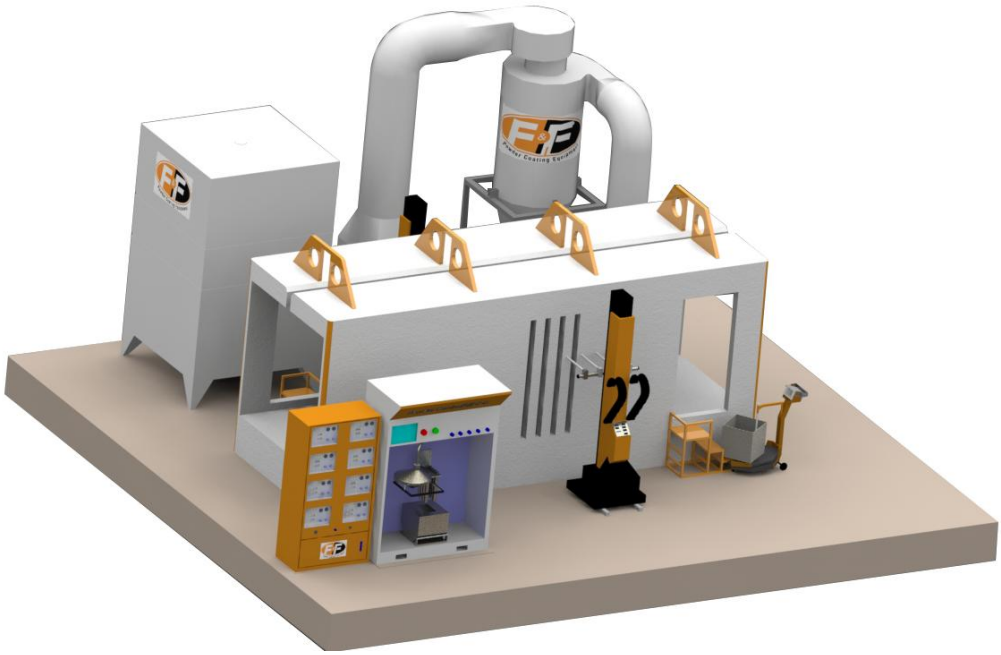
Powder Coating Booth with Monocyclone Recovery System



ADDRESSES

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1. General safety regulations

Installation

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

Grounding

Check the booth and the cyclone grounding before every start-up. The grounding connections are customer specific, and are fitted on the booth basement, on the cyclone separator and on the powder center housing. The grounding of the work pieces 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, this operating manual and the operating instructions of the monocyclone spray booth, before starting up the plant.

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 inquiries unnecessary. For this reason, the operating manual must always be available at the equipment.

Inspection check

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

Before switching on the booth, check the following points (where

applicable) : - there are no foreign objects in the intake channel of the Monocyclone - the Monocyclone is connected, the toggle catches are locked in - the powder hopper is in place, the toggle catches are engaged and locked in, the pneumatic, and powder hoses connected to the powder pumps - the After Filter is connected, the sealing frames are properly sealed, the pneumatic hoses are connected - the Filter plate doors are closed and the waste powder trolley is in place

Repairs

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

Before carrying out repairs or maintenance work the following procedures are to be observed:

- The Monoicyclone must only be started/shut down by authorized persons.

- The Monocyclone must never be put into operation without the interlocking safety devices provided.

- Make sure that the powder spraying equipment is never put into operation without the Monocyclone

Entering the booth

When entering the booth for inspection and cleaning purposes,make sure not to step on powder covering the floor.

2.Function

2．1 Field of application

Monocyclone powder coating booths are used for the electrostatic powder coating of all types of workpieces in large batches with frequent color changes. As part of the process controlled coating plant, they are laid out for fully automatic operation.

The most important characteristics of the MagicCompact BA02 coating booths are:

- booth could be plastic material
- The spray booth floor equipped with automatic air knife,keep the booth floor always no powder stay.
- Automatic floor cleaning (no powder accumulation)
- Monocyclone make fast color change
- Monocyclone separation rate of up to 98%
- The guns are arranged could be vertically and horizontal

2．2 Function description

The principle of function is determined by the requirements placed on the booth, which are:

- The protection of the coating process from external influences, combined with keeping the area around the booth clean
- The powder recovery
- The avoidance of an explosive powder/air mixture inside the booth

An efficient exhaust air system is used to keep the area around the booth clean and to prevent explosive powder/air mixtures. The ventilator in the After Filter extracts the air from the inside of the booth through the

cyclone and afterwards through the filter elements. The air stream created thereby, flowing from the outside to the inside of the booth, prevents powder escaping to the environment of the booth, so that keeping the area around the booth clean is guaranteed. The maintenance of the air flow prevents as well the creation of dangerous powder/air mixtures.

The powder recovery takes place by the powder separation in the cyclone separator during operation.

The booth control takes place by the corresponding control unit with operating interface.

The gun control units are fitted into one or two control cabinets.

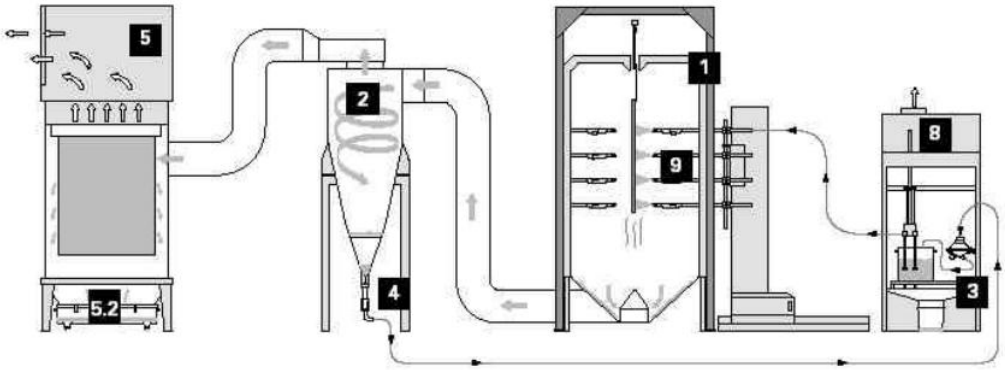
2.3 Powder flow

The powder container is located in the powder center (8). Here, the powder is vibrated and fluidized. The injectors transport the powder through the hoses to the guns (9). The guns spray the powder/air mixture onto the workpieces to be coated.

The powder which does not adhere on the workpieces falls on the booth floor and is sucked off through the slots in the booth floor, and delivered to the cyclone separator (2) as powder-air mixture.

In the cyclone separator, the powder is separated by the influence of centrifugal force. The separated powder falls to the bottom of the monocyclone and transported back to sieving machine(3) by a recovery powder pump (4) , then leaned powder fall to the powder container ,where it is available again for the coating process.

The rest of the non-separated powder (most of it is fine particles) goes into the After Filter (5). The After Filter separates the powder into a refuse container (5.2), which is positioned directly under the filter elements and is very easy to empty. Then, the cleaned air leaves the filter and is fed directly back into the workshop environment.



1 Spray Booth 2 Cyclone separator 3 Sieve machine

4 powder pump 5 After Filter 5.2 Refuse container

8 Powder center 9 Automatic guns

3. Technical Data

Electrical data

Input voltage ： 3x380V/50Hz (other voltages and frequencies on request)

Power consumption ： 15Kw

Pneumatical data

Input pressure ： 6-10bar

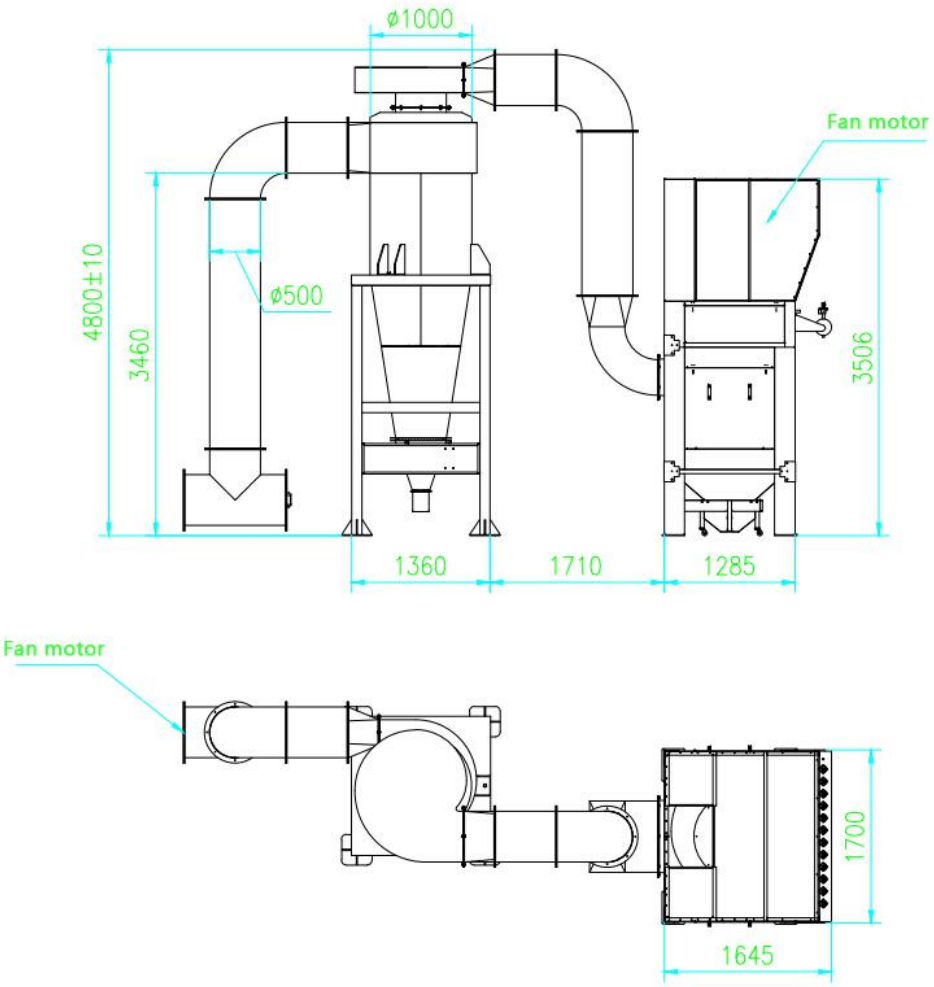
Water vapor content in compressed air ： max. 1,3 g/m3

Oil content in compressed air : max. 0,1 mg/kg

Dimensions

Booth size : 6000 mm x 1200 mm x 2500 (L W H),According to drawing

Cyclone and after filter system dimensions (see picture as below)



Exhaust air unit

Air volume : 3000 Nm^3/h

4. Start-Up

4.1 Setup and assembly

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

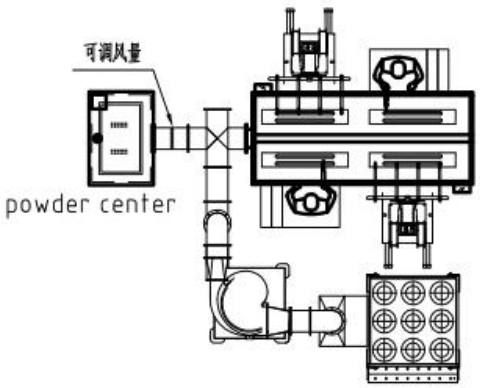
4.2 Cable connections / junctions

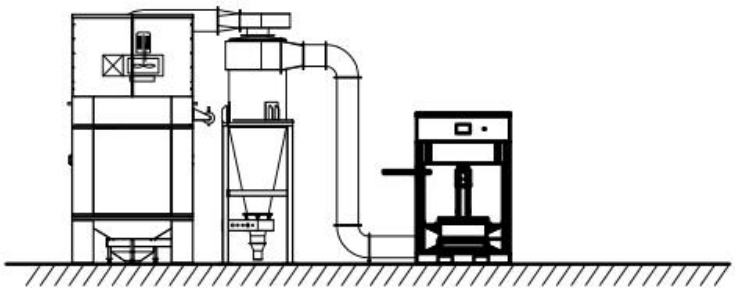
The connecting cables between control unit and guns must be laid out in such a way that they cannot be damaged during operation. Observe the safety regulations!

Grounding

The booth grounding is to be checked at every start-up. The grounding connection is customer specific and fitted on the booth basement, the cyclone separator and the filter housing.

See the connection drawing as below:





Use the air pipe connect to the cyclone and booth

5. Operation

5.1 Before Switch on the booth

Open the compressed air supply and set the input pressure for the After Filter

5.2 Switch on the booth

PLC controller operation

Bottom:

1,power on/off

2,hopper go up/go down

3, emergency stop

Operation:

1.Turn on the power switch

2.Then the PLC will display （Picture below）

3.Press  or  ,make the display screen display （see picture below）

4.Press F4 ,then into the booth control interface （see below）

5.Press F6,then the fan will on （see below）

6.When you want to stop the work, please press F6 ,make the fan off (see below)

7.Working on night，could turn on the light (see below)

5.3 Switch off the booth

1,Switch off the gun control units and all additional plant units

2. Switch off the system in the main menu

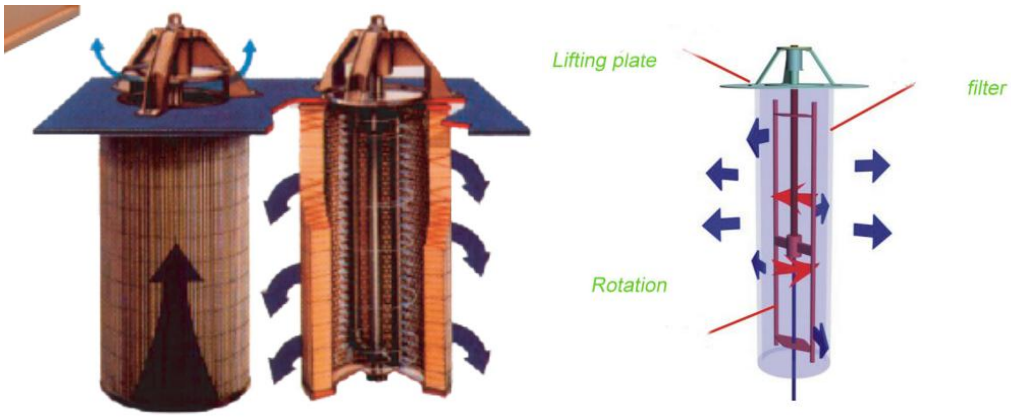
3. Switch off the powder center

4. Switch off the main switch

5.4 Cleaning Filter

The filter cartridges in the After Filter are blown off cyclically from the inside during operation (jet cleaning). The predetermined cycle times are set at the factory, but must be reset if the maximum differential pressure

is repeatedly exceeded



By the instantaneous release of pressurized air pulse valve to the rotary wing, (while the elevator tray automatically closed, so that the exhaust filter to temporarily stop working), in the reaction of the high-speed rotation driven rotor, the air flow from the rotor blade out uniformly and effectively glued to the outside of the filter powder blowing, thus ensuring efficient work of cartridge

5.5 Color change and cleaning

The color change can begin, when the last workpieces have left the booth. Following, a step by step description of the color change procedure from bright to dark is given. 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.

1. Prepare the booth for cleaning

- The coating must be stop

- Stop the conveying system

- Close the booth doors

- Switching over the booth control to cleaning operation

- Move the guns to the cleaning position

2.Prepare the powder center for cleaning

- Remove the powder container from the powder center (the recovery hose remains on the powder container)

- Set the powder center to the cleaning mode

- Coarse cleaning of the powder center

3. Clean the guns externally and move them to the blow off position

4. Blow off (internal cleaning) the powder hoses in direction from the powder center

5. Coarse cleaning of the booth

- Coarse cleaning of the booth with the air lance

- Open the cyclone cone and remove the sieve, leave the cyclone open

- Remove the recovery hose from the powder container

6. Clean the booth

- If necessary, move the guns out of the booth

- If necessary, clean the muzzles etc.

- Blow off the booth with the air lance, clean the suction opening

- If necessary, wipe off the booth walls

7. Clean the powder center

- If necessary, change the powder hoses (bright/dark)

- Clean the powder center (floor, vibrating table, collecting container etc.)

8. Clean the recovery system

- Connect the recovery hose to the blow off connector

- Open the cyclone cone

- Blow off the recovery system

- If necessary, wipe off the cyclone cone

- Blow off the inside of the monocyclone with the air lance

9. Prepare the equipment for coating

- Make the recovery system ready for operation

- Put the powder center into coating operation (insert the powder container with the new color, move down the injectors)

- Put the booth into coating operation (switch on the plant, start the correct reciprocators program)

10. Check the guns for functioning (high voltage and powder output)

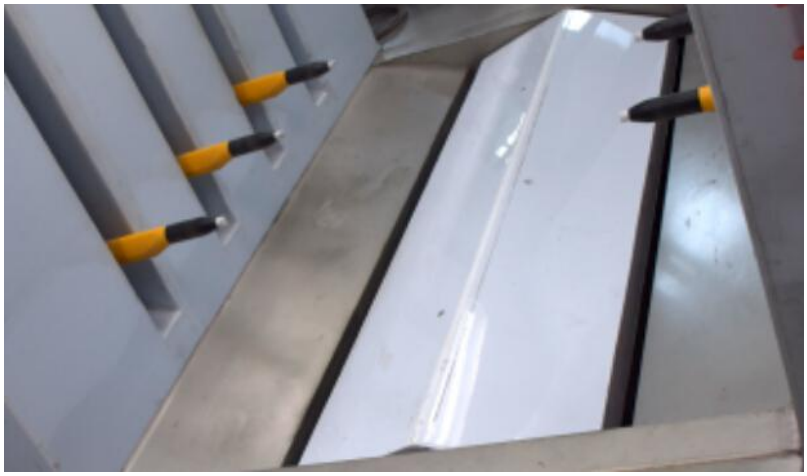
6. Maintenance

6.1 Maintenance of spray booth

1. Cleaning the Accumulated powder in the spray booth daily.Avoid it will be attached to the body after long time.

2.Check the air nozzle on the bottom of the spray booth,if worn out,have to replace it.and cleaning the air knife with the air pressure 3-5 bar. Check

every week.

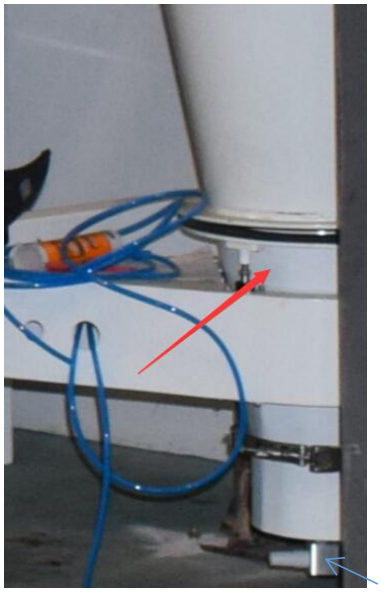


3.if it is plastic material booth,have to check as follow every 6 month

use neutral solvent or soapy water to cleaning the plate inside the booth,for some place have Scratches,could use wool wheel to polish. Then coated with a layer of silicon-free car wax,make it easy to cleaning .

6.2 Maintenance of the cyclone separator

1.Check the bottom of the cyclone (knob by hand),the powder could not more than 2/3 of the funnel(see the picture as below),otherwise will suction by the after filter system,then waste the powder. Check it every two hours.



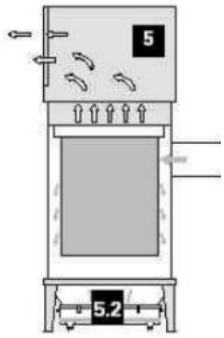
2, Cleaning the inside of the cyclone (even though don't change color,the way same as fast color change),otherwise the powder will attach to the plate. Check every day.

3,check the powder pump under the cyclone,the life about 3 months, the operation pressure is 2 bar,if two high,the life will be short. Check every day

4, check the seal ring of the funnel ,if necessary,replace it. Check every week.

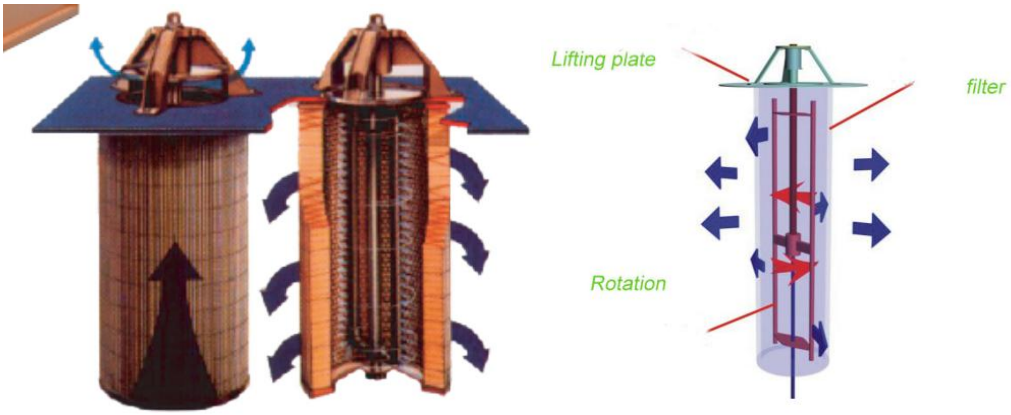
6.3 Maintenance of the after filter system

1, Cleaning the Refuse container (5.2) every day



2. Check the filter if with powder attached ,if have more,the filter is blocked or have problem of air cleaning device. Check every week.

3. Check the Rotation if work normal,and the lifting plate has broken,replace as necessary.Check every 3 months.



4. Check the fan motor if with powder attached,and vibrating is normal.Check every year.

7.0. Troubleshooting Guide

Fault / Error / Problem	Solution
Low powder recovery efficiency Suction leakage :	A leakage in the suction will disturb the cyclone and reduce its efficiency. Check the following areas : - cyclone collecting hopper - Filter collecting hopper - Inspection opening on the Filter - Duct connecting the cyclone and the Filter
Exhaust fan :	Check the direction of rotation and correct the setting of the air volume according to the Fan diagram
cyclone collecting hopper full :	Once the collecting hopper is full all additional powder will pass into the collecting hopper : - Check the functioning of the powder pumps, and the vibrator in the collection hopper. - Check the level sensor of the powder hopper for functioning (the lever sensor monitors the suction pumps)
Too much powder in the After Filter	- Collecting hopper leaks - Collecting hopper over-filled - Idling pressure (vacuum) for powder pumps too low

8. Circuit diagram