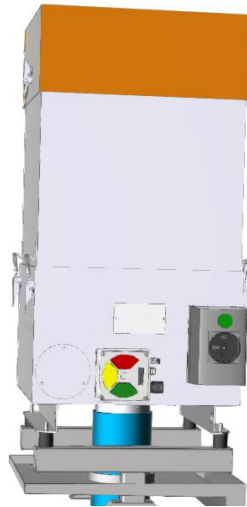
Replace filters B and/or D, wash or replace filter A and /or C and check and clean the suction inlet.

Note:

- If the blood pressure gauge lancet is outside of band A, replace the clogged filter(s) by pulling out each filter individually and checking the behavior of the blood pressure monitor's hand from time to time



## 5.2 Suction system (Oiler)



The oily mist aspirator model ECO PF YE, present on the top of the oiler, consists of three filtration stages, and is characterized by the presence of a pressure gauge to check its status.

The filtration stages are:

Washable metal prefilter	Washable
Fiberglass pocket filter	To be replaced annually
HEPAD filter	To replace every year

Technical drawing of the Testa superiore Promax 800 machine, showing front, side, and detail views with dimensions and a table.

**Front View:** Dimensions include 6100 (width), 1942 (height), 1260 (height), 1395 (height), 3045 (height), and 1000 (height). A note indicates "Electrical cabinet NOT supplied".

**Side View:** Dimensions include 6261 (width), 4000 (width), and 1323 (width). A note indicates "Max Sheet".

**Detail View B (1:10):** Dimensions include 120, 150, 450, 150, and 100. A note indicates "Rz M12x1.75".

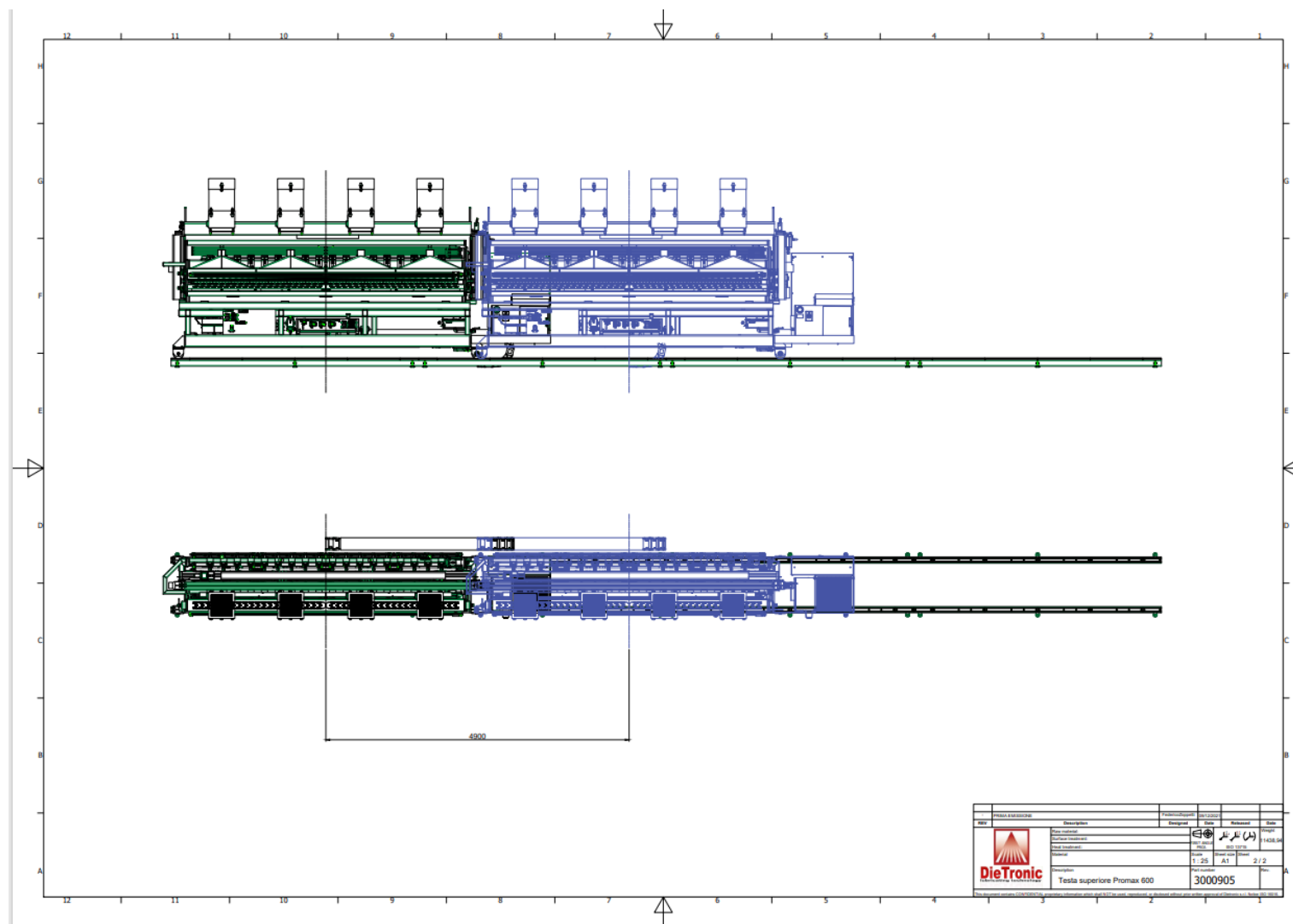
**Detail View A-A (1:20):** Dimensions include 2073 (height), 2000 (height), 800 (width), and 1323 (width).

**Table:**

PRODOTTORE		DESCRIZIONE		REVISIONE	
REV.	DATA	DESCRIZIONE	REVISIONE	DATA	REVISIONE
1	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
2	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
3	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
4	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
5	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
6	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
7	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
8	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
9	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
10	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
11	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA
12	01/01/2010	PRODOTTORE	DESCRIZIONE	REVISIONE	DATA

**DieTronic**  
Testa superiore Promax 800  
3000905

## Movement inside and outside (Stroke)



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## 5.4 ENVIRONMENTAL CONDITIONS

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The partly completed machinery must be installed in a lit and well ventilate industrial building with a solid, leveled floor.

The partly completed machinery is suitable for operating in environments that:

are at an altitude of not more than 1500 m above s.l.;

are at temperatures between +5° C and +40° C;

have relative humidity between 30% and 95%, not more than 50% at 40° C and not more than 90% at 20° C.

It is forbidden to use the machine in environments that are:

dusty;

in a corrosive atmosphere;

at risk of fire;

in an explosive atmosphere.



**The partly completed machinery is not suitable for working in environments with an explosive/corrosive atmosphere or with excessive dust.**

---

## 5.5 LIGHTING

---

The lighting of the assembly environment must comply with the laws in force in the Country where the partly completed machinery is installed and must ensure proper visibility; do not create dangerous reflections and allow a clear reading of the control panels, as well as the identification of the emergency buttons.

The work environment must be equipped with a general lighting system that guarantees values between 200 and 300 lux on each point of the partly completed machinery.

---

## 5.6 VIBRATIONS

---

Under working conditions that comply with the proper use instructions, the vibrations do not create dangerous situations.

---

## 5.7 SOUND EMISSIONS

---

The sound pressure level of the A-weighted emission in the workplace is <80.0 dB (A).

---

## 5.8 TECHNICAL INFORMATION

---

The following are the main technical data of the partly completed machinery.

Operating voltage: 400 VAC

Auxiliary voltage: 12 VDC 220VAC 48VAC

Signal voltage: 24VDC

Frequency: 50 Hz

Rated current: 40°

Total power: 15 kW

IP: IP 5

---

## 5.9 STANDARD SUPPLY

---

The partly completed machinery is fully equipped for commissioning.

It is supplied with:

- a) Assembly Instruction Manual;
- b) Declaration of Incorporation

---

## 5.10 ELECTROMAGNETIC ENVIRONMENT

---

The partly completed machinery is designed to operate correctly in an industrial electromagnetic environment, within the Emission and Immunity limits provided for by the following harmonized standards:

### IEC EN 61000-6-2

Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments.

### IEC EN 61000-6-4

Electromagnetic compatibility (EMC) - Generic standards - Emission for industrial environments

## 6 COMMISSIONING



### WARNING

**Risk of injury from machine parts that move automatically.**

Machine parts that move automatically can lead to shearing, pulling in, crushing, cut-ting, impact, and abrasion injuries.

- Cordon off the danger area, and do not enter while the machine is in operation.
- Make sure that there are no people in the danger area.
- Do not reach the working area.
- Wear safety boots, protective clothing, and hairnet (for long hair and beards).
- Do not wear jewelry (e.g. chains or ribbons), do not wear a tie.
- Only trained and qualified personnel must access the machine inside the danger area.

### Requirements

- **Protective gear:**  
Gloves, safety shoes, hard hat, suitable protective clothing.
- **Machine:**  
in maintenance position, main switch **ON** , no products in the machine.
- **Cleaning modules:**  
in working position, air pressure in pressure buffer of the upper (BIPO) and lower (BIPU) cleaning modules set to 60 mbar for duration of the setup work.
- **Tools:**  
precisely parallel reference panel (e.g. 10 mm thick), wrench.
- **Number of people:** Two

## 6.1 ALIGN THE LOWER CLEANING MODULE (BIPU)

### Details

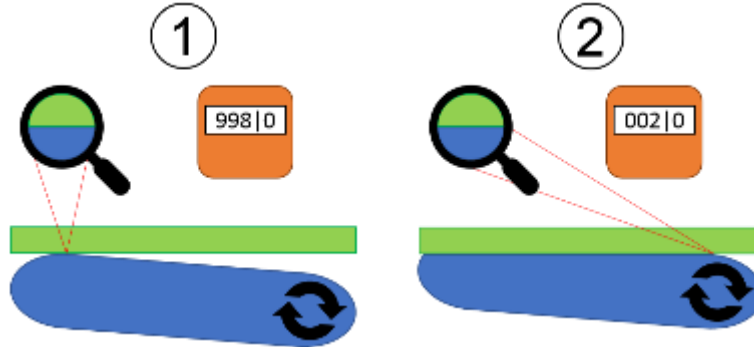


Fig. 17: Measure the BIPU offset - schematic representation

- Note the values on the position indicator here:

Value opposite the drive side ①	Value on the drive side ②	Difference

Tab. 6: Values on the position indicator when the visible gap has disappeared

### Action steps

1. Move the upper cleaning module (BIPO) up roughly 20 mm.
2. Move the lower cleaning module (BIPU) to roughly 20 mm below the pass line.
3. Set **Cleaning ON** and **DT BR Cleaner OFF**.
4. Check that the linear brush guide moves up and down easily in the BIPU profile.
  - ⇒ Has the pressure buffer caused maximum deflection of the linear brush guide?
  - ⇒ If not: Is the compressed air in the pressure buffer set to 60 mbar? Is the belt guide jammed?
5. Place and firmly hold the reference panel **opposite the drive side ①**.
6. 1st person: Watch the light gap between the linear brush and reference panel opposite the drive side.
7. 2. person: Move the BIPU up slowly.
  - ⇒ until the 1st person opposite the drive side can no longer see a light gap between the linear brush and reference panel.
8. Read the position indicator and note the value.
9. Move the lower cleaning module (BIPU) to roughly 20 mm below the pass line.
10. Repeat steps 6 – 9 **on the drive side ②**.
11. Calculate and note the difference between the value on the drive side and the value opposite the drive side.

Continue from here if the difference  $> 0.2$  mm

✓ Adjust on or opposite the drive side as required.

1. 2nd person: Slowly lower or raise one side of the cleaning module.

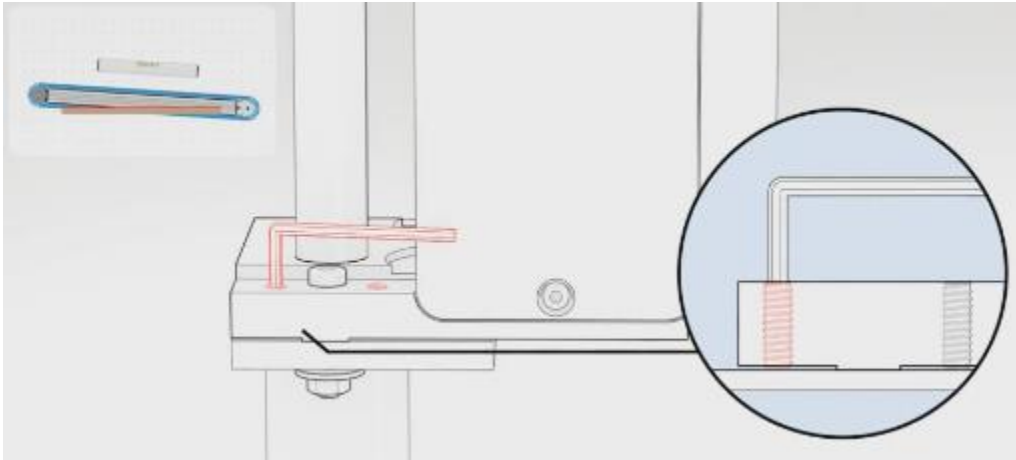


Fig. 18: Example: Lifting one side of a cleaning module using a grub screw

2. 1st person: Watch the light gap between the linear brush and reference panel.

⇒ The alignment is correct if the linear brushes are parallel to the reference panel.

⇒ The difference is now  $\leq 0.2$  mm. Continue.

Continue from here if the difference  $\leq 0.2$  mm

1. Set the position indicator to the value **998.50**.

2. Move the BIPU to the value 0.

⇒ A brush pre-tension of 1.5 mm has been set.

3. Set the pressure in the pressure buffer to 30 mbar (working value).

⇒ The BIPU has now been successfully aligned.



## 6.2 ALIGN THE UPPER CLEANING MODULE (BIPO)

### Details

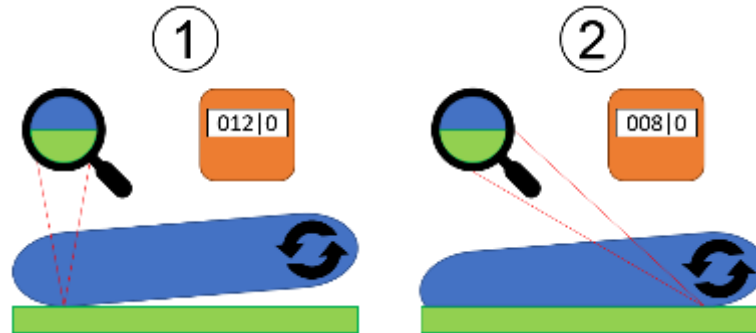


Fig. 19: Measure the BIPO offset - schematic representation •

Note the values on the position indicator here:

Value opposite the drive side ①	Value on the drive side ②	Difference

Tab. 7: Values on the position indicator when the visible gap has disappeared

### Action steps

1. Move the upper cleaning module (BIPO) up roughly 20 mm.
2. Move the lower cleaning module (BIPU) to roughly 20 mm below the pass line.
3. Set **Cleaning ON** and **DT BR Cleaner OFF**.
4. Check that the linear brush guide moves up and down easily in the BIPO profile.  
⇒ Has the pressure buffer caused maximum deflection of the linear brush guide?  
⇒ If not: Is the compressed air in the pressure buffer set to 60 mbar? Is the belt guide jammed?
5. Place and firmly hold the reference panel **opposite the drive side ①**.
6. 1st person: Watch the light gap between the linear brush and reference panel opposite the drive side.
7. 2nd person: Move the BIPO down slowly,  
⇒ until the 1st person opposite the drive side can no longer see a light gap between the linear brush and reference panel.
8. Read the position indicator and note the value.
9. Move the upper cleaning module (BIPO) up roughly 20 mm.
10. Repeat steps 6 – 9 **on the drive side ②**.
11. Calculate and note the difference between the value on the drive side and the value opposite the drive side.

Continue from here if the difference  $> 0.2 \text{ mm}$

✓ on or opposite the drive side as required.

1. 2nd person: Slowly lower or raise one side of the cleaning module.

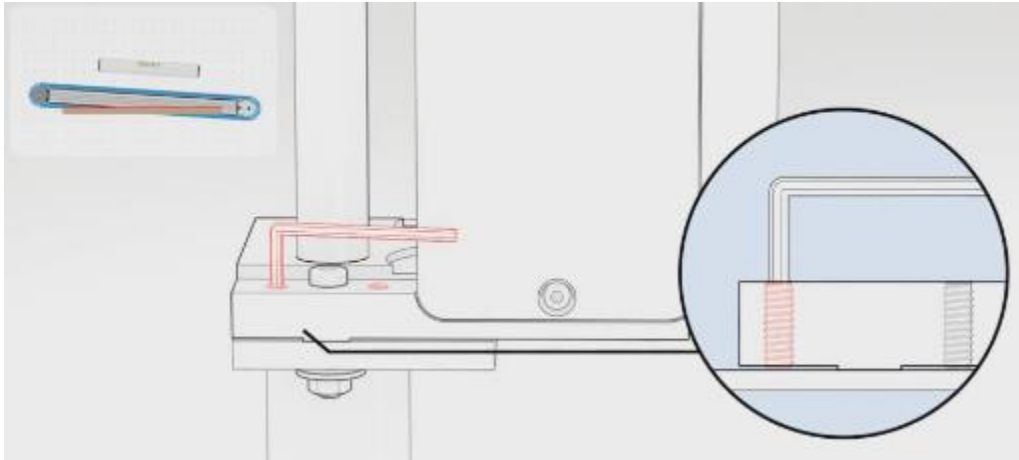


Fig. 20: Example: Lifting one side of a cleaning module using a grub screw

2. 1st person: Watch the light gap between the linear brush and reference panel.

⇒ The alignment is correct if the linear brushes are parallel to the reference panel.

⇒ The difference is now  $\leq 0.2 \text{ mm}$ . Continue.

Continue from here if the difference  $\leq 0.2 \text{ mm}$

1. **Set** the position indicator to the reference panel thickness + **1.5**.

2. Move the BIPO electrically to the value for the reference panel thickness.

⇒ A brush pre-tension of 1.5 mm has been set.

3. Set the pressure in the pressure buffer to 20 mbar (working value).

⇒ The BIPO has been successfully aligned.

---

## 6.3 SET THE POSITION INDICATOR

---

### Requirements

- **Machine:**

Main switch **ON** .

- **Tools:**

Allen keys.

- **Number of people:**

one.

### Details

The position indicator must be set

- after **aligning the cleaning modules**.
- after calibrating the height adjuster.

### Action steps

1. Use the Allen key to loosen the grub screw.
2. Turn the black setting ring until the desired value is displayed.



3. Tighten the grub screw once more.
  4. If the position indicator reads 0.00, the linear brushes must wipe over the product surface without initial tension and without any identifiable clear gap.
- ⇒ The position indicator has been successfully reset.

## 6.4 SET THE PRESSURE BUFFER

### Requirements

- Machine:  
Main switch **ON** .

### Details

Cleaning module	Pressure buffer working pressure
Top	20 mbar
Bottom	30 mbar

Tab. 8: Pressure buffer setting values (set at the factory)

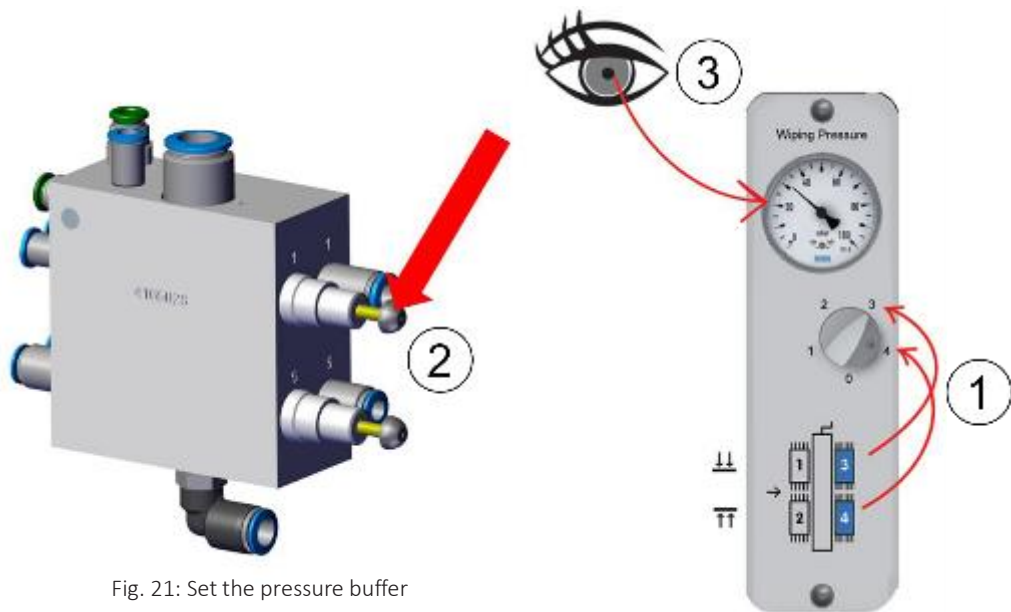


Fig. 21: Set the pressure buffer

- The pressure in the pressure buffers is set at the factory, and the pressure regulators are sealed with sealing wax. Follow these steps if it is still necessary to reset the working pressure of the pressure buffers:

### Action steps

1. Turn the rotary knob ① to select the desired cleaning module.
  2. Adjust the pressure using the pressure regulator ②, and check the pressure indicator ③.
  3. Check that the linear brush guide moves up and down easily in the BIPO profile.
  4. Check that the linear brush guide moves up and down easily in the BIPU profile.
- ⇒ You have successfully set the pressure buffer.

## 6.5 CHECK THE BRUSH PRE-TENSION



### WARNING

Risk of injury from machine parts that move automatically.

Machine parts that move automatically can lead to shearing, pulling in, crushing, cutting, impact, and abrasion injuries.

- Cordon off the danger area, and do not enter while the machine is in operation.
- Make sure that there are no people in the danger area.
- Do not reach the working area.
- Wear safety boots, protective clothing, and hairnet (for long hair and beards).
- Do not wear jewelry (e.g. chains or ribbons), do not wear a tie.
- Only trained and qualified personnel must access the machine inside the danger area.

### Requirements

- **Protective gear:**

Gloves, safety shoes, hard hat, suitable protective clothing.

- **Machine:**

Main switch **ON**.

- **Cleaning modules:**

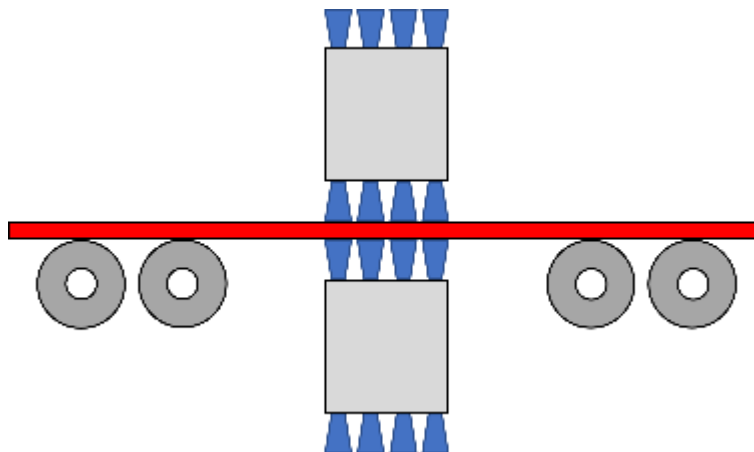
Height, parallelism and pressure buffer set, in maintenance position.

- **Tools:**

Reference panel, 10 mm thick.

### Action steps

1. Place a reference panel (10 mm) between the upper cleaning module and the lower cleaning module on the transport rollers.



2. Using the hand crank, manually move the lower cleaning module to 998.5 mm.

3. Use the electric height adjuster to move the upper cleaning module to 11.5 mm.

4. Set the cleaning to **ON**.

⇒ The linear brushes of the upper and lower cleaning modules now wipe over the reference panel without pre-tension.

⇒ If a clear gap can be detected between the linear brushes and the reference panel or if the linear brushes clearly touch the reference panel: **Adjust the height and parallelism (if necessary) of the cleaning modules.**

5. Using the hand crank, manually move the lower cleaning module to 0.0 mm.

6. Use the electric height adjuster to move the upper cleaning module to 10.0 mm.

⇒ The linear brushes of the upper and lower cleaning modules now wipe over the reference panel with 1.5 mm pre-tension. No clear gap can be detected between the linear brushes and the reference panel.

7. Remove the reference panel.

8. Use the electric height adjuster to set the upper cleaning module to the thickness of the panels to be cleaned.

⇒ You have successfully set the brush pre-tension.

**REMEMBER: IN WORKING MODE THE UNDER BRUSH MUST ALWAYS SETTED AT 0.00 mm, FOR THE UPPER BRUSH USE THE THICKNESS OF THE BLANK!**

## 6.6 SET THE DT BR CLEANER FLOW RATE

### Requirements

- **Protective equipment:**

Chemical safety gloves (nitrile rubber NBR, EN 374) with cut-resistance to EN 388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic sub-stances – adhering to the linear brushes – from processes on the customer's production line.

- **Machine:**

Main switch **ON** , Cleaning **ON** , DT BR Cleaner **ON** .

- **Number of people:**

one.

### Details

- DT BR Cleaner flow rate: approx. 0.6 l/h - 1.6 l/h per cleaning module.
- The set value varies according to the level of soiling, extraction filter, and working width.
- There is one regulator, and one flow rate indicator per cleaning module.

### Action steps

1. Turn the regulator counter-clockwise as far as it goes.
  2. Turn the regulator slowly clockwise until the flow rate indicator shows the desired value.
- ⇒ Air bubbles may falsify the display.



⇒ You have successfully set the DT BR Cleaner flow rate.

#### Inspection interval 5 - 7 days

The interval will depend on the level of soiling of the panels to be cleaned; this must be determined during the machine's running-in phase.

5 - 7 days

The interval will depend on the level of soiling of the panels to be cleaned; this must be determined during the machine's running-in phase.

6 month

## 7 MAINTENANCE

### UNI 11063:2003 Maintenance - Definitions of routine and extraordinary maintenance

The standard provides a classification of maintenance activities, separating these activities in "routine maintenance" and "extraordinary maintenance".

**MAINTENANCE CLASSIFICATION: (routine and extraordinary)** Maintenance is organized according to the content of the works and their purpose in the following categories (or expense categories): - routine maintenance; - extraordinary maintenance;

**Routine maintenance** Type of maintenance interventions during the life cycle: - maintain the original integrity of the good; - maintain or restore the efficiency of the assets; - contain regular use degradation; - guarantee the useful life of the asset; - deal with accidental events. Generally speaking, the interventions are requested in case of: - faults or failures detection (failure or corrective maintenance), - implementation of maintenance policies (preventive and cyclical maintenance, predictive conditions), - need to optimize the availability of the asset and improve its efficiency (improvement interventions or small changes that do not increase the asset's value). The aforementioned interventions do not alter the original characteristics (plate data, dimensioning, constructive values, etc.) of the good and do not modify its essential structure and intended use. The relative costs must be foreseen (also on a statistical basis) in the maintenance budget and allocated to the financial year in which the activities were carried out (see UNI 10992). Routine maintenance costs are always covered.

**Extraordinary maintenance** Type of non-recurring and high cost interventions, compared to the replacement value of the asset and the annual ordinary maintenance costs. The interventions also: - may extend the useful life and/or, alternatively, improve its efficiency, reliability, productivity, maintainability and inspectability; - do not modify the original characteristics (plate data, dimensioning, construction values, etc.) and the basic structure; - do not involve changes in the use of the good. The relative costs are foreseen in the maintenance budget (see UNI 10992). The intervention must be highlighted in the accounts; the cost incurred for its execution can be: - allocated to the financial year in which the interventions were carried out. - capitalized, provided that it determines the increase of the asset's value (interventions such as the replacement of important structural components, the substantial remaking of the asset's parts) which in general leads to a significant increase of the useful life of the asset and or its own function.

#### Note 1

In order to give more precise indications, it is possible to classify and list the extraordinary maintenance interventions; this list can be made according to sector regulations that refer to the current general rule.



#### Note

2

This type includes all those interventions that can be: - scheduled in advance and included in the maintenance budget for the current year; - accidental and therefore not foreseen in the aforementioned budget (extra budget). The value of the Legal Persons' assets is written in the register of assets. The value of capitalized extraordinary maintenance must be written in the asset register, while the calculated value of the replaced or remade asset must be disinvested.

## 7.1 MAINTENANCE- SETTING

Description	Value	Comments
Pressure switch	6 bar	Presettet
Pressure buffer	20 mbar (Upper Sword Brush) 30 mbar (Lower Sword Brush)	Presettet

## 7.2 MAINTENANCE- CHECKLIST BRUSH

Description	What needs to be checked?	Checking Interval
Linear brushes	Have the cleaning modules been adjusted to the material thickness?	When changing the thickness
	Do all the bristles have the same length?	every 2 months
	Do the brushes move correctly within the guides?	every month
	Do all brushes have the right initial tension (approx. 1,5 mm in relation to material surface)?	every month
	Change the brushes	Every 4 months or 3000 hours
DT BR Cleaner	Are all the DT BR Cleaner filters clean?	every month
	Do you still have DT BR Cleaner liquid?	every day
	Do the DT BR Cleaner sprayers function without problems?	every week
	Are the linear brushes moistened correctly, i.e. are the pressure regulators at the sprayer adjusted according to the circumstances?	every week
	Is the suction strong enough to guarantee a minimum vacuum of 500 Pa?	when installing the machine
Deposits	Are all the linear brush guides clear?	every week
	Are the lateral suction sockets clear?	every month
	Are all the DT BR Cleaner sprayers clear?	every week
Pass line	Have the cleaning modules been positioned correctly in relation to the pass line of the production line?	every 2 months

### 7.3 MAINTENANCE - OILER

Description	Frequency
<ul style="list-style-type: none"> <li>Nozzles cleaning and check of the correct operation of the spray heads</li> </ul>	1 months
(remove the nozzles and clean them with compressed air. Reassemble the nozzles and let the spray heads work in manual mode, using a solvent for cleaning - we recommend DTSolv)	
<ul style="list-style-type: none"> <li>Check of the correct operation of the tank level sensor (empty the tank and set the level upwards)</li> </ul>	4 months
<ul style="list-style-type: none"> <li>Check of the integrity of the "roller conveyor" transport system</li> </ul>	4 months
<ul style="list-style-type: none"> <li>Check of the integrity and correct operation of switches, photocells, micro and sensors</li> </ul>	4 months
<ul style="list-style-type: none"> <li>Check of the correct operation of the transformer room ventilation system</li> </ul>	12 months
<ul style="list-style-type: none"> <li>Check of the screws and bolts tightening</li> </ul>	12 months
<ul style="list-style-type: none"> <li>Replacement of adjustable frequency valves</li> </ul>	12 months
<ul style="list-style-type: none"> <li>Check of the correct operation of motors and transformers, the temperature calibration and the integrity of the electric cables and pipes</li> </ul>	12 months
<ul style="list-style-type: none"> <li>Check of the correct operation of the diaphragm pump</li> </ul>	12 months
<ul style="list-style-type: none"> <li>Suction filters replacement</li> </ul>	12 months
<ul style="list-style-type: none"> <li>Lubricant inspection</li> </ul>	5 months

All faults and alarms are signaled on the operator panel, indicating the faulty or malfunctioning component and its position on the machine.

## 7.4 PERIODIC CLEANING

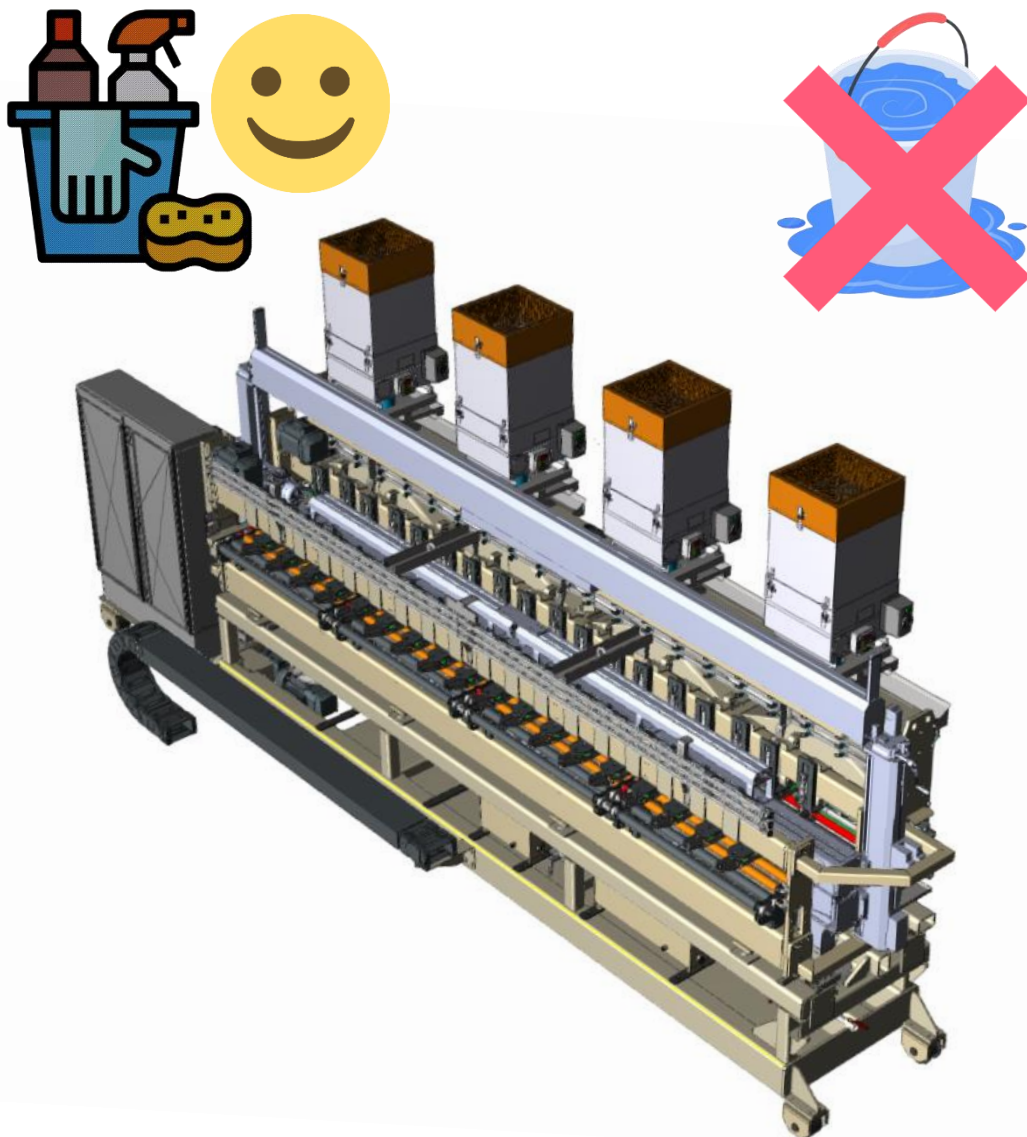
**Remember to keep clean all the parts of the machine!**

Frequently clean the gutters of the oil aspirators and generally every part of the machine in order to always have optimal results.

**WARNING!**

Use specific products (5002403: DI Wash 20l - 5002404: DI Wash 200l)

**DON'T USE WATER!!!**



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## 7.5 MAINTENANCE STATUS

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Maintenance operations must be carried out with the partly completed machinery in compliance with the conditions described under "STATUS OF THE PARTLY COMPLETED MACHINERY" Scheduled Maintenance.

---

## 7.6 Nozzles cleaning

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In the event that one of the nozzles is clogged, or before proceeding with the replacement of a valve, it is recommended to perform a cleaning of the nozzle, to clean a nozzle proceed as follows.

After removing the spraybox from the frame remove the valve hat, first loosening the four fixing screws (foto\_1) to expose the nozzle (foto\_2)

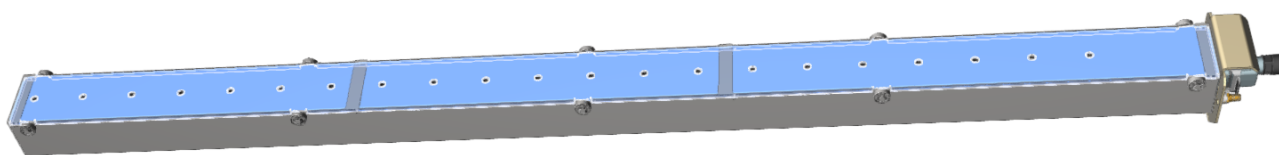


Unscrew the nozzle from the valve and visually check that it is not clogged in case the nozzle is clogged you can proceed with cleaning by means of an air gun blowing in the opposite direction to that of work. (foto\_3 and foto\_4)

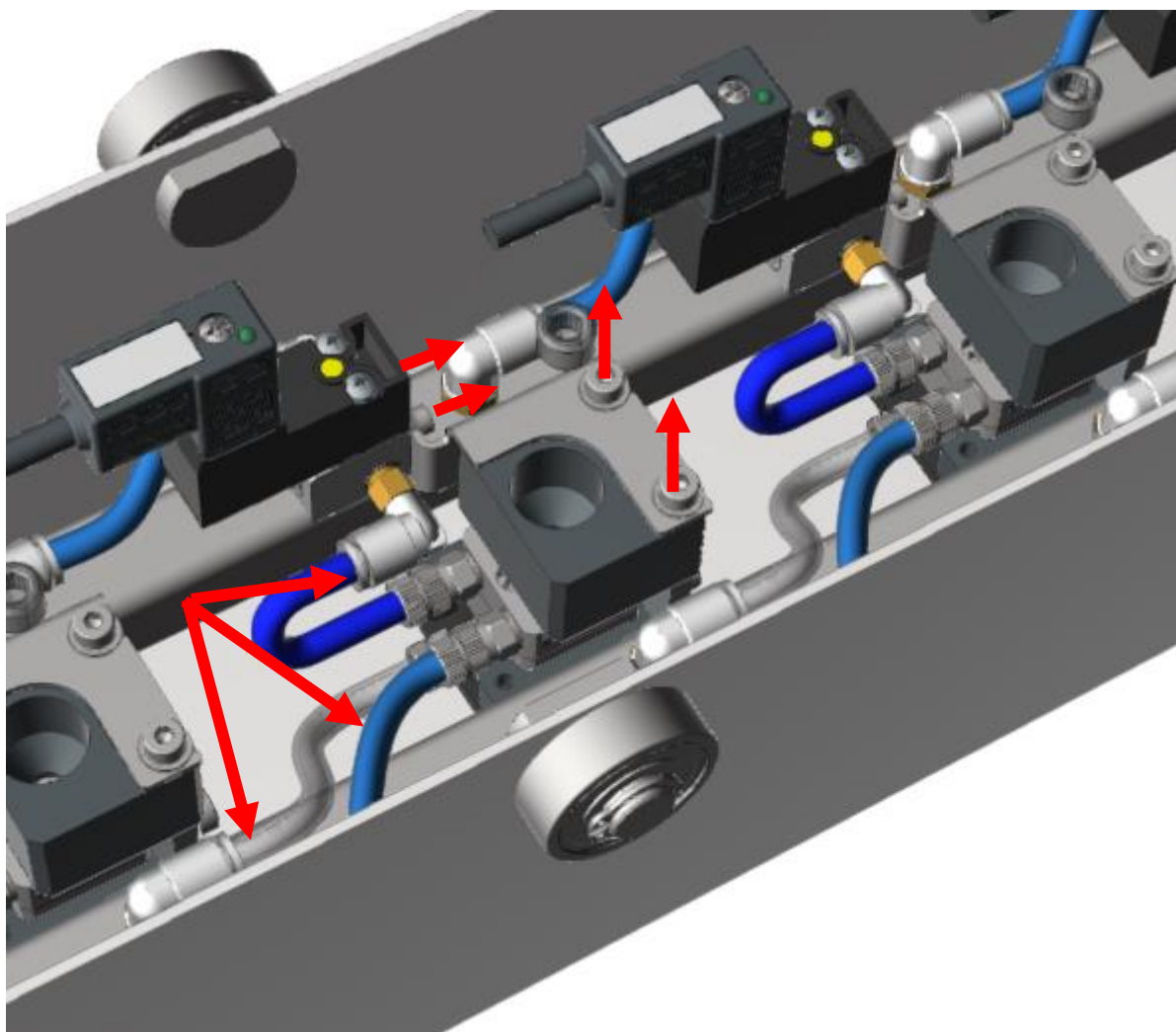


## 7.7 Valve replacement

Remove pressure and remove the Spraybox then put it in a comfortable position and open the case.

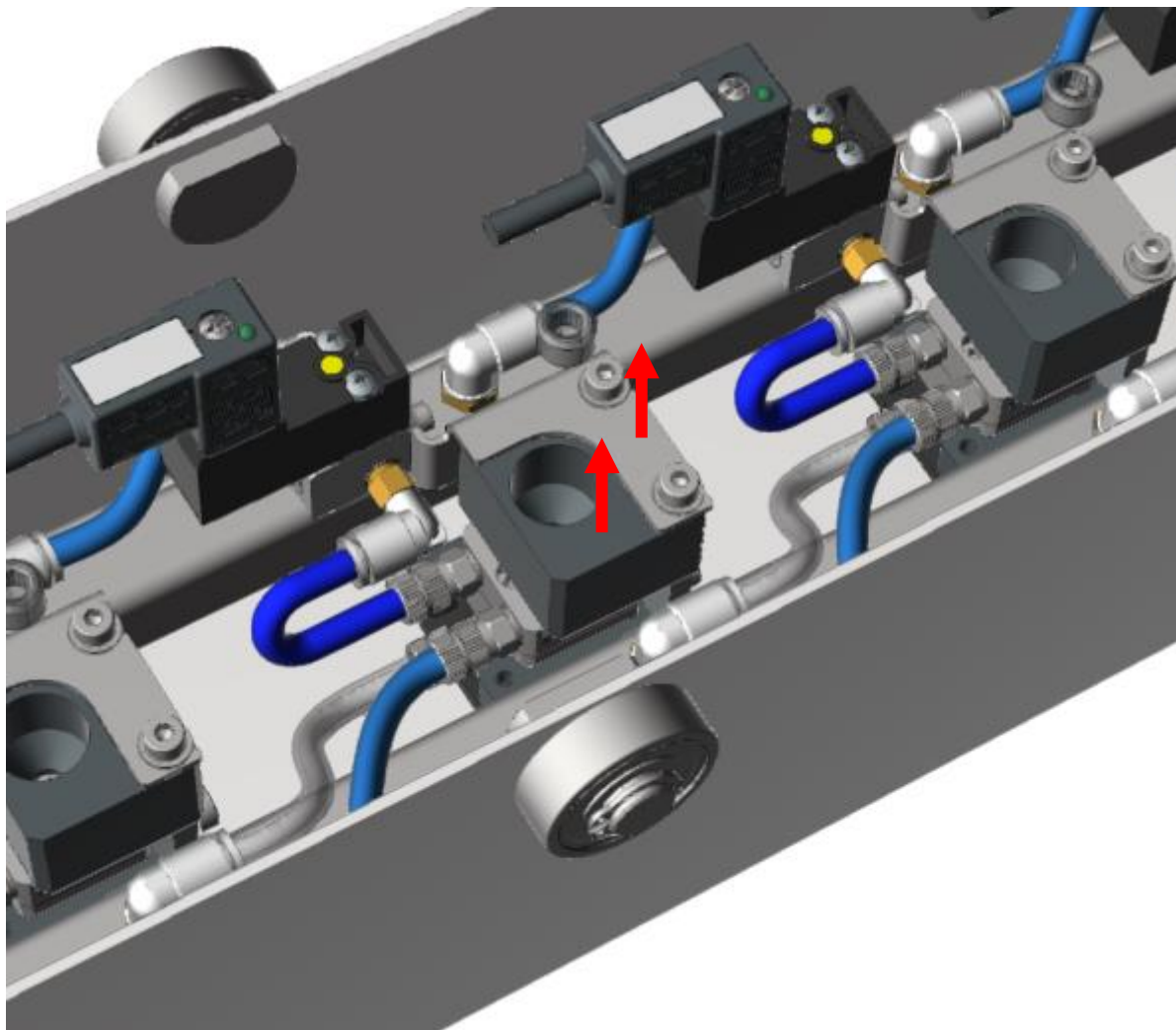


Remove the screws and the tubes.

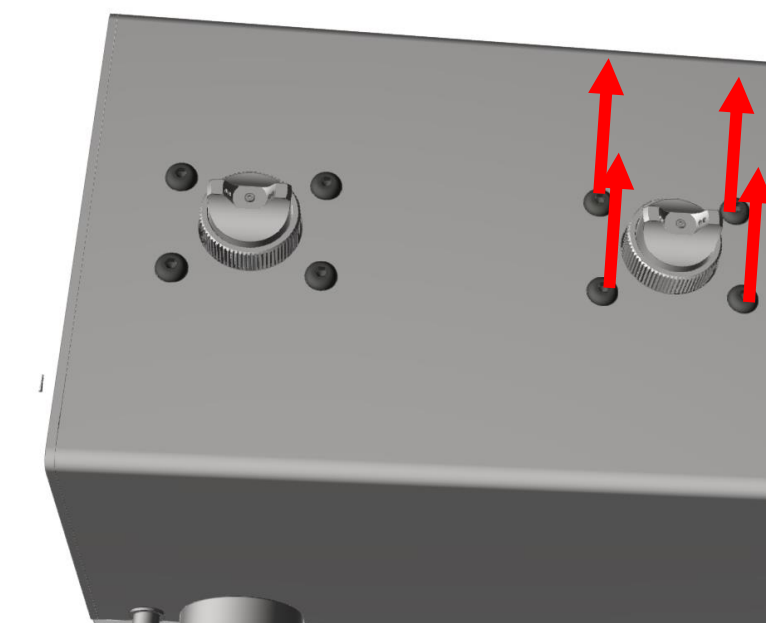
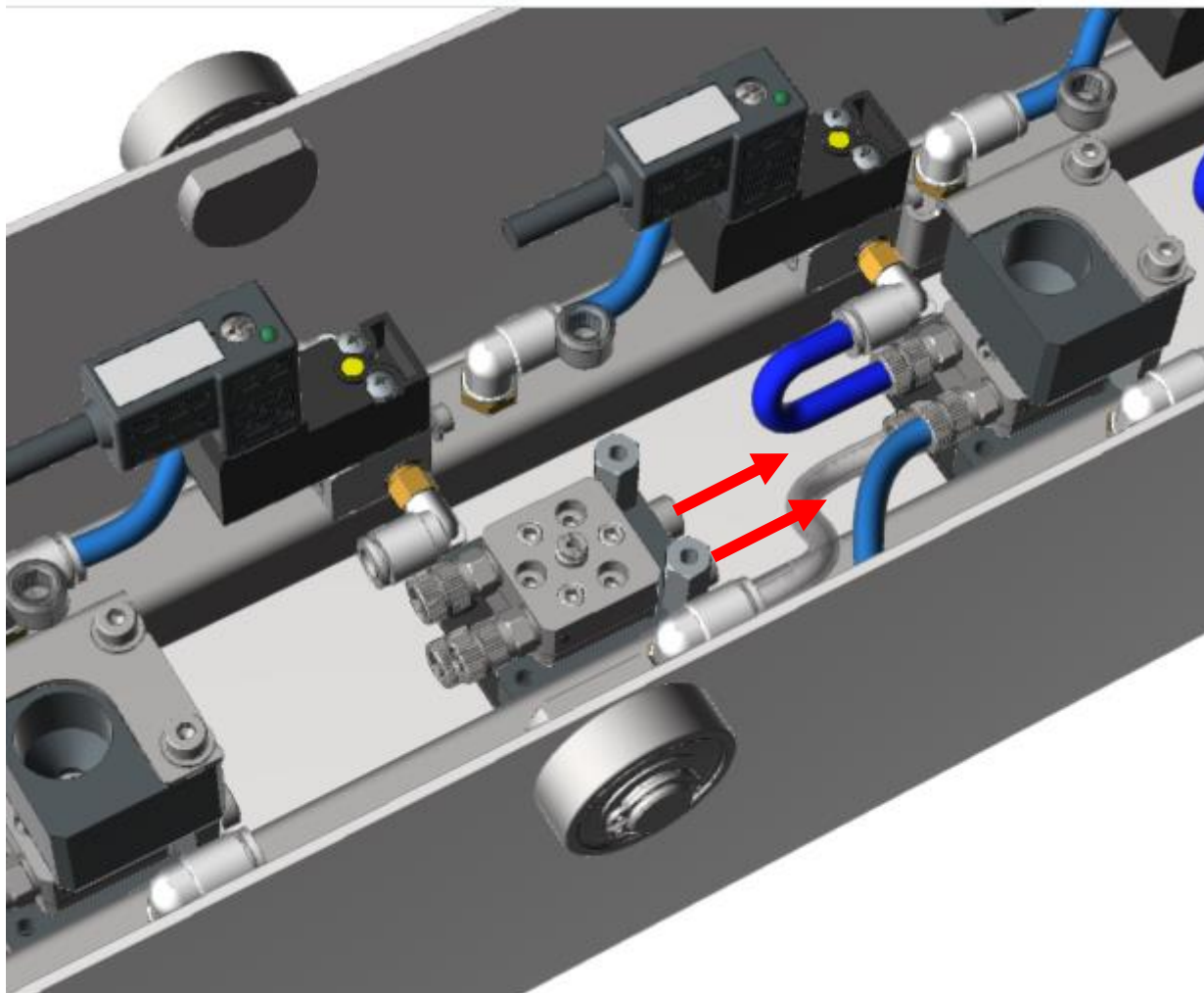




Remove the blocking plate and the support for adjusting valves



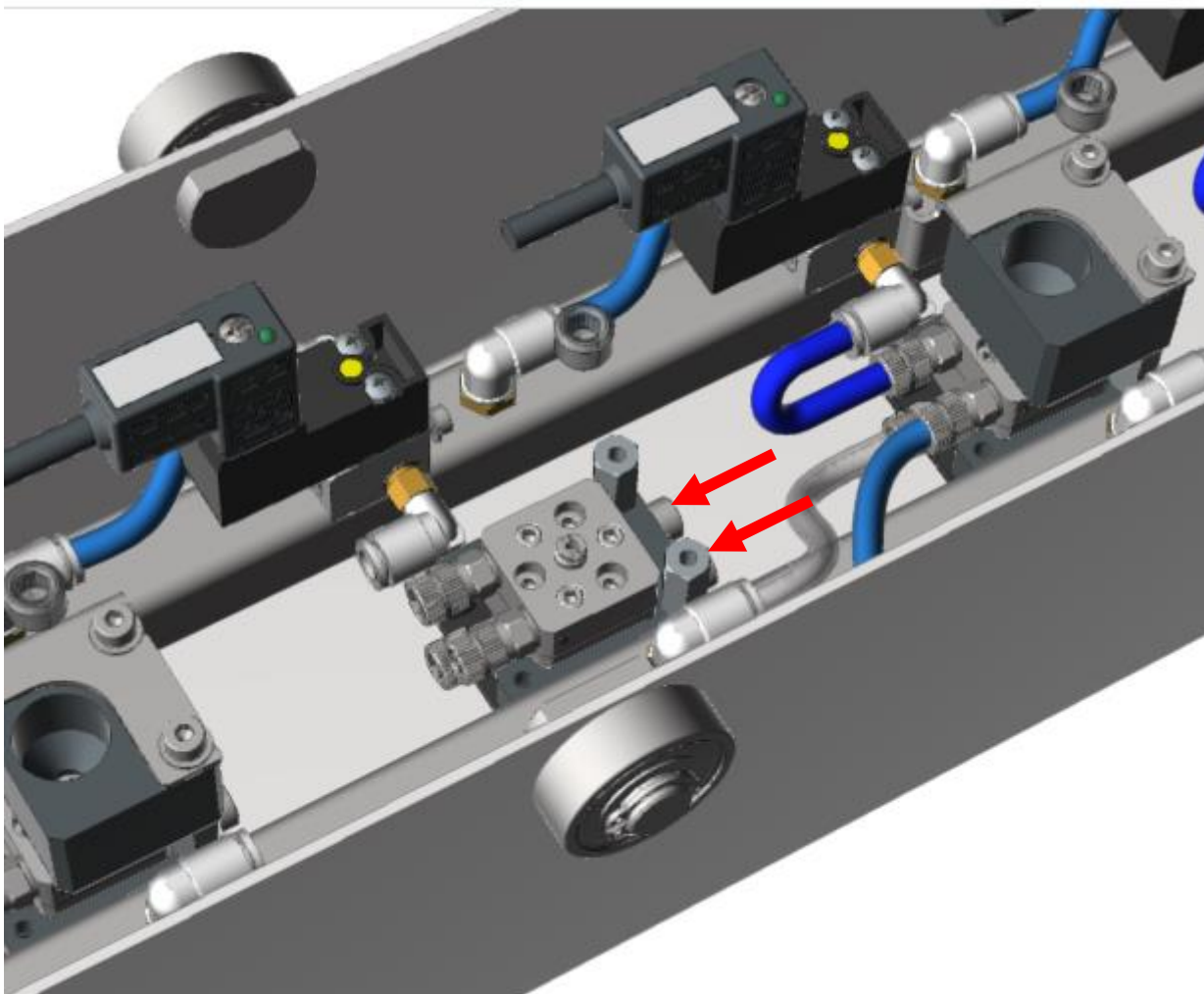
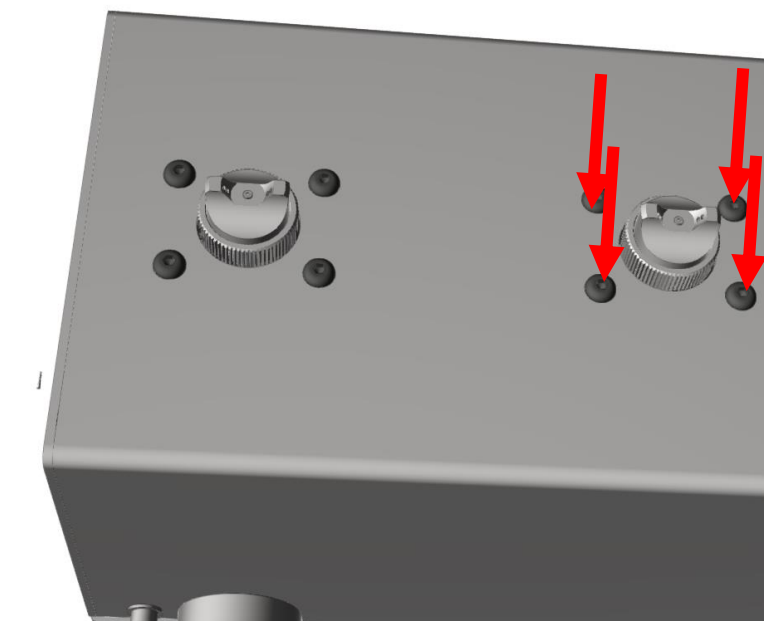
When you free the valve remove also this two screws

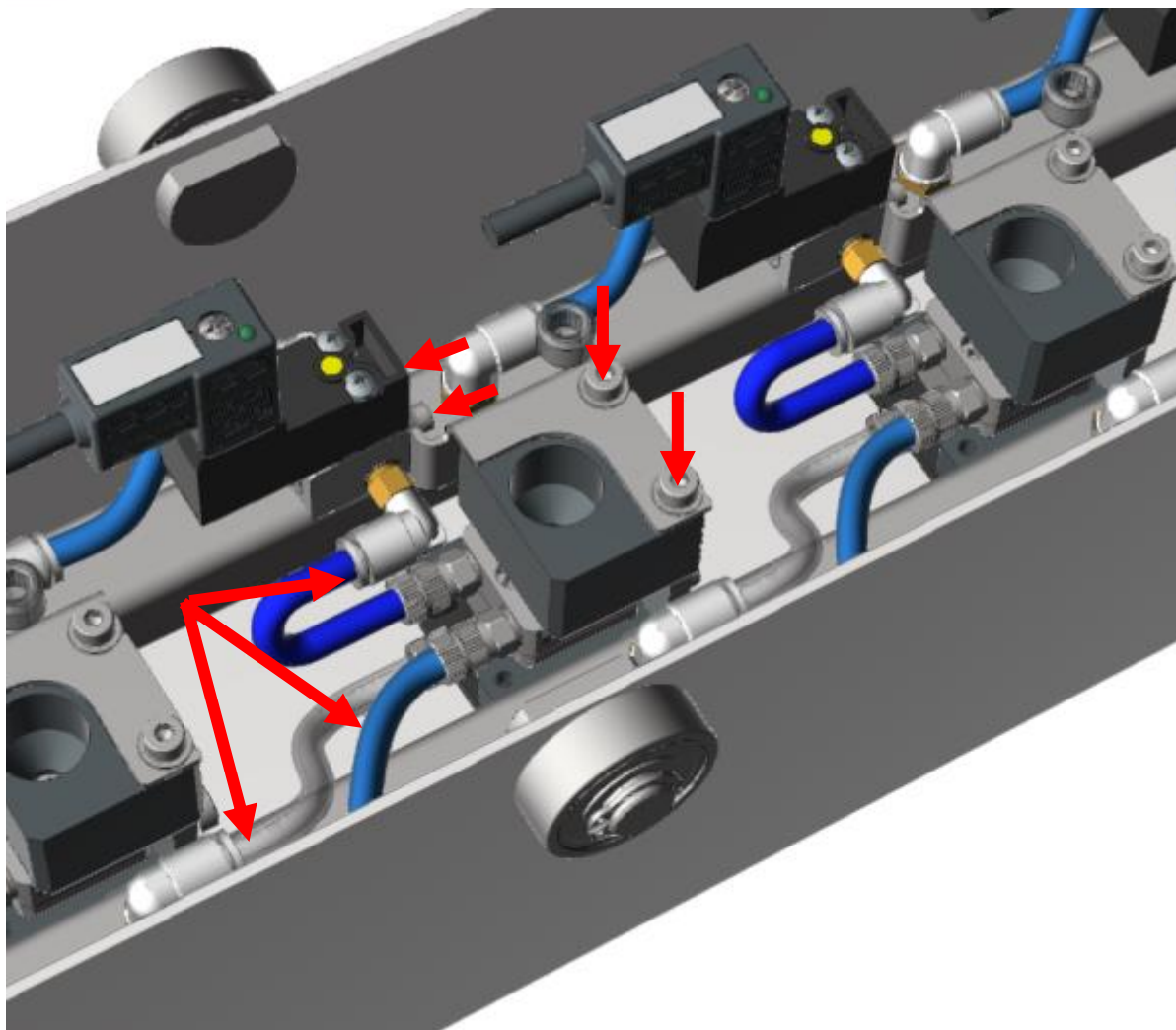


remove this screws then remove the valve

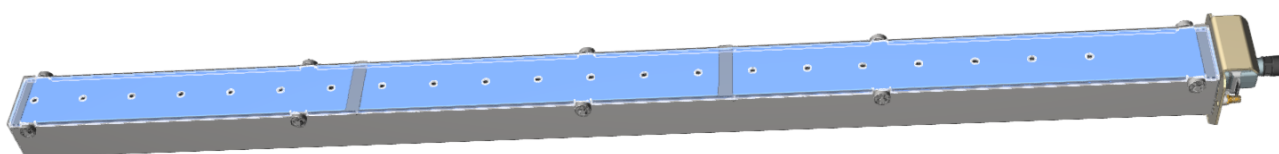
Replace the valve and close everything.





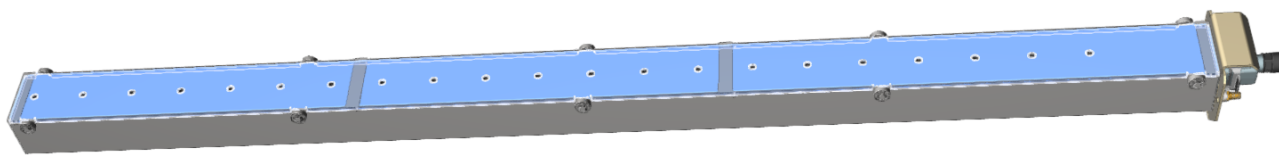


Close the case

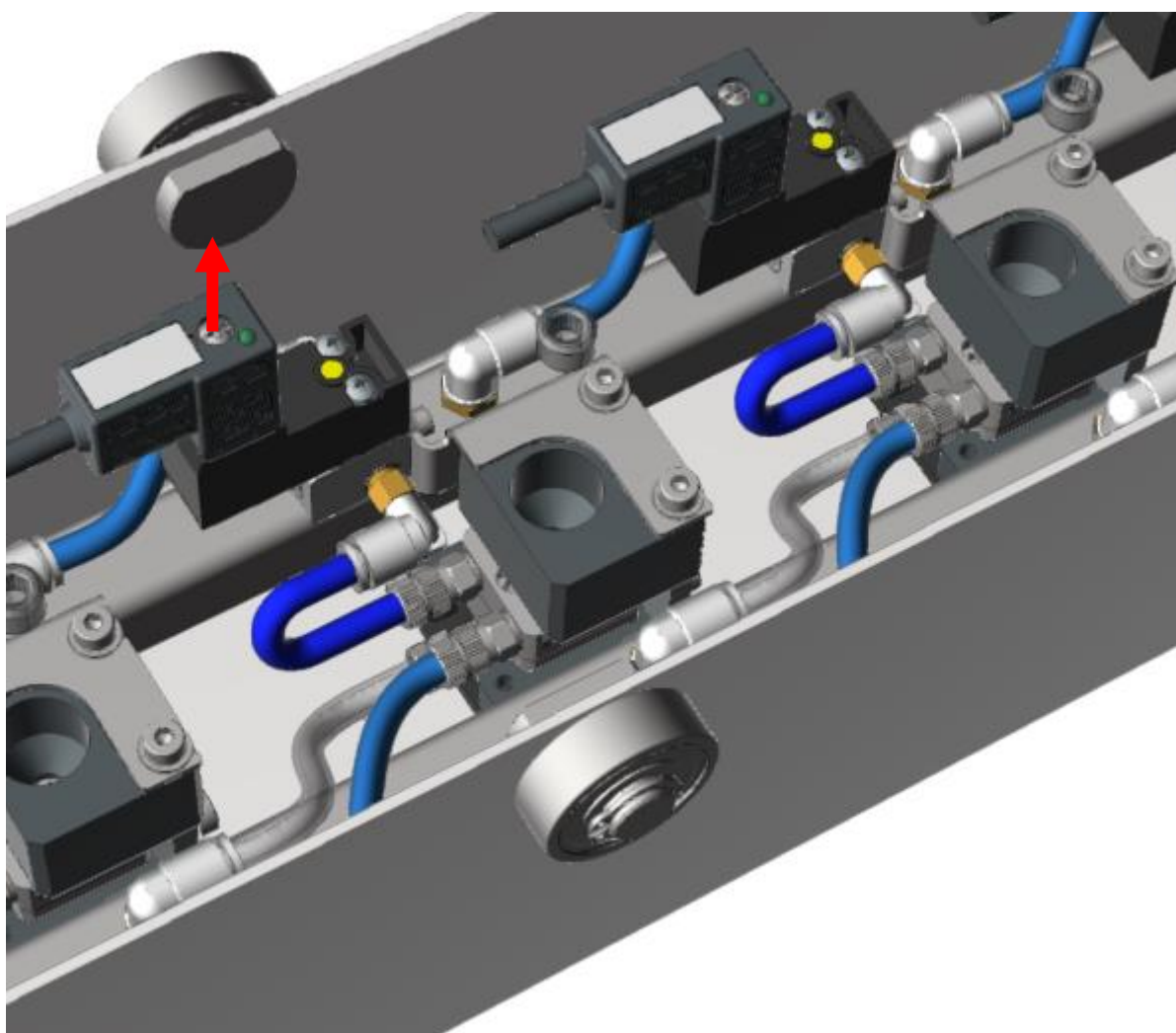


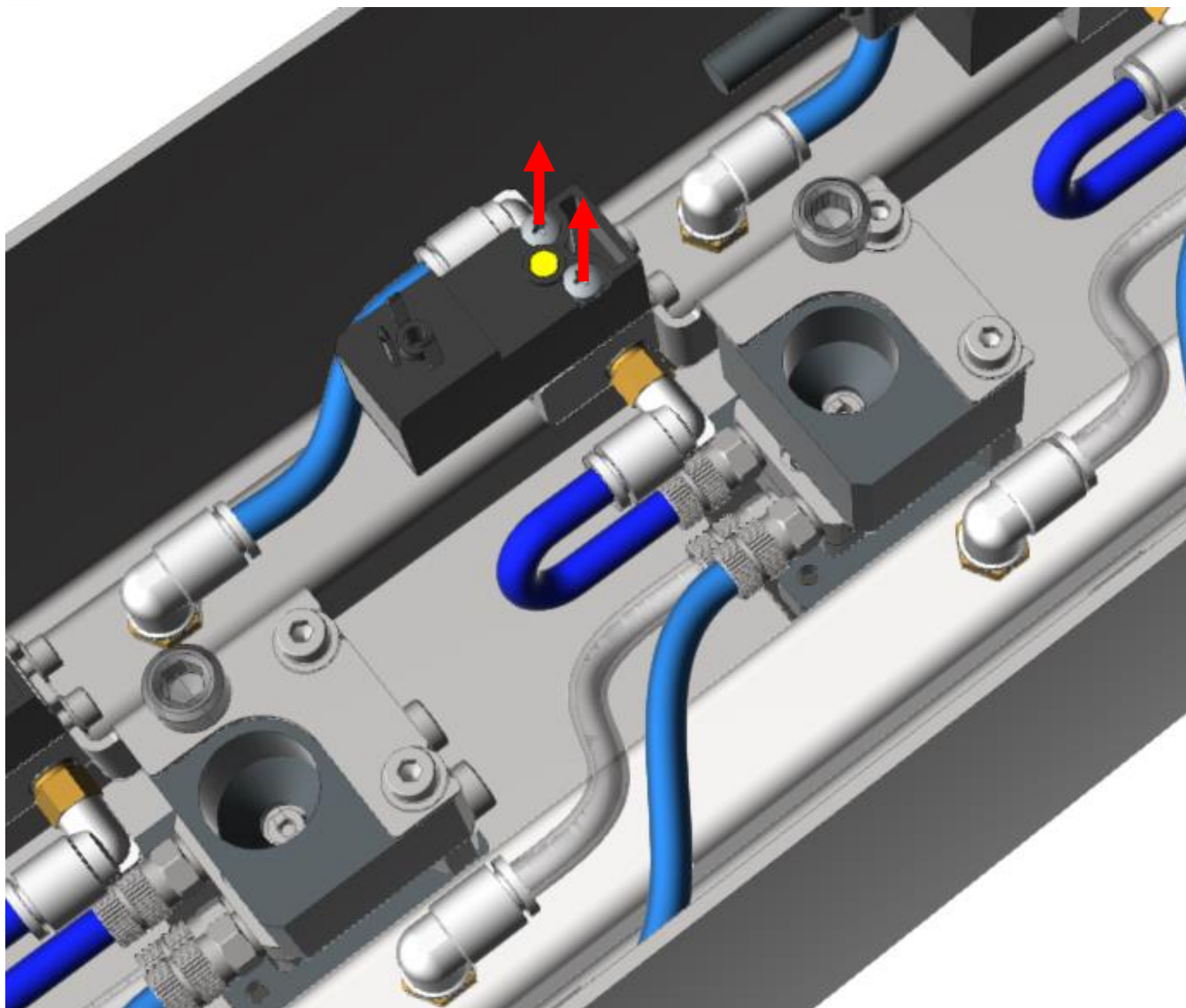
## 7.8 Comand Valve replacement

Remove pressure and remove the Spraybox then put it in a comfortable position and open the case.



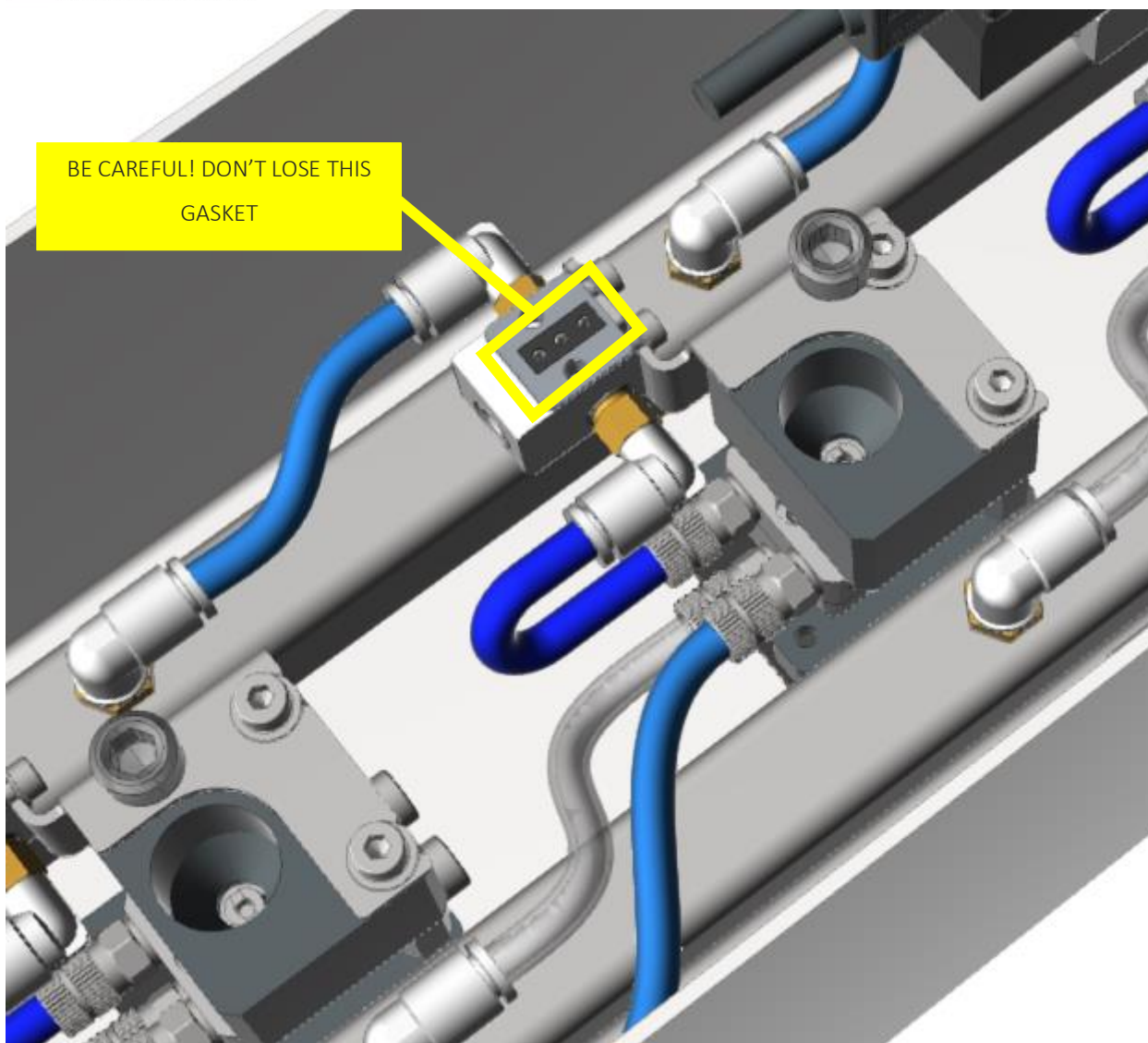
Remove the connector



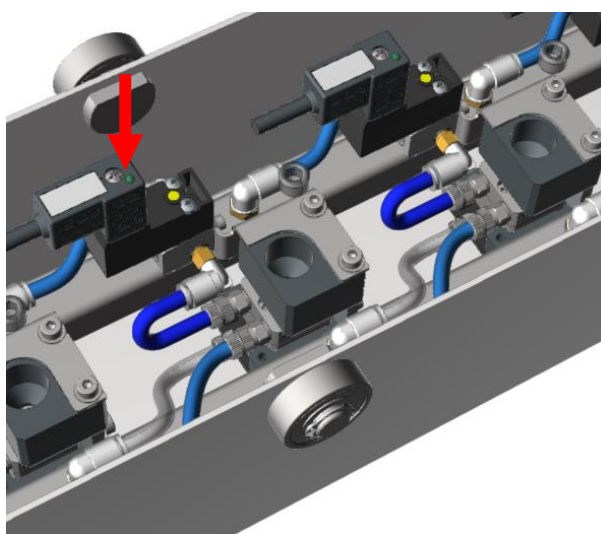
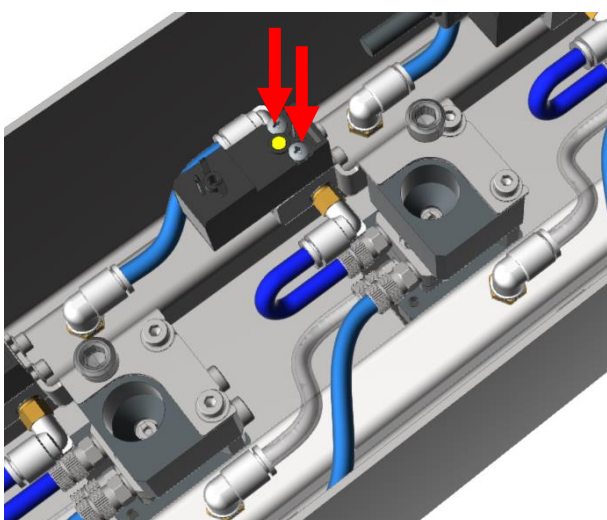


Once you removed the connector unscrew the screws on the command valve



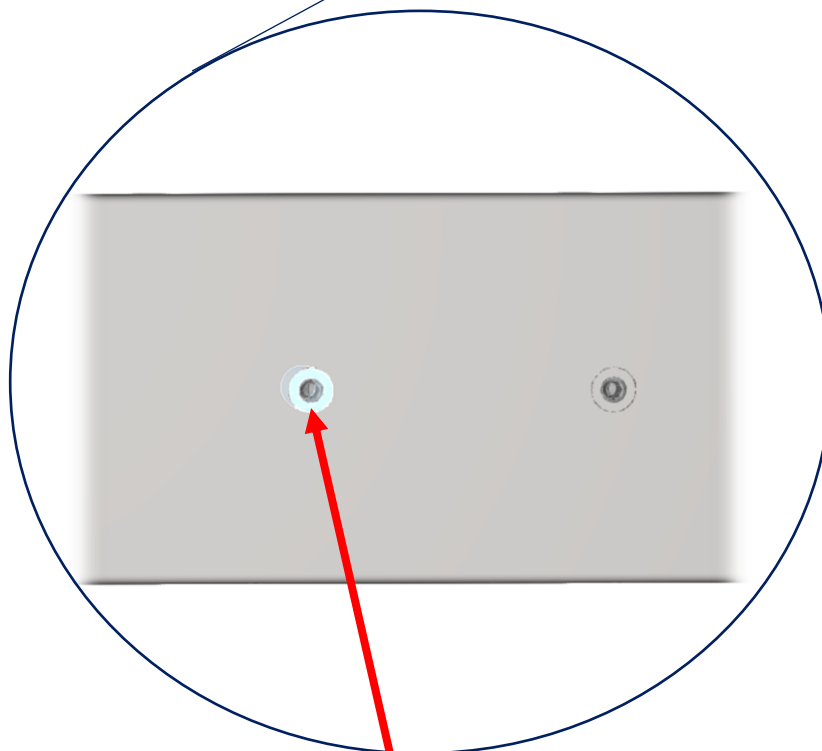
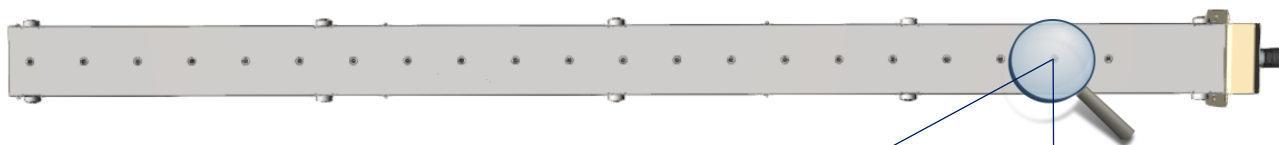


Replace the command valve with a new one and tight the screws then close the case



## 7.9 Valve Regulation

Once the spraybox is removed is possible  
to regulate the valves

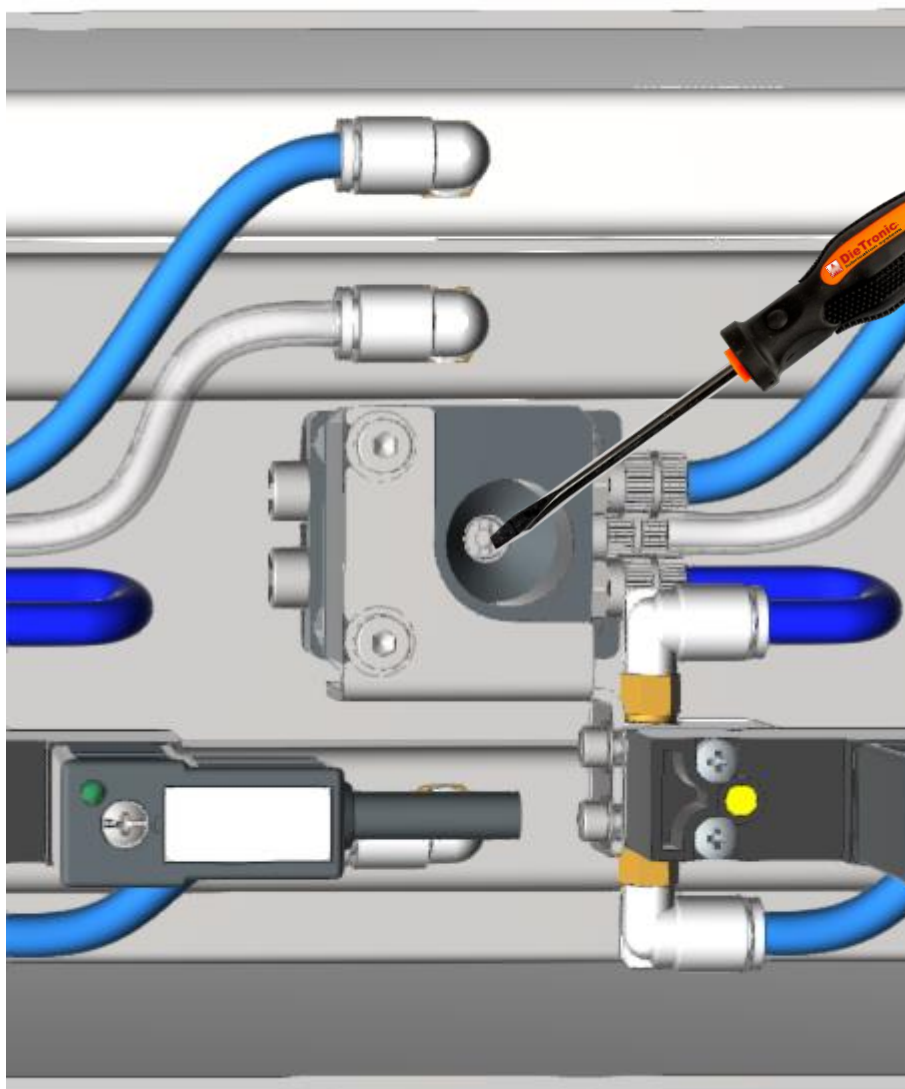


Remove the plug in correspondence of  
the valve you want to regulate then  
insert a flat screwdriver

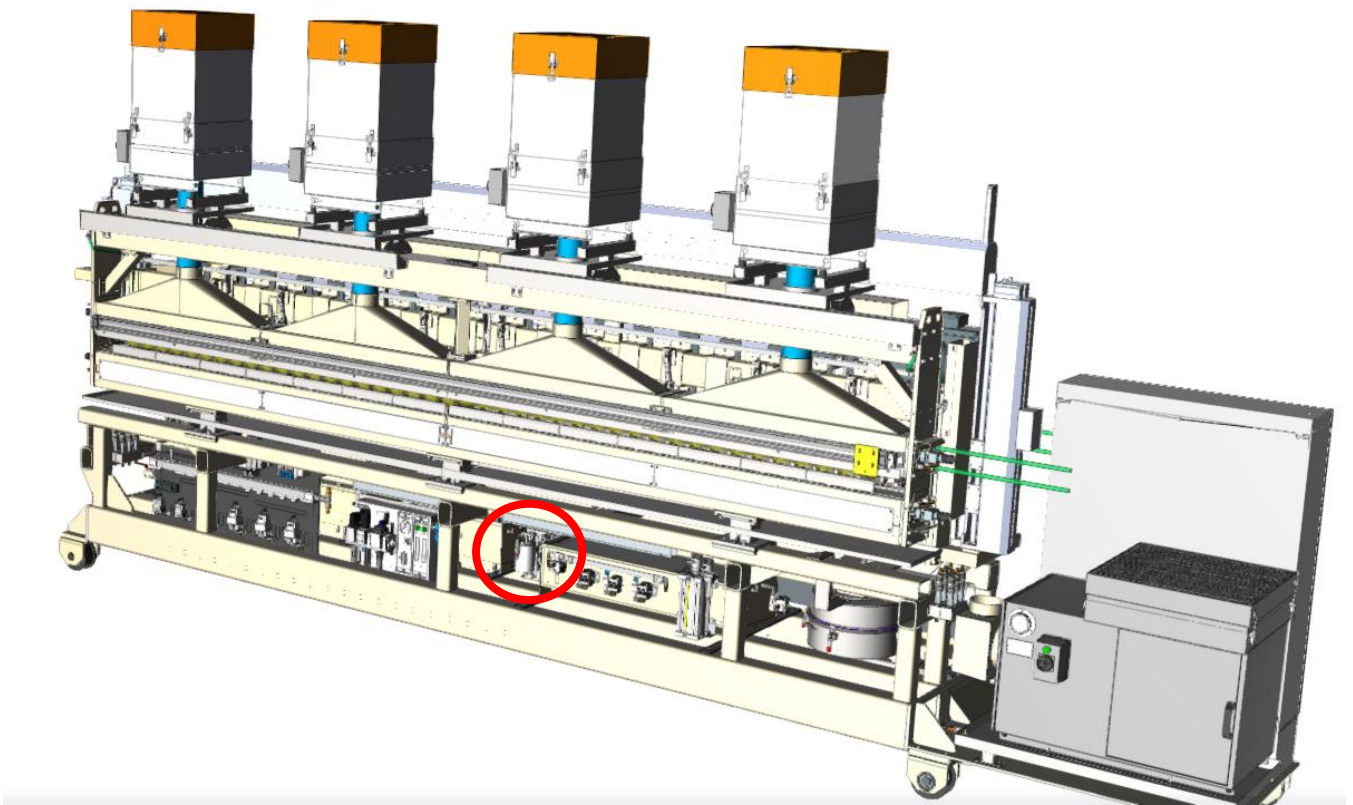
Tighten or loosen the valve screw accessible through the  
hole in the spraybox lid to adjust the valve:

Tighten = close

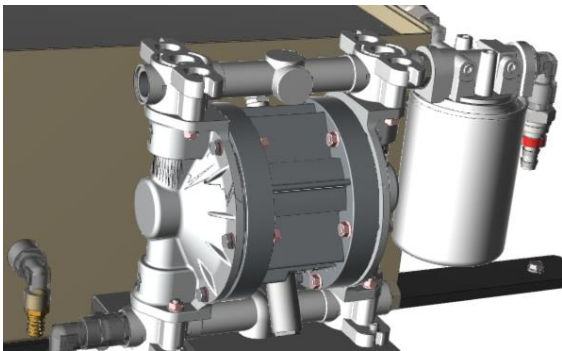
Unscrew = open



## 7.10 Oil Filters Replacement



Before remove the filter put 0 on the pressure on the HMI panel. The filter is located in the lower part of the machine

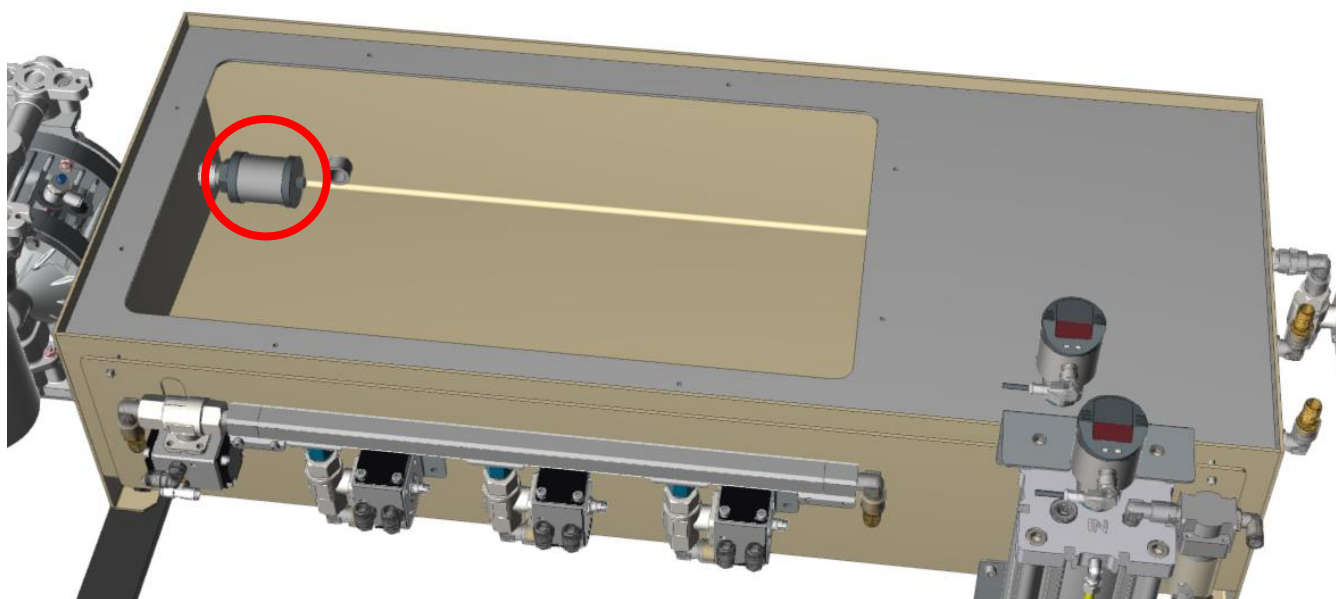


Unscrew the filter and replace it (remember to wet the gasket with some oil).





To change the filter inside the tank open it from above



you can find the filter, unscrew it and replace it with a new one.

**REMEMBER TO CLEAN THE TANK ONCE A YEAR TO AVOID FILTER CLOGGINGS AND CONTAMINATION PROBLEMS.**

## 7.11 How to change suction filters (Brush)

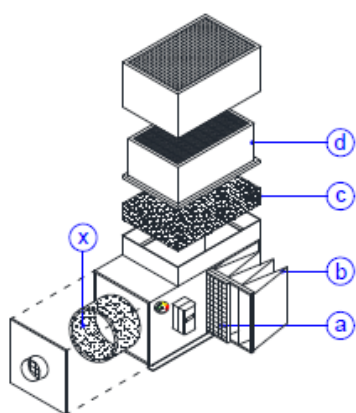
To perform maintenance:

- EXTRACT THE MACHINE from the line.
- Be sure that the suction command is OFF
- Unplug the connector.
- Make sure that the moving parts (momentum) are completely stopped.
- Use all personal protective equipment prescribed by current regulations for occupational safety.

Maintenance operations should only be carried out by qualified personnel with knowledge of the maintenance procedures and precautions to be taken.

The filter set consists of four numbers, which correspond to the letters "a-b-c-d" of the following Figure.

The K extraction system is also equipped with a centrifugal filter "x" (not indicated on the filter set).



### MAINTENANCE SCHEDULE

Quantity	Legend Filter Position	Code	Description	Maintenance Schedule	
				Intervention	Avg. Time
1	X		Centrifugal filter	Substitution	12 months
1	A	5000008	Metal filter	Washing	12 months
1	B	5000009	Pocket filter	Substitution	12 months
1	C	5000018	Black panel filter	Washing	12 months
				Substitution	24/36 months
1	D		Final Filter	Substitution	24/36 months
		5000074	High efficiency HEPA filter	Substitution	24/36 months

Table 3

This maintenance program highlights the indicative average times, the result of statistics developed on the basis of more than a thousand plants that DIETRONIC maintains every year with its customers.

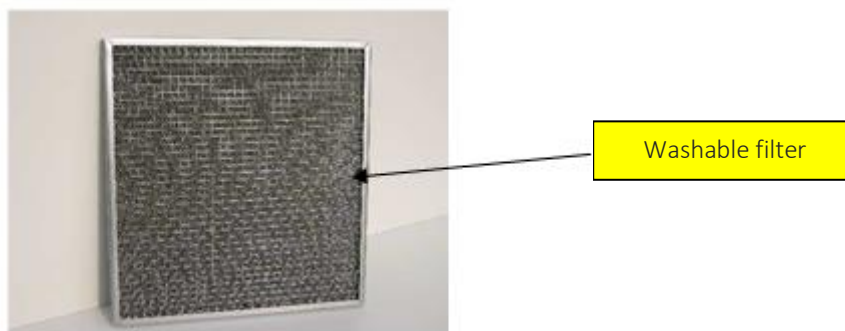
The average time for changing filters can vary in deficiency or excess, depending on the material being processed, the difficulty of the work process and the use of high-pressure pumps.

## 7.12 How to change suction filters (Oiler)

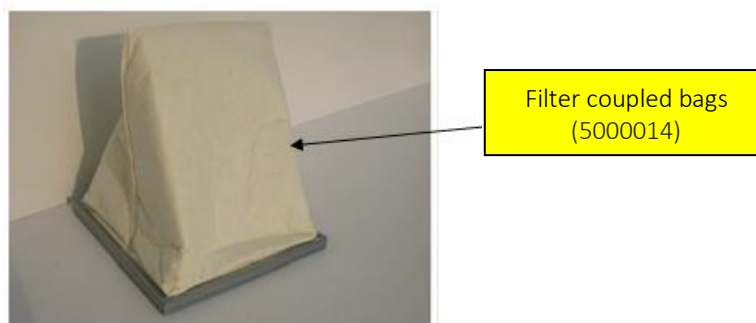
The suction system is equipped with three types of filters, two of which must be replaced according to the indicator placed on the machine body.



the third wire mesh filter is washable. Wash with solvent and compressed air.



To replace the two filters, open the relative closures with the 8mm tube key and replace the used filter with a new one of the same type.





HEPA filter (5301929)

As seen before the suction system is equipped with three types of filters, two of which must be replaced according to the indicator placed on the machine body (foto\_1) the third metal mesh filter is washable to extract it, release the two stops (foto\_2) and blow it with air.

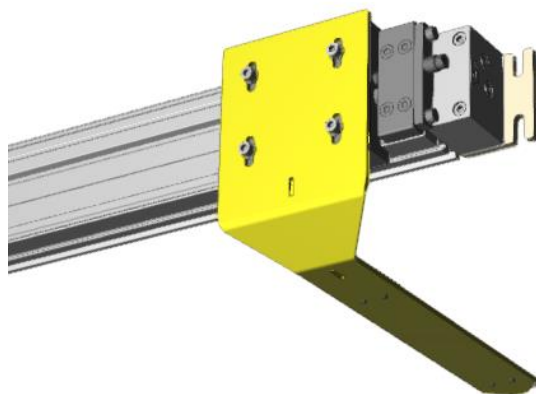


To replace the other two filters, open their closures (foto\_3) on both sides and replace the used filters with new ones of the same type (foto\_4 and 5)

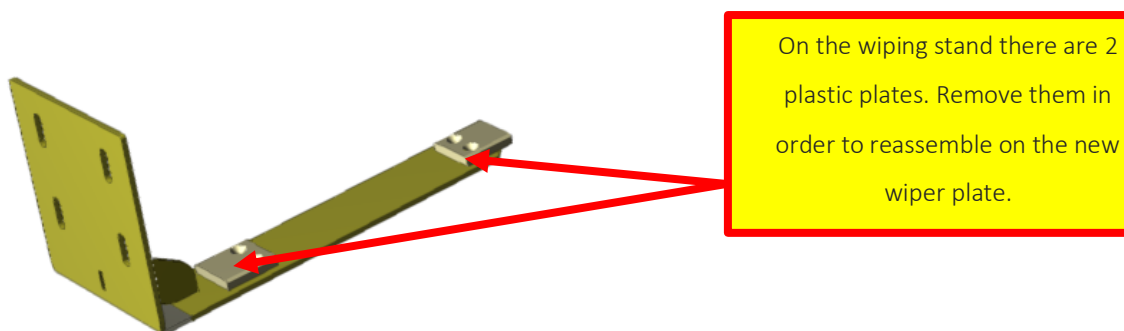
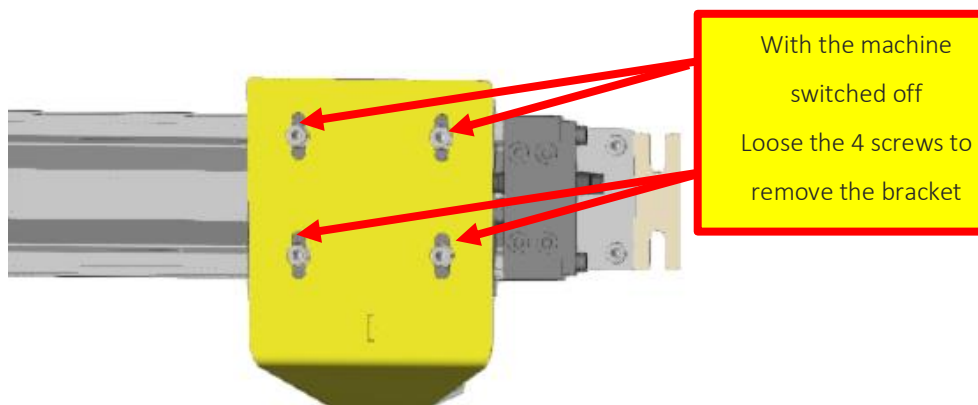


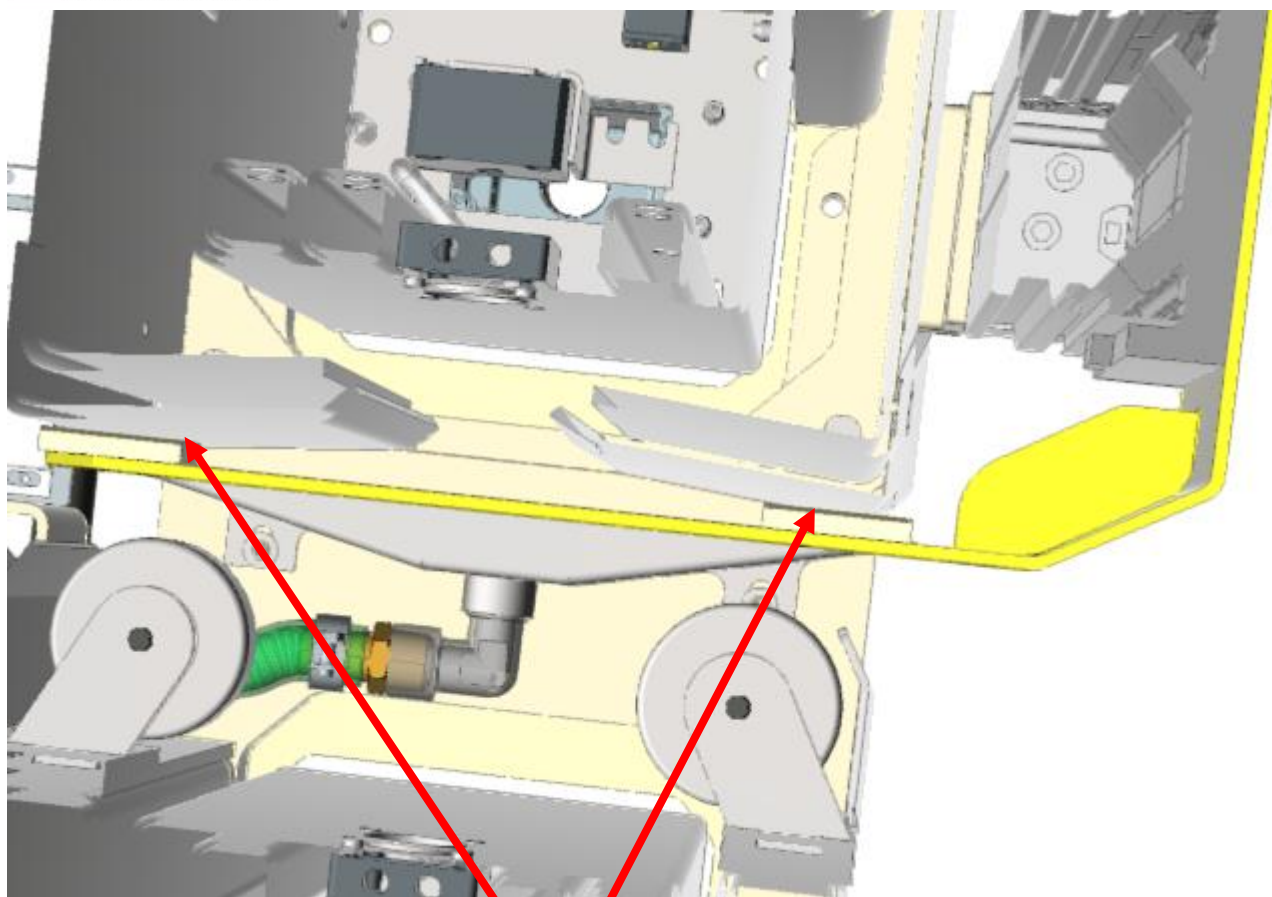


## 7.13 WIPER REPLACEMENT



This procedure will describe how to replace the wiping plates in order to keep a high efficiency on your device.





When you reassemble make sure  
that the new plates are perfectly in  
contact with the edges of the  
feeding

In order to maintain the highest level of performance please check very often the plastic plates and replace them if they are too worn out.

## 7.14 WHEELS SUBSTITUTION ON PINCH ROLLS

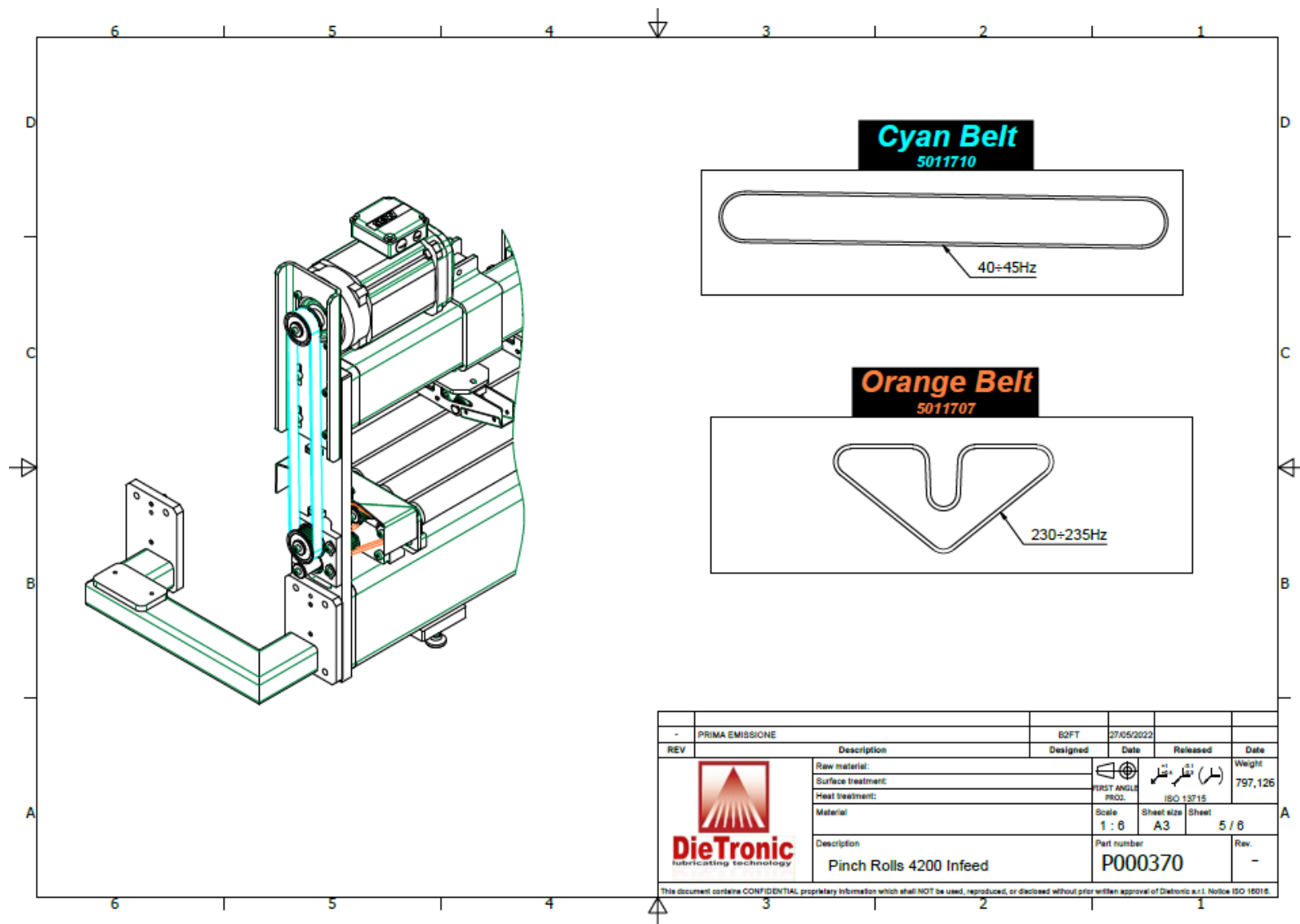


- To change the wheels, remove the input protective housing (1)
- Grind the screws (2) for some freedom of movement
- Remove the wheels to be replaced.

On each pinch roller, there is a non-return valve that allows the pinch roller to remain in place even if the pressure is removed.

- The pressure of the pinch rollers can be adjusted from the panel as needed.

## 7.15 PINCH ROLLS BELTS TENSIONING





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## 7.16 MAINTENANCE BRUSH CLEANER

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- The set parameters must be checked after any servicing work.
- The **cleaning modules must be reset** after servicing work on the cleaning modules.

---

## 7.17 CLEAN CLEANING MODULES

---



### **WARNING**

**Danger of cuts from sharp edges on machine parts!** Touching the sharp edges of machine parts can lead to cuts.

- Do not touch.
- Work with gloves and safety shoes.



### **NOTICE**

**Material damage due to dismantling and incorrect cleaning of the cleaning module's components!**

Dismantling and incorrect cleaning can damage the components of the cleaning module especially the DT BR Cleaner sprayer, scraper and self-cleaning nozzles. Compressed air can cause the filaments of the linear brush to become matted.

- Clean the cleaning module components while installed. Do not remove them for cleaning.
- Do **not** use compressed air. Clean with a suitable cloth and cleaning agent.

---

### Requirements



- **Protective equipment:**

Chemical safety gloves (nitrile rubber NBR, EN 374) with cut-resistance to EN 388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic substances adhering to the linear brushes – from processes on the customer's production line.

- **Machine:**

in maintenance position, main switch **OFF**, secured to prevent switching on again, cleaning modules in maintenance position.

- **Tool:**

Allen key, suitable cloth.

- **Cleaning agent:**

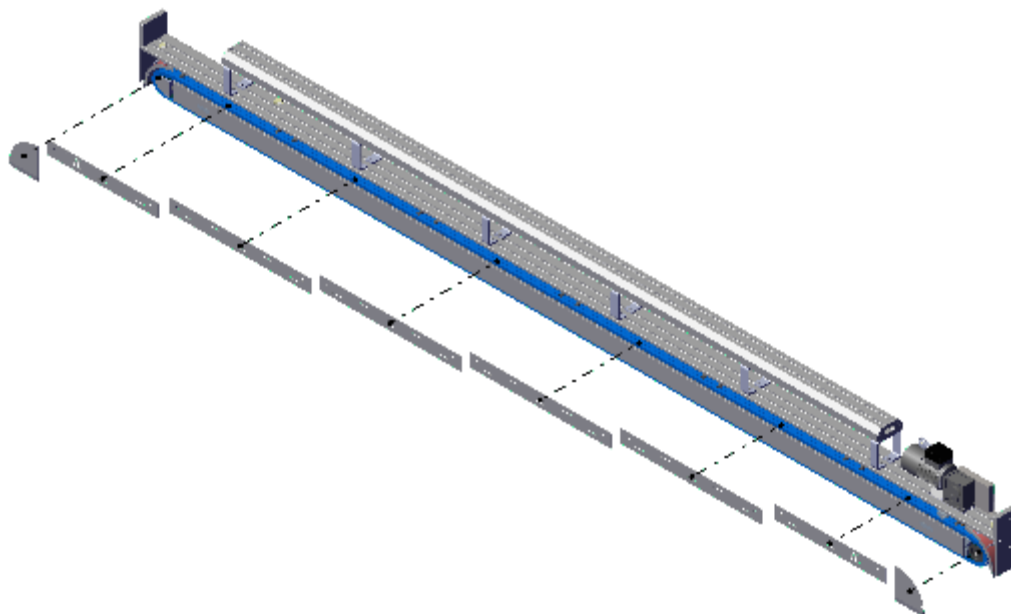
Grease-dissolving, silicone-free, and AOX-free workshop cleaner (the BMF work-shop cleaner is recommended).

- **Number of people:**

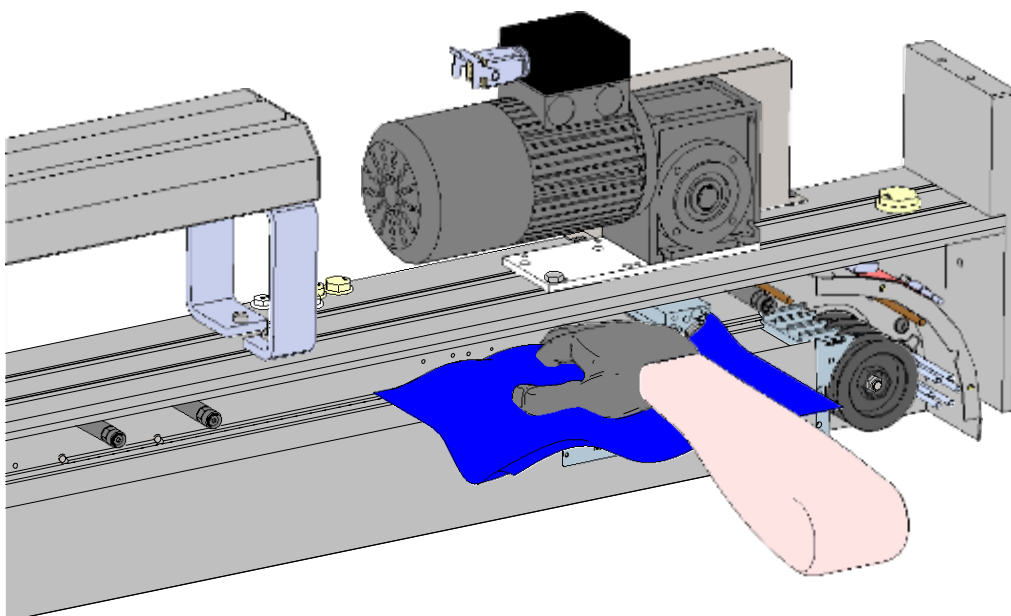
one.

## Action steps

1. Use the Allen key to remove the covers.



2. Clean the DT BR Cleaner sprayer with a cloth and cleaning agent.
3. Clean all self-cleaning nozzles with a cloth and cleaning agent.
4. Clean the scraper with a cloth and cleaning agent.



5. Clean all gaps with a cloth and cleaning agent.
6. Clean all covers with a cloth and cleaning agent.
7. Fit the covers.

⇒ The cleaning module is now clean.

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## 7.18 REPLACE LINEAR BRUSH AND LINEAR BRUSH GUIDE

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### Linear brush

Linear brushes should be replaced when they are worn, see **Maintenance checklist**.

For every change, all the linear brushes of a cleaning module should be replaced. A cleaning module is equipped with four linear brushes.

A linear brush consists of a linear brush belt and bundles of filaments.

Examples of filament wear:

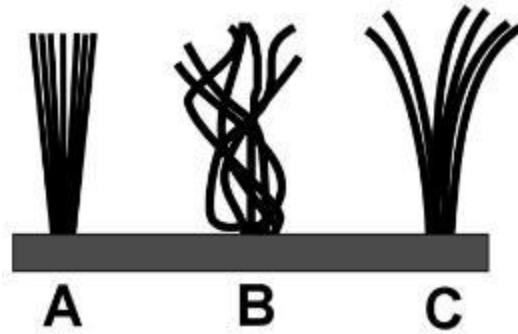


Fig. 22: Filament wear

- A: Filaments are OK.
- B: Filaments are matted. The linear brush must be changed.
- C: Filaments are out of shape. The linear brush must be changed.

### Linear brush guide

The linear brush guide should be replaced if worn, and at every second change of the linear brushes, see **Maintenance checklist**. There are four linear brushes in the linear brush guide.

## 7.19 REMOVING THE LINEAR BRUSH

### Requirements

- **Protective equipment:**

Chemical safety gloves (nitrile rubber NBR, EN 374) with cut-resistance to EN 388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic substances – adhering to the linear brushes – from processes on the customer's production line.

- **Machine:**

in maintenance position, main switch **OFF**, secured to prevent switching on again, cleaning modules in maintenance position.

- **Tool:**

Wrench, Allen key, slotted screwdriver.

- **Number of people:**

one.



### Details

- Each cleaning module is equipped with four linear brushes. These are to be removed one after the other.
- Linear brushes are driven by a gear motor (unit consisting of motor and gearbox) via a timing belt and slide in the linear brush guide.
- The width of the linear brush belt narrows at a point marked in red. This cut-out is used to feed the linear brush out of the linear brush guide, and to feed the linear brush into the linear brush guide.

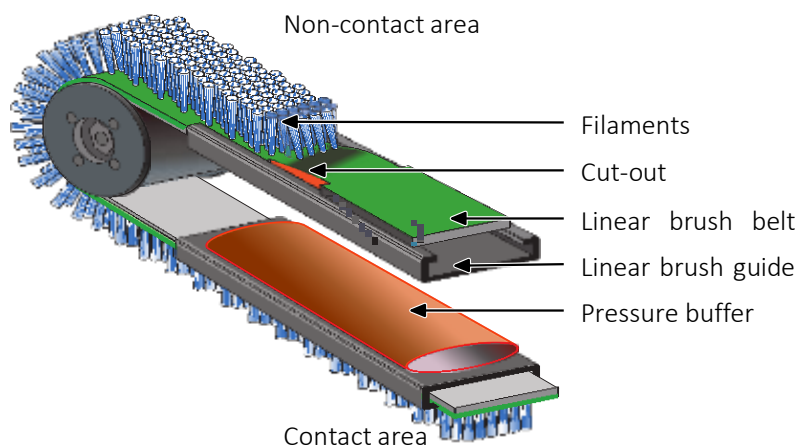
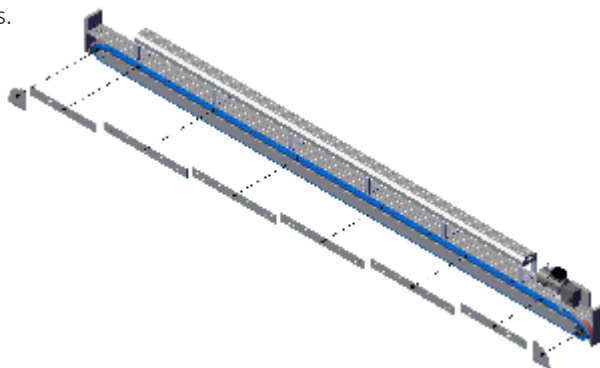


Fig. 23: Linear brush structure

## Action steps

1. Use the Allen key to remove the covers.

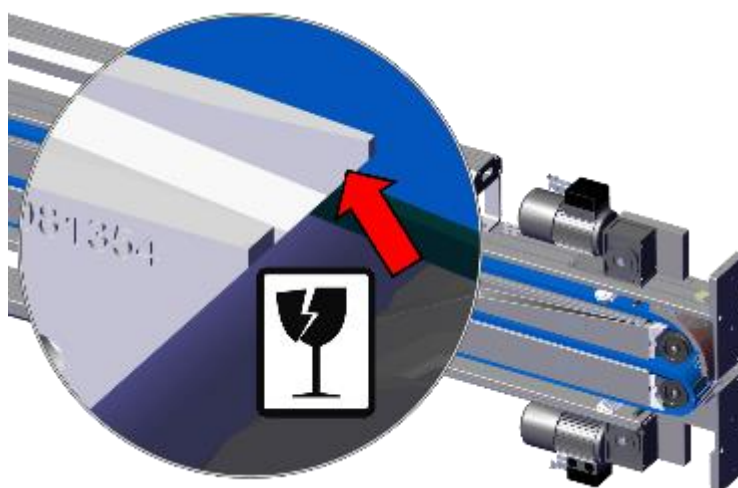


2. Attach wrench to the drive pulley.

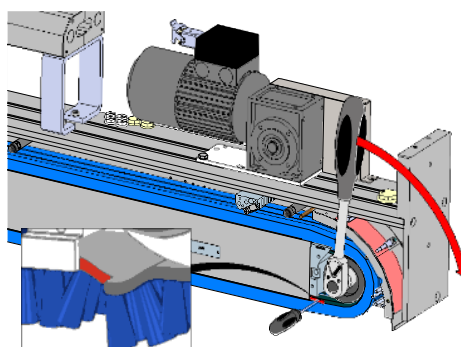
3. Turn the wrench until the cut-out in the foremost linear brush reaches the feed-in guide on the drive pulley.

4. **NOTICE! Material damage due to prying the linear brush out!**

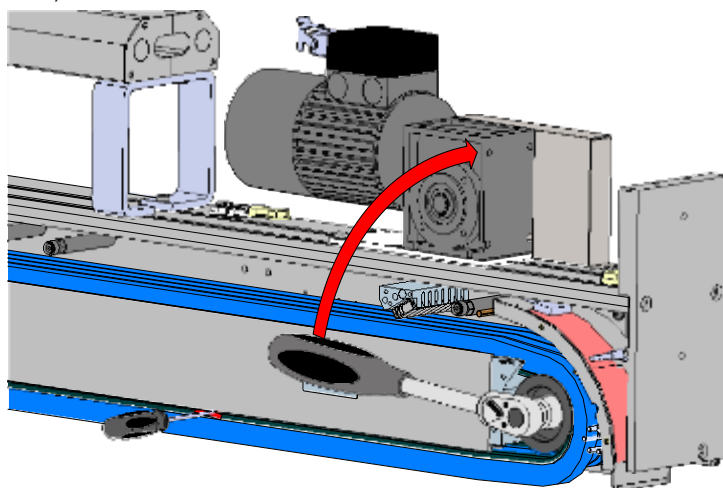
Prying the linear brush out of the linear brush guide can damage the plastic bars of the feed-in guide. Lift the linear brush carefully using the flat-bladed screwdriver. Do not pry it out.



5. Carefully lift the foremost linear brush using the flat-bladed screwdriver at the end of the linear brush guide.

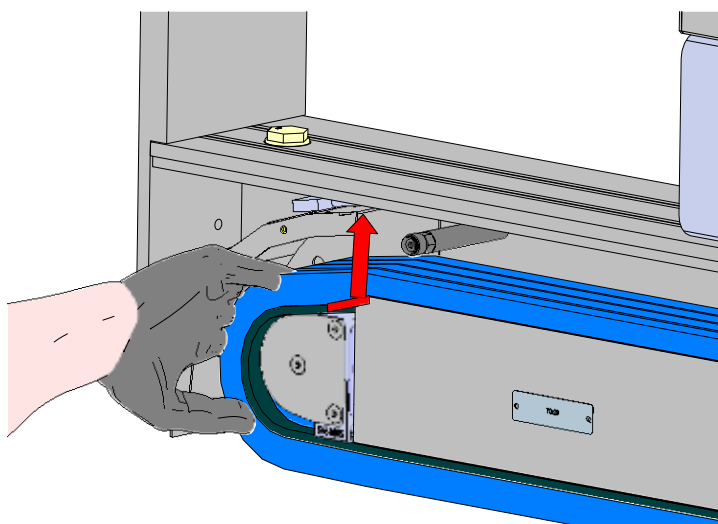


6. Turn the wrench, and carefully lift the linear brush further.

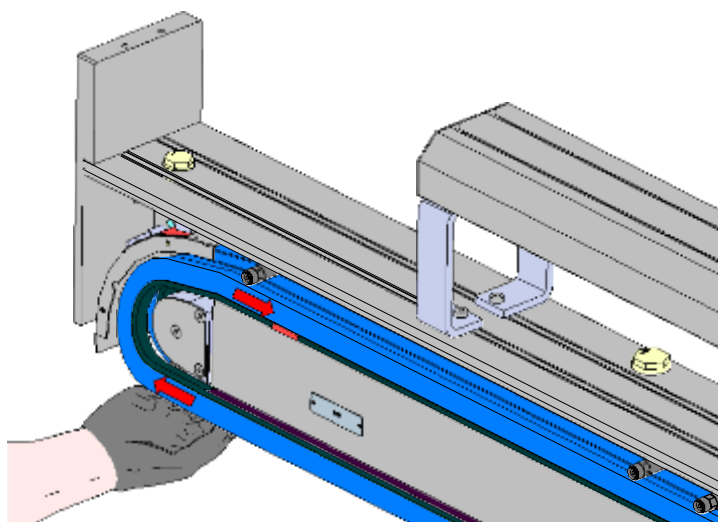


7. Continue turning the wrench until the foremost linear brush has released itself from the lower linear brush guide.

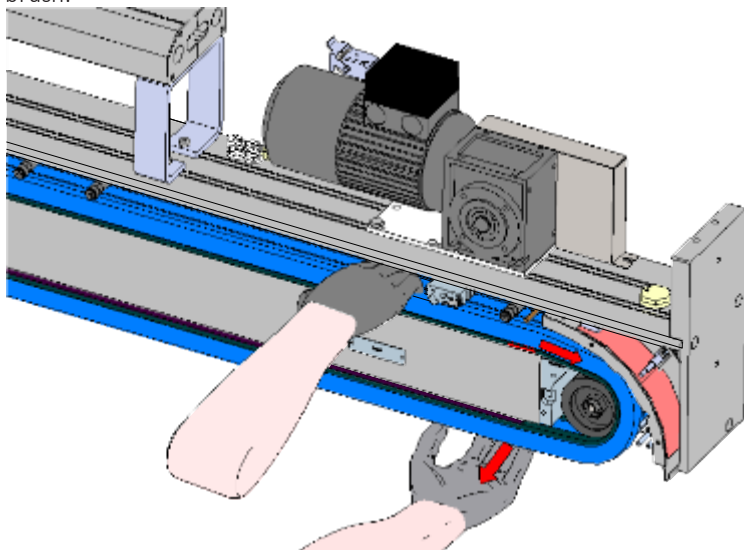
8. Carefully feed the foremost linear brush out of the upper linear brush guide on the chuck side.



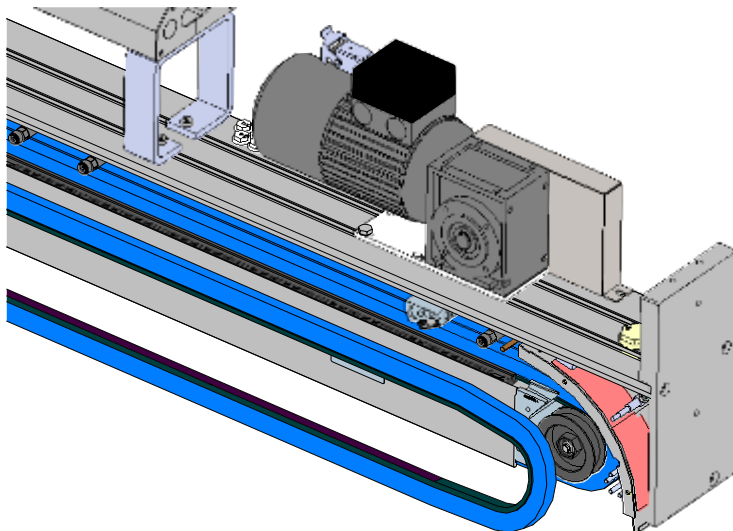
9. Continue turning the wrench until the cut-out in the linear brush has returned to the feed-in guide on the drive pulley.



10. Lift out the foremost linear brush.



⇒ The foremost linear brush has been removed.



11. Remove the other three linear brushes in succession in the same way as for the foremost linear brush.

You have now successfully removed the linear brushes.

### Requirements

- **Protective equipment:**

Chemical safety gloves (nitrile rubber NBR, EN 374) with cut-resistance to EN 388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic sub-stances – adhering to the linear brushes – from processes on the customer's production line.

- **Machine:**

in maintenance position, main switch **OFF** , secured to prevent switching on again, cleaning modules in maintenance position.

- **Covers:**

removed.

- **Linear brushes:**

removed.

- **Tool:**

Slotted screwdriver, suitable cloth.

- **Cleaning agent:**

Grease-dissolving, silicone-free, and AOX-free workshop cleaner (the BMF work-shop cleaner is recommended).

- **Number of people:**

one.



### Details

- The linear brush guide comprises two parts which are connected with pins.

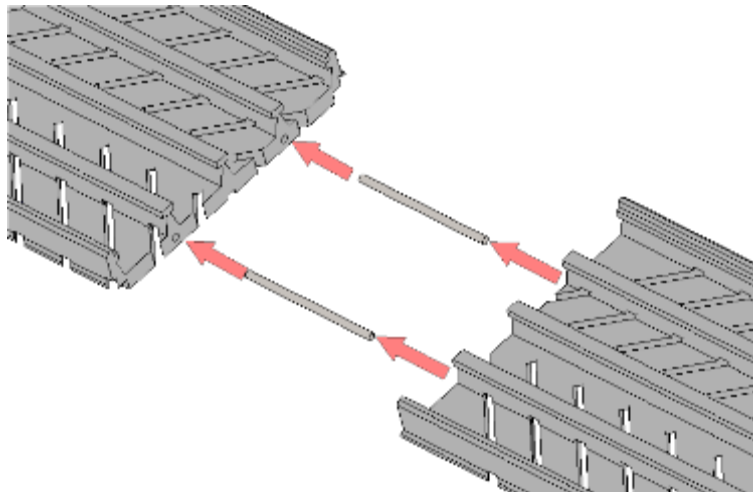


Fig. 24: Linear brush guide with dowel pins

- The linear brush guide latches into the profile on its two long sides.
- The pressure buffer is located between the linear brush guide on the product-contact area side (tight side), and the cleaning module profile.



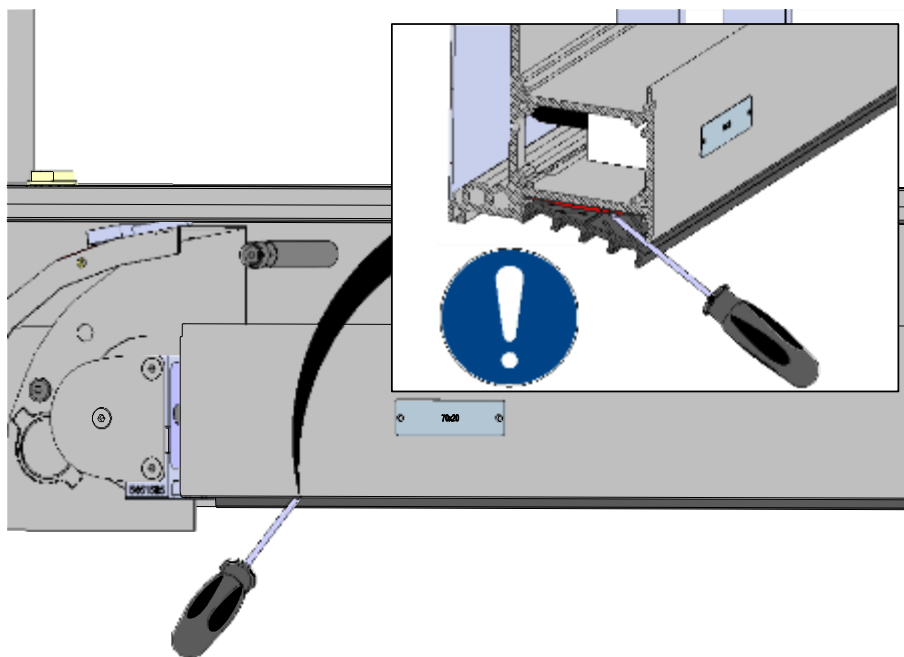
## Action steps

1. Start removing on the **non product-contact area** side (slack side).

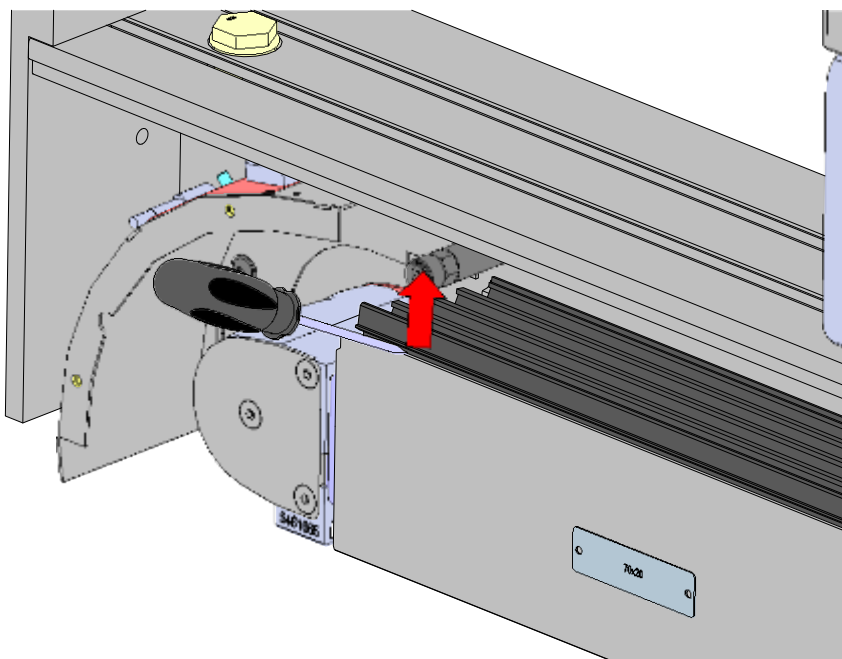
2. **NOTICE! Material damage by inserting too far into the profile!**

The pressure buffer can be damaged by inserting the flat-bladed screwdriver too far into the profile while the linear brush guide is pried out.

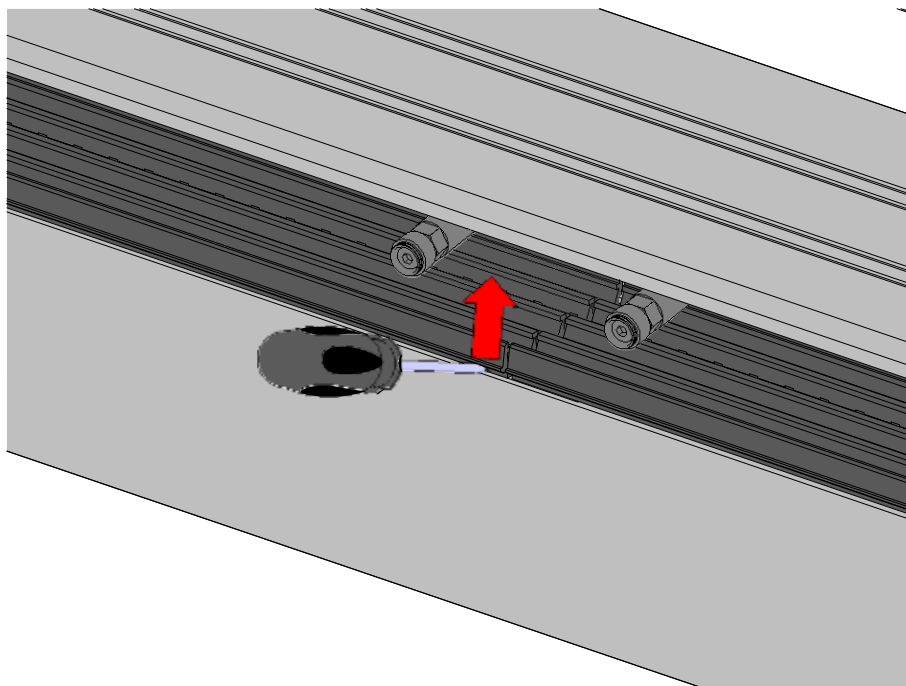
Carefully pry the linear brush guide out with the flat-bladed screwdriver. Insert the flat-bladed screwdriver flat, and do not push too far into the profile.



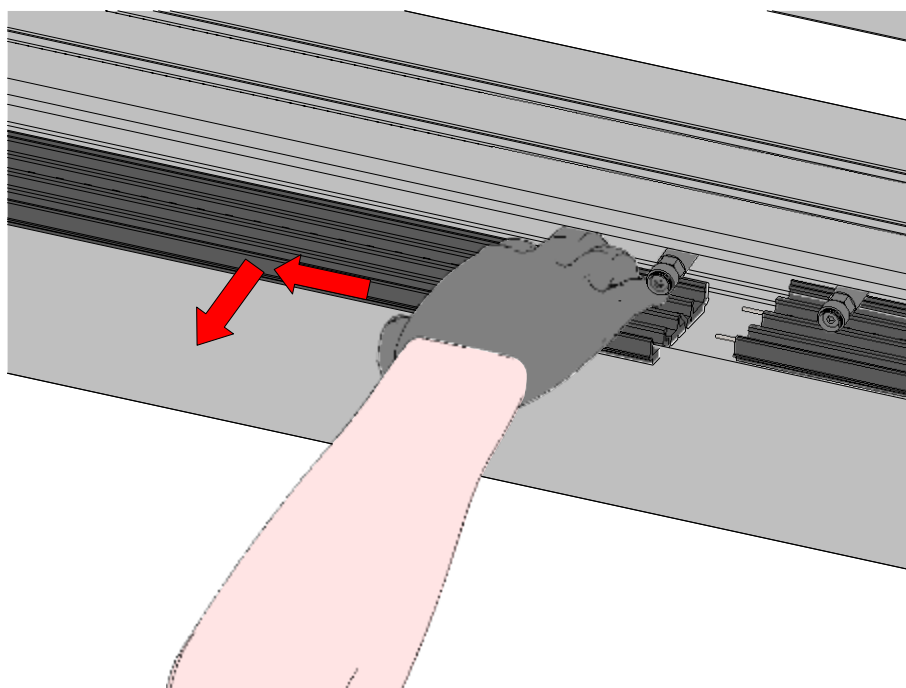
3. Carefully pry the linear brush guide out of the profile with a flat-bladed screwdriver.



4. Starting at the chuck and working down to the parting line between the two parts of the linear brush guide, carefully pry the guide out of the profile.

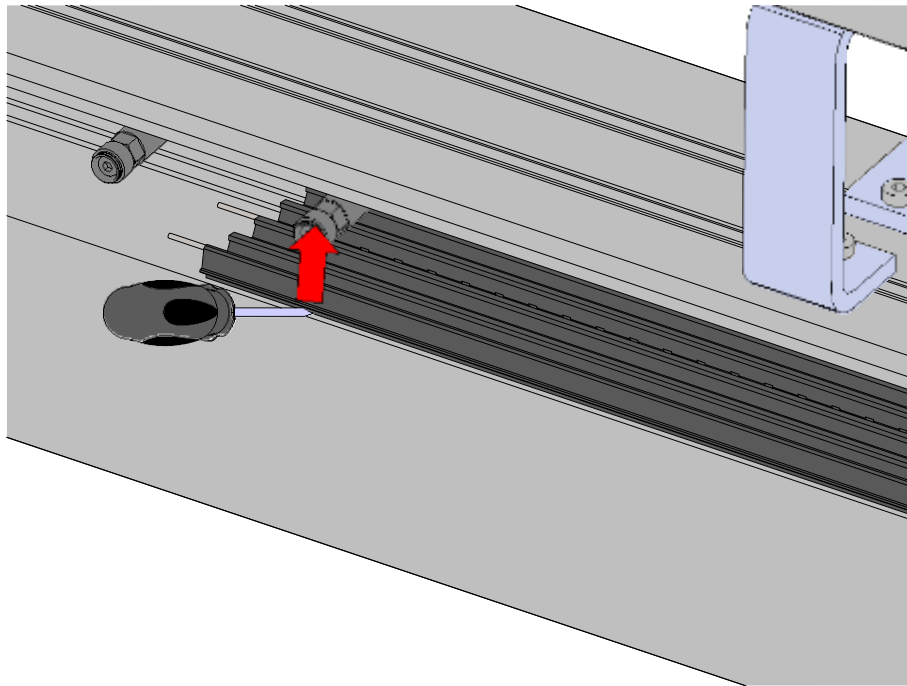


5. Push the first part of the linear brush guide towards the chuck and pull out vertically from the profile.



6. Detach the two pins on the second part of the linear brush guide.

7. NOTICE! Material damage by inserting too far into the profile!



8. Pry out the second part of the linear brush guide.

9. Pull out the second part of the linear brush guide.

⇒ You have now removed the linear brush guide on the slack side.

10. Remove the linear brush guide on the **tight side** in the same way.

⇒ You have now removed all parts of the linear brush guide.

11. **Clean the profile.**

⇒ You have now successfully removed the linear brush guide.

⇒ You can now fit a new linear brush guide.

**NOTICE****Material damage by the use of tools!**

Tools can damage the linear brush guide when it is fitted. • Only use your hands to fit it. Do not use tools.

**Requirements**

- **Protective equipment:**

Chemical safety gloves (nitrile rubber NBR, EN 374) with cut-resistance to EN 388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic substances – adhering to the linear brushes – from processes on the customer's production line.

- **Machine:**

in maintenance position, main switch **OFF** , secured to prevent switching on again, cleaning modules in maintenance position.

- **Covers:**

removed.

- **Linear brush guides:**

removed.

- **Tools:**

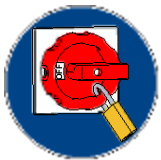
suitable, lint-free cloth.

- **Cleaning agent:**

Grease-dissolving, silicone-free, and AOX-free workshop cleaner (the [BMF workshop cleaner](#) is recommended).

- **Number of people:**

one.

**Details**

- Two linear brush guides are needed for each cleaning module.
- The linear brush guide comprises two parts which are connected with pins.

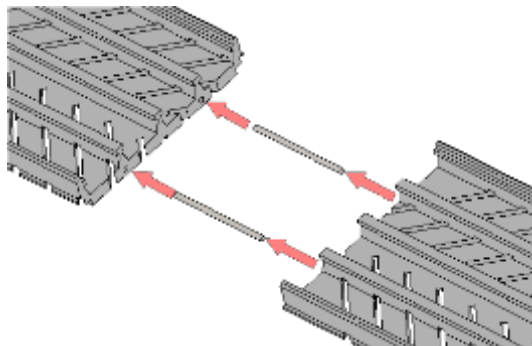


Fig. 25: Linear brush guide with dowel pins

- The linear brush guide is latched into the profile on its two long sides.

## Action steps

1. For each linear brush guide, pin the two parts of the linear brush guide together. You will find the pins needed to do this in one of the two parts of the linear brush guide.
  2. Start fitting on the **non product-contact area** side (slack side).
  3. Place the linear brush guide on the profile on the **slack side**.
- ⇒ The linear brush guide must be aligned as shown in the figure. Note the alignment of the milled slots relative to the wiping direction of the linear brushes. The red arrows indicate the direction of travel of the linear brushes.

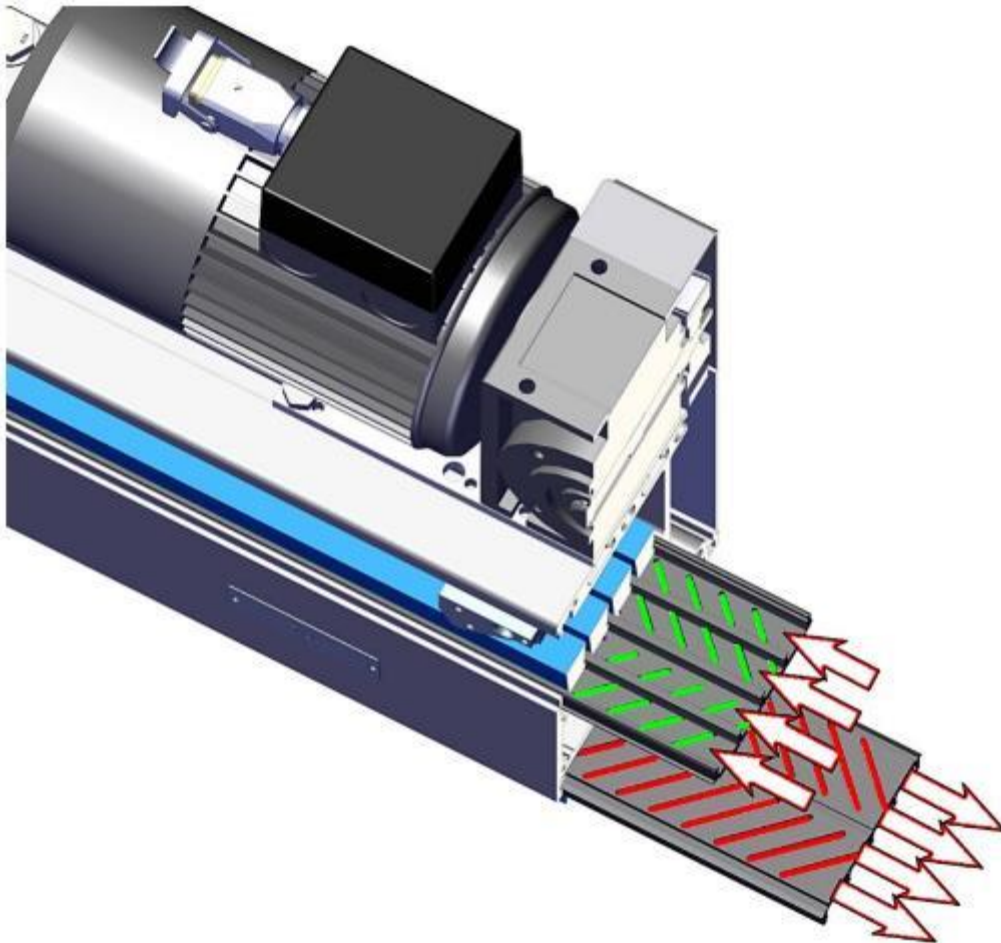


Fig. 26: Linear brush guide directions

4. Raise the linear brush guide on the front long side and press the opposite long side into the profile until the linear brush guide latches into place.
  5. Press the linear brush guide on the front long side into the profile until it latches into place.
  6. Fit the second linear brush guide on the **tight side**.
  7. **Clean** the linear brush guides with a cloth and cleaning agent.
  8. Check that the linear brush guides are seated loosely in the aluminum profile (check for vertical play).
- ⇒ You have now successfully fitted the linear brush guide.
- ⇒ You can now fit new linear brushes.

## 7.22 FITTING THE LINEAR BRUSH

### Requirements

- **Protective equipment:**

Chemical safety gloves (nitrile rubber NBR, EN 374) with cut-resistance to EN 388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic substances – adhering to the linear brushes – from processes on the customer's production line.



- **Machine:**

in maintenance position, main switch **OFF**, secured to prevent switching on again, cleaning modules in maintenance position.

- **Covers:**

removed.

- **Linear brush guides:**

mounted.

- **Tool:**

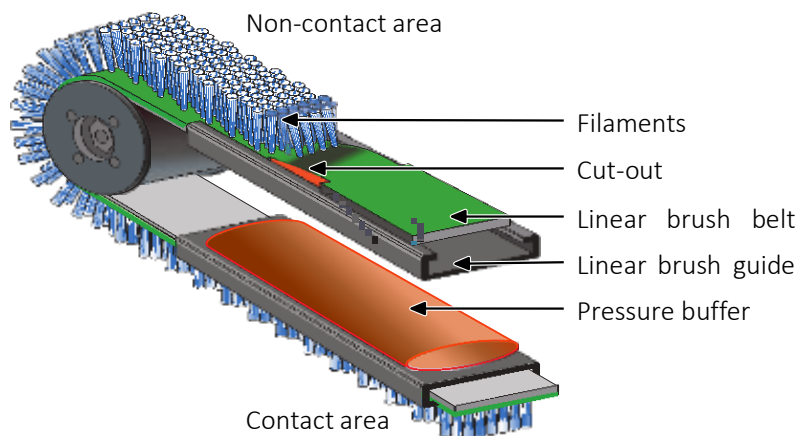
Wrench, Allen key, slotted screwdriver.

- **Number of people:**

one.

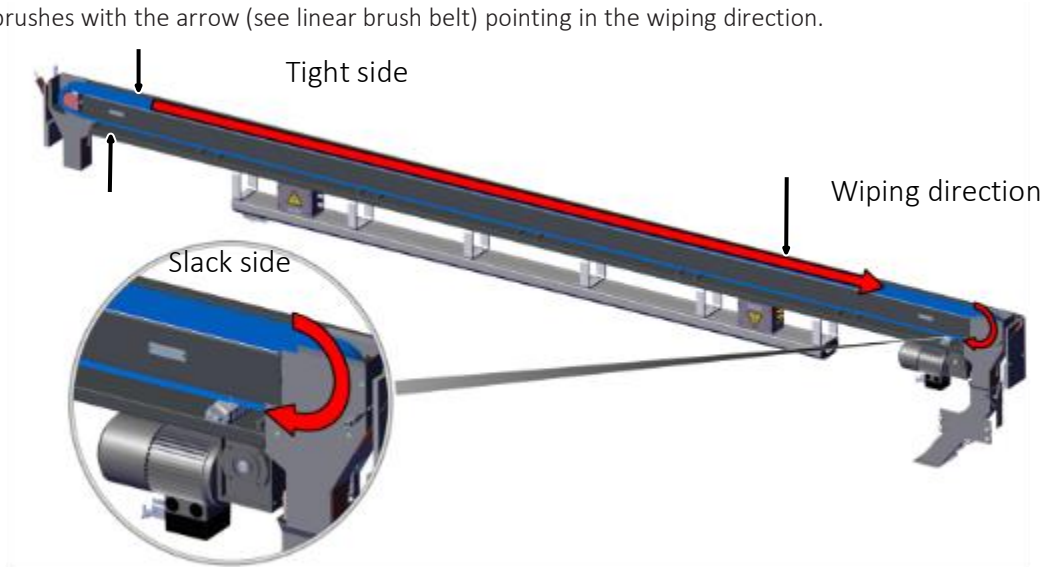
### Details

- Each cleaning module is equipped with four linear brushes. These should be fitted one after the other.
- The width of the linear brush belt narrows at a point marked in red. This cut-out is used to feed the linear brush into the linear brush guide.



### Action steps

1. Start by fitting the rearmost linear brush.
2. **NOTICE! Material damage by linear brushes fitted against the wiping direction!**  
Linear brushes which were fitted with the arrow against the wiping direction can be damaged and may cause further material damage.
3. Fit linear brushes with the arrow (see linear brush belt) pointing in the wiping direction.

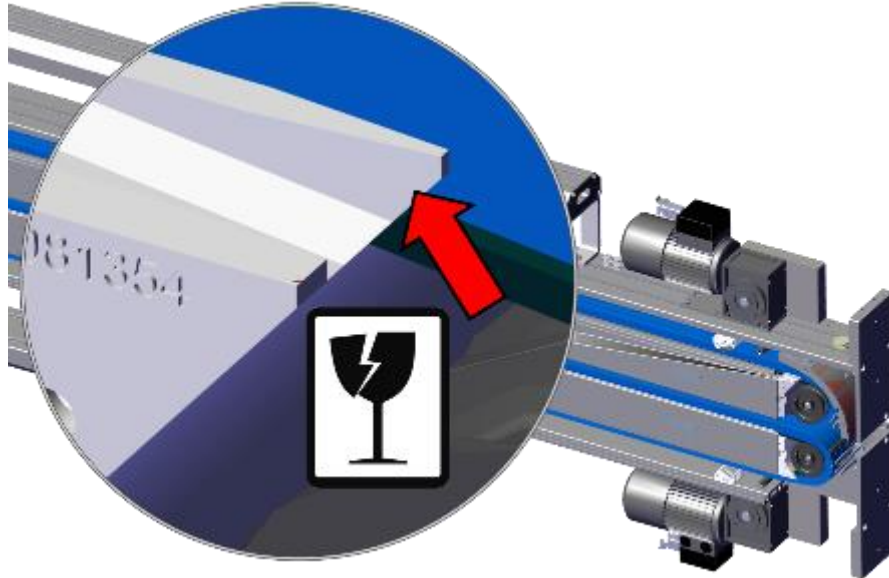


4. Place the linear brush on the drive pulley.
5. Position the linear brush with a screwdriver on the tensioning roller opposite the drive side.
6. Turn the drive pulley with the wrench until the cut-out in the linear brush reaches the feed-in guide on the drive side.



7. **NOTICE! Material damage due to feeding the linear brush in incorrectly!** The plastic bars of the feed-in guide may be damaged.

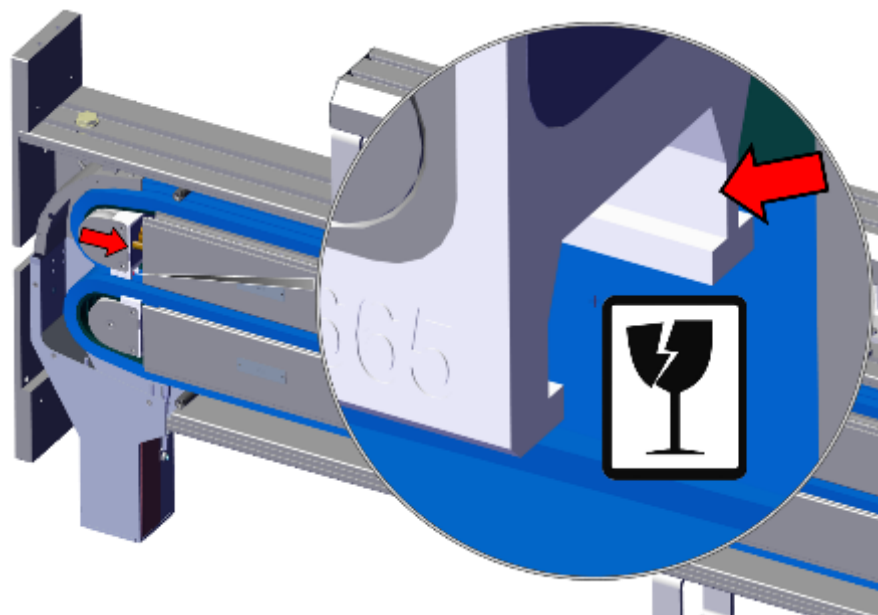
8. Carefully feed the linear brush into the brush guide via the feed-in guide.



9. Turn the wrench until the cut-out in the linear brush reaches the feed-in guide opposite the drive side.

10. **NOTICE! Material damage due to feeding the linear brush in incorrectly!** The plastic bars of the feed-in guide may be damaged.

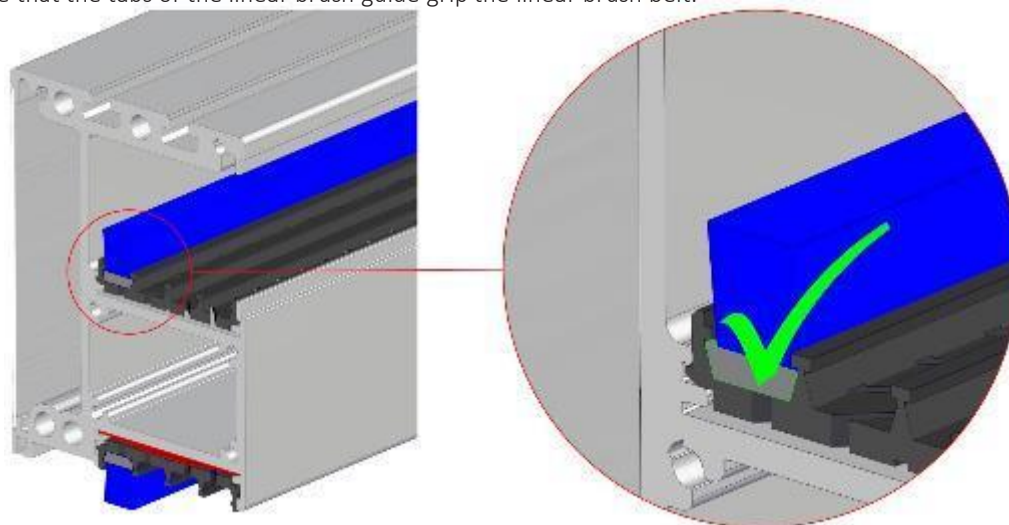
11. Carefully feed the linear brush into the brush guide via the feed-in guide.



12. Turn the drive pulley with the wrench until the linear brush has been fed into the linear brush guide fully.



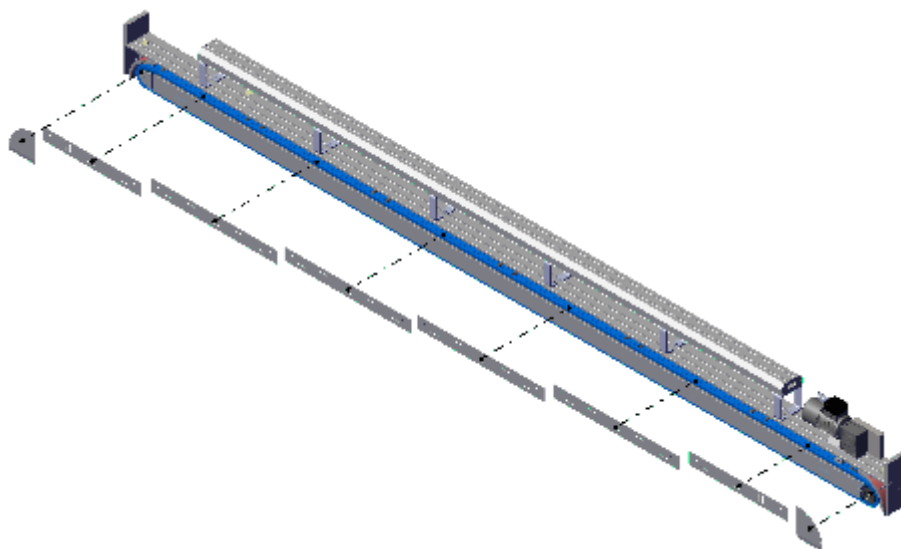
13. Make sure that the tabs of the linear brush guide grip the linear brush belt.



⇒ The first linear brush has been correctly fitted.

14. Fit all the other linear brushes one after the other in the same way.

15. Fit the covers.



**⚠ WARNING****Risk of injury from machine parts that move automatically.**

Machine parts that move automatically can lead to shearing, pulling in, crushing, cutting, impact, and abrasion injuries.

- Cordon off the danger area, and do not enter while the machine is in operation.
- Make sure that there are no people in the danger area.
- Do not reach the working area.
- Wear safety boots, protective clothing, and hairnet (for long hair and beards).
- Do not wear jewelry (e.g. chains or ribbons), do not wear a tie.
- Only trained and qualified personnel must access the machine inside the danger area.

---

**Requirements**

- **Protective gear:**

Gloves, safety shoes, hard hat, suitable protective clothing.

- **Machine:**

Main switch **ON** , Cleaning **ON** , DT BR Cleaner **ON** .

- **Number of people:**

one.

**Details**

- The cleaning modules must be reset after servicing work on the cleaning modules.

**Action steps**

1. **Visually** check that the linear brush and linear brush guide are fully deflected towards the other cleaning module by the pressure buffer.

2. **Align the cleaning modules: Height and parallelism.**

3. Check that the lower cleaning module is at 0 (in the working position).

⇒ The cleaning modules have been set up.

## 7.24 RESET THE CLEANING MODULES



### ⚠ WARNING

**Danger of cuts from sharp edges on machine parts!** Touching the sharp edges of machine parts can lead to cuts. • Do not touch.

- Work with gloves and safety shoes.



### NOTICE

#### **Material damage due to incorrect belt tension!**

The wrong belt tension can lead to material damage to the conveyor system, and to secondary damage.

- Before removing, measure and note the belt tension of any belts that are to be reused.
- Tighten reused belts with the previously measured belt tension.
- Tighten new belts with the specified belt tension.

### Requirements



- **Protective gear:**  
Gloves, safety shoes, hard hat, suitable protective clothing.
- **Machine:**  
in maintenance position, cleaning units in a suitable position, main switch OFF, secured against being switched on again, no products to be cleaned in the machine.
- **Tools:**  
wrench, Allen key, belt tension meter (the Optibelt TT is recommended).
- **Number of people:**  
one.

### Details

- The requirements apply to all subsections.

---

## 7.25 MEASURE AND SET BELT TENSION

---

### Requirements

- The belts have **not** yet been removed.

### Details

- If you are **reusing a used belt**, the belt tension measured before removal must be set.
- If you are **fitting a new belt**, the specified belt tension must be set.
- The relevant section contains a table for your notes and settings.

### Action steps

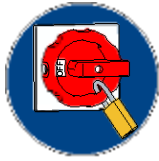
#### If you are reusing a used belt

1. Hold the belt tension meter against the belt.
2. Tap the belt with your finger to start it vibrating.
3. Measure the belt tension.
4. Note the measured belt tension in the table.
5. Remove and fit the belts as described in the instructions.
6. Hold the belt tension meter against the belt.
7. Tap the belt with your finger to start it vibrating.
8. Measure the belt tension.
9. Adjust the tensioning roller until the previously noted belt tension is achieved.

#### If you are fitting a new belt

1. Remove and **dispose** of the old belts as described in the instructions.
2. Fit the new belts as described in the instructions.
3. Hold the belt tension meter against the belt.
4. Tap the belt with your finger to start it vibrating.
5. Measure the belt tension.
6. Adjust the tensioning roller until the specified belt tension (see table) is achieved.

## 7.26 REPLACE CLEANING MODULE MOTOR



### Requirements

- **Machine:**  
in maintenance position, main switch **OFF** , secured to prevent switching on again, cleaning modules in maintenance position.
- **Number of people:**  
one.
- **Tools:**  
wrench, Allen key, circlip pliers, belt tension meter (the Optibelt TT is recommended).

### Details

ID	Belt tension [Hz]			
	New belt	Used belt Date: _____	Used belt Date: _____	Used belt Date: _____
2	70 ± 5			

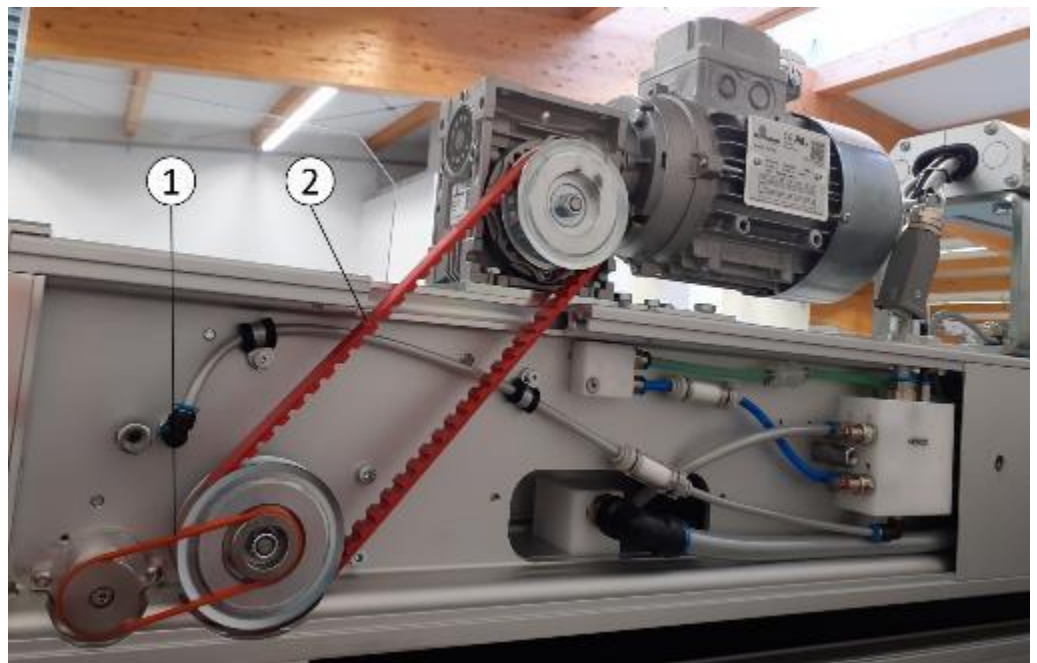
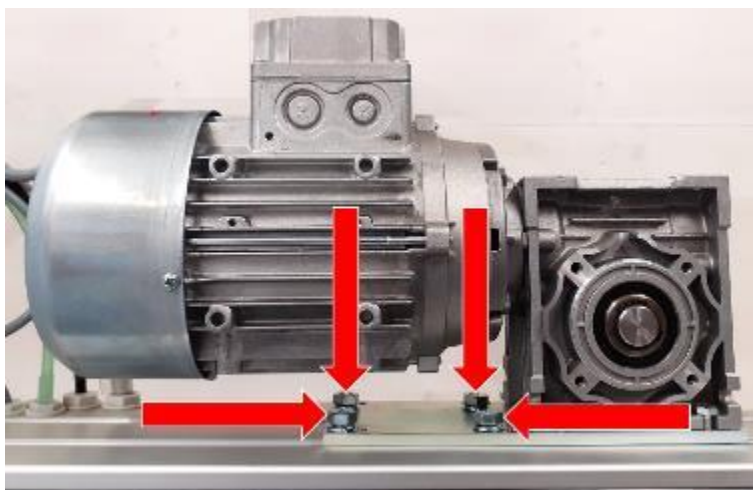


Fig. 27: Belt arrangement on the cleaning module motor

### Action steps

1. Test for absence of voltage. 2. Remove the cover
3. Remove the Harting connector from the motor.
4. If the timing belt ② is to be reused, **measure and note the belt tension** (see details).

5. Use the wrench to loosen 4 bolts on the retaining plate.



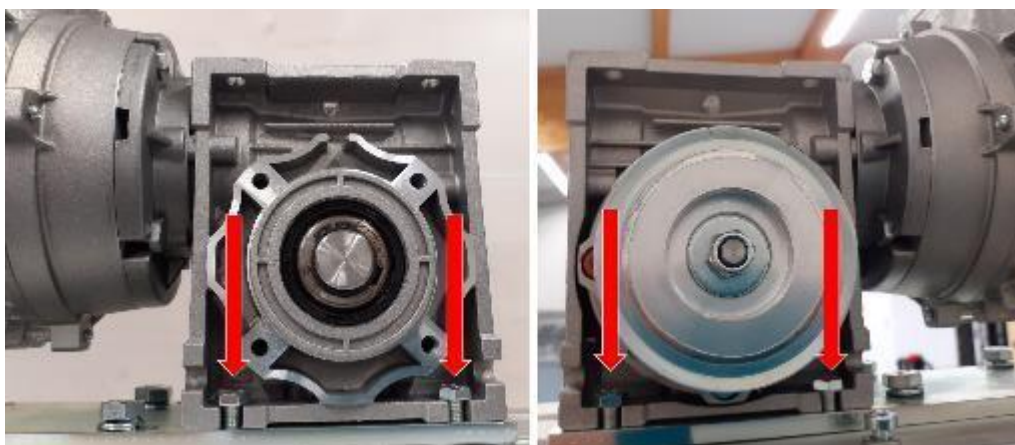
6. Push the motor to one side to relieve the tension on the timing belt ②.

7. Remove ① the round belt.

8. Release the timing belt ② from the pulley on the motor gearbox.

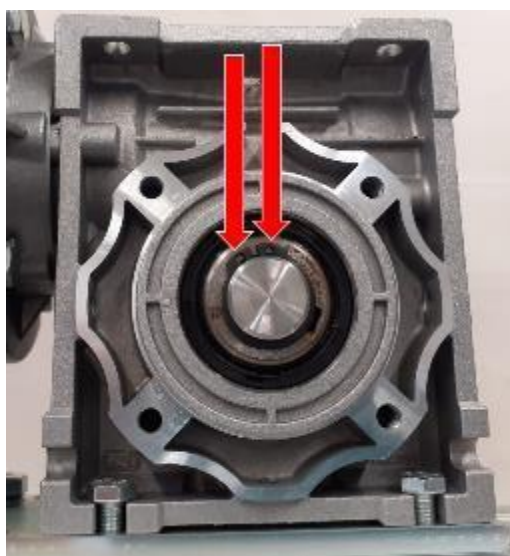
9. Release the motor with the retaining plate from the cleaning module.

10. Loosen 4 screws between the motor and retaining plate.



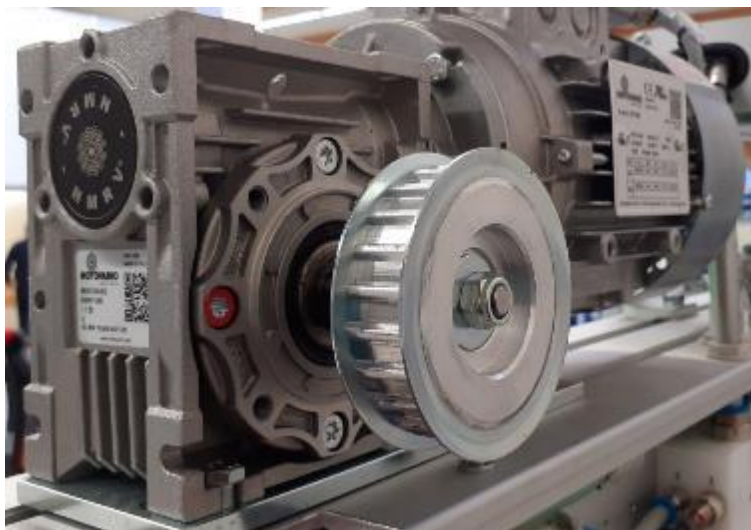
11. Release the motor from the retaining plate.

12. Use the circlip pliers to release the circlip on the gearbox.





13. Pull the shaft and belt pulley from the gearbox.



14. Fit the shaft and belt pulley to the gearbox of the new motor.

15. Fit the circlip to the shaft in the gearbox.

16. Screw the new motor to the retaining plate.

17. Use 4 bolts to bolt the retaining plate to the cleaning module.

18. Fit the timing belt ②.

19. **Set the belt tension** (for value, see details). The tension can be changed by moving the motor together with the retaining plate.

20. Fit ① the round belt.

21. Fit the cover.

22. Connect the Harting connector to the motor.

23. Set the main switch to **ON**.

24. Check that the motor is working.

⇒ You have now successfully replaced the motor.



## 7.27 DRAIN AND CLEAN THE CYCLONE



### WARNING

#### Risk of burns from hot machine parts!

The machine parts of the extraction system become hot while in use. Touching hot machine parts can result in burns.

- Do not touch.
- Wear safety gloves while working.
- Wait at least ten minutes for the machine parts to cool down before starting any servicing work.

### Requirements

- **Protective equipment:**

388:2016, abrasion resistance level 2, cut resistance level 2 and puncture resistance level 2), plus safety boots, hard hat, hairnet, splash-proof safety goggles, ear defenders and suitable protective clothing.

**Breathing apparatus** if there is inadequate ventilation (breathing apparatus with filter: P2, EN 143) and if there is possible contact with particles with toxic substances – adhering to the linear brushes – from processes on the customer's production line.

- **Machine:**

in Maintenance position, main switch **OFF**, secured to prevent switching on again.

- **Tools:**

suitable, lint-free cloth.

- **Number of people:**

one.

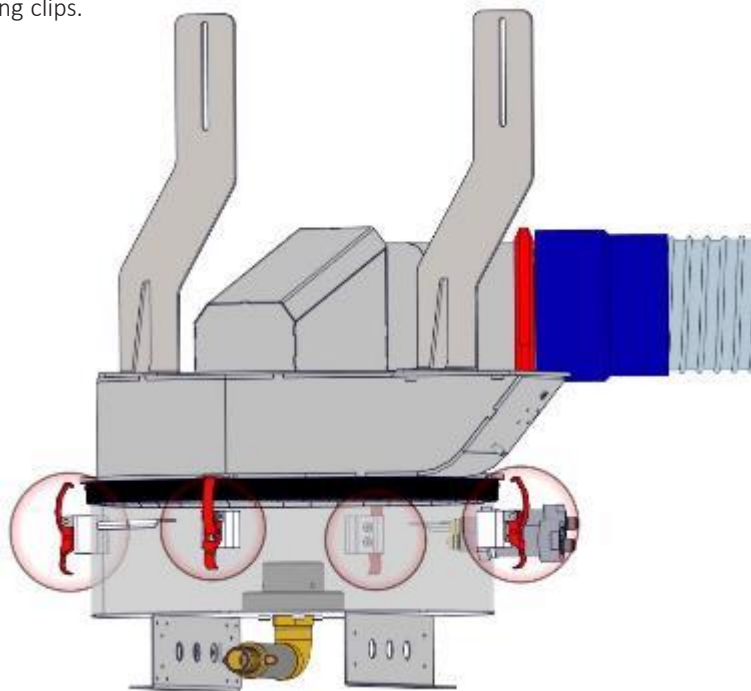


### Details

- The cyclone is a centrifugal separator for separating solid or liquid particles from aerosols (air/particle mixtures).
- The machine's cyclone acts as a pre-separator.
  - The air/particle mixture (aerosol) from the self-cleaning unit is extracted through a heated downpipe into the cyclone. The heat makes viscous lubricants (hot melts) flowable.
  - In the cyclone, the particles and lubricants from the extracted air/particle mixture (aerosol) are separated and collected in a collecting container.
- Interval: see **Maintenance checklist**.

### Action steps

1. Remove the sensor connector from the cyclone.
2. Release the four retaining clips.

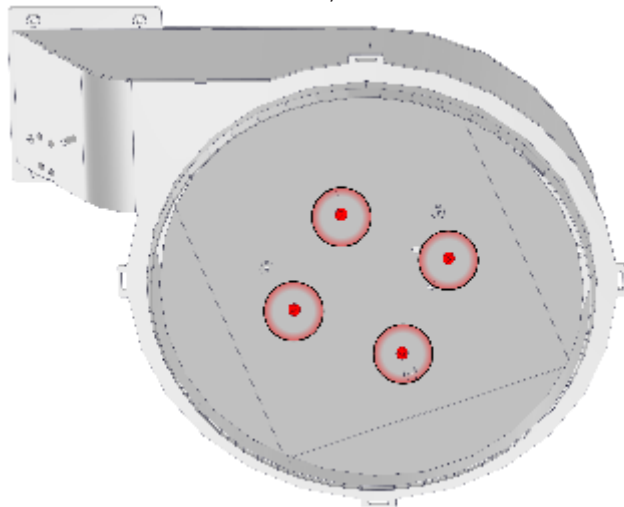


3. **NOTICE!** Tilt the collecting container to pour out the particle/lubricant mixture.
4. Support the collecting container with your gloved hand so that it does not topple over.
5. Remove the collecting container.
6. Drain the particle/lubricant mixture from the collecting container and dispose of correctly.
7. Clean the collecting container with a suitable cloth (do not use any cleaning agents).

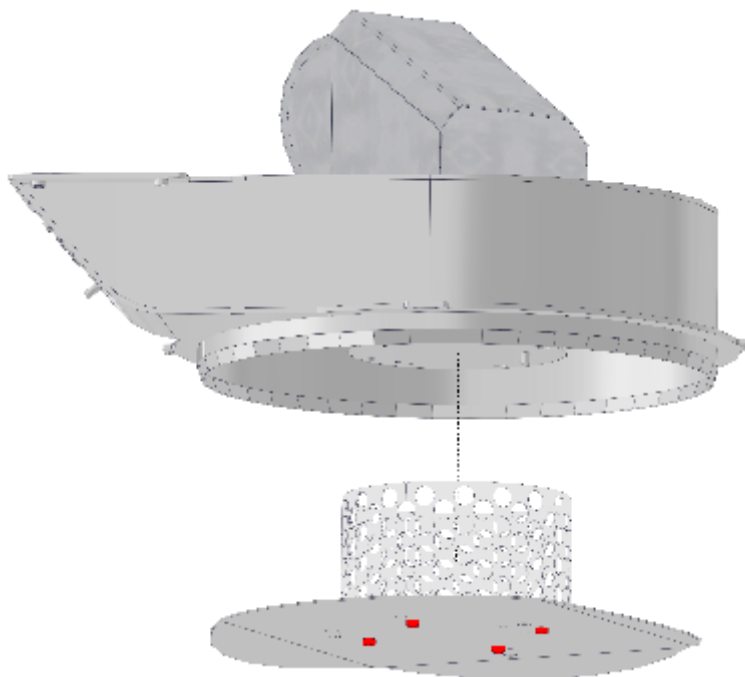


⇒ The collecting container is now clean.

8. Carry out the next steps every six months.
9. Loosen the four screws on the screen. Hold the screen firmly.



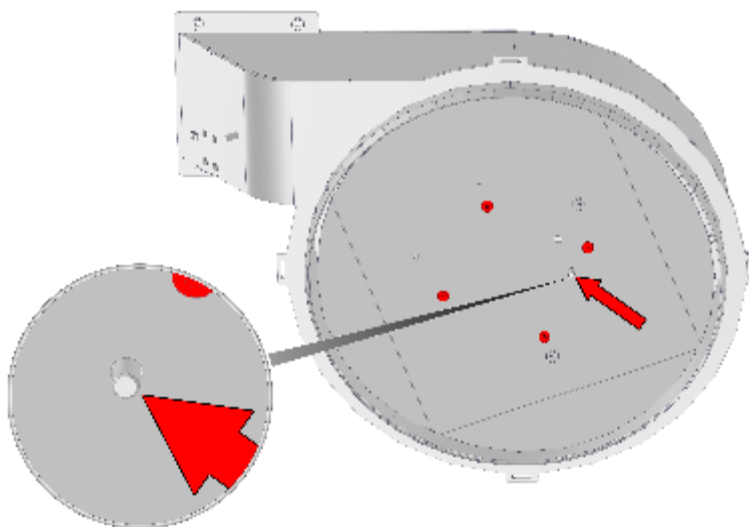
10. Remove the screen.



11. Clean the screen and inlet channel.

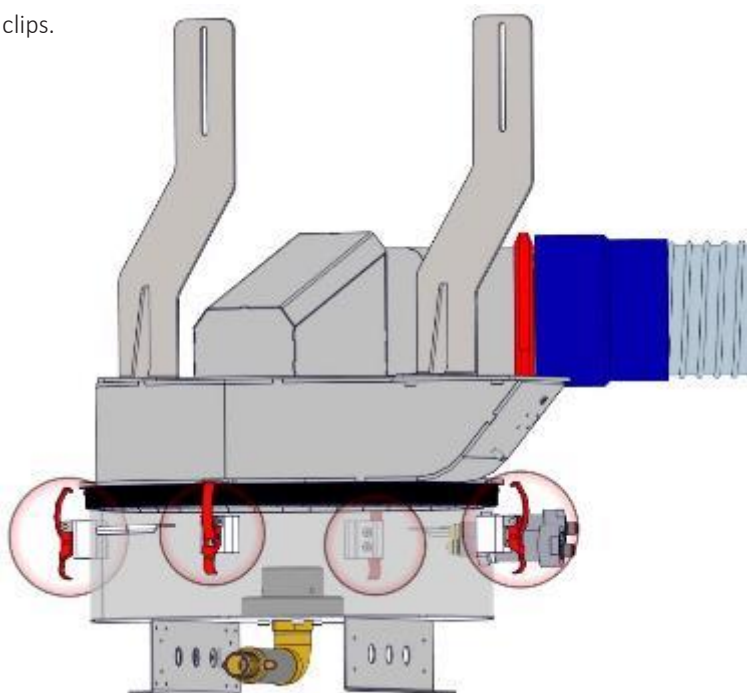


12. Insert the screen, checking the installation position with the coding pin, and fix in place with screws.



13. Insert the collecting container.

14. Apply the four retaining clips.



15. Plug in the connectors.

16. Set the main switch to **ON**.

17. Move the machine into the production line.

18. Cleaning **ON**.

19. Check for error messages on the controller (PLC).

⇒ You have successfully drained and cleaned the cyclone.

## 7.28 MAINTENANCE CHECKLIST

### Deposits

Inspection procedure	Inspection interval
Are the cleaning modules free of soiling?	1 week
Are the DT BR Cleaner sprayers free of deposits?	1 week
Are the self-cleaning nozzles free of deposits?	1 week
Are the extraction ducts free of deposits?	1 month
Are the upper crossbeams (with spindle drive) free of deposits?	2 months
Are the limit switches on the spindle drive free of deposits?	2 months

Tab. 9: Deposits

### Compressed air / extraction unit

Inspection procedure	Inspection interval
Is the compressed air connection adequately dimensioned?	During commissioning
Is there a negative pressure of at least 500 Pa at the extraction nozzle?	Once during commissioning, and then after modifications to the extraction system.

Tab. 10: Compressed air / extraction unit

### DT BR Cleaner

Inspection procedure	Inspection interval
Is the DT BR Cleaner supply switched on?	Daily
Is there DT BR Cleaner cleaning fluid in the tank?	Daily
Are the DT BR Cleaner sprayers working perfectly?	1 week
Do the linear brushes feel as though they are moistened correctly and are the pressure regulators on the DT BR Cleaner sprayers set correctly?	1 week

Tab. 11: DT BR Cleaner

## Linear brushes

Inspection procedure	Inspection interval
Do the linear brushes have a pre-tension of 1.5 mm?	1 month
Do the linear brushes slide correctly in the guides?	1 month
Are the filaments still all present?	1 month
Do the filaments have a uniform height?	2 months

Tab. 12: Linear brushes

## Cyclone

Inspection procedure	Inspection interval
Check the cyclone	1 month
Drain and clean the cyclone	1 month
Clean screen in the cyclone	1 month

Tab. 13: Cyclone

## 7.29 UNCTIONAL CHECKS OF THE MACHINE'S ELECTRICAL SYSTEM

I

Only properly trained personnel can carry out maintenance operations on switchboards or electrical equipment of the machine.

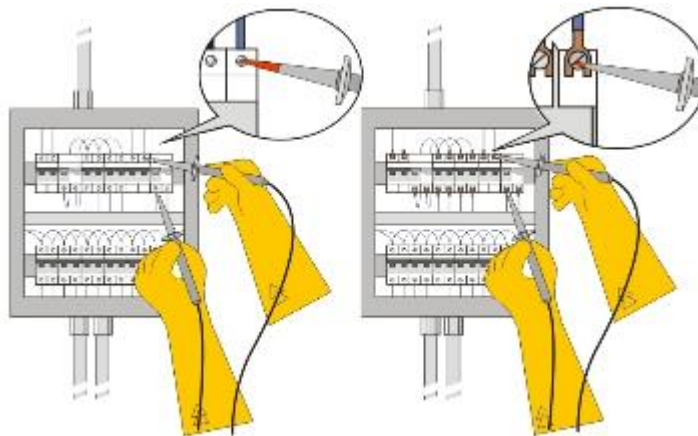
### TYPE OF MEASUREMENT

The open panel has a degree of protection towards active parts <IP55B.

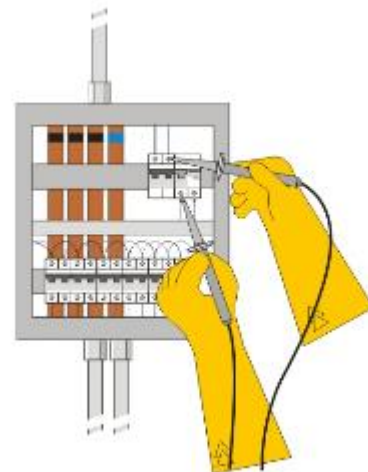
There is a risk of accidental contact, but no risk of accidental short circuit, taking into account the type of bits used (size and shape of the bare contact bit) and the distances between the active parts towards the masses.

I

The measurement must be carried out by an expert person authorized to work under voltage, wearing insulating gloves, but without the short circuit protection visor.



NB) If there is a risk of contact with the active parts accessible in the proximity, as an alternative to insulating gloves, it is



necessary to protect against active parts by using an insulating cloth.



### 7.30 PARTLY COMPLETED MACHINE INSULATION

Before carrying out any type of maintenance and/or repair operations, it is necessary to cut off the electrical power and other power sources.

All disconnecting switches must be able to be locked in an «isolated circuit» position, for example by means of padlocks, so that the operators operating on the partly completed machinery can ensure that no part can be started while the intervention is in progress, by following the procedure:

*before operating on the partly completed machinery each operator blocks all the disconnecting switches of the external power sources with his own locking means - for example padlocks - and carries the opening keys. Each operator removes the personal locking means of the disconnecting switches only when the intervention on the machine is finished; in this way the blocking devices of the disconnecting switches can be removed only after all the operators have removed the personal locking means, i.e. only after all operators have completed the operations on the partly completed machinery.*



If the disconnecting switches do not have sufficient space for all the padlocks, simple locking means like those shown in the picture can be used:



A procedure of this type prevents an operator from starting the machine without noticing the presence of another operator inside the dangerous areas of the machine; in order to be effective it is essential that all operators working on the partly completed machinery to lock the disconnecting switches with personal locks.

Apply the "maintenance in progress" warning signs



<i>Insulation</i>	<i>Mode</i>
Electric power	
Pneumatic power	

## Power insulation procedure

### Electrical

Turn OFF the selector of the machine's switchboard.

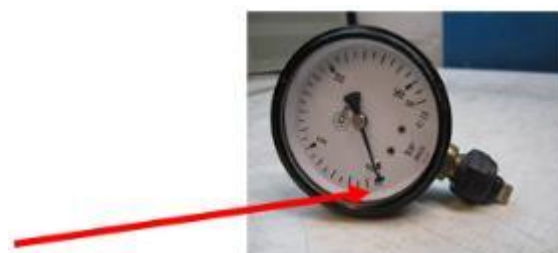
### Oil-hydraulic

The OFF position of the electrical panel allows isolating also the oil-hydraulic circuit. Make sure the hydraulic unit is locked, in order to stop the pump ("zero" pressure gauge).

make sure the oil circuit is drained

### Pneumatic

Close the manual valve of the air supply circuit upstream of the partly completed machinery; discharge the air present in the pneumatic system; the pressure gauge must show "zero" bar



Before carrying out any installation, adjustment, maintenance or repair work, **MAKE SURE** the voltage is cut off.

The removal of energy sources must be ensured with appropriate locking systems and the key must be kept by the maintenance supervisor.


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### 7.31 SPECIAL PRECAUTIONS

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When carrying out maintenance and/or repair work scrupulously follow the instructions below:

- a) before starting the work, place a "MAINTENANCE OPERATIONS IN PROGRESS" sign in a clearly visible position;
- b) do not use solvents and flammable materials;
- c) make sure not to disperse lubricant-coolant liquids in the environment;
- d) to access the highest parts of the machine, use the means suitable for the operations to be carried out;
- e) do not climb on machine parts, as they are not designed to support people;
- f) at the end of the work, restore and fix all protections and guards removed or disabled.



The manufacturer will not be held responsible for failure to comply with the above-mentioned recommendations and for any other use that is not mentioned in these instructions.

---

### 7.32 CLEANING

---

Before carrying out any type of cleaning, it is necessary to cut off the electrical power and other power sources.

Cleaning the internal parts of the machine can be an extremely risky operation, especially if the operator has to enter inside the machine to perform them and if these parts have contained dangerous substances.

The measures necessary for the safe execution of these operations are indicated in the following procedure.

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### 7.33 LUBRICATION

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Lubricate/grease periodically the mechanical parts that complete the moving parts of the machine, chains and gears.

Periodically check the lubricant level in the reducer.

---

### 7.34 SCHEDULED ROUTINE MAINTENANCE

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#### General requirements

Scheduled routine maintenance includes inspections, checks and interventions which, to prevent blocks and breakdowns and systematically monitor the lubrication status of the machine and the condition of the parts subject to wear.

These operations must always be performed by Qualified Personnel.

The partly completed machinery has been designed to minimize ordinary maintenance and it is up to the operator to decide the status and its suitability for use.

Any maintenance operation must be carried out with the machinery switched off and only after having disconnected the switchboard.

It is recommended to stop the machine and perform maintenance operations every time a faulty action is detected; this will always ensure the maximum efficiency.

- a) Always use the appropriate P.P.E. - Personal Protective Equipment:

- b) gloves;
- c) non-slip footwear;
- d) goggles;
- e) suitable work clothing.

Visually check the status of each part of the partly completed machinery, by making sure there are no changes due to failure or deformation.

For all maintenance operations that does not require voltage, stop the system by disconnecting the power supply from the main switch, by setting it to "O" (OFF) position with the appropriate padlock.

Check and test once a month the correct operation and intervention of the Emergency Shutdown, by performing the no-load test.

In case of malfunctioning, entrust the fault detection only to specialized personnel or call the technical assistance of the electrical part manufacturer.

Check the continuity of the grounding circuit according to the provisions of IEC EN 60207-1 p. 18.2.2.



Failure to comply with these requirements exonerates the manufacturer from any liability.

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## 7.35 EXTRAORDINARY MAINTENANCE

---

### General requirements



Caution! It is forbidden for the user to carry out extraordinary maintenance interventions, since, having no detailed information on their execution methods, the operators could find themselves in dangerous situations.

The interventions must be carried out by expert personnel appointed by the user.  
Any maintenance operation must be carried out with the machinery switched off and only after having disconnected the switchboard.

It is recommended to stop the machine and perform extraordinary maintenance operations every time a faulty action is detected; this will always ensure the maximum efficiency.

- a) Always use the appropriate P.P.E. - Personal Protective Equipment:
- b) gloves;
- c) non-slip footwear;
- d) goggles;
- e) suitable work clothing.

### Nozzle heads removal procedure

For extraordinary replacement operations of the nozzles, remove the "nozzle holder drawer" from the guides of the machine and unscrew the fixing screws.

The load must be lifted with suitable lashings, by hooking the loads and mechanical lifting means or carrying out the operation with several workers.



#### Initial conditions

- Turn off the system
- Cut off the power supply

#### Safety conditions

- Padlock the electrical enclosure and carry the key
- Apply the "maintenance in progress" warning signs
- Use appropriate PPE
- Contact the manufacturer

Visually check the status of each part of the partly completed machinery, by making sure there are no changes due to failure or deformation.

For all maintenance operations that does not require voltage, stop the system by disconnecting the power supply from the main switch, by setting it to "O" (OFF) position with the appropriate padlock.



Failure to comply with these requirements exonerates the manufacturer from any liability

## 8 ACCESSORIES AND SPARE PARTS

### 8.1 ASSISTANCE

The Manufacturer is always available to offer any type of information regarding the installation, maintenance, and use of the partly completed machinery.

The Client must always ask the questions in clear terms, with references to this Manual and to the listed instructions.

### 8.2 ACCESSORIES

The accessories that can be combined with the partly completed machinery are:

- brushing machine (see attached documentation) for metal sheet cleaning
- extractor (see attached documentation) for the extraction of oil mists

The accessories are installed in compliance with the provisions of each manufacturer.

### 8.3 SPARE PARTS

Always use genuine spare parts.

Contact the manufacturer regarding any spare part.

See annex 6.7

For the spare parts management the manufacturer recommends using the attached form. To request the spare parts, fill in the form, making sure to insert all requested information, and send it to the Manufacturer.

In order to interact in the most effective way with our technicians when ordering spare parts, please follow the procedure below:

call the Company's spare parts service and describe the type of fault detected;  
describe the non-functional part;  
trace the area of the partly completed machinery in which the faulty part is located;  
order the part using the Order Form on the following page;

The use of non-genuine spare parts is not recommended: in case this happens, the warranty conditions (if still existing) and Manufacturer's Liability regarding the use of the partly completed machinery and for possible damages to people and/or objects will become void.

#### SPARE PARTS REQUEST FORM

APPLICANT DATA	COMPANY NAME	
	NAME SURNAME	
	ADDRESS	
	PLACE	
	ZIP CODE	
	PROVINCE	
	TELEPHONE	
	E-MAIL	

PARTLY COMPLETED MACHINERY DATA	PARTLY COMPLETED MACHINERY NAME	
	MODEL	
	SERIAL NUMBER	
	YEAR OF MANUFACTURE	

LIST OF THE PARTS TO BE ORDERED	ID	P/N	DESCRIPTION	QUANTITY

NOTES	
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## 9 INTERFACE DESCRIPTION

edited: 19.05.2022 updated:

### program functions

<b>motors</b>			
brush drive motor	-2MA1 -2MA2		
filterunit	-2MA3		
height adjustment motor with absolute encoder	-6MA1		
<b>valves</b>		<b>sensors</b>	
mainvalve	-1KK1	pressure watchdog	-1BP1
pneumatic quick adjustment(HVP)	-6KK1 -6KK2 -6KK3 -6KK4		
DT BR Cleaner sprayer valves	-4KK2 -4KK3	end-limit sensors electrical	-6BG5
		height adjustment(HVE)	-6BG6 end-
heating element	-2EB1 to - 2EB15	limit sensors pneumatic	-6BG1 quick
		adjustment(HVP)	-6BG2 -6BG3
			-6BG4
		max oil level filterunit	-2BG3
		cyclone <b>monitoring</b>	-2BG1
		<b>max oil level</b>	-2BG2
		temperature sensors for	-2BT1 to -
		thermal cleaning PT100	2BT15

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updated:

**1) pressure watchdog -1BP1**

- a) This device -1BP1 needs to be evaluated by the control before the brush is started. A high signal shows that compressed air is available. The signal must be read with a 1s delay so that pressure variation are not interpreted as a fault when the machine is activated.

**2) main valve -1KK1**

- a) The main valve -1KK1 needs to be activated via the control together with the brush motor.
  - a) pressure watchdog device high.

**3) open -6KK1, -6KK4/ close -6KK2, -6KK3 brushes pneumatically**

- a) In order to close the brush pneumatically, you need to activate valves -6KK2 and -6KK3.
- b) In order to open the brush, you need to deactivate valve -6KK2 and -6KK3 and activate valve -6KK1 and 6KK4.
- c) The positions can be evaluated by using end-limit sensors (HVP) 6BG1, -6BG2, -6BG3 and -6BG4.

**4) filter unit 2MA3(OEL)**

- a) The filter unit should be switched on before the brush motors -2MA1 and -2MA2.
- b) The filter unit should be switched off only delayed with the brush motors -2MA1 and -2MA2.
- c) In the case of a notification of the sensor -2BG3 must be taken to ensure that the oil is drained from the filter unit.

**5) start brush drive motor -2MA1 and -2MA2**

- a) pressure watchdog -1BP1 high.
- b) main valve -1KK1 on.
- c) filter unit -2MA3 on.
- d) pneumatic quick adjustment (HVP) closed, -6KK5 and 6KK6 activated.

**6) DT BR Cleaner**

**DT BR Cleaner valves (-4KK2 and -4KK3)**

- a) In order to be able to switch on the DT BR Cleaner supply, the brush motor and the suction filter need to be activated.
- b) If DT BR Cleaner is switched on, the DT BR Cleaner valve will be activated.
- c) For the brush cleaning the DT BR Cleaner can be switched on for 60s. This is recommended after the change of different cleanable materials (eg aluminium and steel)

- 7) inlet released to the upstream machine is when ... a) The Cleaner is in operation and there is no fault.  
b) Brush pneumatically closed, -6KK5 and 6KK6 activated.
- 8) There is a fault if  
a) Fault pressure, **pressure watchdog** (contact open) **-1BP1** AND (i) delay 1 s
- 9) **Height adjustment -6MA1(HVE)** (for upper brush module)  
a) Requirement:  
a) Pressure control device high. b) Main valve is activated  
c) Brushes are closed pneumatically  
d) HVE is within positioning range limits (monitoring by end of travel switch -6BG5 and -6BG6).  
e) No product may be below the brushes.  
b) The height adjustment motor will be activated until the value of the absolute value indicator coincides with the reference value of the customer's control.

Please note that the customer needs to integrate the electrical height with the help of his overall control. The triggering needs to come from the customer's PLC. The customer needs to write a software module for his PLC so that the Dietronic height adjustment motor may be triggered accordingly. This is a typical positioning task.

Various settings are factory set and stored in the motor. The values have to be read out from the drive!

- 10) **absolute encoder -6MA1(HVE)**  
a) The absolute encoder -6MA1 is a Profibus participant who must be integrated into the Profibus system of the client and is used to position the upper cleaning unit. This is located in height adjustment motor.  
b) It has the possibility to be present a target to perform actual balance on the visualization.

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updated:

- 11) cyclone monitoring -2BG1, -2BG2 (max oil level)
- a) The sensors -2BG1, -2BG2 report that the respective cyclone separators are full and must be emptied.

Subject to change!

## 10 TROUBLESHOOTING

### Inadequate cleaning result

Possible cause	Recommended action
Linear brush is not in contact with the product surface.	Aligning the machine.
Linear brush is elongated or worn.	Change the linear brush.
Direction of travel of the linear brush is not correct.	Reverse motor polarity.
Linear brush guides are dirty.	Clean the linear brush guides
The DT BR Cleaner tank is empty.	Refill tank with DT BR Cleaner
The DT BR Cleaner filter is blocked.	Clean or replace the DT BR Cleaner filter
DT BR Cleaner sprayer is dirty.	Clean the DT BR Cleaner sprayer.
The DT BR Cleaner sprayer is faulty.	The DT BR Cleaner sprayer must be replaced. Contact Dietronic Service.
Negative pressure of the extraction unit is < 500 Pa.	Clean the extraction ducts. Adjust the extraction unit settings, if necessary.

Tab. 24: Troubleshooting: Insufficient cleaning carried out

**TROUBLESHOOTING - BRUSH**

Fault	Cause	Action required
Poor cleaning quality	Brushes have no contact with the material surface	Adjust cleaning modules so that brushes wipe across the product with an initial tension of 1,5 mm
	Brushes are worn or stretched	Change brushes
	Incorrect brush direction (brush direction must be towards the suction system)	Reverse brush motor poles
	Brushes stop if product enters the cleaning module (i.e. brushes have become stretched)	Change brushes
	No DT BR Cleaner	Refill DT BR Cleaner
	DT BR Cleaner filter is blocked	Clean or change DT BR Cleaner filter
	DT BR Cleaner sprayer is not working	The sprayer is broken it has to be replaced by a service technician.
		The sprayer is dirty, remove deposits
	Linear brush guides are dirty.	Clean linear brush guides
	Vacuum blocked or too weak.	Clean suction sockets and/or raise suction performance
	Brushes out of guides frequently	Check the guides, if they are worn out change them. Check the correct function of the pneumatic belt tensioner (opposite side from the motor)
	Brushes out of guides (one blank is embedded inside the guides)	Check the crooked blank sensor and reinsert the brush in the guide

**TROUBLESHOOTING - OILER**

Fault	Cause	Action Required
Poor Lubrication quality	Dirtiness of nozzle	Dismantle and clean nozzle
	wrong assembly	Check tight of nozzle
	wrong assembly	check tight of air cup
	Air in the oil circuit	activate all nozzle in manual mode for 20sec
	heating system On or Off according oil viscosity	Lower than 50cst OFF - upper ON
	Atomization air no correct	Find Atomization air according quantity need
	Perform Test nozzle	Fix problem according test result (Change HFV)
	Green nozzle OR squeezed	Remove the nozzle and change the green OR
Drops on blank	Oiler Sution unit filters clogged	Change filters
	Wiper worn out	check and change wiper
	Wiper is not moving correctly	check solenoid valve and reed sensors
Oil run out	Check barrel in the PIT	Alarm is displayed if barrel finish but doublecheck
	Pneumatic pump not working	Check air regulator on the pump
	Pneumatic pump membrane broken	Change pump membrane
	Auto mode not selected	select auto mode for oil refill
Temperature Alarm	Check temperature sensor	if broken replace
	Check heating resistance	if broken replace
HFV power alarm	Check power supply for HFV	replace if broken



## 11 DISPOSAL

All replacement parts or the entire machine should be disposed of by specialist disposal companies in accordance with the applicable legal regulations; this applies particularly to electronic components.

If there is any doubt, information on environmentally sound disposal can be obtained from the local authority or from specialist disposal companies.

For the disposal of machine components that have been in contact with DT BR Cleaner, follow the DT BR Cleaner material safety data sheet, see **Material safety data sheet for DT BR Cleaner**.