En

Operating instructions and spare parts list

PZ Powder center with Touch Panel

Translation of the original operating instructions

Documentation PZ Powder center with Touch Panel

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General safety regulations

This chapter specifies the fundamental safety regulations that must be followed by the user and third parties using the PZ Powder center with Touch Panel.

These safety regulations must be read and understood before the PZ Powder center with Touch Panel is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the ITW Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

DANGER!
Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

WARNING!
Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

INFORMATION!
Useful tips and other information

Conformity of use

1. The PZ Powder center with Touch Panel is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.
2. Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the PZ Powder center with Touch Panel is to be used for other purposes or other substances outside of our guidelines then ITW Gema GmbH should be consulted.

3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The PZ Powder center with Touch Panel should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.
4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the PZ Powder center with Touch Panel has been set up and wired according to the guidelines for machinery (98/37 EG). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to the PZ Powder center with Touch Panel exempts the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore the country-specific safety regulations must be observed.

Explosion protection	Protection type	Temperature class
CE Ex II 3 D	IP54	T6 (zone 21) T4 (zone 22)

Technical safety regulations for stationary electrostatic powder spraying equipment

General information

The powder spraying equipment from ITW Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Improper use of the controlling device can lead to accidents, malfunction or damage to the control itself.
2. Before every start-up check the equipment for operational safety (regular servicing is essential)!
3. Safety regulations BGI 764 and VDE regulations DIN VDE 0147, part 1, must be observed for safe operation.
4. Safety precautions specified by local legislation must be observed.
5. The plug must be disconnected before the machine is opened for repair.
6. The plug and socket connection between the powder spraying equipment and the mains network should only be taken out when the power is switched off.

7. The connecting cable between the controlling device and the spray gun must be set up so that it cannot be damaged during operation. Safety precautions specified by local legislation must be observed!
8. Only original ITW-Gema spare parts should be used, because the explosion protection will also be preserved that way. Damage caused by other parts is not covered by guarantee.
9. If ITW-Gema powder spraying equipment is used in conjunction with machinery from other manufacturers then their safety regulations must also be taken into account.
10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!
11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!
12. As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!

WARNING!
We emphasize that the customer himself is responsible for the safe operation of equipment. ITW-Gema is in no way responsible for any resulting damages!

Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the “Safety regulations”-chapter. The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The control units for the spray guns must only be set up and used in zone 22. The spray guns are permitted in the zone 21 created by them.

The powder spraying equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The operating instructions and the necessary closing down procedures must be followed before any work is carried out concerning the set-up, start-up, operation, modification, operating conditions, mode of operation, servicing, inspection or repairs.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shut-down. Individual components can be turned off during operation by using the appropriate switches.

Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method which will negatively influence the technical safety of the powder spraying equipment is to be avoided.

2. The operator should care about no non-authorized personnel works on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).
3. For dangerous materials, the employer has to provide an operating instructions manual for specifying the dangers arising for humans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an understandable form and in the language of the persons employed, and has to be announced in a suitable place in the working area.
4. The operator is under obligation to check the powder spraying equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.
5. The operator is obliged to check that the powder spraying equipment is only operated when in satisfactory condition.
6. As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).
7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.
8. No safety devices should be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take place immediately after the maintenance or repair work is finished. The powder spraying device must be turned off while servicing is carried out. The operator must train and commit the responsible personnel to this.
9. Activities such as checking powder fluidization or checking the high voltage spray gun etc. must be carried out with the powder spraying equipment switched on.

Notes on special types of hazard

Power

It is necessary to refer once more to the danger of life from high voltage current if the shut-down procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying device is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - see chapter "Earthing".

Grounding/Earthing

All electricity conducting parts and machinery found in the workplace (according to DIN VDE 0745, part 102) must be earthed 1.5 meters either

side and 2.5 meters around each booth opening. The earthing resistance must amount to maximally 1 MOhm. The resistance must be tested on a regular basis. The condition of the machinery surroundings as well as the suspension gear must ensure that the machinery remains earthed. If the earthing of the machinery includes the suspension arrangements, then these must constantly be kept clean in order to guarantee the necessary conductivity. The appropriate measuring devices must be kept ready in the workplace in order to check the earthing.

Compressed air

When there are longer pauses or stand-still times between working, the powder spraying equipment should be drained of compressed air. There is a danger of injury when pneumatic hoses are damaged and from the uncontrolled release and improper use of compressed air.

Crushing and cutting

During operation, moving parts may automatically start to move in the operating area. It must be ensured that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

Access under exceptional circumstances

The operating firm must ensure that local conditions are met when repairs are made to the electronic parts or when the equipment is restarted so that there are additional measures such as barriers to prevent unauthorized access.

Prohibition of unauthorized conversions and modifications to machines

All unauthorized conversions and modifications to electrostatic spraying equipment are forbidden for safety reasons.

The powder spraying equipment should not be used if damaged, the faulty part must be immediately replaced or repaired. Only original ITW-Gema replacement parts should be used. Damage caused by other parts is not covered by guarantee.

Repairs must only be carried out by specialists or in ITW-Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The ITW Gema GmbH guarantee would no longer be valid.

Safety requirements for electrostatic powder coating

1. This equipment is dangerous if the instructions in this operating manual are not followed.
2. All electrostatic conductive parts, in particular the machinery within 5 meters of the coating equipment, must be earthed.
3. The floor of the coating area must conduct electricity (normal concrete is generally conductive).
4. The operating personnel must wear electricity conducting footwear (e.g. leather soles).
5. The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.

6. The supplied earthing cable (green/yellow) must be connected to the earthing screw of the electrostatic powder spraying hand appliance. The earthing cable must have a good metallic connection with the coating booth, the recovery unit and the conveyor chain and with the suspension arrangement of the objects.
7. The electricity and powder supply to the hand guns must be set up so that they are fully protected against heat and chemical damage.
8. The powder coating device may only be switched on once the booth has been started up. If the booth cuts out then the powder coating device must be switched off.
9. The earthing of all electricity conducting devices (e.g. hooks, conveyor chains) must be checked on a weekly basis. The earthing resistance must amount to maximally 1 MOhm.
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturers instructions must be observed when using such cleaning agents.
12. The manufacturers instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, tears) or missing then it should not be used.
14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original ITW-Gema replacement parts should be used.
15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.
16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of 10 g/m³ should be used.

A summary of the rules and regulations

The following is a list of relevant rules and regulations which are to be observed:

Guidelines and regulations, German professional association

BGV A1	Prevention principles
BGV A3	Electrical equipment and material
BGI 764	Electrostatic coating
BGR 132	Guidelines for the avoidance of the dangers of ignition due to electrostatic charging (guideline “Static Electricity”)

VDMA 24371	Guidelines for electrostatic coating with synthetic powder[1)] - Part 1 General requirements - Part 2 Examples of use

EN European standards

RL94/9/EC	The approximation of the laws of the Member States relating to apparatus and safety systems for their intended use in potentially explosive atmospheres
EN 12100-1 EN 12100-2	Machine safety [2)]
EN IEC 60079-0	Electrical equipment for locations where there is danger of explosion [3)]
EN 50 050	Electrical apparatus for potentially explosive atmospheres - electrostatic hand-held spraying equipment [2)]
EN 50 053, part 2	Requirements for the selection, installation and use of electrostatic spraying equipment for flammable materials - hand-held electrostatic powder spray guns [2)]
EN 50 177	Stationary electrostatic spraying equipment for flammable coating powder [2)]
EN 12981	Coating plants - spray booths for application of organic powder coating material - safety requirements
EN 60 529, identical: DIN 40050	IP-Type protection: contact, foreign bodies and water protection for electrical equipment [2)]
EN 60 204 identical: DIN VDE 0113	VDE regulations for the setting up of high voltage electrical machine tools and processing machines with mains voltages up to 1000 V [3)]

VDE (Association of German Engineers) Regulations

DIN VDE 0100	Regulations for setting-up high voltage equipment with mains voltages up to 1000 V [4)]
DIN VDE 0105	VDE regulations for the operation of high voltage equipment [4)]
part 1	General regulations
part 4	Supplementary definitions for stationary electrical spraying equipment
DIN VDE 0147 part 1	Setting up stationary electrostatic spraying equipment [4)]
DIN VDE 0165	Setting up electrical equipment in locations in areas with danger of explosion [4)]

Sources:

[1)] Carl Heymanns Verlag KG, Luxemburger Strasse 449, 5000 Köln 41, or from the appropriate employers association

[2)] Beuth Verlag GmbH, Burgrafenstrasse 4, 1000 Berlin 30

[3)] General secretariat, Rue Bréderode 2, B-1000 Bruxelles, or the appropriate national committee

[4)] VDE Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12

Product specific security measures

Installation

Installation work to be done by the customer must be carried out according to local safety regulations.

Grounding

The booth and the powder center grounding is to be checked at every start-up. The grounding connection is customer specific and is fitted on the booth basement, on the cyclone and on the powder center housing. The grounding of the workpieces and other plant units must also be checked.

Operating the equipment

In order to be able to operate the equipment safely, it is necessary to be familiar with the safety regulations, the operational characteristics and functioning of the various plant units. For this purpose, read the safety notes and the operating manual of the plant control unit, before starting up the plant.

In addition, all further equipment-specific operating instructions, e.g. the OptiFlex or OptiMatic or APS series and all additional components should also be read.

To obtain practice in operating the plant it is absolutely essential to start the operation according to the operating instructions. Also later on, they serve as a useful aid on possible malfunctions or uncertainty and will make many enquiries unnecessary. For this reason, the operating manual must always be available at the equipment.

Should difficulties arise, however, your ITW Gema service center is always ready to assist.

Inspection check

The following points are to be checked at every booth start-up:

- No foreign material in the central suction unit in the booth and in the powder suction
- Sieve machine is connected to the cyclone separator, the clamp is tightly locked
- Pneumatic conduction and powder hose are connected to the dense phase conveyor
- The filter elements door is closed, the waste container is fitted and pressed on

Repairs

Repairs must be carried out by trained personnel only. Unauthorized conversions and modifications can lead to injuries and damage to the equipment. The ITW Gema GmbH guarantee would no longer be valid.

Note:
We point out that the customer himself is responsible for the safe operation of the equipment. ITW Gema GmbH is in no way responsible for any resulting damage!

By carrying out repairs, the powder center must be disconnected from the mains, according to the local safety regulations!

Only original ITW Gema spare parts may be used! The use of spare parts from other manufacturers will invalidate the ITW Gema guarantee conditions!

About this manual

General information

This operating manual contains all the important information which you require for the working with the PZ Powder center with Touch Panel. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - reciprocators, booths, powder gun control units, powder guns etc. - should be referenced to their corresponding documents.

Software version

This document describes the operation of the powder center control with software version starting from:

Software	Version
Galileo	V2_1g
MXPro	V2_1g

Structure and function

Field of application

The PZ Powder center with Touch panel is conceived for simple and clean handling of the coating powder and enables a quick color change. The coating powder can optionally be processed either from powder containers, as delivered from the powder manufacturer, or from a special fluidized container.

The powder center is an essential part of the color change system and is largely responsible for the end product quality. As a part of the process controlled coating plant, it is laid out for fully automatic operation.

The most important characteristics of the powder center are:

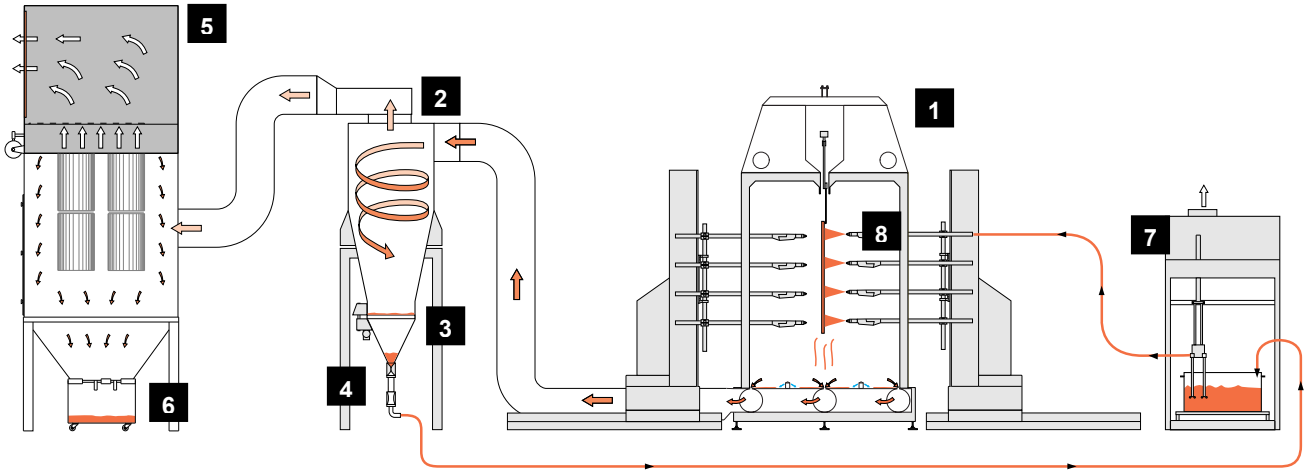
- Processing the powder from the original container or a fluidized container
- Functional unit with its own exhaust system
- Integrated electrical and pneumatic control units
- Powder level monitoring through level sensor
- Level controlled raising and lowering station with built-in injectors and fluidizing equipment
- Automatic internal cleaning of the suction tubes, injectors, powder hoses and guns
- Refeed of the recovered powder through a sieve machine or directly into the powder container
- A built-in exhaust unit prevents the escape of powder particles during the coating process and during cleaning

General operating sequence

Powder flow

By the typical powder center (**7**) operation, the powder container is placed on the vibrating table. The injectors move downwards into the powder through the level sensor, and fluidize the area around the suction tubes. The fluidized powder is sucked up by the injectors and fed through the powder hoses to the spray nozzles (**8**). The powder, which does not adhere to the workpieces, is absorbed by the exhaust air of the booth and separated from the air in the cyclone separator (**2**).

The separated powder is cleaned passing through the integrated sieve (**3**) and transported back into the powder container by the dense phase conveyor (**4**), where it can be reused for coating operation.



Powder flow in the plant

1	Booth	5	After Filter
2	Cyclone separator	6	Refuse container
3	Sieve	7	Powder center
4	Dense phase conveyor	8	Automatic guns

Cleaning procedure for color change

If a color change is necessary, the powder center will be cleaned, the injectors are moved out from the powder container, and the powder container is removed.

The cleaning procedure is released now, and the injectors and suction tubes are transported into the cleaning position, i.e. they move onto the blow-off nozzles below the vibrating table. The powder in the hose lines is now blown out automatically by the pre-rinsing. The following rinsing procedure at full system pressure cleans the suction tubes, injectors, powder hoses and guns internally. These parts are blown off externally by hand, in preparation for the next color.

The powder, which is still in the recovery system, is caught in a waste container. The powder recovery line from the cyclone is also cleaned by back flushing.

Note:
The booth and the cyclone have also to be cleaned, when a color

change takes place! The cleaning procedures are described in the corresponding user manuals.

After this cleaning process, a new powder container can be used and the coating with the new color can continue. During the first minutes of operation with the new powder, it is recommended to collect the recovered powder in a waste container and not to reuse.

PZ Powder center

The PZ powder center is an independently functioning unit with its own powder preparation unit, powder transport equipment with blow-off equipment, an exhaust air system, an electrical control unit and pneumatic control unit.

The powder center is designed for a quick color change concept and replaces the usual powder coating from fluidized powder hoppers.

Instead of fluidized powder hoppers, powder boxes or powder manufacturer's containers are supplied for direct use. After using, these containers can be kept in the powder storage room.

In order to avoid color change problems, well known from practical experience, a fundamental difference is made in the powder center between light and dark colors, to achieve a quick and qualitatively good changeover from light to dark colors or vice versa. This means, that an own set of powder hoses for light and dark colors is provided.

Powder preparation unit

In the powder preparation unit the recovered powder and also the fresh powder are prepared for the transport to the spray guns.

The powder box or the powder container, from which the guns are supplied, is positioned on the vibrating table. An additional, local fluidization enables the powder transport.

Powder transport equipment

In this collective term, the injectors with the suction tubes, the powder hoses and powder level regulation with fluidization are included.

The complete powder transport equipment is fitted on a pneumatic linear cylinder.

Blow-off equipment

The blow-off equipment enables the automatical cleaning or blowing off of the injector suction tubes, the injectors, the powder hoses and the spray guns.

The blow-off nozzles required for this are fitted below the vibrating table. One blow-off nozzle is required for each injector.

The cleaning procedure must be initiated manually by activating the cleaning key on the powder center. Starting from this time, the cleaning procedure takes place automatically.

Cleaning operation mode

The booth is stopped on the booth control unit, switched to cleaning mode and the booth doors are closed. The powder container or powder box are removed from the powder center.

Now, the activation of the cleaning function can take place on the powder center. The powder transport equipment moves down into the cleaning position. The injector suction tubes, the injectors, the powder hoses and the guns are rinsed in pulses with compressed air.

During the cleaning sequence, the powder transport equipment is cleaned manually on the exterior with a compressed air gun.

Detailed information about the commands mentioned in this manual you will find in the plant control unit operating manual.

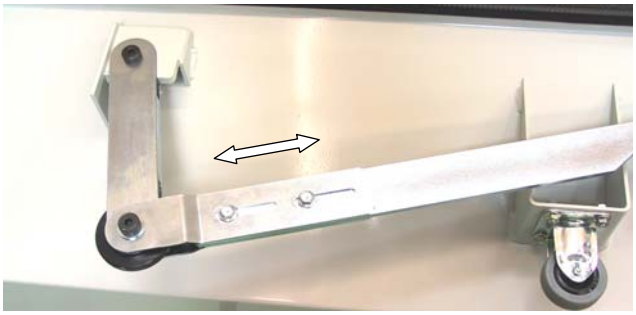
Emptying the waste powder container

Waste powder container

The waste powder container is fitted under the powder center and is emptied in accordance to following steps:

1. Pull the handle upwards and move it outwards
2. Put the handle in the rear notch
3. Move the waste powder container outwards and empty it
4. Move the empty waste powder container under the powder center
5. Pull the handle upwards and move it inward
6. Put the handle in the front notch

Note:
The waste powder container must be fitted tightly under the powder center, so that no additional air can be aspirated!
The stroke for fitting the container is adjusted on both sides of the handle.



Waste powder container - setting the stroke on the handle

Note:
The minimum space requirement for emptying the waste powder container is 1000 mm. The minimum space requirement for moving out and removing the waste powder container is 1500 mm!

Functional procedure during coating operation

Basically, two operation types are possible with the powder transport equipment; the operation with or without fresh powder supply.

Without fresh powder supply

Normally, the multiple color operation takes place without automatic fresh powder supply.

In this main function, the powder transport equipment moves constantly downwards with the sinking powder level in the powder box or powder container. The powder level to be fluidized can be adjusted by the level sensor.

If the powder transport equipment reaches the lowest powder level, a powder shortage signal takes place. The used powder container must be replaced with a full one. The coating process can now be restarted.

If coating is done with the powder box, a new powder bag is to be put into the powder box after the powder shortage signal has initiated. By pressing the **Refill fresh powder** key, the powder transport equipment moves on the upper powder level in the powder box. The coating procedure is not interrupted, compared to the preceding coating procedure.

With fresh powder supply

If coating is done with an automatic fresh powder supply, e.g. with one main color and fresh powder supply from a Big Bag, then the powder transport equipment in the powder box does not move.

In this case, the fresh powder supply is initiated by level sensor. As soon as the level sensor is no longer covered with powder, the fresh powder supply is initiated and new powder is fed into the powder box.

In both application cases, a continuous powder output to the guns is ensured, because the immersion depth of the injector suction tubes into the powder is kept constant.

Technical data

PZ Powder center with Touch panel

Electrical data of the powder center

PZ Powder center with Touch panel	
Input voltage	3x400 V
Frequency	50/60 Hz
Power consumption	3,5 kW
Protection type	IP54

Electrical data of the Touch panel

PZ Powder center with Touch panel	
Nominal voltage	24 VDC SELV extra-low safety voltage
Tolerance	+/- 10%
Reverse voltage protection	yes
Protection	yes (internal melting fuse)
Electrical insulation	no
Power consumption	max. 34 W

Pneumatic data

PZ Powder center with Touch panel	
Input pressure	min. 6 bar / max. 10 bar
Compressed air consumption during operation	25 Nm³/h
Compressed air consumption during cleaning	150 Nm³/h
Water vapor content of compressed air	max. 1,3 g/m³
Oil content of compressed air	max. 0,1 mg/kg

Dimensions

PZ Powder center with Touch panel	
Base area (width x depth)	1330 mm x 1790 mm
Overall height	2370 mm
Weight	from 740 kg, depending on the version

Exhaust air unit

PZ Powder center with Touch panel	
Air volume	approx. 3000 Nm³/h

Powder transport

PZ Powder center with Touch panel	
Conveying performance	150 kg/h

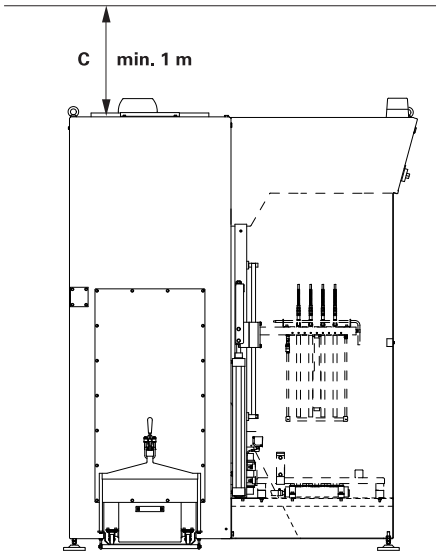
Start-up

Set-up and assembly

Assembly notes

By assembling a PZ Powder center with Touch panel, the following points are to be observed:

- The powder center is set up on 4 leveling pads
- The vibrating table must be leveled exactly during assembly
- In order to prevent the powder center from moving during operation, the leveling pads must be fixed with screws to the floor
- The powder center must be grounded according to the local regulations
- To avoid disturbing air turbulences at the exhaust air opening, there must be a free space (**C**) of min. 1 m



PZ Powder center - free space on exhaust air opening

Hose connections

When laying out the hose connections, the largest radii as possible (if possible, at least 300 mm) are to be used. This reduces pressure losses in the lines and avoids wear and depositing in the powder hose.

A proper hose layout improves the overview, increases operating safety, and simplifies the search for faults.

Note:
Installation work to be done by the customer must be carried out according to local safety regulations!

Preparation for start-up

Before the start-up of the powder center must be considered, that the powder center is already parameterized on delivery, however, it can be adapted according to client's plant specifications.

Note:
All changed values have absolutely to be entered into the parameter table!

Check cable and hose connections

All cable and hose connections must be checked for perfect layout and tight fitting of the connection elements.

Electrical wiring and screening concept

All CAN bus users are to be wired in accordance to the enclosed electrical diagrams.

Attention:
The control unit must be connected to the emergency stop power circuit, i.e. when an emergency stop takes place, the control unit is switched off!

- Assembly and fitting of electric devices may only be done by an electronics specialist
- For trouble-free operation with high data transmission rates, a clear grounding concept is mandatory. A uniform grounding potential is a prerequisite for this!
- Exclusively screened cables are to be used for the wiring. The cable shield is connected at both ends largely to ground

Note:
Both ends of the cable shield must generally or as often as possible be connected to the ground, otherwise malfunctions can occur! Furthermore, the reliability of the unit and the normal processing procedure could be reduced!

Addressing/address distribution

The communication between the users in the network takes place by CAN bus, therefore each existent component must be classified with an explicit, individual user address (Node-ID).

Equipment	Address decimal	Address hexadecimal	Remark
Guns	1-64	1-40	Last Opti with bus termination
Axes	65-80	41-50	in display 1-16
Powder center/FixCleaner	82	52	Gematic control unit/Touch Panel
Booth node	84	54	Decentral passive WAGO-I/O
Light grid node	85	55	Decentral passive WAGO-I/O
CA07 valve pool for OptiAir 1-12	86	56	Festo valve pool CPV10-GE-C02-8
CA07 valve pool for OptiAir 13-24	87	57	Festo valve pool CPV10-GE-C02-8
CA07 valve pool for OptiAir 25-36	88	58	Festo valve pool CPV10-GE-C02-8
I/O for powder center/FixCleaner	89	59	Decentral passive WAGO-I/O
I/O for FixCleaner, simulator	90	5A	Decentral passive WAGO-I/O
Valve pool for FixCleaner	91	58	Festo valve pool CPV
Encoder	96	60	Fixed address with bus termination
Gematic CR03 panel	97	61	Gematic panel
Powder center panel	98	62	Gematic panel
CEDES Master light grid	100	64	Master address
CEDES Slave light grid	116	74	Slave address

Grounding of the powder center

The powder center must be grounded according to the general, local safety regulations. The grounding of the powder center must be checked regularly.

Adjusting the reflex sensor

On the vibrating table, a reflex sensor checks the presence of a powder container. The sensor must be adjusted in accordance to the following description:

Adjusting the switching threshold

1. Point the sensor to the object and clean the optical lenses
2. Adjust the sensitivity with the potentiometer in such a way, that the switching point is between the target and the background (or between a bright and dark target)

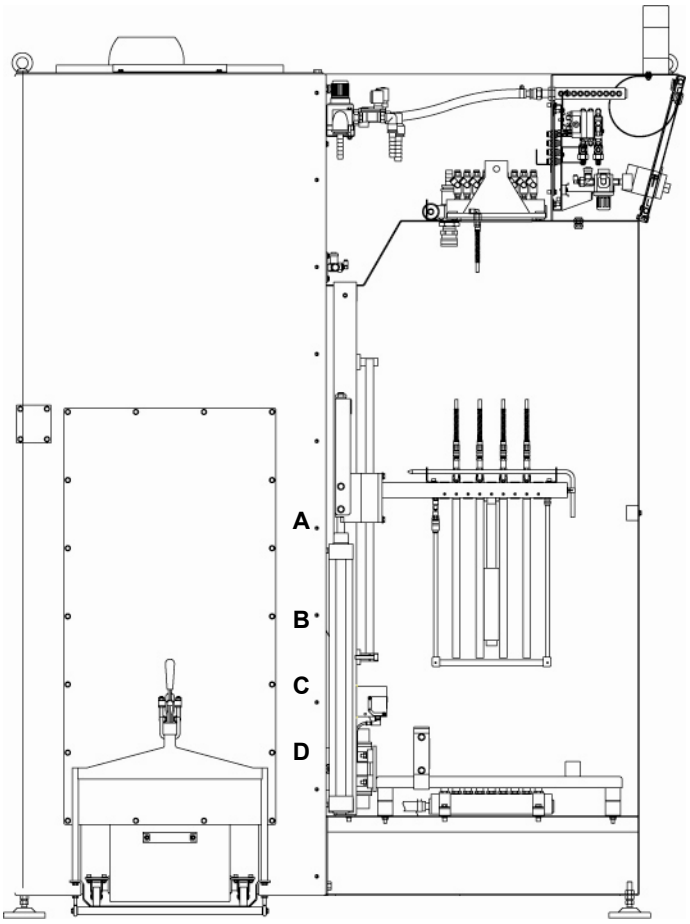
Attention:
The scanning range depends on the target surface condition and the color of the object being monitored!

A blinking LED shows that the sensor is working without excess gain. Either the sensor is not adequate aligned to the object, the lens surfaces are dirty or the target does not emit enough light.

The optical lenses surface must be cleaned regularly and carefully!

Adjusting the limit switches on the lifting cylinder

On the lifting cylinder, 4 proximity switches are installed for following functions, from top to bottom:



PZ Powder center - limit switches on lifting cylinder

A	Operating position with automatic fresh powder supply (level sensor in filling position, fresh powder working position)
B	Lowest operating position (level sensor in end position, lowest suction level)
C	Cleaning position for blowing off the suction tubes
D	Cleaning position for blowing off the suction tubes, injectors and powder hoses

Adjusting the proximity switches

The proximity switches are adjusted in following steps:

1. Install the proximity switch for the operating position **A** with automatic fresh powder supply at 330 mm, starting from the upper cylinder end piece
2. Install the proximity switch for the lowest working position **B** at 440 mm, starting from the upper cylinder end piece
3. Install the proximity switch for blow-off position **C** at 550 mm, starting from the upper cylinder end piece
4. Install the proximity switch for blow-off position **D** at 600 mm, starting from the upper cylinder end piece
5. Move the cylinder to the upper end position
6. Move the cylinder to the working position for automatic fresh powder supply
7. Check, if the distance between the suction tube and the fluidizing plate of the powder container, respectively the floor of the powder box is approx. 100-300 mm.
   These settings can be made according to the customer's specifications. A greater distance from the floor means a large powder volume to run the plant, gives, however, greater safety with short breaks in the fresh powder supply.
8. Move the cylinder to the blow-off position of the suction tube. Check, if the distance between the suction tube and nozzle is approx. 20-30 mm.
   With this distance the blow-off effect of the suction tube is influenced and can be accommodated to the customer‘s specifications.
9. Move the cylinder to the blow-off position
10. Check if the limit switch 4 is in operation (cylinder is under pressure)

Exhaust system/differential pressure

The powder center exhaust system (fan with filter cartridges) prevents the escape of powder from the powder center. The differential pressure is the air pressure difference between the filter cartridges/fan (suction side) and the working room (exhaust side). This differential pressure gives information about the resistance of the filter cartridges (general state/pollution) and will be set with the pressure gauge in the powder center (factory setting 1.5 kPa).

Set exhaust volume

The exhaust air volume can be influenced with the vanes on the fan exhaust. In order to achieve the correct air volume, the unobstructed exhaust exit of the fan at start-up must be 80 mm (at mains frequency of 50 Hz) or 70 mm (at mains frequency of 60 Hz).

Note:
If too large exit openings are chosen, this can lead to premature clogging or to damage on the filter cartridges!

Touch panel

Operating panel

The operation and monitoring of the powder center takes place by the operating panel of the control unit.

The operation panel serves to initiate the function commands, which are necessary for the satisfactory operation of the powder center. The function parameters are also entered by the control panel. These are set at the factory and, therefore, may only be changed after consultation with an ITW Gema service center.

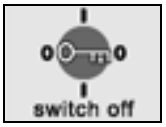
Operating panel

Information

No release - booth not ready

Release OK - booth is ready

The signal comes from the booth control unit trough the CAN bus, or through the digital input, if it's a foreign manufacturer booth.



Control voltage is switched off

Control voltage is switched on

Key functions

Attention:
The keys of the input field should only be pressed with fingertips and under no circumstances with fingernails or hard objects!

Function keys

Start powder center for coating

Key is not activated until boot is ready

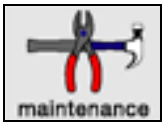
For this function, no log-in is necessary

Cleaning for color change

Key is not activated until boot is ready

For this function, no log-in is necessary

Change log-in for parameters, modify configuration or change language



Configuration

Parameters

Language change

By pressing the Help-key, the phone number of the ITW Gema Helpline will appear.

Attention:
The function parameters are set at the factory and may not be changed by the customer!
Parameters may only be modified after consultation with an ITW Gema Service center!

Operating modes

General information

The following operating modes can be selected by the Touch panel:

- **Powder coating**
- **Cleaning**
- **Service/set-up/parameterization**

The operating modes are explicitly described in the following chapters.

The operation level of the Touch panel is designed with pictograms, so that only the really essential parameters are displayed and the operator can therefore reach his solution quickly.

Basically, the control unit is not in one of these operating modes after switching on, or after a restart. The operating modes are selected on the panel.

Coating operation

Before switching on the powder center

Before switching on the powder center, the following points must be observed:

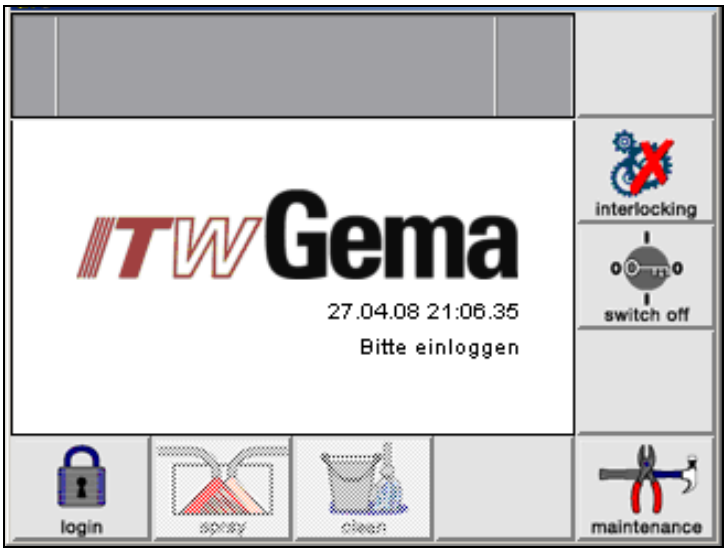
- Observe the safety regulations
- Check the grounding of the powder center, the booth and the other plant units and ensure it, if necessary
- Check the compressed air supply

Starting up the powder center

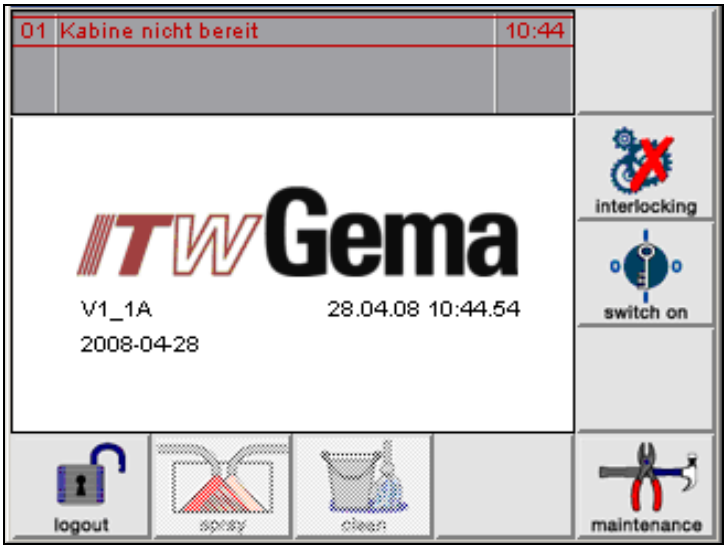
Attention:
The keys of the input field should only be pressed with fingertips and under no circumstances with fingernails or hard objects!

The start-up takes place according the following steps:

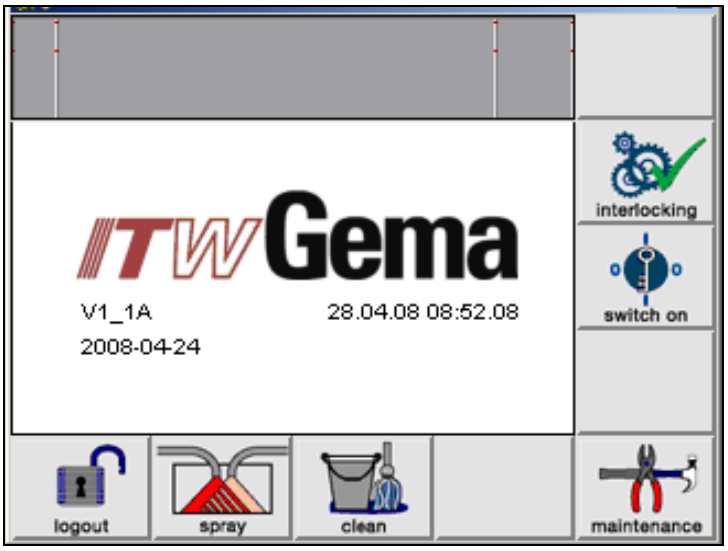
1. Switch on the booth (see the booth operating instructions) - the **Booth ready** signal may be present
2. Switch on the powder center main switch



3. Switch on the control voltage in the powder center with the key switch:
   - the key switch returns to its starting position
   - the interior lighting switches on
   - the exhaust air fan starts up
   - the display shows the basic menu



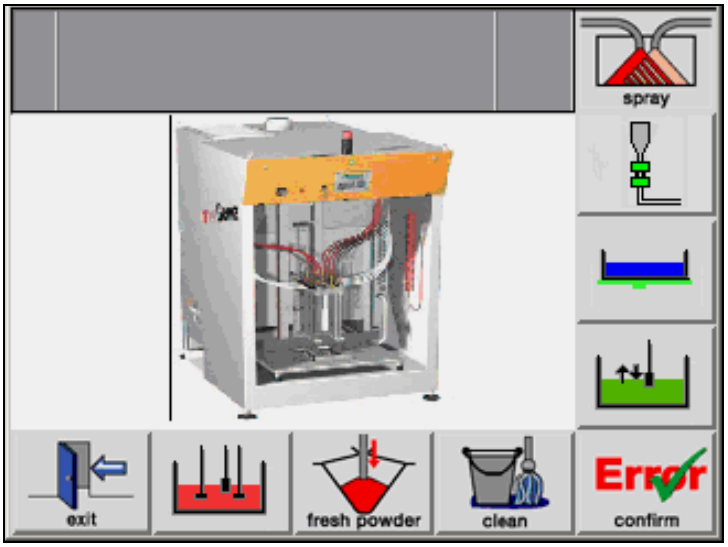
4. Wait for booth release



5. Place the powder box on the vibrating table

6. Press the 

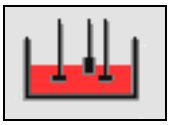
key
The following menu appears on the display:
   - Fluidization switches on

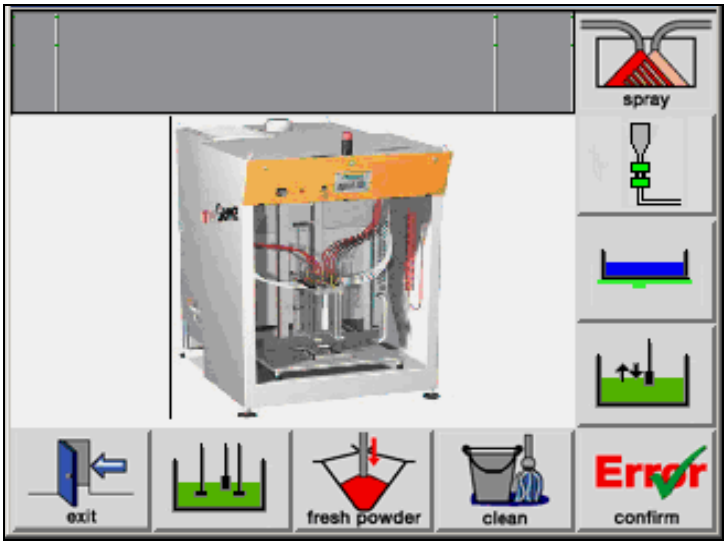


The fresh powder system symbol appears only if it was preselected in the **Configuration** menu.

7. The key 

closes the **Coating** menu and returns to the main menu

8. Press the  key
The following menu appears on the display:



The dense phase conveyor symbol appears only if it was preselected in the **Configuration** menu.

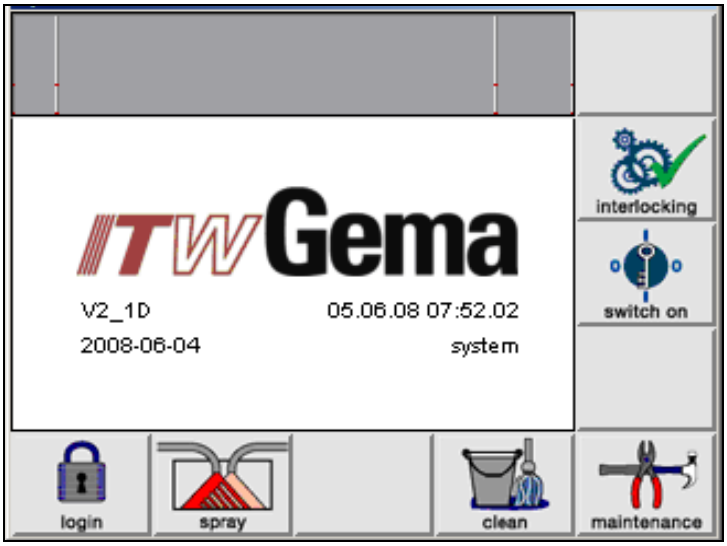
- the injectors move downwards
- the level control is activated
- the vibrating table switches on

- the powder sieve switches on

9. Check the fluidization in the powder container
   - The powder must "boil" lightly (adjust with the pressure regulator on the rear wall of the powder center)

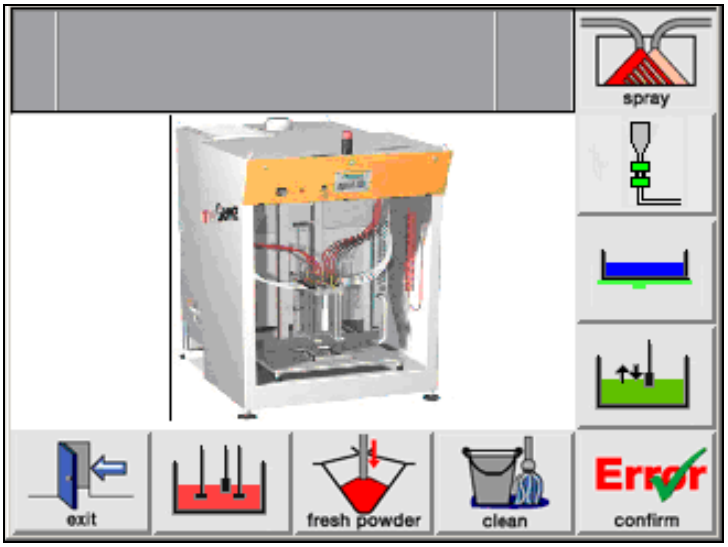
Starting up the powder center after an emergency stop

1. Switch on the booth (see the booth operating instructions) - the **Booth ready** signal may be present
2. Switch on the powder center main switch
3. Switch on the control voltage in the powder center with the key switch:
   - the key switch returns to its starting position
   - the interior lighting switches on
   - the exhaust air fan starts up
   - the display shows the basic menu

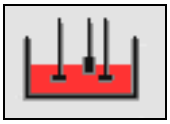


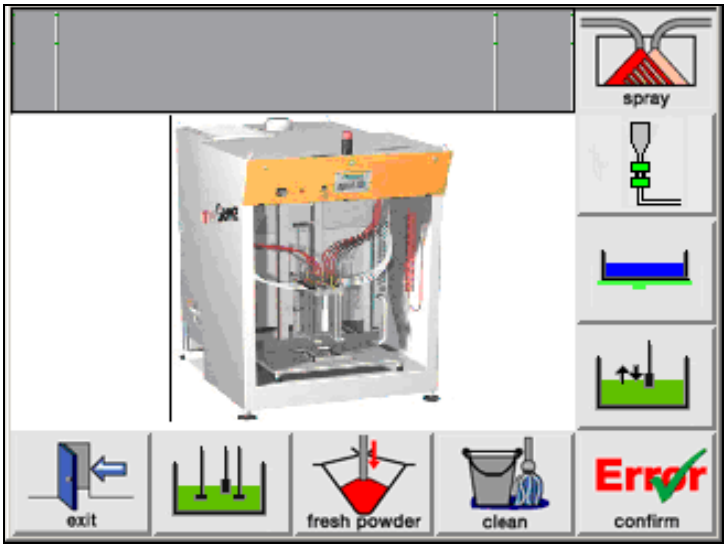
4. Press the 

key
The following menu appears on the display:



- Fluidization switches on

5. Press the  key
   The following menu appears on the display:



- The injectors move downwards, and the level control unit is activated
- The vibrating table switches on, the powder sieve switches on

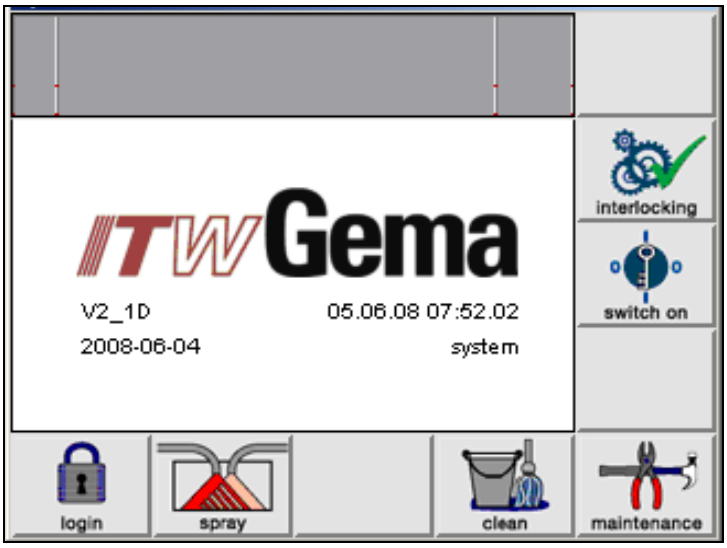
6. Check the fluidization in the powder container
   - The powder must "boil" lightly (adjust with the pressure regulator on the rear wall of the powder center)

Switch off the powder center

The following steps must be taken to switch off the powder center:

1. Check if all the workpieces have been coated
2. Press the 

key
The following menu appears on the display:



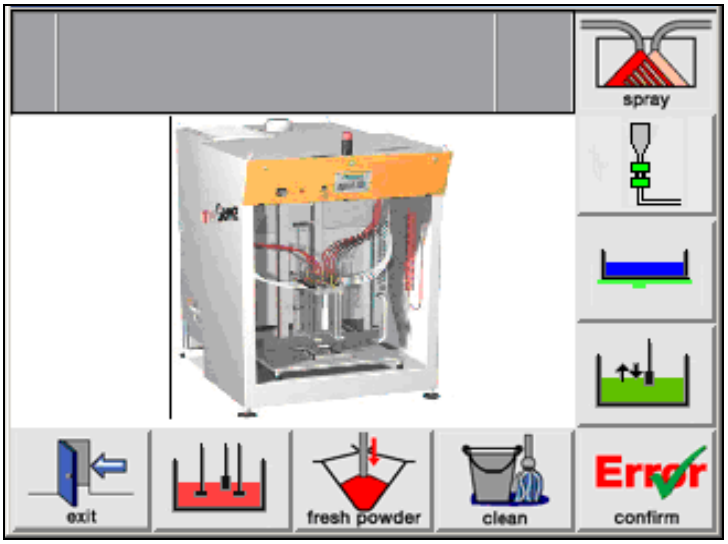
   - the injectors move upwards
   - the level control is activated
   - the vibrating table switches off
3. Switch off the powder center by key switch
   - the interior lighting expires
   - the exhaust air fan switches off
4. Switch off the main switch

Change the powder container during coating

Changing a powder container during the coating process takes place with the following steps:

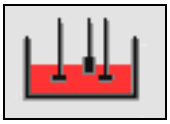
1. Check if coating can be interrupted
2. Press the 

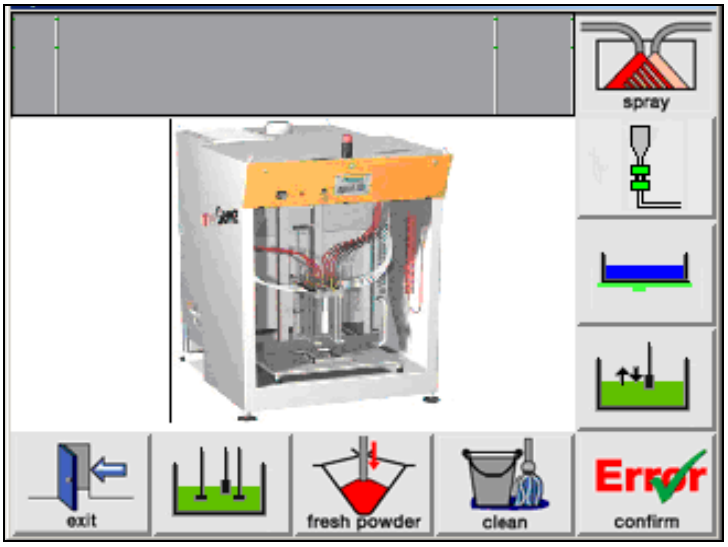
key
The following menu appears on the display:



- the injectors move upwards
- the level control is switched off
- the vibrating table switches off

3. Change the box on the vibrating table

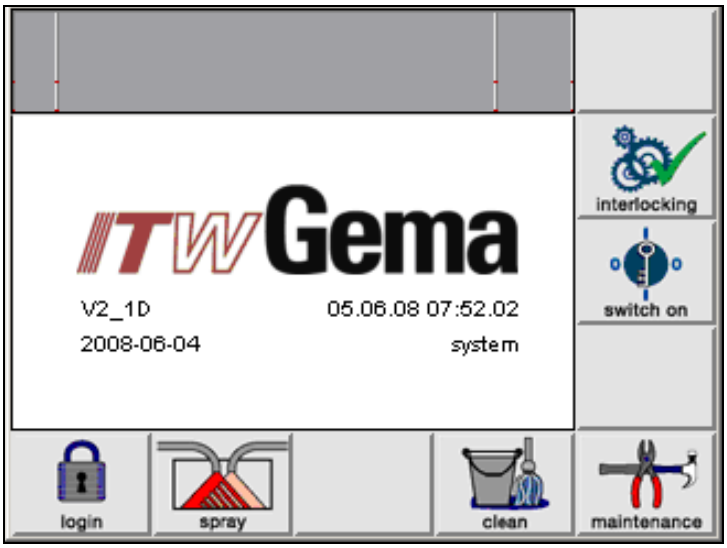
4. Press the  key
The following menu appears on the display:



- the injectors move downwards, and the level control unit is activated
- the vibrating table switches on

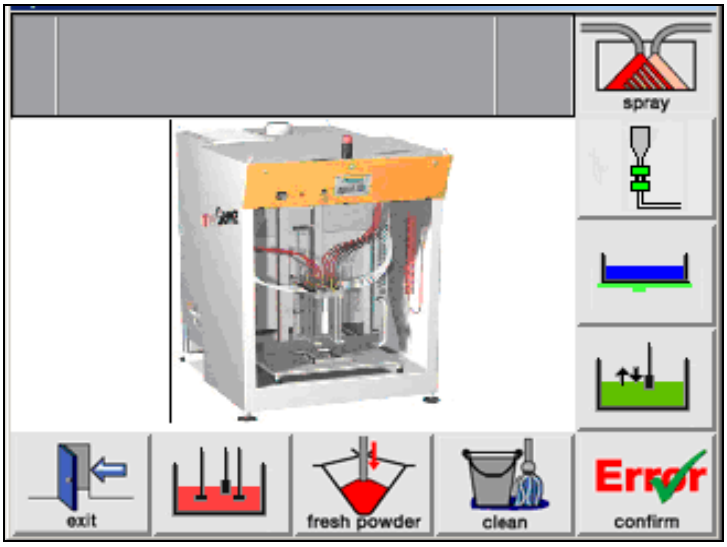
Operating with automatic fresh powder supply

1. Switch on the booth (for further information, see the booth operating instructions) - the **Booth ready** signal may be present
2. Switch on the powder center main switch
   The following menu appears on the display:
3. Switch on the control voltage in the powder center with the key switch:
   - the key switch returns to its starting position
   - the interior lighting switches on
   - the exhaust air fan starts up
   - the display shows the basic menu



4. Place the powder box on the vibrating table
5. Press the 

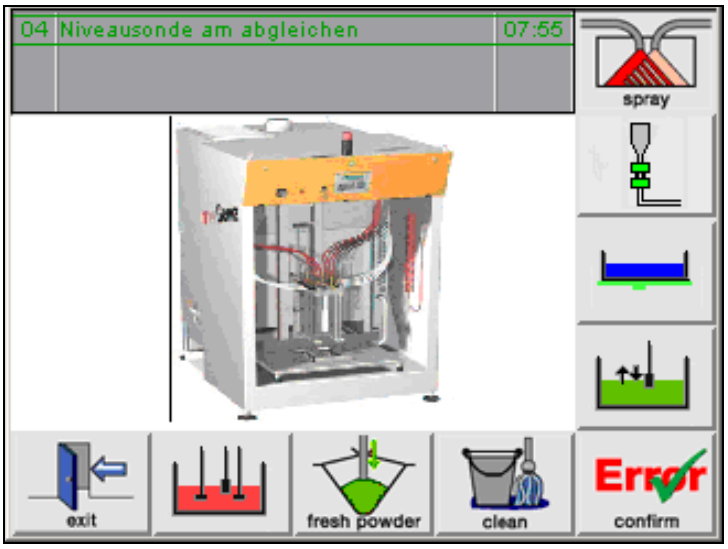
key
   The following menu appears on the display:



- the injectors move upwards automatically (to the starting position)

6. Press the 

key
The following menu appears on the display:



- the injectors move downwards to the fresh powder working position
- the fresh powder supply is activated
- the vibrating table switches on
- Fluidization switches on

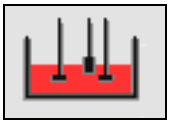
7. Check the fluidization in the powder container
   - The powder must "boil" lightly (adjust with the pressure regulator on the rear wall of the powder center)

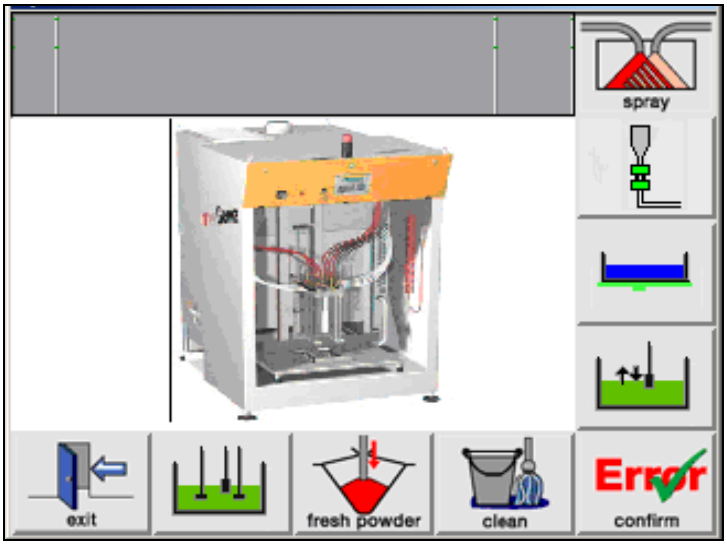
Procedure at a fault in the automatic fresh powder supply

If within the set time, no or only an insufficient fresh powder supply occurs, the flashing light switches on and the error message **no fresh powder** appears on the display

1. Press the 

key
This will acknowledge the error and restart the fresh powder supply

2. Press the 
key
The following menu appears on the display:



- the injectors move to the actual powder level
- Coating takes place without automatic powder supply
- the powder container will be emptied

If the fresh powder supply is ready to operate, the following procedure will activate the system again:

1. Press the 

key
The following menu appears on the display:

- the injectors move upwards (fresh powder operating position)
- the level control is switched off
- the fresh powder supply is activated

Coating with fresh powder is now operating again.

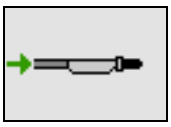
Cleaning

General information

The cleaning is started with the 

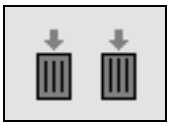
key.

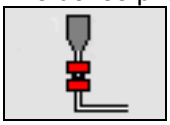
In the operating mode **Cleaning**, various cleaning procedures can be automatically initiated:

-  Cleaning of the guns, injectors and powder hoses

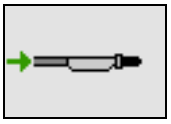
- 

Cleaning of the dense phase conveyor

-  Cleaning of the filter cartridges

The dense phase conveying can be stopped during cleaning with the  key.

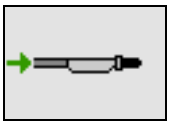
Gun cleaning

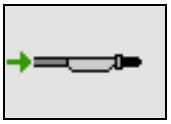
The gun cleaning is started with the  key

Attention:
Before starting the gun cleaning, the guns must be in cleaning position (see the operating instructions of the booth and axes)!

1. Press the 

key
The display shows the menu **Cleaning**

2. Press the  key
Following procedure will initiate automatically:
   - the injectors move downwards to the cleaning position
   - the blow off nozzles switch on, the suction tubes, injectors, powder hoses and guns are rinsed internally
   - the injectors remain in the cleaning position

3. This procedure can be repeated by pressing the  key again!
   - During this procedure the outsides of the suction tubes, injectors, supports etc. can be cleaned manually with the compressed air gun

4. Press the 

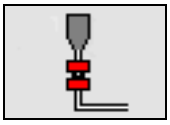
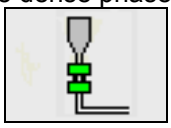
key
The display shows the main menu

Cleaning the recovery hose

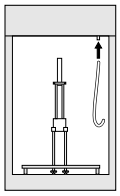
The cleaning of the recovery hose is started with the 

key

1. Press the 

key
   The display shows the menu **Cleaning**
2. Press the  key to stop the dense phase conveyor
   The key changes to the following view 
3. Open the cyclone funnel
4. Slowly swing out the sieve and clean with the compressed air gun

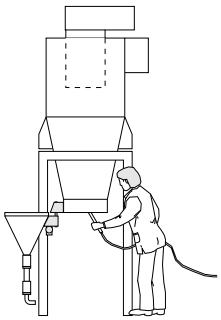
Attention:
In order to avoid damage to the sieve when blowing through the transport hose, make sure that the sieve is swung out completely during the cleaning process!



5. Connect the recovery hose to the cleaning connection on the cover of the powder center
6. Press the 

button
   - The transport hose is blown off in pulses for a defined duration
   - This procedure can be repeated by pressing the 

key again!



7. Swing the funnel on the cyclone slowly away and at the same time clean it off with the compressed air gun
8. Blow off the cyclone with the air hose/air lance from bottom to top, carefully clean the internal and external surfaces of the interior tube
9. Close the sieve and funnel on the cyclone again
10. Press the 

button
11. Place the powder container with the desired color on the vibrating table

12. Disconnect the recovery hose
13. Put the powder center into operation (see chapter "Start-up")

Cleaning the filter cartridges

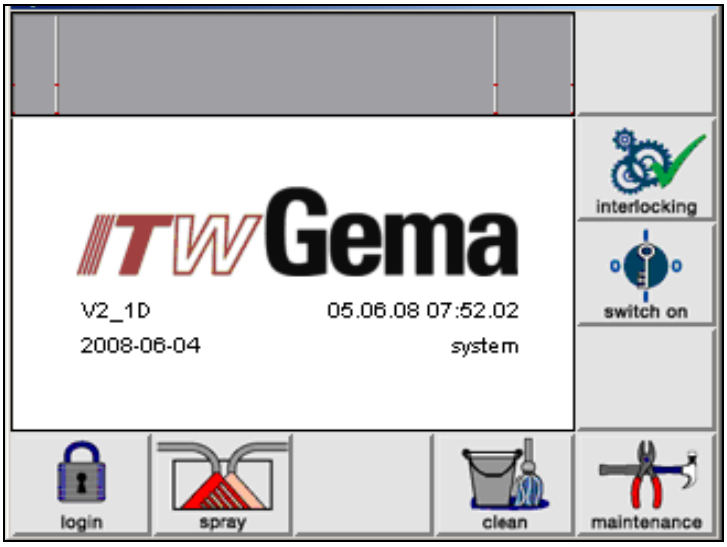
The filter cartridges can be cleaned cyclically during booth operation. The cleaning procedure must be initiated manually at the switch. The cycle determining times are set at the factory.

Note:
It is recommended to clean the filter cartridges at least once per week or more frequently with stronger powder accumulation. However, not more than once or twice per shift!

Filter cleaning can only be carried out when the powder center is in operation, with the following steps:

1. Check if coating can be interrupted
2. If yes, press the 

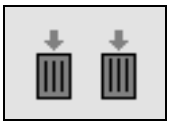
key
The display shows the main menu



- the injectors move upwards
- the level control is switched off
- the vibrating table switches off

3. Press the 

key
The display shows the **Cleaning** menu

4. Press the  key
   The filter cartridges are cleaned once or several times, one after the other (according to the set parameter) **(Attention - loud air blast!)**

This cleaning process can be repeated, as required.

Attention:
The cleaning times are set at the factory!
If the filter cartridges must be cleaned after a few hours of operation because the max. differential pressure has been overstepped (at which the fault message "M9 Please clean filter" is displayed), contact must be made with an ITW Gema Service center!

The upper limit value, at which the fault message is displayed, is customer-specific. The corresponding parameters are set on assembly by the ITW Gema service personnel.

5. Press the 

key
   The display shows the main menu

6. Press the 

key
   - the injectors move downwards
   - the level control is activated
   - the vibrating table switches on
   - Fluidization switches on

Now the control unit is ready for coating.

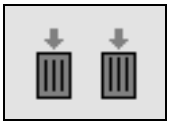
Color change

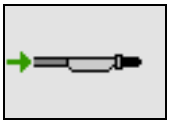
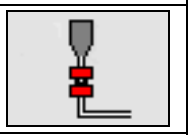
General information

The procedure at a color change in an automatic plant is described below. If the powder center is used for other applications, it can happen that some of the following points are not applicable and can, therefore, be skipped over.

A prerequisite for a quick and efficient color change is that it is done by 2 people, so that some of these steps can be carried out simultaneously. The color change can begin, when the last workpieces have left the booth. In automatic operation mode, the coating is stopped automatically.

Color change procedure

	Work step	Action
1	Close the booth and the manual coating doors - this prevents the powder from escaping when blowing off/trough the guns	
2	Switch the booth to cleaning mode	
3	Move the reciprocator and the XT axes to the cleaning position	
4	Return to the main menu	
5	Select **Cleaning** operating mode	
6	Remove the powder accumulations from the suction unit	
7	Take away the powder box from the vibrating table	
8	Blow off the suction unit from outside with the air gun	
9	Connect the recovery hose to the container	
10	Clean the filter cartridges, if necessary	

	Work step	Action
11	Move the suction unit to the cleaning position, internally gun cleaning	
12	Open the cyclone	
13	Stop the dense phase conveyor	
14	Disconnect the recovery hose from the container, insert it for cleaning and clean	
15	Connect the recovery hose to the rinsing connection	
16	Blow off and check the cyclone funnel	
17	Blow off the cyclone immersion tube by changing of extremely colors!	Use the immersion tube cleaning lance!
18	Close the cyclone	Watch out the gasket!
19	Clean and check the sieve	
20	Insert the sieve	Watch out the gasket!
21	Move suction unit upwards, fine cleaning, visual inspection	
22	Blow off the interior of the powder center	
23	Check suction unit for powder accumulation	
24	Insert powder container	
25	Activate coating operation, move suction unit downwards	
26	Connect recovery hose to the sieve machine after 2-3 minutes	
	Empty the waste drawer once per shift	Watch out the gasket!
	Check the guns for wear once per week	Replace the worn guns!

Service / set-up / parameterization

General information

All presettings which are necessary for operating, can be entered in the **Service** operating mode. The following submenus are available:

	Edit and check the system parameters of the plant
	Select the system language
	Check the inputs and define the output settings

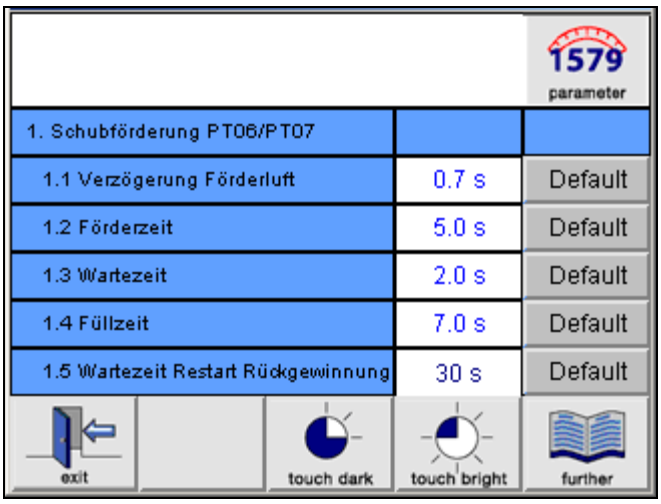
Note:
The programming of the parameters and programs takes place by the operating panel. During the setting of parameters, the fan is switched off and the control of the powder center does not take place. After terminating the service operating mode, a restart of the software must take place, if necessary!

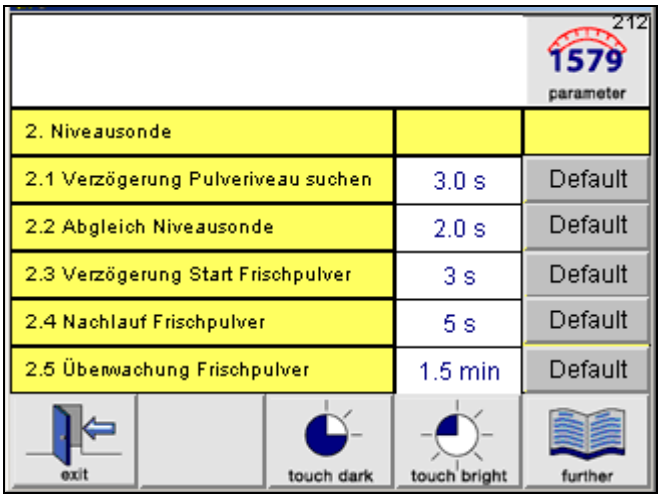
Parameterization

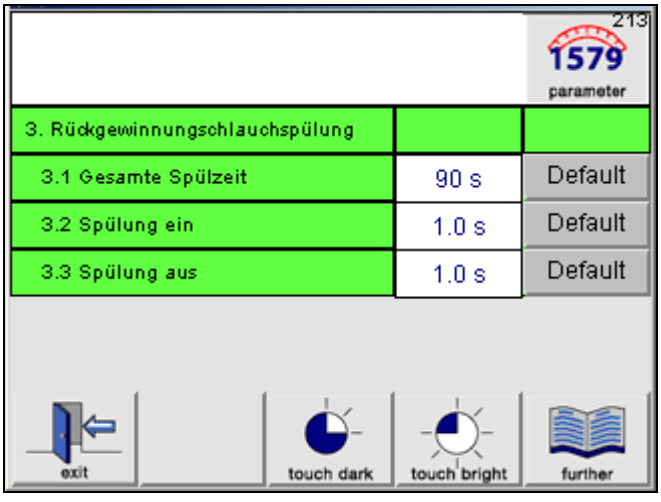
Attention:
The parameters are set at the factory and may not be changed by the customer!
Parameters may only be modified after consultation with an ITW Gema service center!

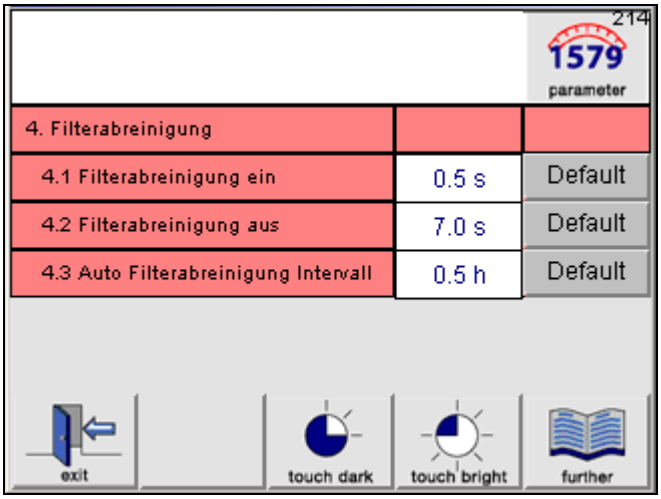
Parameter values

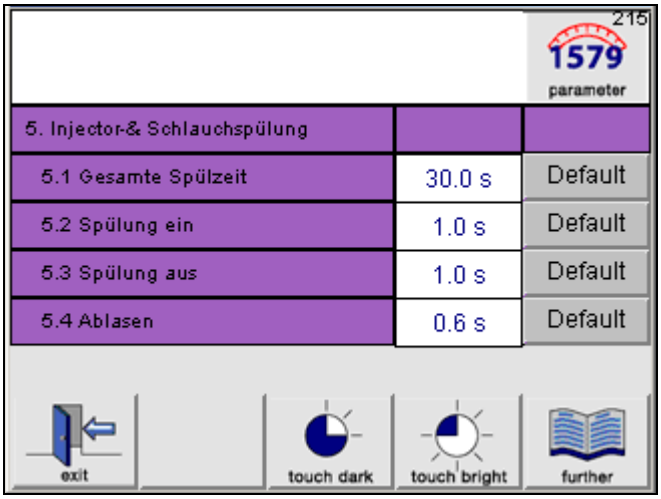
The following values are default values and are set at the factory. They have to be entered and adjusted by the service engineer at start-up.

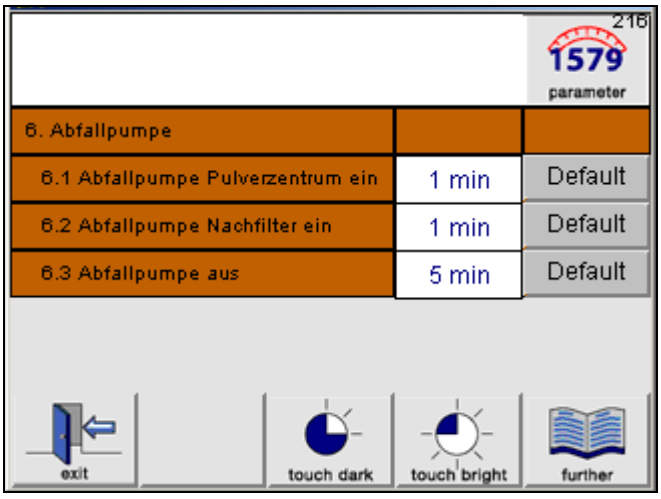


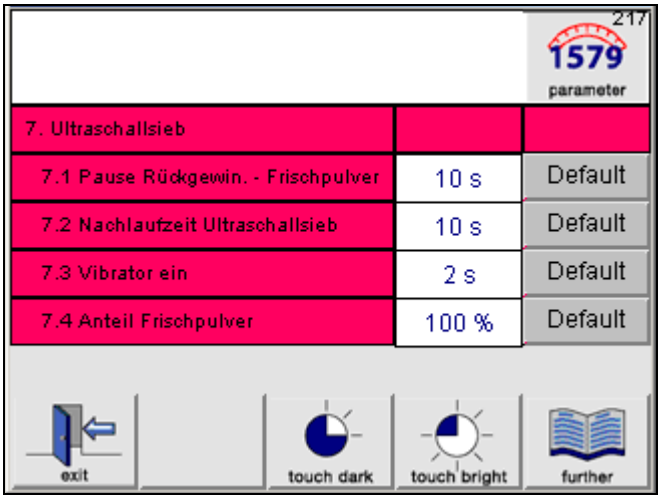


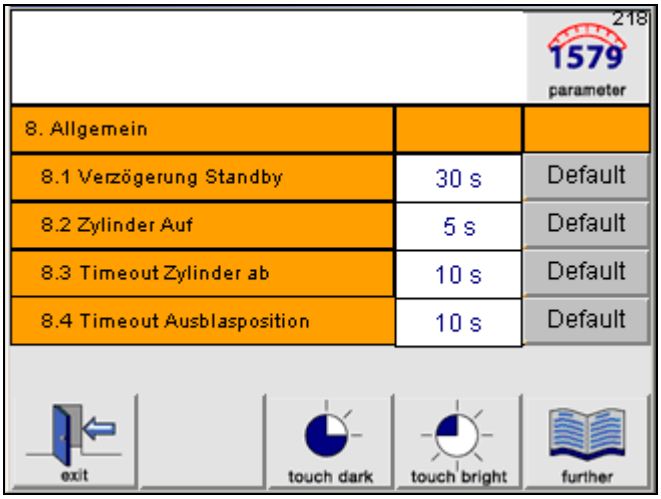


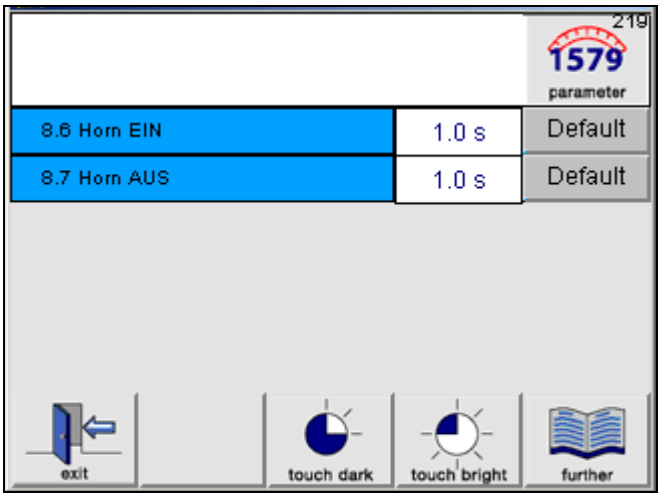

214
1579
parameter
4. Filterabreinigung
4.1 Filterabreinigung ein
0.5 s
Default
4.2 Filterabreinigung aus
7.0 s
Default
4.3 Auto Filterabreinigung Intervall
0.5 h
Default
exit
touch dark
touch bright
further


215
1579
parameter
5. Injector-& Schlauchspülung
5.1 Gesamte Spülzeit
30.0 s
Default
5.2 Spülung ein
1.0 s
Default
5.3 Spülung aus
1.0 s
Default
5.4 Ablasen
0.6 s
Default
exit
touch dark
touch bright
further


216
1579
parameter
6. Abfallpumpe
6.1 Abfallpumpe Pulverzentrum ein
1 min
Default
6.2 Abfallpumpe Nachfilter ein
1 min
Default
6.3 Abfallpumpe aus
5 min
Default
exit
touch dark
touch bright
further


217
1579
parameter
7. Ultraschallsieb
7.1 Pause Rückgewin. - Frischpulver
10 s
Default
7.2 Nachlaufzeit Ultraschallsieb
10 s
Default
7.3 Vibrator ein
2 s
Default
7.4 Anteil Frischpulver
100 %
Default
exit
touch dark
touch bright
further

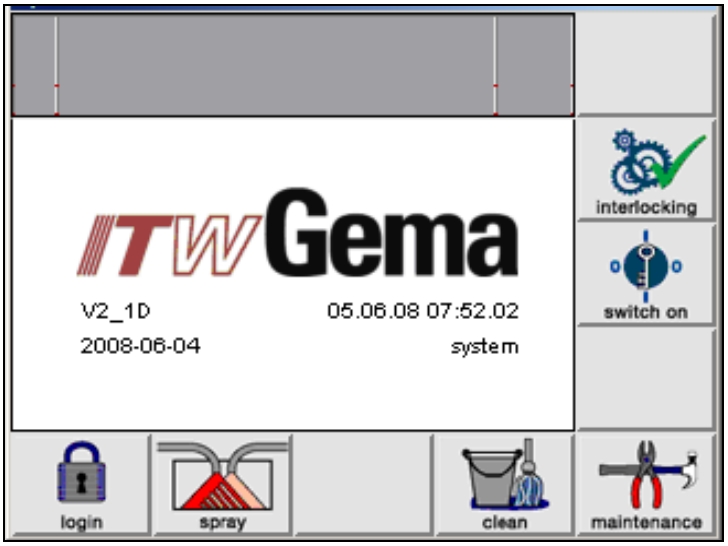

218
1579
parameter
8. Allgemein
8.1 Verzögerung Standby
30 s
Default
8.2 Zylinder Auf
5 s
Default
8.3 Timeout Zylinder ab
10 s
Default
8.4 Timeout Ausblasposition
10 s
Default
exit
touch dark
touch bright
further

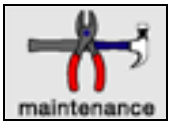

219
1579
parameter
8.6 Horn EIN
1.0 s
Default
8.7 Horn AUS
1.0 s
Default
exit
touch dark
touch bright
further

Language change

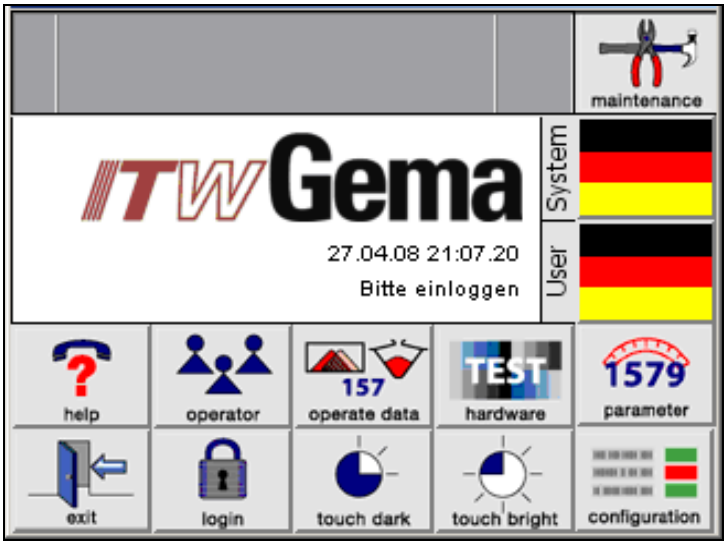
In order to input the settings on the operating panel, the plant must be in operation. To do this, proceed as follows:

1. Switch on the booth (see the booth operating instructions) - the **Booth ready** signal may be present
2. Switch on the powder center main switch
3. Switch on the control voltage in the powder center with the key switch:
   - the key switch returns to its starting position
   - the interior lighting switches on
   - the exhaust air fan starts up
   - the display shows the basic menu



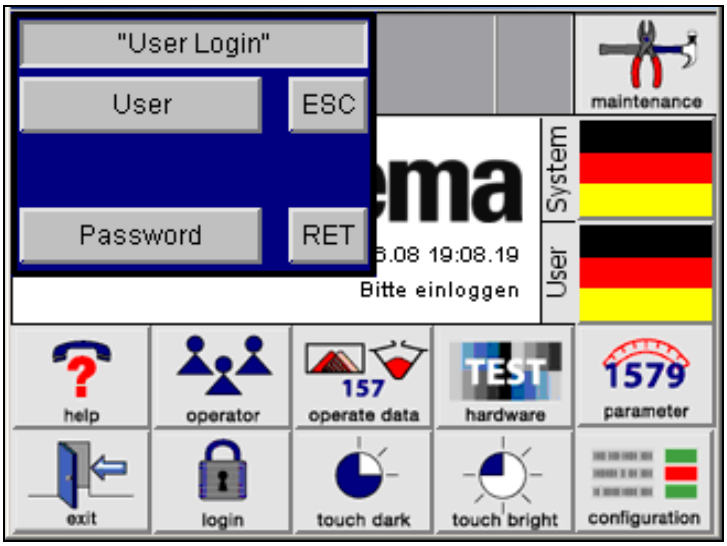
4. Press the 

key
The following menu appears on the display:

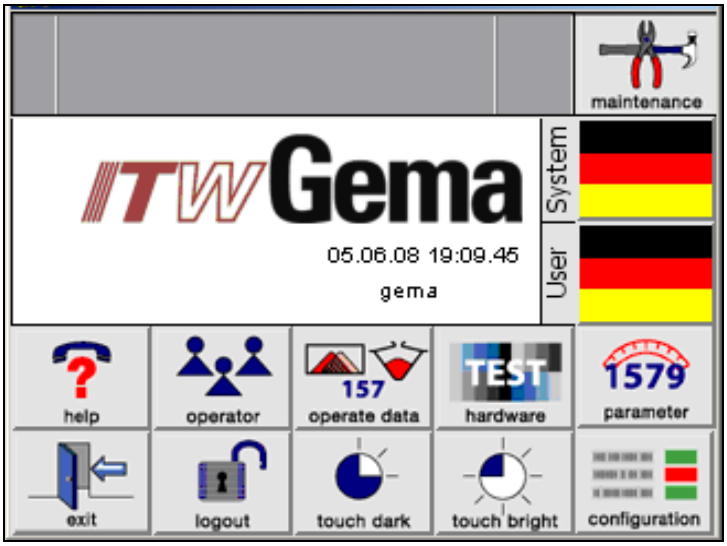


5. Press the 

key
The following menu appears on the display:

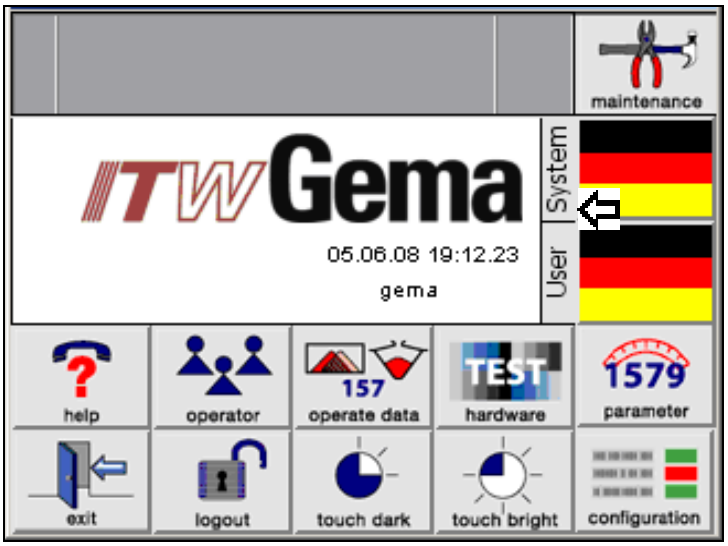


6. Log in with User = **gema**, password = **3138**
The following menu appears on the display:



7. Press the **User** key and select the desired flag

8. The following appears on the display:



9. Press the 

key, the previous display appears

Messages

Error messages

If there are faults on the powder center, an error message shown with a red font appears on the display. The causes of these errors must be eliminated, before further procedures are carried out (see therefore the troubleshooting guide).

If the error is eliminated, the display returns to the previous menu again.

No.	Text	Cause
1	Booth not ready	This message will be indicated, if the parameter **Stand alone** = FALSE and the signal **Booth ready** = FALSE
2	Cylinder or level sensor defective	Operation mode **Coating** is activated Coating started If the level sensor detects powder, the cylinder moves upwards. If the level sensor doesn't communicate **no powder** within 5 seconds, this error will be indicated **Remark:** This error is indicated with the message number 8! **Further reasons:** The sensor at the end position is defective or dampened, the level sensor is defective or too much powder clings to it
3	Switch on the control voltage	
4	Vibrator motor protection switch off	If the vibrator is switched on, the motor protection switch release will be monitored Check motor (overheat, running properties, voltage etc.) Check the settings of the motor protection switch Check the motor protection switch
5	Filter motor protection switch off	If the fan is switched on, the motor protection switch release will be monitored Check motor (overheat, running properties, voltage etc.) Check the contamination of the propeller Check the settings of the motor protection switch Check the motor protection switch
No.	**Text**	**Cause**
6	Vibrator sieve motor protection switch	If the sieve is switched on, the motor protection switch release will be monitored
7	Deep powder level	Operation mode **Coating** is activated

		Coating started Powder level sinks, and the cylinder will be lowered If the lower final position is reached without detecting powder, this message will be shown This message will be indicated if the cylinder is still on the final position **Remark:** This error is indicated with the message number 1
8	No fresh powder	Operation mode **Coating** is activated Fresh powder system is activated If the powder level dropped, fresh powder will be requested. This error will be indicated, if the powder level is not detected after 100 secs
9	Fill position not detected	Operation mode **Coating** is activated Fresh powder system is activated Cylinder will be lowered until the fill position is reached. This error will be indicated, if no powder is detected after the timeout of 5 seconds
10	Blow-off position not detected	Operation mode **Cleaning** is activated Injector, powder hose and gun cleaning is activated The cylinder will be lowered. This error will be indicated, if the blow-off position is not reached after 5 secs.
11	Cleaning position not detected	Operation mode **Cleaning** is activated Injector, powder hose and gun cleaning is activated This fault will be indicated, if the blow-off position is reached, but the cleaning position is not reached after 5 seconds
12	Differential pressure reached	This error is indicated if the control voltage is switched on and the differential pressure is reached **Remark:** This error is indicated with the message number 9
13	ICS communication malfunctioning	Check the CAN bus cable to the ICS
14	Security light grid interrupted	Check the PLC input 1.05 according to the wiring diagram
15	Powder center emergency stop	Check the powder center emergency stop key
16	External emergency stop	Check the external emergency stop key
17	No powder	Operation mode **Coating** is activated Coating started Cylinder will be lowered, until powder is detected This error will be indicated, if no powder is detected after the timeout of 5 secs

Warnings

Warnings shown with a green font are notes for the operating personnel. If a warning is present, it appears on the display. The warning must be acknowledged. Afterwards the last illustration shown appears on the display.

No.	Text	Cause
1	Refill powder	Operation mode **Coating** is activated Coating started Powder level sinks and the cylinder will be lowered. If the lower final position is reached without detecting powder, this message will be shown **Remark:** This message is indicated by error number 1
2	Remove the powder container	Operation mode **Cleaning** is activated Injector, powder hose and gun cleaning is activated This message will be indicated if the powder box is still inserted
3	Insert the powder box	Operation mode **Coating** is activated Coating started This message will be indicated if the powder box is not inserted
4	Level sensor adjustment	
5	Start fresh powder	Operation mode **Coating** is activated Fresh powder system is activated If the powder level dropped, fresh powder will be requested. An error message will be released, if the powder level is not detected after 100 secs
6	Clean the filter	This error is indicated if the control voltage is switched on and the differential pressure is reached **Remark:** This message is indicated by error number 9
7	No release for injector hose rinsing	X axes are not located on internal cleaning position

Maintenance

Daily after working pauses and at the end of shift

- Coarse cleaning of the booth
- Carry out the cleaning (see chapter "Cleaning")
- Dry cleaning of the container recognition sensor on the vibrating table
- Check the nozzles for wear (see also the gun operating instructions)
- Check the injector hose connections for wear or clogging with the help of the ITW Gema plug gauge

Check weekly

- Check in the clean air chamber the after-filter housing for powder deposits through the exhaust air opening (powder deposits are an indication of defect or badly fitted filter elements)
- Clean the powder center completely (no wet cleaning)
- Check the oil separator
  (if oil is present, the compressed air preparation must be checked)

Check every 6 months

- Disconnect the measuring lines of the pressure gauge on the manometer, and blow it off from the manometer to the measuring point (beginning of the line).

Attention:
The indicated blowing direction is absolutely to be observed!

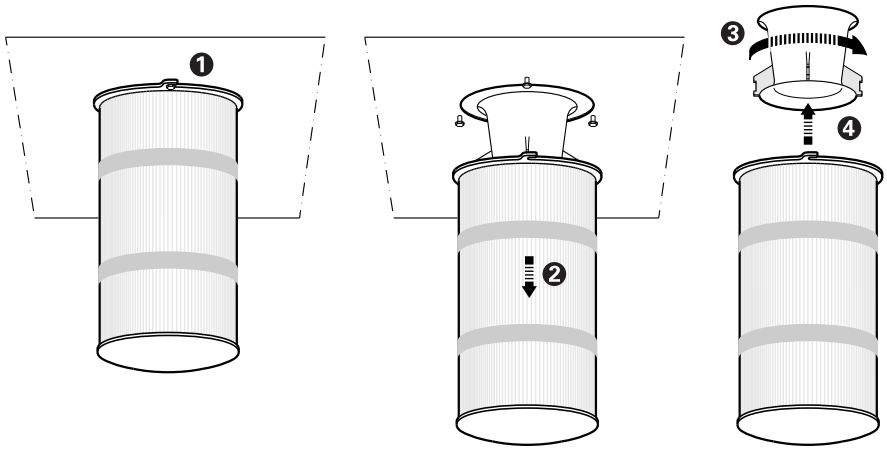
Replacing the filter cartridges

The filter cartridges must be replaced, if:

- Powder is present in the fan chamber in spite of satisfactory assembly
- The fault message **Clean filter cartridges** appears in short intervals

A filter cleaning operation must take place before every filter cartridge replacement:

1. Start up the powder center
2. Clean all filter cartridges manually several times
3. Switch off the powder center
4. Remove the service panel on the side of the exhaust air housing
5. Loosen the 3 filter cartridge fixing screws a couple of turns (**1**), do not unscrew completely
6. Turn the filter cartridge slightly and lift down from the fixing screws (**2**)
7. Turn the Venturi tube (**3**) and dismantle from the filter cartridge (**4**)



Replacing the filter cartridges

8. Remove the displacement tube by pressing the locking spring and pull out of the filter cartridge
9. Clean all parts, especially the seating surfaces and the threads on the filter cartridge connection
10. Fit the displacement tube and the Venturi tube into the new filter cartridge
11. Hang the filter cartridge onto the fixing screws and turn to the stop
12. Tighten the fixing screws evenly to the spacing stop, so that the seal sits all the way round and the filter cartridge hangs vertically
13. Install the service panel again

Replacing the filter pad on the fan housing

The filter pad must be replaced, if:

- The contamination is very thick and can no longer be blown off
- The filter pad is clogged with powder residue
- The air permeability is strongly reduced

After unscrewing the retaining grid, the filter grid can be opened, the filter pad replaced and the grid can be screwed back.

Attention:
If the interior of the fan housing is covered with powder, it must be looked for from where the powder can occur this area!
Above all it is important to check the filter cartridges!

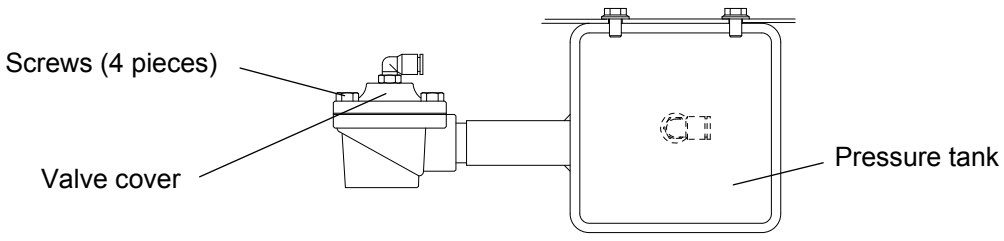
Replacing the membrane valve on the pressure tank

Attention:
Before the working on the membrane valve can be carried out, it must be made sure that the pressure tank is empty!

The membrane valves are installed with split nuts on the rinsing tubes of the pressure tank. The following steps must be taken:

1. Empty the pressure tank:
   Disconnect the compressed air supply to the powder center
2. Remove the filter cartridges according to chapter "Replacing the filter cartridges"
3. Check if the pressure gauge on the filter rinsing pressure reducing valve displays 0 bar
4. Remove the membrane valve by unscrewing the split nut
5. Loosen the membrane valve hose connection
6. Fit the new membrane valve in the reverse order

Attention:
The exhaust opening of the membrane valve must be fitted vertically, pointing downwards, in the center of the filter cartridge!



Troubleshooting

General information

Attention:
Faults may be fixed by trained personnel only!

If an emergency stop occurs or there is a fault in the powder center fan motor, the whole plant is switched off.

A signal lamp illuminates simultaneous with the appearance of every fault message. The fault message is acknowledged by pressing the **ACK** key.

Problem fixing

Problem/error/malfunction	Procedures/remedy
The fan does not run or switches off	Check the switch-on procedure, see section "Starting up the powder center" Check the motor protection relay Check the temperature of the fan motor Check the contamination of the fan
Too little suction	Check the direction of rotation of the fan Cleaning pressure too low, set to at least 2.5 bar Filter cartridges are clogged, clean according to section "Replacing the filter cartridges" Filter pad on the fan housing clogged, see section "Replacing the filter pad on the fan housing" Check the fan exhaust opening, see section "Set exhaust volume"
Powder in the clean air chamber and/or powder exits from the exhaust opening	Filter cartridges defect or badly fitted (leaking), see also section "Replacing the filter cartridges"

Problem/error/malfunction	Procedures/remedy
Filter cleaning does not work or only works unsatisfactorily	Check the cleaning pressure Poor compressed air quality (contains oil or water) Check the control pressure of the membrane valve Check the membrane valve according to chapter "Replacing the membrane valve on the pressure tank" Check exhaust opening of the membrane valve (vertically, pointing downwards)
Filter cleaning does not switch off	Check the control pressure to the membrane valve Replace the membrane valve according to chapter "Replacing the membrane valve on the pressure tank"
Air escapes from the safety valve on the compressed air tank (hissing noise)	Check the adjusted pressure on the filter rinsing pressure regulator

Attention:
Do not make repairs or setting works on the safety valve!
The pressure tank must be empty before service works on the membrane valves are carried out!

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** PZ Powder center with Touch Panel
  Serial number 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *****.

The wear parts are always marked with a **#**.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

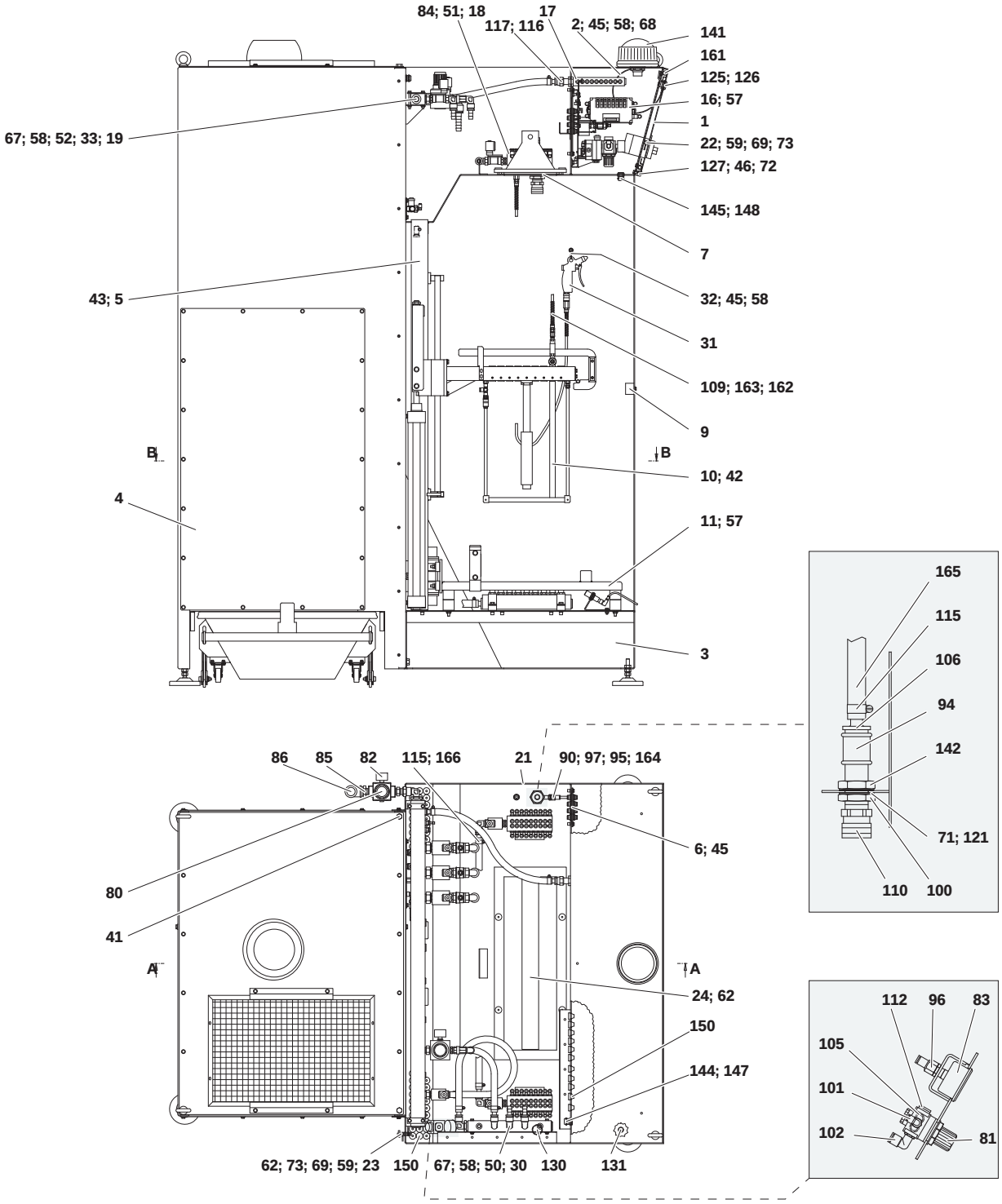
Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)

WARNING!
Only original ITW-Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the ITW Gema guarantee conditions!

PZ1 Powder center - complete

1	Panel (see Touch Panel spare parts list)	
2	Safety cable - L=550 mm	373 940
3	Operating area housing	379 999
4	Exhaust air unit 1 - complete	391 336
	Exhaust air unit 2 - complete	386 278
	Exhaust air unit 3 - complete	391 964
5	Cylinder unit - complete	380 652
6	Connection plate - 16-fold, complete, VZ01	382 264
	Connection plate - 32-fold, complete, VZ01	382 272
7	Plexiglas plate - type 100	374 202
8	Hose connector	375 551
9	Double hose holder - complete	372 790
10	Injector holder - complete (see Injector unit spare parts list)	
11	Vibration table - complete (see Vibration table spare parts list)	
12	Blow-off block	373 079
13	Block holder bracket	379 913
14	Rubber nozzle	379 921
15	Blow-off nozzle	379 930
16	Pneumatic unit - 1.0, dense phase conveyor, VZ01/AL1 1SF	373 206
	Pneumatic unit - 1.0, dense phase conveyor, VZ01/AL1 2SF	374 580
	Pneumatic unit - 1.01, dense phase conveyor, VZ01/AL2	387 754
	Pneumatic unit - 1.02, dense phase conveyor, VZ01/AL2	387 762
17	Distributor tube 1.0 - complete	379 158
18	OR-Valve battery 18-F - complete	393 908
19	Distributor tube 2.0 - complete (see distributor tube spare part list)	
20	Connection plate	386 340
22	Grounding cable - APS 1	366 650
23	Studding - M6x50 mm, brass	301 159
24	Lighting unit - type 100-2-5 - complete	351 725
25	Perforated plate - 2sp	382 434
	Perforated plate - 4sp	384 216
	Perforated plate - 6sp	384 232

PZ1 Powder center - complete

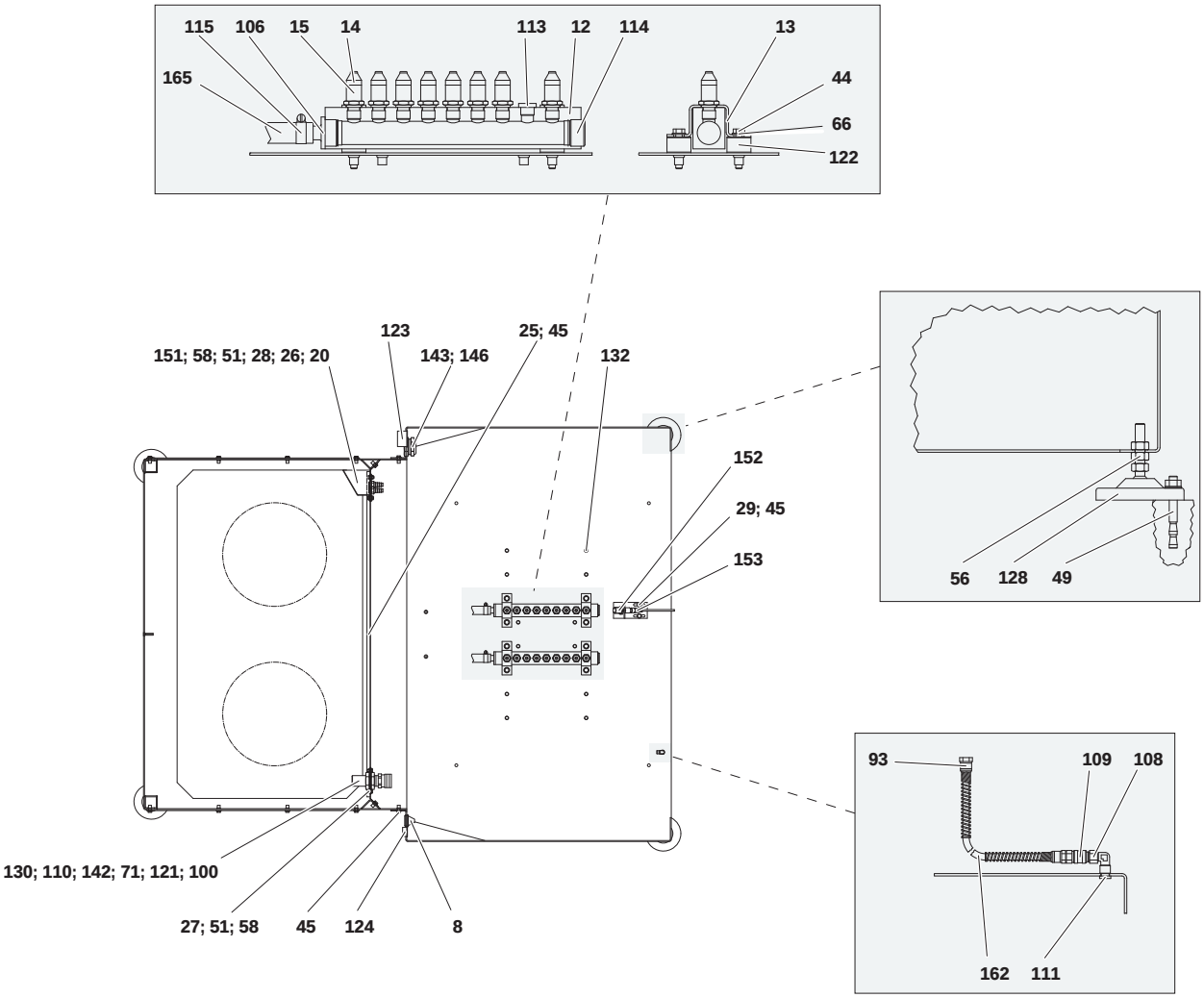


PZ1 Powder center - complete, part 1

PZ1 Powder center - complete (cont.)

26	Deflector	382 442
27	Cover panel	384 224
28	Connecting nipple	386 359
29	Sensor holder	389 234
30	Distributor tube 2.1 - complete (see distributor tube spare part list)	
31	Compressed air gun - complete	389 510
32	Compressed air gun hook	393 320
33	Terminal strip	393 894
41	Hexagon screw - M12x20 mm, galv.	248 576
42	Shakeproof screw - M8x25 mm, galv.	244 465
43	Shakeproof screw - M8x20 mm, galv.	244 422
44	Hexagon screw - M8x10 mm, galv.	213 900
45	Shakeproof screw - M6x16 mm, galv.	244 503
46	Hexagon screw - M12x20 mm, galv.	213 802
49	Steel bolt dowel A - M10x90 mm	245 216
50	Hexagon screw - M6x50 mm, galv.	213 870
51	Shakeproof screw - M6x12 mm, galv.	244 406
52	Hexagon screw - M6x60 mm, galv.	213 888
56	Hexagon nut - M12, galv.	215 597
57	Hexagon shakeproof nut - M8, galv.	244 449
58	Hexagon shakeproof nut - M6, galv.	244 430
59	Hexagon nut - M6, brass	200 417
62	Milled nut - M6, brass	200 433
66	Washer - Ø 8.4/17x1.6 mm, galv.	215 813
67	Washer - Ø 6.4/12.5x1.6 mm, galv.	216 020
68	Washer - Ø 6.4/16x1.6 mm, galv.	215 805
69	Washer - Ø 6.4/12.5x1.6 mm, brass	200 476
71	Spacing ring - Ø 36/48x0.3 mm	200 760
72	Lock washer - M6 R	205 117
73	Shake proof washer - A-type, M6 R	200 450
80	R/F unit - 0-10 bar	240 133
81	Pressure regulator - 0.5-6 bar	264 342
82	Pressure gauge - 1/8"a, 0-10 bar	259 179
83	Pressure gauge - Ø 50 mm, 1/4"a, 0-6 bar	260 517
84	Plug - Ø 8 mm	238 023

PZ1 Powder center - complete (cont.)



PZ1 Powder center - complete, part 2

PZ1 Powder center - complete (cont.)

85	Double nipple - 1"a-1/2"a, galv.	259 225
86	Elbow joint - 1"i-1"i, galv.	259 454
90	Fluidizing pad	237 264
93	Nut with kink protection - M12x1 mm, Ø 8 mm	201 316
94	Adapter - 1"i-1"i, galv.	260 274
95	Connection sleeve - 1/4"i, Ø 8 mm	233 390
96	Connection sleeve - 1/4"i, Ø 6 mm	233 404
97	Adapter nipple - 1/8"i-1/4"a	231 932
100	Double nipple - 1"a-1"a, galv.	258 733
101	Elbow joint - 1/8"a, Ø 6 mm	203 033
102	Elbow joint - 1/4"a, Ø 8 mm	224 359
105	Y-connection fitting - 1/4"a, Ø 8 mm	260 215
106	Hose connection - Ø 19 mm, 1"a	259 250
108	Connector - NW5, 1/8"i	200 859
109	Quick release connection - NW5, Ø 8 mm	203 181
110	Coupling - female thread G1"	258 539
111	Plug cap - 1/8"a	203 297
112	Plug cap - 1/4"a	203 300
113	Plug cap - 3/8"a	203 319
114	Plug cap - 1"a	258 679
115	Hose clamp - 25-35 mm	226 335
116	Adapter - 1/2"i-1/2"i	202 622
117	Hose connection - Ø 16-1/2"a	259 268
121	Gasket - Ø 36/50x2 mm	200 751
122	Rubber damper - Ø 30x20 mm, M8	260 460
123	Blind grommet - TI-2-234	260 541
124	Blind grommet - TI-2-222	260 576
125	Locking	262 110
126	Guide - Zh 26	262 153
127	Hinge - 180°, black	258 652
128	Leveling pad - Ø 110 mm/M12, L=96 mm	255 610
130	Blind grommet - TI-4-355	207 705
131	Blind grommet - TI-2-214	263 648
132	Blind grommet - TI-4-073	260 754

PZ1 Powder center - complete (cont.)

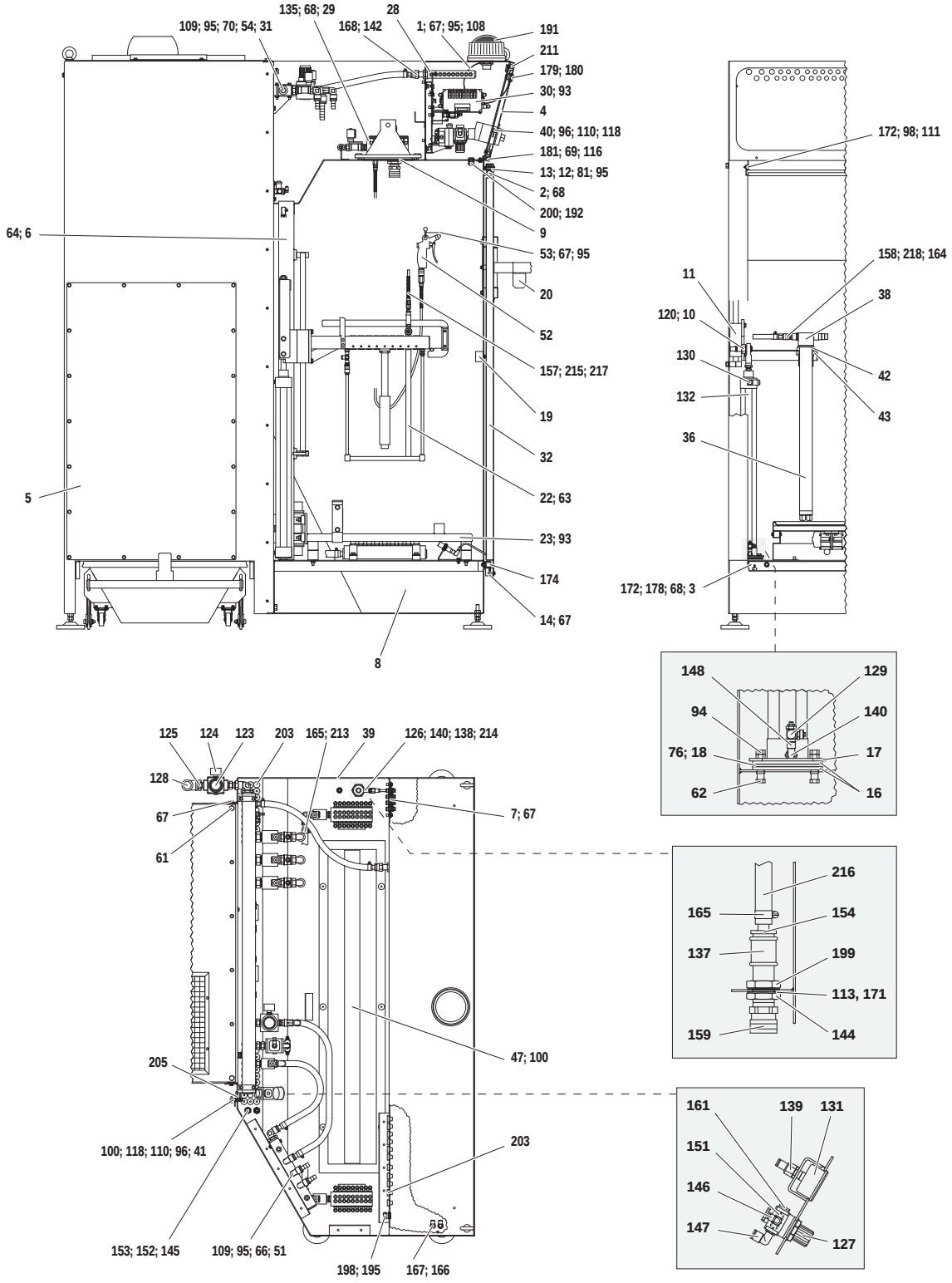
141	Flashing lamp	266 680
142	Locknut - G1", galv.	258 717
143	Lead-through - PG36, Ø 30-35 mm, brass	260 550
144	Lead-through - PG13, brass	204 919
145	Lead-through - PG11, brass, long	260 240
146	Locknut - PG36, brass	217 166
147	Locknut - PG13, brass	229 474
148	Locknut - PG11	200 387
150	Cable lead-through - Tet-C, 7-10 mm	258 873
151	Locknut - PG09, brass	204 420
152	Switch-key	265 802
153	Connecting cable - 5 m, 4 pins, M12, elbow connector	260169
161	Edge protection profile - 22x15 mm	104 655
162	Plastic tube - Ø 8/6 mm, black, antistatic	103 756*
163	Plastic tube - Ø 8/6 mm, red	103 500*
164	Plastic tube - Ø 8/6 mm, black	103 152*
165	Solaflex hose - Ø 19/26 mm	104 213*
166	Solaflex hose - Ø 16/23 mm	102 296*

* Please indicate length

PZ2 Powder center - complete

1	Safety wire - L=550 mm	373 940
2	Bar	375 349
3	Guide profile	375 381
4	Cover Standard - VZ02	375 306
	Cover with OP17 - VZ02	384 739
5	Exhaust air unit 1 - complete	391 336
	Exhaust air unit 2 - complete	386 278
	Exhaust air unit 3 - complete	391 964
6	Cylinder unit - complete	380 652
7	Connection plate - 16-fold, complete, VZ01	382 264
	Connection plate - 32-fold, complete, VZ01	382 272
8	Operating area housing	382 906
9	Plexiglas plate - type 150	376 175
10	Bearing bolt	374 210
11	Linear slide bar	374 229
12	Roll	375 357
13	Bearing bush	375 373
14	Runway	375 403
15	Hose connector	375 551
16	Rubber washer	376 388
17	Clamp plate	376 302
18	Retaining disk	376 310
19	Double hose holder - complete	372 790
20	Swivel frame - complete	373 877
21	Guide support - double	376 299
22	Injector holder - complete (see injector spare parts list)	
23	Vibration table - complete (see vibration table spare parts list)	
24	Blow-off block	373 079
25	Block holder bracket	379 913
26	Rubber nozzle	379 921
27	Blow-off nozzle	379 930
28	Distributor tube 1.0 - complete (see distributor tube spare part list)	
29	OR-Valve battery 18-F - complete	393 908

PZ2 Powder center - complete

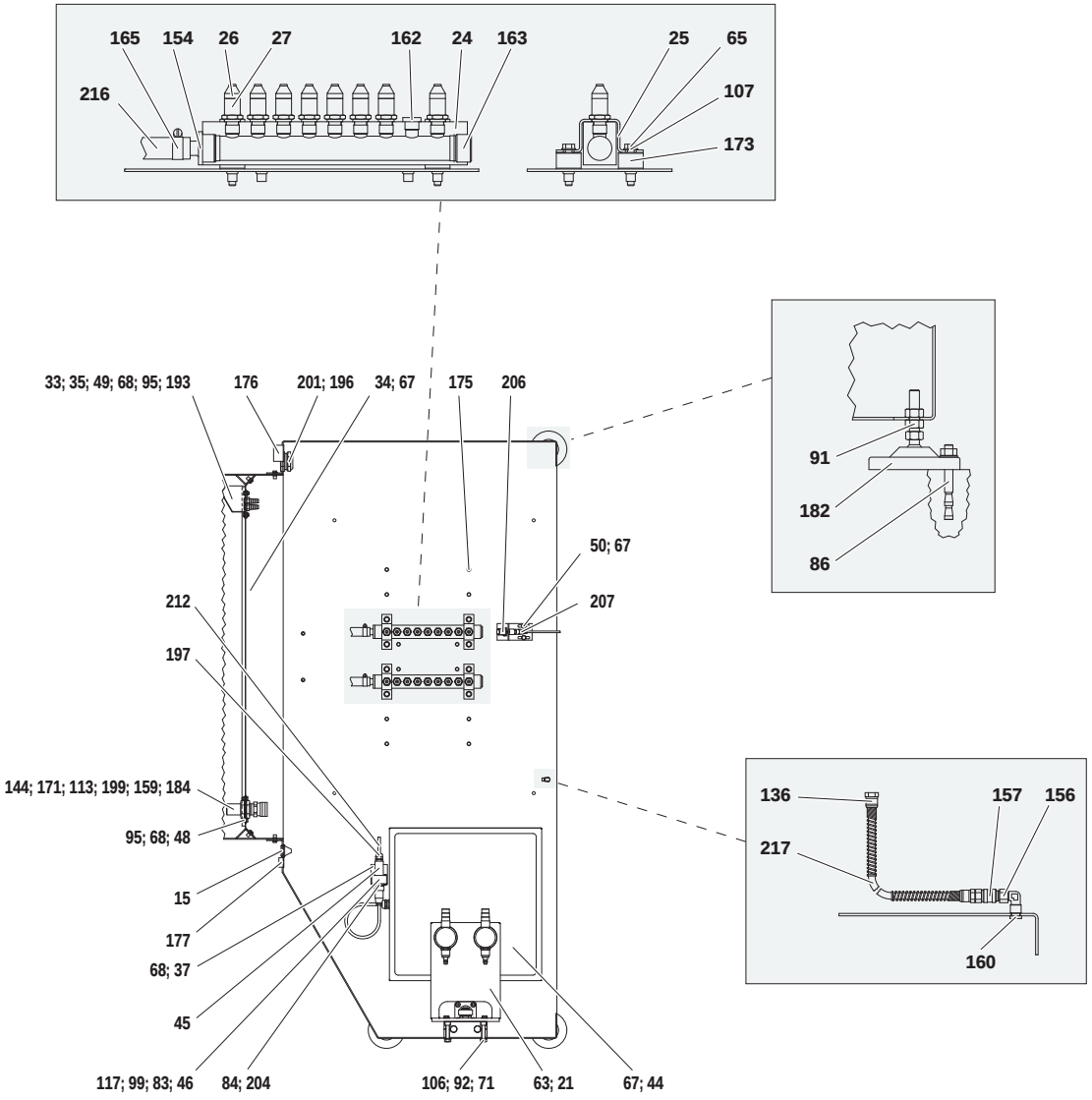


PZ2 Powder center - complete, part 1

PZ2 Powder center - complete (cont.)

30	Pneumatic unit - 1.0, dense phase conveyor, VZ02/AL1	378 305
	Pneumatic unit - 1.0, dense phase conveyor, VZ02/AL2	387 770
31	Distributor tube 2.0 - complete (see distributor tube spare part list)	
32	Door	375 390
33	Connection plate	386 340
34	Perforated plate - 2sp	382 434
	Perforated plate - 4sp	384 216
	Perforated plate - 6sp	384 232
35	Deflector	382 442
36	Fluidizing/suction unit	357 960
37	Mounting bracket	355 437
38	PP02 Powder pump - complete	357 910
40	Grounding cable - APS 1	366 650
41	Studding - M6x50 mm, brass	301 159
42	Pump holder	357 855
43	Locknut	357 863
44	Vibration table - complete	372 099
45	Cap	205 133
46	Intermediate piece	303 267
47	Lighting unit - type 150-2-5 - complete	354 945
48	Cover panel	384 224
49	Connecting nipple	386 359
50	Sensor holder	389 234
51	Distributor tube 2.1 - complete (see distributor tube spare part list)	
52	Compressed air gun - complete	389 510
53	Compressed air gun hook	393 320
54	Terminal strip	393 894
61	Hexagon screw - M12x20 mm, galv.	248 576
62	Hexagon screw - M8x45 mm, galv.	213 985
63	Hexagon shakeproof screw - M8x25 mm, galv.	244 465
64	Hexagon shakeproof screw - M8x20 mm, galv.	244 422
65	Hexagon screw - M8x10 mm, galv.	213 900
66	Hexagon screw - M6x50 mm, galv.	213 870
67	Hexagon shakeproof screw - M6x16 mm, galv.	244 503
68	Hexagon shakeproof screw - M6x12 mm, galv.	244 406

PZ2 Powder center - complete (cont.)



PZ2 Powder center - complete, part 2

PZ2 Powder center - complete (cont.)

69	Hexagon screw - M6x10 mm, galv.	213 802
70	Hexagon screw - M6x60 mm, galv.	213 888
71	Allen cylinder screw - M10x50 mm, galv.	260 975
76	Countersunk screw - M8x20 mm, galv.	241 504
81	Cap screw - M6x35 mm, galv.	216 933
83	Cap screw - M3x35 mm, galv.	219 932
84	Cap screw - M3x12 mm, galv.	216 747
86	Steel bolt dowel A - M10x90 mm	245 216
91	Hexagon nut - M12, galv.	215 597
92	Hexagon nut - M10, galv.	215 589
93	Hexagon shakeproof nut - M8, galv.	244 449
94	Hexagon nut - M8, galv.	215 570
95	Hexagon shakeproof nut - M6, galv.	244 430
96	Hexagon nut - M6, brass	200 417
98	Hexagon nut - M4, galv.	205 192
99	Hexagon nut - M3, galv.	202 142
100	Milled nut - M6, brass	200 433
106	Washer - Ø 10.5/21x2 mm, galv.	215 821
107	Washer - Ø 8.4/17x1.6 mm, galv.	215 813
108	Washer - Ø 6.4/16x1.6 mm	215 805
109	Washer - Ø 6.4/12.5x1.6 mm, galv.	216 020
110	Washer - Ø 6.4/12.5x1.6 mm, brass	200 476
111	Washer - Ø 4.3/9x0.8 mm	215 791
113	Spacing ring - Ø 36/48x0.3 mm	200 760
116	Lock washer - M6 R	205 117
117	Lock washer - M3 R	201 880
118	Shake proof washer - A-type, M6	200 450
120	Snap ring - A-16	260 258
123	R/F unit - 0-10 bar	240 133
124	Pressure gauge - 1/8"a, 0-10 bar	259 179
125	Double nipple - 1"a-1/2"a, galv.	259 225
126	Fluidizing pad	237 264
127	Pressure regulator - 0.5-6 bar	264 342
128	Elbow joint - 1"i-1"i, galv.	259 454
129	Throttle check valve - DRV-SS	235 059

PZ2 Powder center - complete (cont.)

130	Throttle check valve	258 750
131	Pressure gauge - Ø 50 mm, 1/4"a, 0-6 bar	260 517
132	Cylinder - Ø 50 mm, stroke=600 mm	258 784
135	Plug cap - Ø 8 mm	238 023
136	Nut with kink protection - M12x1 mm, Ø 8 mm	201 316
137	Adapter - 1"i-1"i, galv.	260 274
138	Connection sleeve - 1/4"i, Ø 8 mm	233 390
139	Connection sleeve - 1/4"i, Ø 6 mm	233 404
140	Adapter nipple - 1/8"i-1/4"a	231 932
142	Adapter - 1/2"i-1/2"i	202 622
144	Double nipple - 1"a-1"a, galv.	258 733
145	Connection fitting - 3/8"a-3/8"a	202 975
146	Elbow joint - 1/8"a, Ø 6 mm	203 033
147	Elbow joint - 1/4"a, Ø 8 mm	224 359
148	Elbow joint - 1/8"a-1/8"i	237 604
151	Y-connection fitting - 1/4"a, Ø 8 mm	260 215
152	Threaded sleeve - 3/8"i	203 157
153	Hose nipple - Ø 8 mm	203 165
154	Hose connection - Ø 19 mm, 1"a	259 250
156	Connector - NW5, 1/8"i	200 859
157	Quick release connection - NW5, Ø 8 mm	203 181
158	Quick release connection - NW7.4 - Ø 10 mm	239 267
159	Coupling - female thread G1"	258 539
160	Plug cap - 1/8"a	203 297
161	Plug cap - 1/4"a	203 300
162	Plug cap - 3/8"a	203 319
163	Plug cap - 1"a	258 679
164	Hose clamp - 15/18 mm	203 386
165	Hose clamp - 25/35 mm	226 335
166	Lead-through connection - Ø 8/8 mm	253 880
167	Adjusting elbow - Ø 8/Ø 8 mm	238 287
168	Hose connection - Ø 16 mm, 1/2"a	259 268
171	Gasket - Ø 36/50x2 mm	200 751
172	Rubber buffer - Ø 15x8 mm, M4	234 915
173	Rubber buffer - Ø 30x20 mm, M8	260 460

PZ2 Powder center - complete (cont.)

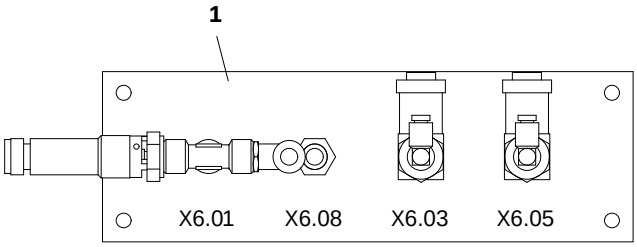
174	Blind grommet - TI-2-213	206 784
175	Blind grommet - TI-4-073	260 754
176	Blind grommet - TI-2-234	260 541
177	Blind grommet - TI-2-222	260 576
178	Terminal slider - -25x25x1-2 mm	260 851
179	Locking	262 110
180	Guide - Zh 26	262 153
181	Hinge - 180°, black	258 652
182	Leveling pad - Ø 110 mm, M12	255 610
184	Blind grommet	207 705
191	Flashing lamp	266 680
192	Locknut - PG11	200 387
193	Locknut - PG09, brass	204 420
195	Lead-through - PG13, brass	204 919
196	Locknut - PG36, brass	217 166
197	Lead-through - PG9, plastic	222 330
198	Locknut - PG13, brass	229 474
199	Locknut - G1", galv.	258 717
200	Lead-through - PG11, brass, long	260 240
201	Lead-through - PG36, Ø 30-35 mm, brass	260 550
203	Cable lead-through - 7-10 mm	258 873
204	Flange socket - 4 pins	206 490
205	Cable bush - interior Ø 30 mm	260 614
206	Switch-key	265 802
207	Connecting cable - 5 m, 4 pins, M12, elbow connector	260 169
211	Edge protection profile - 22x15 mm	104 655
212	Cable - 4x1 mm²	100 579*
213	Solaflex hose - Ø 16 mm	102 296*
214	Plastic tube - Ø 8/6 mm, black, PA	103 152*
215	Plastic tube - Ø 8/6 mm, red, PUR	103 500*
216	Solaflex hose - Ø 19/26 mm	104 213*
217	Plastic tube - Ø 8/6 mm, black, antistatic	103 756*
218	Solaflex hose - Ø 10/16 mm	100 498*

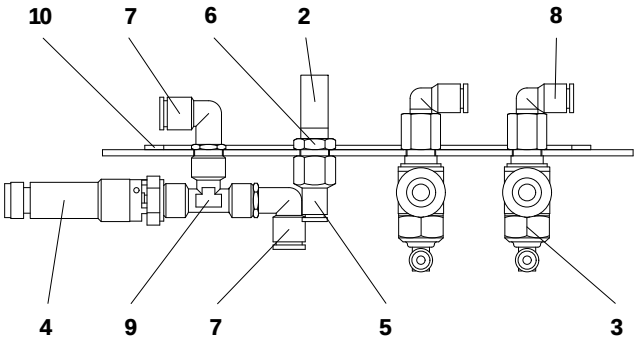
* Please indicate length

Connection plate - complete

	Connection plate, large - complete	380 407
1	Connection plate - large	380 385
2	Silencer - 1/8"	235 083
3	Stop valve	259 004
4	Safety valve - 1/4", 6 bar	258 776
5	Connection sleeve - 1/4", Ø 6 mm	233 404
6	Adapter nipple - 1/8"-1/4"	231 932
7	Elbow joint - 1/4", Ø 8 mm	224 359
8	Elbow joint - 1/4", Ø 8 mm	254 002
9	T-piece - 1/4"-1/4"-1/4"	261 173
10	Adhesive sealing strip	100 250*

***** Please indicate length





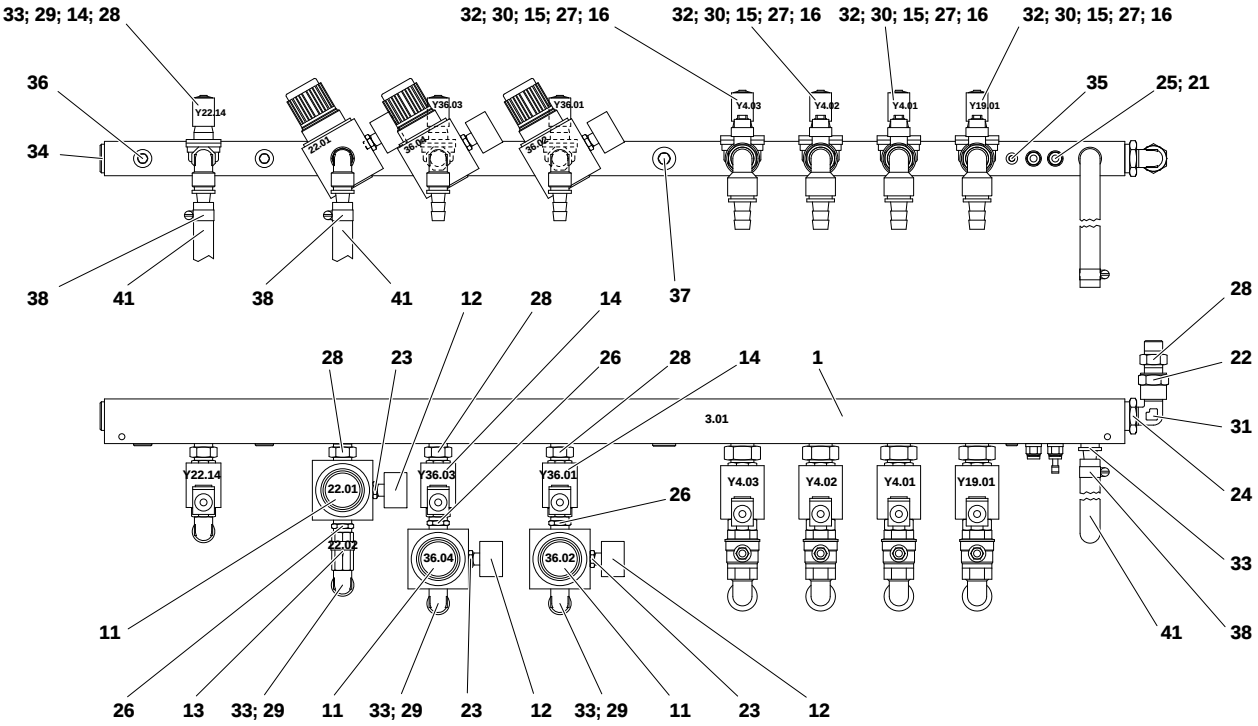
Connection plate - complete

PZ1 Distributor tube 2

1	Distributor tube	393 878
11	Pressure regulator - 0-10 bar	259 187
12	Pressure gauge - 1/8"a, 0-10 bar	259 179
13	Check valve - 1/2"i-1/2"i	259 160
14	Solenoid valve - 1/2", NW11,5 / 24VDC	259 195
15	Solenoid valve - 3/4", NW18, 24VDC	259 209
16	Ball valve - 3/4"a-3/4"i	259 764
21	Plug cap - Ø 8 mm	238 023
22	Adapter - 1/2"i-1/2"i	202 622
23	Adapter nipple - 1/8"i-1/4"a	231 932
24	Adapter nipple - 1/2"i-1"a	252 875
25	Screw-in nipple - 1/4"a, Ø 8 mm	245 933
26	Double nipple - 1/2"a-1/2"a	243 540
27	Double nipple - 3/4"a-3/4"a, divisible	243 574
28	Double nipple - 1/2"a-1/2"a, divisible	243 582
29	Elbow joint - 1/2"a-1/2"i	223 166
30	Elbow joint - 3/4"a-3/4"i	259 233
31	Elbow joint - 1/2"a-1/2"a	266 906
32	Hose connection - Ø 19 mm, 3/4"a	226 343
33	Hose connection - Ø 16 mm, 1/2"a	259 268
34	Plug cap - 1"a	258 679
35	Plug cap - 1/4"a	258 695
36	Plug cap - 1/2"a	259 306
37	Plug cap - 3/4"a	259 314
38	Hose clamp - 25-35 mm	226 335
41	Solaflex hose - Ø 16/23 mm	102 296*

* Please indicate length

PZ1 Distributor tube 2



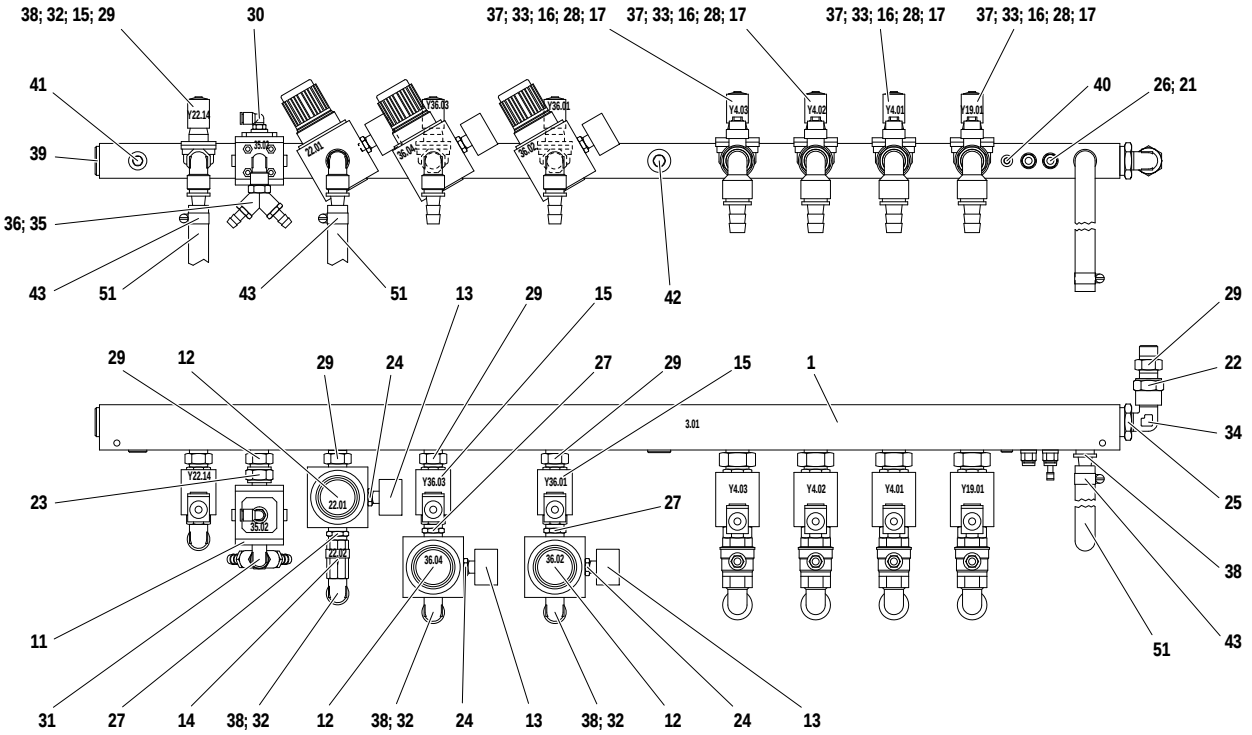
PZ1 Distributor tube 2

PZ2 Distributor tube 2

1	Distributor tube	393 878
11	Pressure regulator - 3/8", remote control	244 384
12	Pressure regulator - 0-10 bar	259 187
13	Pressure gauge - 1/8"a, 0-10 bar	259 179
14	Check valve - 1/2"i-1/2"i	259 160
15	Solenoid valve - 1/2", NW11,5 / 24VDC	259 195
16	Solenoid valve - 3/4", NW18, 24VDC	259 209
17	Safe ball valve - 3/4"a-3/4"i	259 764
21	Plug cap - Ø 8 mm	238 023
22	Adapter - 1/2"i-1/2"i	202 622
23	Connection sleeve - 1/2"i-3/8"a	202 380
24	Adapter nipple - 1/8"i-1/4"a	231 932
25	Adapter nipple - 1/2"i-1"a	252 875
26	Screw-in nipple - 1/4"a, Ø 8 mm	245 933
27	Double nipple - 1/2"a-1/2"a	243 540
28	Double nipple - 3/4"a-3/4"a, divisible	243 574
29	Double nipple - 1/2"a-1/2"a, divisible	243 582
30	Elbow joint - 1/8"a, Ø 8 mm	203 050
31	Elbow joint - 3/8"a-3/8"i	223 158
32	Elbow joint - 1/2"a-1/2"i	223 166
33	Elbow joint - 3/4"a-3/4"i	259 233
34	Elbow joint - 1/2"a-1/2"a	266 906
35	Y-piece - 3/8"a-3/8"i-3/8"i	254 304
36	Hose connector - Ø 12 mm, 3/8"a	220 000
37	Hose connection - Ø 19 mm, 3/4"a	226 343
38	Hose connection - Ø 16 mm, 1/2"a	259 268
39	Plug cap - 1"	258 679
40	Plug cap - 1/4"a	258 695
41	Plug cap - 1/2"a	259 306
42	Plug cap - 3/4"a	259 314
43	Hose clamp - 25-35 mm	226 335
51	Solaflex hose - Ø 16/23 mm	102 296*

* Please indicate length

PZ2 Distributor tube 2



PZ2 Distributor tube 2

Hose list "Solaflex"

Hose no.	Length* (mm)	Ø (mm)	Order no.
1	1520	23/16	102296*
2	460	23/16	102296*

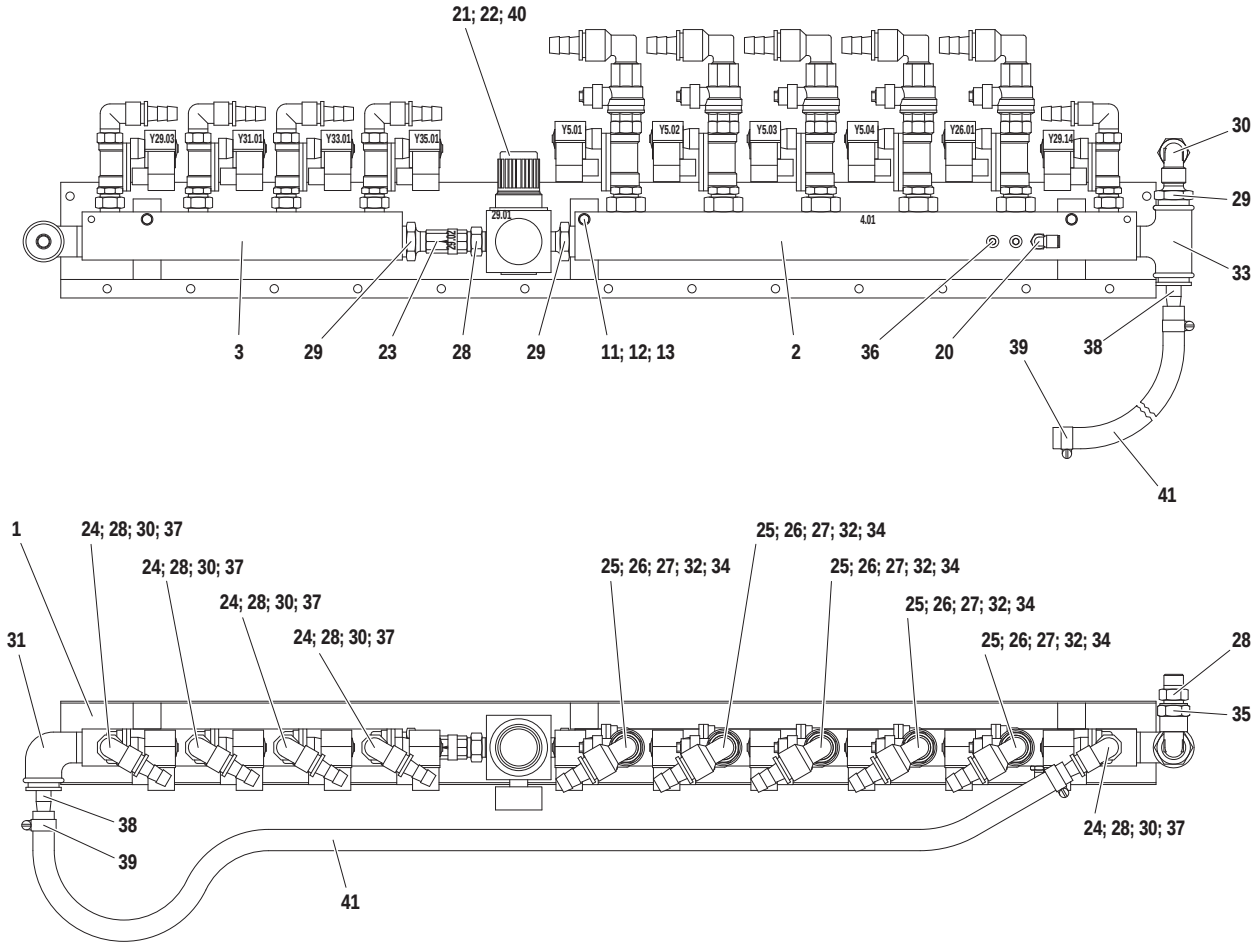
* Please indicate length

PZ3 Distributor tube 2

1	Fixing profile	383 171
2	Distributor tube - 2.0	377 279
3	Distributor tube - 2.1	377 287
11	Hexagon screw - M6x50 mm, galv.	213 870
12	Hexagon shakeproof nut - M6, galv.	244 430
13	Washer - Ø 6.4/12.5x1.6 mm, galv.	216 020
20	Elbow joint - 1/4"a, Ø 8 mm	254 029
21	Pressure regulator - 0-10 bar	259 187
22	Pressure gauge - 1/8"a, 0-10 bar	259 179
23	Check valve - 1/2"i-1/2"i	259 160
24	Solenoid valve - 1/2", NW11,5 mm, 24VDC	259 195
25	Solenoid valve - 3/4", NW18, 24VDC	259 209
26	Double nipple - 3/4"a-3/4"a, divisible	243 574
27	Safe ball valve - 3/4"a-3/4"i	259 764
28	Double nipple - 1/2"a-1/2"a, divisible	243 582
29	Double nipple - 1"a-1/2"a, galv.	259 225
30	Elbow joint - 1/2"a-1/2"i	223 166
31	Elbow joint - 1"a-1"i, galv.	258 725
32	Elbow joint - 3/4"a-3/4"i	259 233
33	T-piece - 1"a-1"i-1"i, galv.	261 114
34	Hose connection - Ø 19 mm, 3/4"a	226 343
35	Adapter - 1/2"i-1/2"i	202 622
36	Plug cap - 1/4"a	258 695
37	Hose connection - Ø 16 mm, 1/2"a	259 268
38	Hose connection - Ø 16 mm, 1"a	259 276
39	Hose clamp - 25-35 mm	226 335
40	Adapter nipple - 1/8"i-1/4"a	231 932
41	Solaflex hose - Ø 16/3,5 mm	102 296*

* Please indicate length

PZ3 Distributor tube 2

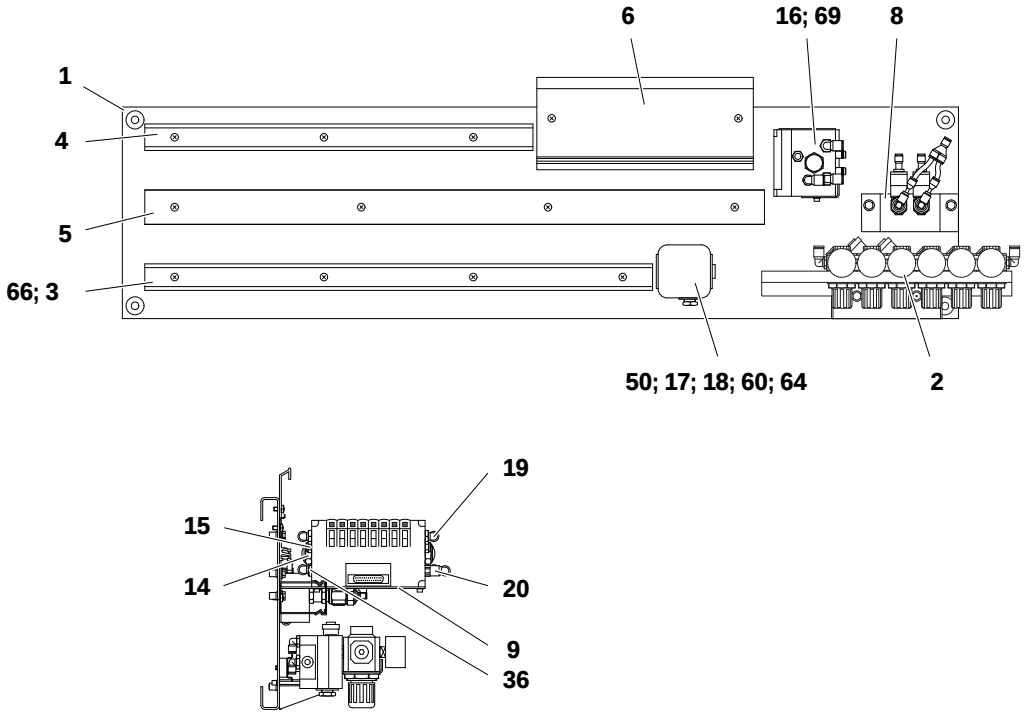


PZ3 Distributor tube 2

PZ1 Pneumatic unit

1	Assembly plate	394 955
2	Assembly rack, 1 drawer - VZ01/AL1	387 665
	Assembly rack, 2 drawer - VZ01/AL1	387 673
	Assembly rack, 1 drawer - VZ01/AL2	387 703
	Assembly rack, 2 drawer - VZ01/AL2	387 711
3	Carrier profile - 35-680 mm	378 666
4	Carrier profile - 35-520 mm	373 281
5	Filter element - 40/60 mm	373 257
6	Fitting rail - VZ 01	374 539
8	Valve holder - complete	378 810
9	Valve block holder bracket	377 384
14	Silencer - 1/2"a	261 599
15	Silencer - 1/8"a	251 305
16	Valve block	261 602
17	Elbow joint - 1/4"a, Ø 6 mm	203 041
18	Elbow joint - 1/8"a, Ø 6 mm	254 061
19	Elbow joint - 1/4"a, Ø 8 mm	254 029
20	Elbow joint - 1/8"a, Ø 8 mm, high	259 101
36	Plug cap - 1/8"a	203 297
50	Differential pressure monitor	259 110
60	Spacer - M4, SW7x45 mm, i/e thread	256 501
61	Hexagon shakeproof screw - M6x16 mm, galv.	244 503
62	Cap screw - M5x10 mm, galv.	241 849
64	Cap screw - M4x16 mm, galv.	216 801
65	Washer - Ø 4.3/9x0.8 mm, galv.	215 791
66	Spacer (4 pieces)	238 325
67	Cap screw - M5x16 mm, galv.	216 852
68	Allen cylinder screw - M4x10 mm, galv.	216 267
69	Spacer screw - M3	261 688

PZ1 Pneumatic unit

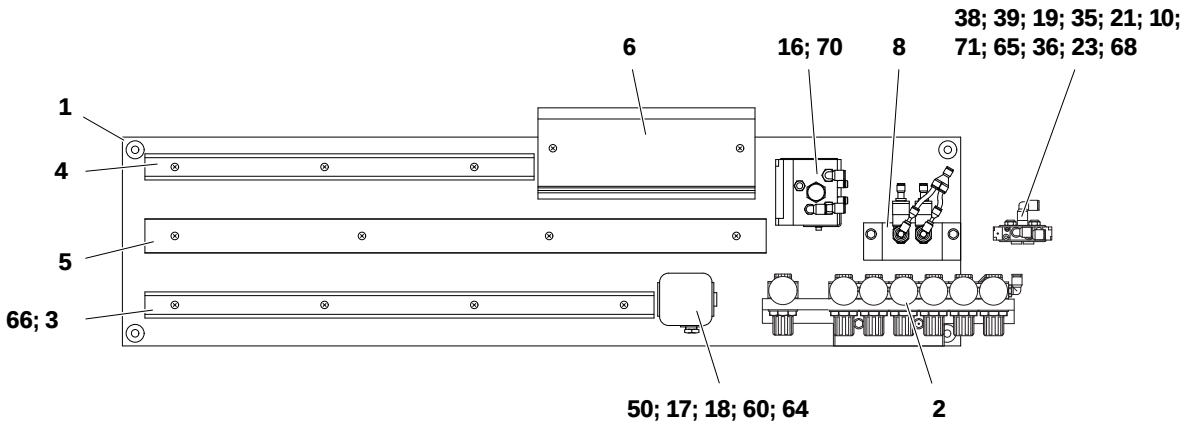


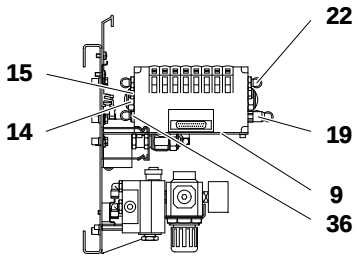
PZ1 Pneumatic unit

PZ2 Pneumatic unit

1	Assembly plate	394 955
2	Assembly rack, 1 drawer - VZ02/AL2	387 720
	Assembly rack, 2 drawer - VZ02/AL1	387 681
3	Carrier profile - 35-680 mm	378 666
4	Carrier profile - 35-520 mm	373 281
5	Filter element - 40/60-830 mm	373 257
6	Fitting rail - VZ01	374 539
8	Valve holder - complete	378 810
9	Valve block holder bracket	377 384
10	Fluidizing pad	404 780
14	Silencer - 1/2"a	261 599
15	Silencer - 1/8"a	251 305
16	Valve block - 7CTPC	263 010
17	Elbow joint - 1/4"a, Ø 6 mm	203 041
18	Elbow joint - 1/8"a, Ø 6 mm	254 061
19	Elbow joint - 1/8"a, Ø 8 mm, high	259 101
21	Silencer - 1/8"a	251 305
22	Elbow joint - 1/4"a, Ø 8 mm	254 029
23	Screw-in nipple - M5a, Ø 4 mm	257 095
35	Elbow joint - 1/8"a, Ø 8 mm	203 050
36	Plug cap - 1/8"a	203 297
38	Pneumatical valve - VI-5/2-1/8"-P, NW4	257 125
39	Connection plate - AS, brass, 1/8"	257 141
50	Differential pressure monitor - type 930.86	259 110
60	Spacer - M4, SW7x45 mm, i/e thread	256 501
61	Hexagon shakeproof screw - M6x16 mm, galv.	244 503
62	Cap screw - M5x10 mm, galv.	241 849
64	Cap screw - M4x16 mm, galv.	216 801
65	Washer - Ø 4.3/9x0.8 mm, galv.	215 791
66	Spacer (4 pieces)	238 325
67	Cap screw - M5x16 mm, galv.	216 852
68	Allen grub screw - KK, M5x5 mm, galv.	258 908
70	Spacer screw - M3, UNC4-40	261 688
71	Cap screw - M4x16 mm, galv.	216 801
72	Allen cylinder screw - M4x10 mm, galv.	216 267

PZ2 Pneumatic unit





PZ2 Pneumatic unit

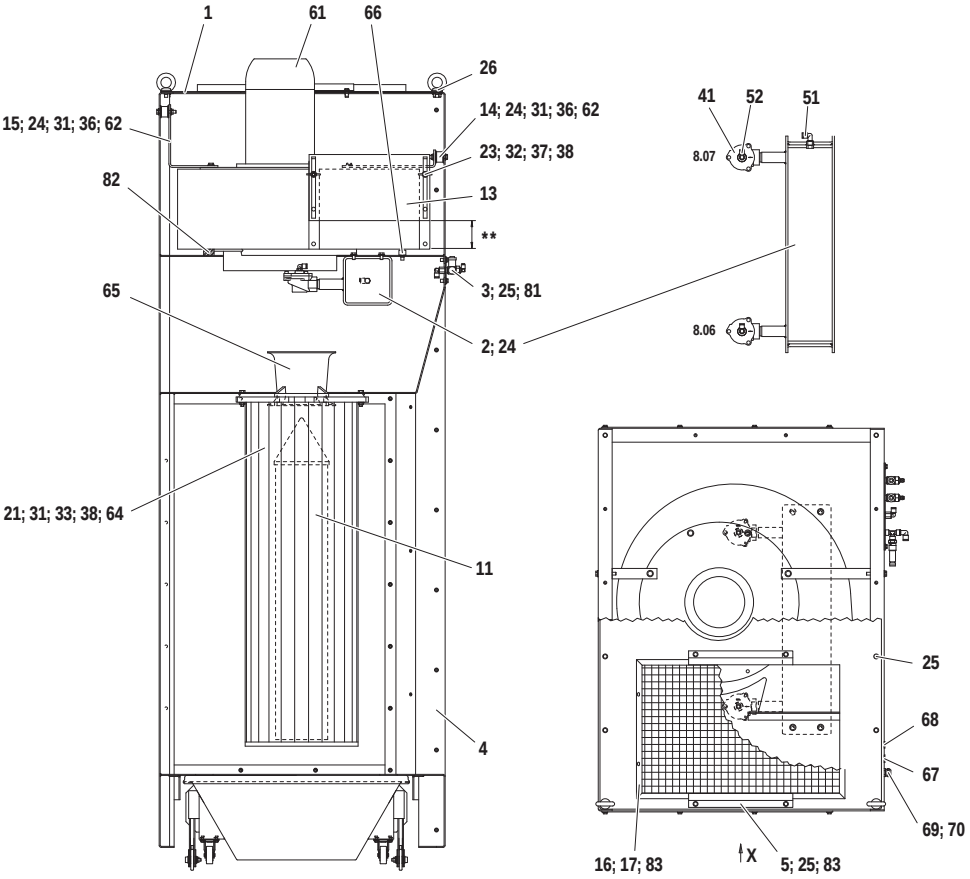
Exhaust air unit

1	Cover plate	373 133
2	Pressure tank	380 377
3	Connection plate, large - complete	380 407
4	Exhaust air housing	391 298
5	Stop bracket	375 209
7	Service cover - AL01	391 832
11	Displacement tube - L=920 mm	390 259
12	Waste powder container - complete	395 773
13	Regulating valve	373 419
14	Support bracket rear	374 377
15	Support bracket front	374 385
16	Quick-change frame - 400x600 mm	320 633
17	Filter pad - 405x605x23 mm	320 650
21	Hexagon screw - M8x40 mm, galv.	213 977
23	Hexagon screw - M8x16 mm, galv.	213 926
24	Hexagon shakeproof screw - M8x12 mm, galv.	248 550
25	Hexagon shakeproof screw - M6x16 mm, galv.	244 503
26	Eye bolt - M12, galv.	260 568
31	Hexagon shakeproof nut - M8, galv.	244 449
32	Wing nut - M8, galv.	215 678
33	Square nut - M8/20x20x4 mm	242 659
36	Washer - Ø 9/35x2.5 mm, galv.	241 490
37	Washer - Ø 8.4/17x1.6 mm, galv.	215 813
38	Lock washer - M8 R	215 953
41	Membrane valve - DN20, 3/4"i-1/8"i	259 985
51	Elbow joint - 1/4"a, Ø 8 mm	224 359
52	Elbow joint - 1/8"a, Ø 8 mm	203 050
61	Fan	259 756
62	Rubber buffer - Ø 30x20 mm, M8	260 460
64	Filter cartridge - JP32, Ø 325x1000 mm	258 830
65	Venturi - Ø 325 mm	258 857
66	Rubber buffer - Ø 20x15 mm, M6	211 770
67	Blind grommet - TI-2-214	263 648
68	Blind grommet - TI-2-212	252 204
69	Lead-through - PG11, brass, long	260 240

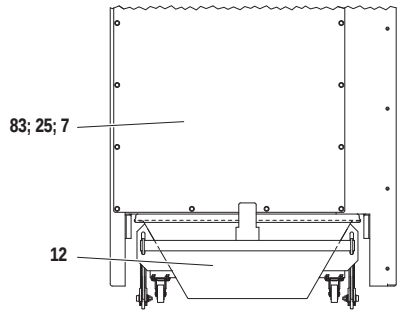
Exhaust air unit

70	Locknut - PG11	200 387
81	Plastic tube - Ø 8/6 mm, black	103 152*
82	Adhesive profile PUR - 30x20x2000 mm	257 770
83	Adhesive seal strip - 9x2 mm	100 250*

***** Please indicate length



View X



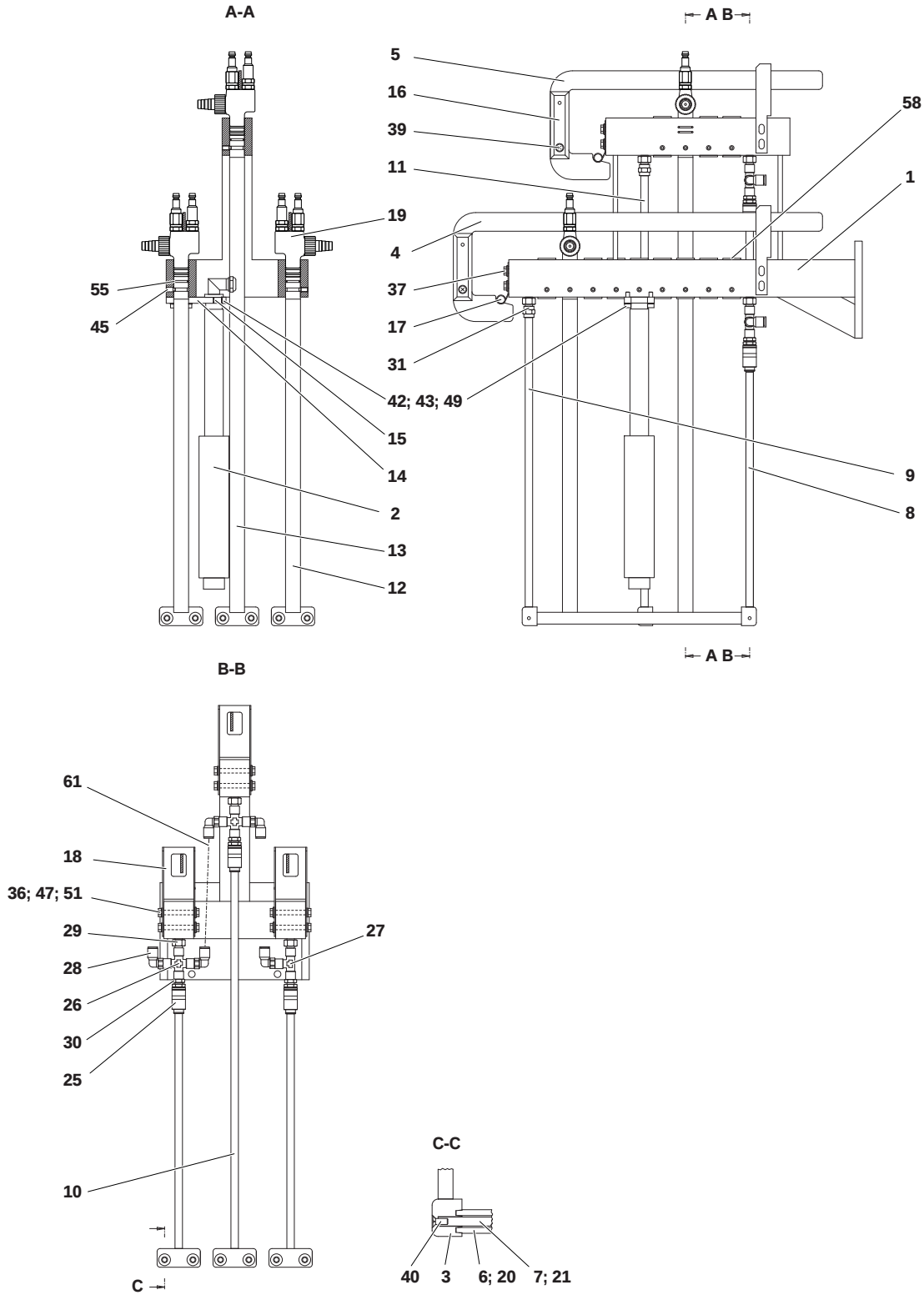
** 80 mm (on plants with 3x…V/50 Hz)
70 mm (on plants with 3x…V/60 Hz)

Exhaust air unit

Injector unit

1	Injector holder - 9P, right	392 502
	Injector holder - 9P, left	392 510
	Injector holder - 18P	392 529
	Injector holder - 22P	392 537
	Injector holder - 27P, right	392 545
	Injector holder - 27P, left	392 553
2	Level sensor - complete (see the level sensor spare parts list)	373 192
3	Fluidizing T-piece	373 150
4	Bracket (stop rod) - 9P	392 588
5	Bracket (stop rod) - 4P	392 570
6	Fluidizing tube - L=282 mm	373 109
7	Tie rod - L=306 mm	373 052
8	Support tube - G1/8", X329	387 320
9	Support tube - G1/8", X402	387 290
10	Support tube - G1/8", X519	387 347
11	Support tube - G1/8", X592	387 339
12	Suction tube - L=450 mm	379 956
13	Suction tube - L=640 mm	386 057
14	Sensor holder	383 287
15	Clamp	373 095
16	Handhold	392 618
17	Clamp band	392 600
18	Fixing profile	392 596
19	Injector IG02-V - complete	391 530
20	Fluidizing tube - L=127 mm	385 719
21	Tie rod - L=151 mm	385 697
25	Throttle check valve - 1/8"	259 330
26	Cross piece - 1/8"i	259 560
27	T-piece - 1/8"i-1/8"i-1/8"i	253 928
28	Elbow joint - 1/8"a, Ø 8 mm	203 050
29	Double nipple - 1/8"a-1/8"a, divisible	253 847
30	Double nipple - 1/8"a-1/8"a	259 578
31	Adapter - 1/8"i-1/8"i	259 551
36	Hexagon screw - M6x50 mm	213 870
37	Hexagon shakeproof screw - M6x12 mm	244 406
39	Countersunk head screw - M5x20 mm	237 779

Injector unit



Injector unit

Injector unit (cont.)

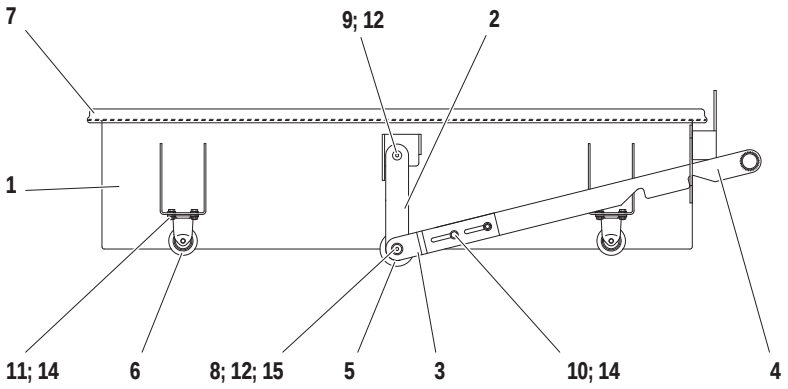
40	Countersunk head screw - M4x10 mm	214 655
42	Allen cylinder screw - M5x20 mm	222 950
43	Allen cylinder screw - M5x16 mm	216 356
45	Allen grub screw - M6x12 mm	259 748
47	Washer - Ø 6.4/12.5x1.6 mm	216 020
49	Lock washer - M5 R	205 168
51	Hexagon shakeproof nut - M6	244 430
55	O-ring - Ø 16x2 mm	231 517
58	Blind grommet	259 586
61	Plastic tube - Ø 8/6 mm, black, antistatic	103 756*

* Please indicate length

Waste powder container

1	Waste powder container	395 730
2	Roller holder	395 757
3	Connecting plate	395 765
4	Handle	395 749
5	Wheel	395 722
6	Roller - 50 mm	258 571
7	Edge protection profile - 19x19 mm	102 261*
8	Screw - Ø 10x25 mm, M8	268 232
9	Screw - Ø 10x16 mm, M8	242 896
10	Hexagon shakeproof screw - M6x20 mm, galv.	244 414
11	Hexagon shakeproof screw - M6x12 mm, galv.	244 406
12	Hexagon shakeproof nut - M8, galv.	244 449
14	Hexagon shakeproof nut - M6, galv.	244 430
15	Washer - Ø 10.5/21x2 mm, galv.	215 821

***** Please indicate length

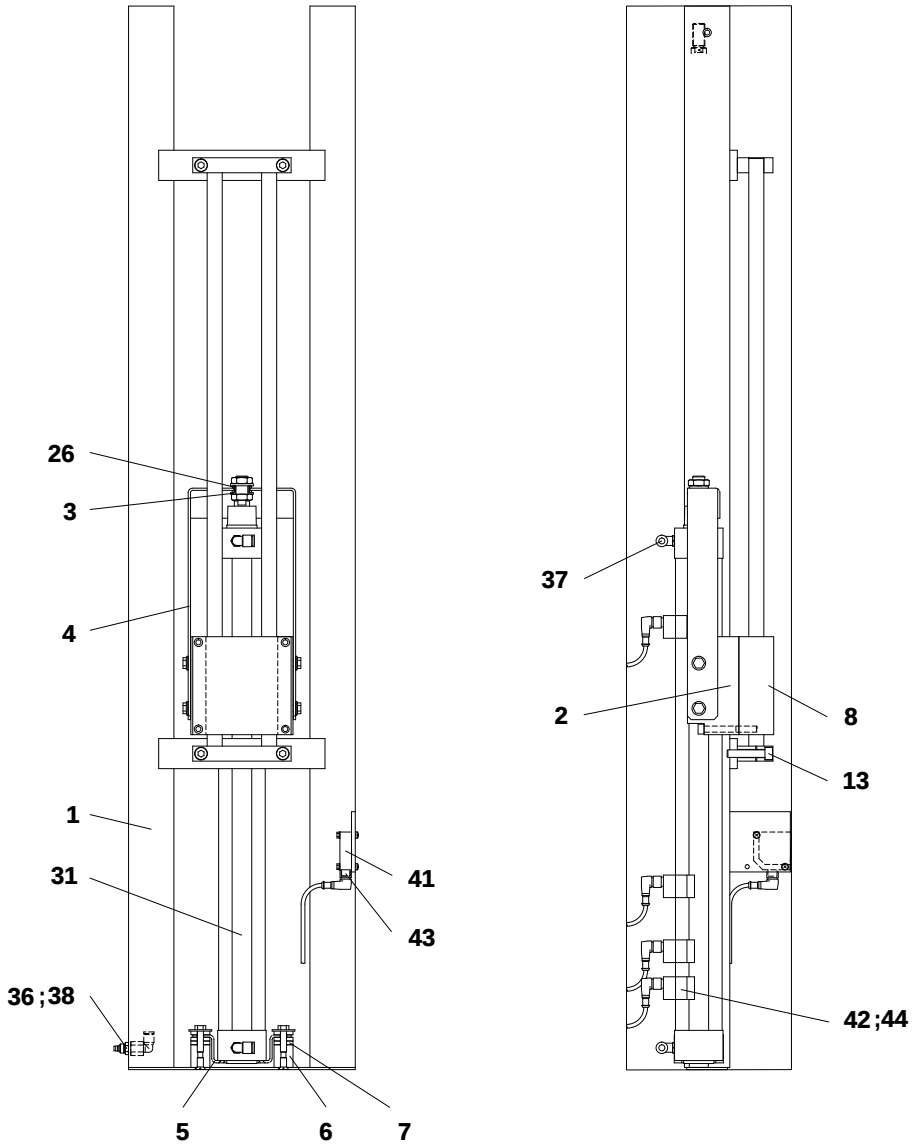


Waste powder container

Cylinder unit - complete

	Cylinder unit - complete	380 652
1	Cylinder holder	380 644
2	Carrier plate	380 750
3	Clamping bush	380 768
4	Intermediate plate	380 660
5	Cylinder holder	380 679
6	Spacer	380 687
7	Rubber washer	380 695
8	Linear slide bar	380 776
26	O-ring - Ø 20x3 mm	224 359
31	Cylinder	258 784
36	Screw-in nipple - 1/4", Ø 8 mm	225 479
37	Elbow joint - 1/4", Ø 8 mm	224 359
38	Elbow joint - 1/4", Ø 8 mm	254 002
41	Reflected light switch	260 150
42	Cylinder switch	259 438
43	Connection cable with angled plug	260 169
44	Connection cable with angled plug	259 420

Cylinder unit - complete



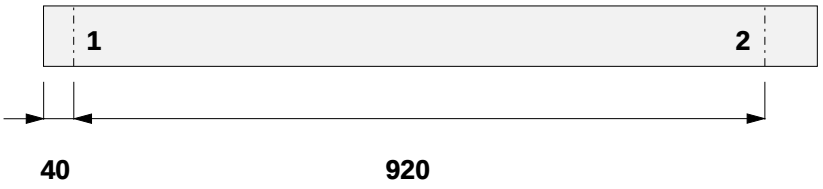
Cylinder unit - complete

Vibration table - complete

1	Vibrating table	375 411
2	Clamping plate	375 420
3	Rubber band	375 438*
21	Vibrator	258 628
22	Terminal slider	209 082
23	Rubber buffer - Ø 40x40 mm, M8	223 000
24	Lead-through - PG13	204 919
31	Vibrator cable	103 764*

* Please indicate length

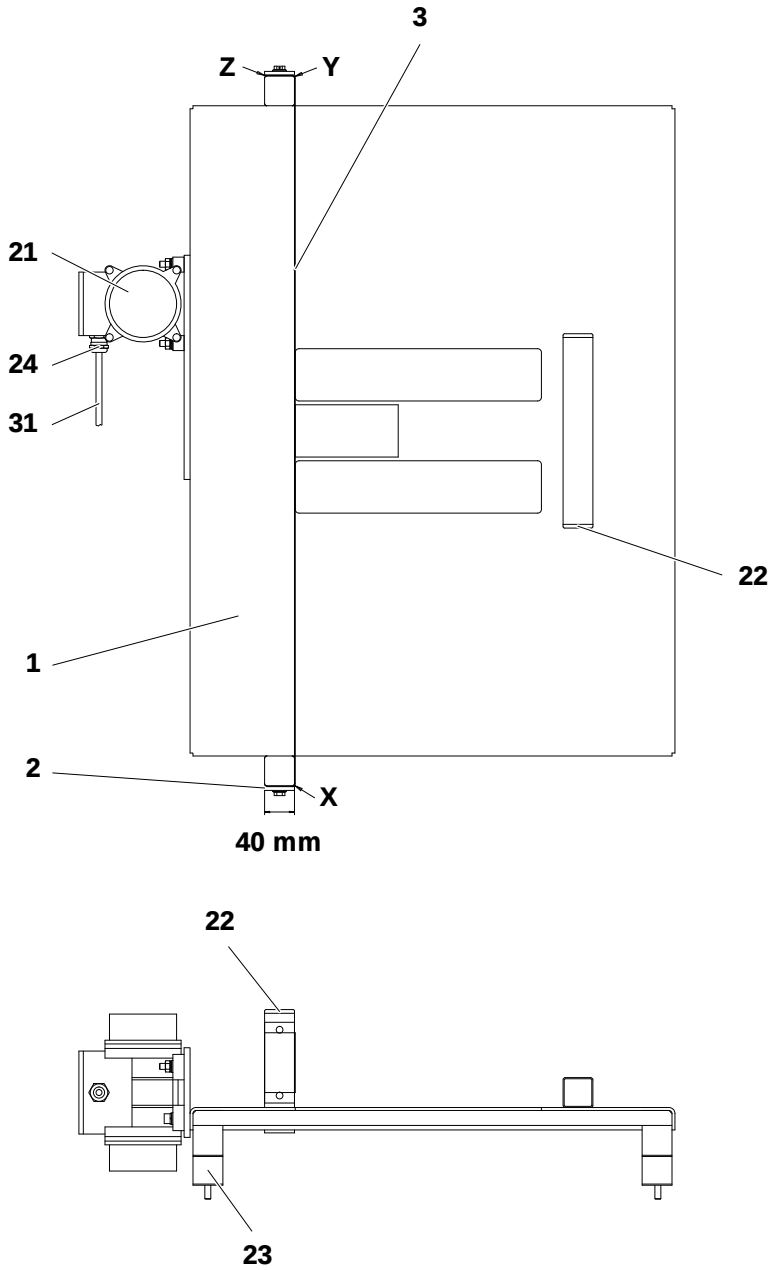
Tensioning the rubber band



Procedure:

1. Measure and mark 40 mm and 920 mm on the not tensioned band
2. Fix the rubber band tight with the clamp plate on pos. 2, so that the first marking (40 mm) is at the position **X**
3. Stretch the rubber band to the second marking, so that it is level with position **Y**, then clamp it tight with the second clamp plate
4. Cut off any surplus rubber at the position **Z**

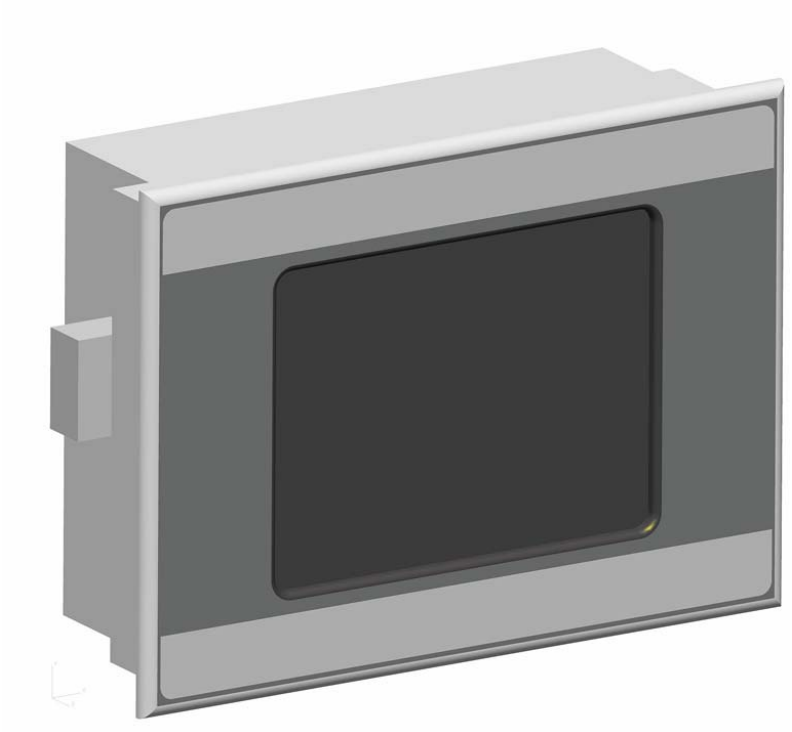
Vibration table - complete



Vibration table - complete

Touch panel control unit

1	Touch Panel - 5,7"	269 450
	Compact Flash card - 32 MB (not shown)	269 018



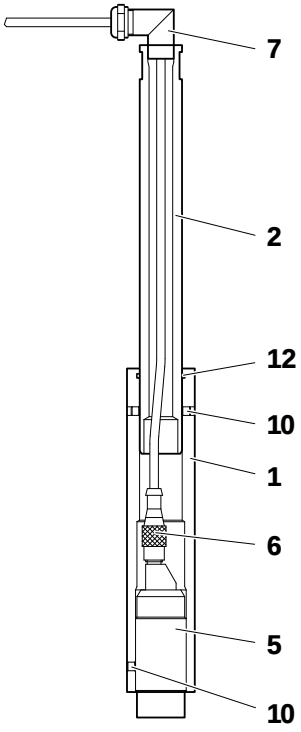
Touch panel control unit

Level sensor

	Level sensor - complete	373 192
1	Sensor holder	373 176
2	Holder extension	373 184
5	Proximity switch	258 911
6	Connection cable	258 920*
7	Elbow lead-through - PG9	258 938
10	Grub screw - M5x5 mm	258 908
12	O-ring - Ø 25x2 mm	241 733#

***** Please indicate length

Wearing part



Level sensor