Note
This manual applies to the entire series.

Order number
P/N = Order number for Nordson products

Notice
This is a Nordson Corporation publication which is protected by copyright. Original copyright date 2001. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Nordson Corporation. The information contained in this publication is subject to change without notice.

Trademarks


Designations and trademarks stated in this document may be brands that, when used by third parties for their own purposes, could lead to violation of the owners’ rights.
## Table of Contents

### Safety

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intended Use</td>
<td>1</td>
</tr>
<tr>
<td>Area of Use (EMC)</td>
<td>1</td>
</tr>
<tr>
<td>Operating restrictions</td>
<td>1</td>
</tr>
<tr>
<td>Unintended Use – Examples –</td>
<td>1</td>
</tr>
</tbody>
</table>

### Description

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Residual Risks</td>
<td>2</td>
</tr>
<tr>
<td>3. Note on Manual</td>
<td>2</td>
</tr>
<tr>
<td>4. Series Overview</td>
<td>2</td>
</tr>
<tr>
<td>Type Designation</td>
<td>2</td>
</tr>
<tr>
<td>System Components</td>
<td>3</td>
</tr>
<tr>
<td>5. Functioning</td>
<td>4</td>
</tr>
<tr>
<td>Versa-Spray</td>
<td>4</td>
</tr>
<tr>
<td>TRIBOMATIC</td>
<td>5</td>
</tr>
<tr>
<td>Contact Switch</td>
<td>6</td>
</tr>
<tr>
<td>Warning Light / Alarm</td>
<td>6</td>
</tr>
<tr>
<td>6. ID Plate</td>
<td>6</td>
</tr>
</tbody>
</table>
# Table of Contents

## Installation

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unpacking</td>
<td>7</td>
</tr>
<tr>
<td>2. Setting Up</td>
<td>7</td>
</tr>
<tr>
<td>3. Assembly</td>
<td>8</td>
</tr>
<tr>
<td>Attach Powder Gun(s)</td>
<td>9</td>
</tr>
<tr>
<td>Versa-Spray</td>
<td>9</td>
</tr>
<tr>
<td>TRIBOMATIC</td>
<td>9</td>
</tr>
<tr>
<td>Pneumatic Connections</td>
<td>10</td>
</tr>
<tr>
<td>Electrical Connections</td>
<td>10</td>
</tr>
<tr>
<td>Connecting Panels 1 to 4</td>
<td>11</td>
</tr>
<tr>
<td>Laying Power Cord</td>
<td>12</td>
</tr>
<tr>
<td>Line Voltage</td>
<td>12</td>
</tr>
<tr>
<td>Electrical Connections (External)</td>
<td>12</td>
</tr>
<tr>
<td>Compressed Air Supply</td>
<td>13</td>
</tr>
<tr>
<td>Preparing Spray Chamber</td>
<td>13</td>
</tr>
</tbody>
</table>

## Operation

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control Unit Rack Versa-Spray</td>
<td>14</td>
</tr>
<tr>
<td>2. Control Unit Rack TRIBOMATIC</td>
<td>15</td>
</tr>
<tr>
<td>Master Control Module</td>
<td>16</td>
</tr>
<tr>
<td>Control Unit for 1st Versa-Spray Gun</td>
<td>16</td>
</tr>
<tr>
<td>Control Unit for TRIBOMATIC Gun</td>
<td>16</td>
</tr>
<tr>
<td>FC Control Unit</td>
<td>16</td>
</tr>
<tr>
<td>PFC Control Unit (Option)</td>
<td>16</td>
</tr>
<tr>
<td>3. Operation</td>
<td>17</td>
</tr>
<tr>
<td>Filling Powder</td>
<td>17</td>
</tr>
<tr>
<td>Adding Powder During Operation</td>
<td>17</td>
</tr>
<tr>
<td>Basic Settings</td>
<td>18</td>
</tr>
<tr>
<td>Startup</td>
<td>19</td>
</tr>
<tr>
<td>Optimizing Coating – Guidelines</td>
<td>20</td>
</tr>
</tbody>
</table>
### Operation (contd.)

- Nozzle Setting Versa-Spray ........................................ 21
- Settings Record ..................................................... 22
- Switching Off for Short Period of Time ......................... 23
- Daily Switch ON ..................................................... 23
- Daily Switch OFF .................................................... 23
- Switching Off in an Emergency ................................. 23

### Maintenance

1. General .............................................................. 24
   - Cleaning Reservoir Filter .................................... 25
2. Regular Maintenance ............................................. 26
   - Access to Filters ............................................... 27
   - Powder Pumps .................................................. 27
3. Maintenance Record ................................................ 28

### Troubleshooting

1. General Checking .................................................. 29
2. Troubleshooting Table ............................................. 29
   - Only for TRIBOMATIC ......................................... 29
   - For TRIBOMATIC and Versa-Spray: .......................... 30
3. PFC: Incorrect Charge Display ................................. 31
4. Calibrating Level Sensor ........................................ 31

### Specifications

- Dimensions ......................................................... 33
- Options .............................................................. 33
- Air Dryer ........................................................... 33
- Accessories ........................................................ 34
  - Installation of PFC Charge Tube ............................ 34
  - Installation of Refill Hopper PC 80 ....................... 34
Safety

**WARNING:** Observe and follow all safety instructions, the general safety instructions included as a separate document, as well as the specific safety instructions in all other related documentation.

Description

1. **Intended Use**

Cable coaters in the series *ECC 301* – hereafter also referred to as *system* – may be used only to coat cables or similar substrates with talcum (*ECC301 V*) or other nonflammable super absorbent powder (*ECC301 T*). The model (*ECC301 C*) is intended for coating with abrasive materials.

Any other use is considered to be unintended. Nordson will not be liable for personal injury or property damage resulting from unintended use.

Intended use includes the observance of Nordson safety regulations. Nordson recommends obtaining detailed information on the materials to be used.

**Area of Use (EMC)**

The system is intended to be used in industrial areas.

**Operating restrictions**

When using in residential, business or industrial areas, the system may cause interference with other units, e.g. radios.

**Unintended Use – Examples –**

The system may not be used under the following conditions:

- For application of unsuitable materials, particularly flammable materials and stearates
- In defective condition
- When changes or modifications have been made by the customer
- In an atmosphere in which the maximum ppm concentration permitted is exceeded
- In a potentially explosive atmosphere
- When the values stated under *Specifications* are not complied with.
2. **Residual Risks**

In the design of the unit, all precautions were taken to protect personnel from potential danger. But some residual risks can not be avoided. Personnel should be aware of the following:

- Emission of material particles into the atmosphere when filling the hopper, disconnecting pneumatic lines and material hoses and opening the spray chamber
- Inhalation of potentially hazardous material particles.

3. **Note on Manual**

- This manual applies to the entire series.
- This manual is valid only in conjunction with all other parts of the system documentation.

4. **Series Overview**

The various systems in the series ECC 301 basically differ from one another in the model of the spray chamber, the guns and the control units used.

**Type Designation**

ECC301 V / C / T

- T = TRIBOMATIC system
- C = Versa-Spray system *Ceramic*
- V = Versa-Spray system
- Series 301
- Electrostatic Cable Coater
Fig. 1  Principle drawing

1  Warning light / Alarm
2  Control units*
3  Rack for control units
4  Basic unit
5  Door to powder hopper
6  Powder pump (Versa-Spray)*
7  Pump powder recovery
8  Powder recovery hose
9  Second powder pump mount
10  Spray chamber
11  Rubber cover
12  Inside: Versa Spray powder gun*
13  Powder hose
14  Cable to powder gun
15  Air dryer with preliminary and after filters (accessory)*
16  Powder hoses (charged material)
17  Powder pump (TRIBOMATIC)*
18  Hose atomizing air
19  Charge measuring cable
20  TRIBOMATIC powder gun*
21  F: Hose flow rate air
22  A: Hose atomizing air
23  Not shown: Level sensor (on back of system)

Note: There are separate manuals available for components marked with an asterisk (*).
5. Functioning

The system functions on the principle of electrostatic charging of powdery materials. The charged powder particles seek the closest and best ground – the substrate itself. Cable is usually coated.

Versa-Spray

The powder is conveyed out of the hopper with a powder pump working on the Venturi principle. The pump (6, Fig. 1) has two compressed air connections: flow rate air (F) and atomizing air (A). The pressure of the flow rate air determines the quantity of powder sucked in. The powder/air mixture generated by the atomizing air is conveyed to the powder gun and charged there by a high voltage electrode. The charged powder particles find the grounded substrate and stick to it.

This procedure is referred to as the Corona procedure in Nordson literature.

In order to make the powder in the hopper capable of being conveyed, it is fluidized. The fluidized air is introduced from underneath, penetrating a plate that is air permeable but not solid permeable.

NOTE: With higher line speeds / powder quantities (high flow), two powder pumps are used.

---

Fig. 2 Principle drawing with one powder gun
**TRIBOMATIC**

The powder (e.g.: Super Absorbent Powder) is conveyed out of the hopper with a powder pump working on the Venturi principle. The pump (17, Fig. 1) has a compressed air connection for the flow rate air (F). The pressure of the flow rate air determines the quantity of powder sucked in. The atomizing air and the powder come together at the diffuser of the TRIBOMATIC powder gun. The powder particles are charged by friction in the charge tube. The charged powder particles find the grounded substrate and stick to it.

In order to make the powder in the hopper capable of being conveyed, it is fluidized. The fluidized air is introduced from underneath, penetrating a plate that is air permeable but not solid permeable.

**NOTE:** When the line speed / powder quantity is low (low flow), a gun with 4 nozzles is used; with medium line speed / powder quantity the gun has 8 nozzles. When the line speed / powder quantity is high (high flow), the system is equipped with 2 guns with 4 nozzles each.

---

Fig. 3  *Principle drawing with one powder gun (middle flow)*
**Contact Switch**

When the spray chamber (10, Fig. 1) is opened during operation, the contact switch on the spray chamber causes the powder flow to stop and, with Versa-Spray, the high voltage supply to the powder gun to be interrupted.

When the door to the powder hopper (5, Fig. 1) is opened during operation, the contact switch on the door causes filter cleaning to be interrupted.

When the spray chamber / door is closed, the system automatically returns to the original operating state.

**Warning Light / Alarm**

The orange lamp lights up to indicate that the powder level is too low or there is too little powder (with option PFC). If desired, an acoustic warning signal can be emitted.

The acoustic signal can be switched on and off with the switch on the warning light.

### 6. ID Plate

![ID Plate Diagram]

<table>
<thead>
<tr>
<th>Information</th>
<th>Explanation</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>Unit designation and configuration code</td>
<td>–</td>
</tr>
<tr>
<td>P/N</td>
<td>Order number (part number)</td>
<td>–</td>
</tr>
<tr>
<td>Ser.</td>
<td>Serial number</td>
<td>–</td>
</tr>
<tr>
<td>U</td>
<td>Operating voltage</td>
<td>Volt</td>
</tr>
<tr>
<td>I</td>
<td>Fuse protection</td>
<td>Ampère</td>
</tr>
<tr>
<td>f</td>
<td>Line voltage frequency</td>
<td>Hertz</td>
</tr>
<tr>
<td>P</td>
<td>Power consumption of unit</td>
<td>Watt</td>
</tr>
<tr>
<td>P&lt;sub&gt;max&lt;/sub&gt;</td>
<td>Power consumption of unit and connected accessories</td>
<td>Watt</td>
</tr>
</tbody>
</table>

Fig. 4
**Installation**

**WARNING:** Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. **Unpacking**
   Carefully unpack cable coater and components. Keep packaging material to reuse it, or dispose of properly according to local regulations.

   **Lifting (Unpacked System)**
   Refer to *Specifications* for weight. Use only suitable floor lifting equipment (lifting truck or fork lift).

2. **Setting Up**
   Set up only in an environment that conforms with the stated Degree of Protection (Refer to *Specifications*). Do not set up in a potentially explosive atmosphere!

   Ensure that there is enough space to fill powder (2) and for installation (1) and maintenance work.

---

**Fig. 5 Free space**
3. Assembly

Also refer to separate manuals for powder guns.

**NOTE:** Refer to Fig. 10 for a detailed illustration of the connecting panels.

![Front and Back of System](image)

**Fig. 6**

1. Remove transport protection (if present).
2. Attach spray chamber (10, Fig. 1) to the holders.
3. Attach powder recovery hose (8, Fig. 1) between the spray chamber and the pump *powder recovery* (3).

**NOTE:** Make sure that this hose is of minimum length to avoid clogging of returning powder.
Attach Powder Gun(s)

Versa-Spray

**1-gun version:** Attaching to spray chamber

1. Screw holder (1) onto spray chamber.

2. Connect cables and hoses to the gun as described under *Pneumatic Connections / Electrical Connections*.

3. Guide gun into the holder from the top and then stick it into the connecting piece.

4. Screw the two gun spacers (2) onto the side of the holder.

5. Connect cables and hoses to the system as described under *Pneumatic Connections / Electrical Connections*.

**2-gun version:** Attaching to spray chamber and the back of the chamber.

1. Put gun in the connecting piece (1).

2. Screw the two gun spacers (2) onto the spray chamber.

3. Repeat steps for second gun on the back of the chamber.

4. Connect cables and hoses as described under *Pneumatic Connections / Electrical Connections*.

TRIBOMATIC

Attach to the holder (1) on the system.

Connect cables and hoses as described under *Pneumatic Connections / Electrical Connections*.
**Pneumatic Connections**

**NOTE:** 1: 1st gun; 2: 2nd gun (if present)

1. Connect powder pump and gun inlet with the powder hose.

2. **TRIBOMATIC:** Connect powder hoses (for charged material) to diffuser on end of charging tube and connect atomizing air also to diffuser.
   
   **NOTE:** The outlet A1/2 (connecting panel 1) is connected to the gun inlet and used for atomizing air.

**Electrical Connections**

1. Electrically connect level sensor *(LEVEL PROBE, connecting panel 2).*

2. Electrically connect powder gun(s).

   **Versa-Spray:** Connect cable to powder gun (14, Fig.1) to *GUN CONNECTOR 1/2* (connecting panel 2). To do this, guide the cable through the cable duct (connecting panel 1 and 4) and the cable channel on the back of the system.

   **TRIBOMATIC:** Use charge measuring cable to connect gun and *PFC 1/2* (connecting panel 2). To do this, guide the cable through the cable duct (connecting panel 1 and 4) and the cable channel on the back of the system.

3. Connect spray chamber contact switch to the connection *SPRAY CHAMBER INTERLOCK* (connecting panel 2). To do this, guide the cable through the cable duct (connecting panel 1 and 4) and the cable channel on the back of the system.

4. Ground spray chamber holder. Do this by connecting the holder with terminal screw GND (connecting panel 3). To do this, guide the cable through the cable duct (connecting panel 1 and 4) and the cable channel on the back of the system.
Connecting Panels 1 to 4

Fig. 10
Laying Power Cord

**WARNING:** In the working area around the unit, lay power cords such that they do not pose a risk of stumbling and such that they can not be damaged. Do not pinch power cords, and regularly check for damage. Replace damaged power cord immediately!

Line Voltage

**WARNING:** Operate only with the line voltage shown on the ID plate.

**NOTE:** Permitted deviation from nominal voltage is ± 10%.

**NOTE:** The power cord cross-section must comply with the power consumption. Refer to *Specifications*.

Electrical Connections (External)

**WARNING:** Risk of electrical shock. Failure to observe may result in personal injury, death, or equipment damage.

1. Connect cable coater to the customer’s power supply with the power cord (*MAIN VOLTAGE*, connecting panel 2, Fig. 10).

2. Connect ground.

**NOTE:** The ground wire in the power cord is usually not sufficient for good grounding. The system should be independently connected to the best ground connection. Do this by laying a cable with a large cross-section from the terminal screw *GND* (connecting panel 3, Fig. 10) to good earth, e.g. a water pipe.

3. Connect *INTERLOCK* (connecting panel 2, Fig. 10). *INTERLOCK* is a potential-free connection that is used for coupling the system function with Start/Stop of the cable production line, for a PLC link or for an external control unit.
Compressed Air Supply

For applying powder, dry, non-lubricated and clean compressed air is imperative. The compressed air supply must be such that it can be dependably regulated in a range up to 600 kPA.

Nordson recommends using the air dryer P/N 634 807 (Fig. 11).

If the air dryer is to retrofitted:

1. Attach the air dryer to the intended position on the coater.
2. Link air dryer and AIR SUPPLY (connecting panel 2, Fig. 10).
3. Connect compressed air supply to air dryer.
4. Electrically connect air dryer (DRYER, connecting panel 3).

Preparing Spray Chamber

Before the system can be started up, the spray chamber (10, Fig. 1) must be prepared as follows:

1. Set the height of the spray chamber such that the cable to be coated runs through the center of the spray chamber.
2. If necessary, run the cable over supporting rolls before it enters the chamber and after it exits the chamber to keep it from sagging.
3. Punch or cut holes in the rubber lid (11, Fig. 1) for chamber inlet and outlet.

**NOTE:** Approximately 12.5 mm (.50 in.) larger than cable outer diameter.
4. Fasten rubber lid to chamber inlet and outlet.
Operation

**WARNING:** Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. **Control Unit Rack**

   Versa-Spray

   Detailed descriptions of the control units can be found in separate manuals in the system documentation.

![Control Unit Rack Diagram](image)

**Fig. 12**

1. Master control module
2. Control unit for 1st Versa-Spray gun
3. Control unit for 2nd Versa-Spray gun
4. FC control unit
5. PFC control unit (option)
2. Control Unit Rack
TRIBOMATIC

Detailed descriptions of the control units can be found in separate manuals in the system documentation.

Fig. 13
1 Master control module
2 Control unit for 1st TRIBOMATIC gun
3 Control unit for 2nd TRIBOMATIC gun
4 FC control unit
5 Blind cover
**Master Control Module**
The master control module controls the gun control units. The module has two air pressure controllers and pressure measuring instruments for fluidization and powder recovery. LEDs show the selected functions and warnings.

**Control Unit for 1st Versa-Spray Gun**
The control unit contains the pneumatic and electrical control elements, the DC supply and monitoring functions for automatic powder guns, type IPS (Integral Power Supply).

**Control Unit for TRIBOMATIC Gun**
The automatic TRIBOMATIC II spray guns are controlled with the pneumatic and electrical control elements.

**FC Control Unit**
The control unit is used to pneumatically and electrically control the filling of powder hoppers and filter cleaning.

**PFC Control Unit (Option)**
The PFC control unit is used to make visible powder flow by showing the powder charge values. It is used only with Versa-Spray guns.

A measuring ring (1) is attached to the powder outlet on the pump(s).

---

Fig. 14
3. **Operation**

**Filling Powder**

Do not switch on the cable coater immediately. Particularly the compressed air supply must remain off.

**WARNING:** When the hopper is filled and the chamber is opened, material particles are emitted into the atmosphere. Keep emission to a minimum by handling drum carefully. Wear respiratory protection.

1. Open door to powder hopper (5, Fig. 1).
2. Carefully open powder drum.
3. Carefully pour approximately half (12.5 kg) of the standard powder drum (25 kg) into the hopper of the system.

**NOTE:** The powder level in the hopper must be significantly below the recovery connection piece (Fig. 15).

4. Firmly close door.
5. Store opened powder drum in a dry place.

**Adding Powder During Operation**

When refilling powder during operation, observe the following points:

- Turn off powder recovery with the pressure regulator on the master control module (Fig. 16) by making pressure zero.
- Allow fluidization to run.
- Do not exceed maximum powder level.
**Basic Settings**

*NOTE:* When setting air pressures, the principle "working from the bottom up" should be followed.

If, for example, the manometer shows 5 bar but only 3.5 bar is to be set, a value significantly below 3.5 should be used as the starting point (e.g. 1 bar). Then the pressure can be increased slowly from this low value up to the desired value of 3.5 bar.

<table>
<thead>
<tr>
<th>Functioning</th>
<th>Maximum value</th>
<th>Minimum value</th>
<th>Recommended value</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air supply /</td>
<td>600 kPa/6.0</td>
<td>500 kPa/5.0</td>
<td>600 kPa/6.0 bar</td>
<td>Installation, Compressed Air Supply</td>
</tr>
<tr>
<td>operating air pressure</td>
<td>bar</td>
<td>bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluidization pressure</td>
<td>150 kPa/1.5</td>
<td>50 kPa/0.5</td>
<td>100 kPa/1.0 bar</td>
<td>Separate manual Master Control Module</td>
</tr>
<tr>
<td>Powder recovery</td>
<td>200 kPa/2.0</td>
<td>150 kPa/1.5</td>
<td>150 kPa/1.5 bar</td>
<td></td>
</tr>
<tr>
<td>Powder flow rate</td>
<td>250 kPa/2.5</td>
<td>40 kPa/0.4</td>
<td>120 kPa/1.2 bar</td>
<td>Separate manual Control Unit for Versa-Spray or TRIBOMATIC guns</td>
</tr>
<tr>
<td>Atomizing / diffuser air</td>
<td>120 kPa/1.2</td>
<td>100 kPa/1.0</td>
<td>120 kPa/1.2 bar</td>
<td></td>
</tr>
<tr>
<td>Powder refill air</td>
<td>350 kPa/3.5</td>
<td>350 kPa/3.5</td>
<td>350 kPa/3.5 bar</td>
<td>Separate manual FC Control Unit</td>
</tr>
<tr>
<td>Air blast cleaning of filters</td>
<td>AUX</td>
<td>300 kPa/3.0</td>
<td>230 kPa/2.3 bar</td>
<td>250 kPa/2.5 bar</td>
</tr>
<tr>
<td>PFC control unit</td>
<td>—</td>
<td>—</td>
<td>Alarm level 20% Charge displays around 50%</td>
<td>Separate manual PFC Control Unit</td>
</tr>
</tbody>
</table>
NOTE: Good electrostatic powder coating can occur only when — in addition to independent, sufficient grounding of the system — the substrate to be coated is effectively grounded.

1. Effectively ground the end of the cable at the unwinder.

2. Verify that the ON/OFF switch on the Versa-Spray- or TRIBOMATIC control units are still set to OFF.

3. Start compressed air supply.

4. Set operating air pressure to 600 kPa, 6 bar.

5. Switch on air dryer when present.

6. Set master switch on master system control module to the position to the right (system ON: solenoid valves open)

7. Set ON/OFF switch on FC control unit and – when present – on PFC control unit to ON.

8. Set air pressure values as recommended.

9. Allow the powder supply to fluidize for several minutes during startup.

10. Start cable production line.

11. Switch ON Versa-Spray or TRIBOMATIC control unit(s).

12. When using Versa-Spray guns, initiate production with maximum charging voltage.

NOTE: When using Versa-Spray nozzles, refer to Nozzle Setting.

13. Visually check the quality of the powder coating during production. If necessary, adjust pressure to optimize quality. Use the Settings Record for this purpose.
Optimizing Coating – Guidelines

There are no set rules for optimizing coating quality. Production parameters such as line speed (retention time of a section of cable in the spray chamber), material properties of cable surface and powder, ambient conditions, quality of grounding, etc. can vary significantly from customer to customer. But the following guidelines can generally be applied:

- Set the lowest possible powder output quantity, without impairing charge level, to avoid overspray.
- Set charge voltage at 50% of max.
- When using an optional PFC control unit: Select amplification range such that the charge level shows approx. 50%. Set alarm level to approx. 20%.
- When a charge alarm occurs, check coating quality. If coating is insufficient and increasing the powder output quantity does not cause improvement, the powder pump as well as the Venturi inside pipe, the powder hoses and the powder guns must be thoroughly cleaned.
- Set atomizing/diffuser air as low as possible without impairing the powder/air mixture.
- Ensure that air blast cleaning of the filter cartridge is functioning regularly (6 x /min).
- Keep air current speed in the spray chamber as low as possible, by using smallest possible spray chamber openings.

NOTE: When optimizing the coating quality, only one setting should be changed at a time – e.g. powder output quantity – leaving the others unchanged. This way changes in results can be better interpreted. The Settings Record can be used for this purpose.

NOTE: In order to be able to reproduce at any time the optimal settings determined for production, the Settings Record should be used.
**Nozzle Setting Versa-Spray**

<table>
<thead>
<tr>
<th>Cable</th>
<th>Setting 1</th>
<th>Setting 2</th>
<th>Setting 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10 mm</td>
<td>Fig. 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - 20 mm</td>
<td>Fig. 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 20 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Versa-Spray nozzle, 2.5 mm slit, P/N 174 223
2. Versa-Spray nozzle, 2.5 mm slit, P/N 174 223
3. Versa-Spray nozzle, 2.5 mm slit, P/N 174 223; alternative: 4 mm slit, P/N 174 227

**Fig. 17**
## Settings Record

<table>
<thead>
<tr>
<th>Production:</th>
<th>Cable type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line speed</td>
<td>Line speed</td>
<td></td>
</tr>
<tr>
<td>Powder type</td>
<td>Powder type</td>
<td></td>
</tr>
<tr>
<td>Compressed Air Supply</td>
<td>600 kPA/6.0 bar</td>
<td></td>
</tr>
<tr>
<td>Fluidization</td>
<td>100 kPA/1.0 bar</td>
<td></td>
</tr>
<tr>
<td>Powder recovery</td>
<td>150 kPA/1.5 bar</td>
<td></td>
</tr>
<tr>
<td>Powder flow rate</td>
<td>120 kPA/1.2 bar</td>
<td></td>
</tr>
<tr>
<td>Atomizing / diffuser air</td>
<td>120 kPA/1.2 bar</td>
<td></td>
</tr>
<tr>
<td>Powder refill air</td>
<td>350 kPA/3.5 bar</td>
<td></td>
</tr>
<tr>
<td>Air blast cleaning of filters</td>
<td>250 kPA/2.5 bar</td>
<td></td>
</tr>
<tr>
<td>Gun type</td>
<td>Gun type</td>
<td></td>
</tr>
<tr>
<td>Charge in kV or µA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powder pump type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PFC amplification range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm level</td>
<td>Alarm level</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

- Settings Record
Switching Off for Short Period of Time

Switch off control unit(s) for powder gun(s). Check powder level.

Daily Switch ON

1. Check powder level; refill if necessary.
2. Check that air dryer functions correctly.
3. Inspect all compressed air and powder hoses as well as electrical connections. Tighten loose connections and replace damaged parts.
4. Proceed as described under Startup.

Daily Switch OFF

1. Switch off control unit(s) for powder gun(s).
2. Allow system to run for 10 to 20 minutes for self-cleaning.
3. Set main switch on master control module to left position, OFF.

Switching Off in an Emergency

WARNING: When any type of emergency occurs, immediately switch off the system.

1. Stop cable production line.
2. Set main switch on master control module to left position, OFF.
3. After standstill and before switching the system back on, have the fault remedied by qualified personnel.
Maintenance

**WARNING:** Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

**WARNING:** Before doing any maintenance work, switch the system off completely (Refer to Operation, Daily Switch OFF) and secure such that it can not be unintentionally switched on.

Maintenance of the cable coating system is usually limited to cleaning. It is important that cleaning is thorough, because system functioning and coating quality are very much dependent on the cleanliness of all parts that come into contact with powder and compressed air.

The following points should always be observed when conducting maintenance tasks:

- If possible, clean all detachable components such as powder guns, powder hoses, pumps and filters in a separate, closed room equipped with an exhaust system.

**WARNING:** Since cleaning with compressed air is inevitable, extreme caution is imperative. Never direct air guns at yourself or others; compressed air can cause serious injury. When injuries occur or are suspected, immediately consult the first aid office!

- When using compressed air to clean, ensure that the air is dry, clean and non-lubricated. Whenever cleaning with compressed air is the prescribed method, also use a vacuum cleaner or exhaust system.
When cleaning powder guns with compressed air, ensure that they are securely grounded. Otherwise blowing compressed air could lead to charging and uncontrolled discharging, causing sparks. The resistance to ground may not exceed 1 Ω (one ohm).

Never use sharp objects to scrape off powder deposits. Scratches on the surface can cause powder to collect, resulting in blockage.

BLOWING OUT of unit parts and the complete coater may need to be conducted longer and possibly even more often than the stated interval.

**WARNING:** Emission of material particles into the atmosphere. Keep emissions to a minimum during all maintenance tasks and wear suitable respiratory protection. Ensure effective vacuuming of suspended powder particles.

**WARNING:** When damaged parts endanger the operating safety and/or the safety of personnel, switch off the system and have the damaged parts replaced by qualified personnel. Use only original Nordson spare parts.

1. Vacuum out the reservoir when the system is switched off.
2. Switch on system.
3. Switch off control unit(s) for powder gun(s).
4. On the master control module, set the air pressure for fluidization to 0 bar.
5. On the FC control unit, set the air pressure for powder refilling to 0 bar.
6. On the FC control unit, set the air pressure for filter cleaning to 5 bar; on the master control module, also set the air pressure for powder recovery to 6 bar.
7. Allow system to run for 10 to 20 minutes for self-cleaning.
8. Switch off system.
2. Regular Maintenance

The stated maintenance intervals are only general values based on experience. Depending on production conditions – particularly with multiple shifts – other maintenance intervals may prove necessary.

<table>
<thead>
<tr>
<th>System part</th>
<th>Activity</th>
<th>Interval</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter cartridges</td>
<td>Refer to Cleaning Reservoir Filter</td>
<td>Weekly</td>
<td>Pos. 3, Fig. 18; in separate room with exhaust, if possible</td>
</tr>
<tr>
<td>Final filter</td>
<td>Remove filter, knock out firmly, blow out with compressed air and vacuum</td>
<td>At least monthly; depending on type of powder and operating time, possibly every two weeks</td>
<td>Pos. 2, Fig. 18; in separate room with exhaust, if possible</td>
</tr>
<tr>
<td>Spray chamber</td>
<td>Vacuum, blow out with compressed air if necessary</td>
<td>Weekly</td>
<td>Pos. 10, Fig. 1</td>
</tr>
<tr>
<td>Hopper</td>
<td>Vacuum, blow out with compressed air if necessary</td>
<td>Weekly</td>
<td>Fig. 19</td>
</tr>
<tr>
<td>Powder pump</td>
<td>Remove and blow out with compressed air, check Venturi inside pipe for eccentric wear, replace if necessary</td>
<td>Weekly</td>
<td>Fig. 20; in separate room with exhaust, if possible</td>
</tr>
<tr>
<td>Powder hoses</td>
<td>Remove and blow out with compressed air</td>
<td>Weekly</td>
<td>Pos. 8, 13, 16, Fig. 1; in separate room with exhaust, if possible</td>
</tr>
<tr>
<td>Powder recovery equipment</td>
<td>Blow out with compressed air and vacuum</td>
<td>Weekly</td>
<td>Pos. 1, Fig. 18</td>
</tr>
<tr>
<td>Powder gun</td>
<td>Detach and blow out with compressed air. WARNING: Ground first!</td>
<td>Weekly</td>
<td>Refer to separate manuals for Versa-Spray or TRIBOMATIC powder guns; in separate room with exhaust, if possible</td>
</tr>
<tr>
<td>Versa-Spray:</td>
<td>Check nozzle/electrode (antenna) for wear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete coater, external</td>
<td>Wipe with soft cloth Visual inspection for damage</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>Air dryer</td>
<td>Refer to separate manual</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Access to Filters

Fig. 19 Hopper with filters

Powder Pumps

Fig. 20
## 3. Maintenance Record

<table>
<thead>
<tr>
<th>System part</th>
<th>Date/name</th>
<th>Date/name</th>
<th>Date/name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter cartridges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final filter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray chamber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hopper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powder pump</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powder hoses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovery equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powder guns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete coater</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Troubleshooting

NOTE: When the system is used as intended, problems do not usually occur. Experience has shown that malfunctions are causes by either failure to clean or by foreign objects that accidentally land in the hopper when filling with powder.

1. General Checking

Before other troubleshooting, check the following:

- Are the pneumatic and electrical operating values set correctly (Refer to section Operation / Basic Settings)?
- Are all pneumatic connections and powder hoses intact?
- Do all electrical plug connections have correct contact?
- Have any fuses blown?

2. Troubleshooting Table

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different amounts of powder come out of the spray nozzles</td>
<td>Individual charge tubes or nozzles clogged?</td>
<td>Clean charge tubes / nozzles</td>
<td>Maintenance</td>
</tr>
<tr>
<td>No powder comes out of the spray nozzles</td>
<td>Blockage at Venturi pump, diffuser or in charge tubes due to damp compressed air or air atomized with oil</td>
<td>Check air conditioning unit, drain condensate, ensure that only clean, dry and non-lubricated compressed air is used</td>
<td>Maintenance</td>
</tr>
<tr>
<td>No charge, or charge value too low (microampère display)</td>
<td>Insufficient ground?</td>
<td>Check plug connections for good contact, especially ground</td>
<td>Installation</td>
</tr>
<tr>
<td></td>
<td>Is the processed powder suitable for Tribomatic use (electrostatic charging capacity)</td>
<td>Consult powder manufacturer (or material safety data sheet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microampère display defective</td>
<td>Consult Nordson</td>
<td></td>
</tr>
</tbody>
</table>

Only for TRIBOMATIC
<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
<th>Refer to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder comes out unevenly</td>
<td>Powder level in hopper too low</td>
<td>Fill powder</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Powder is clogged in the Venturi pipe of the pump</td>
<td>Clean powder pump</td>
<td>Maintenance</td>
</tr>
<tr>
<td></td>
<td>The conical powder inlet of the Venturi pipe is (eccentrically) worn</td>
<td>Replace Venturi plug insert</td>
<td>Maintenance / Powder Pumps</td>
</tr>
<tr>
<td>Powder is not fluidized in the hopper</td>
<td>Compressed air is damp</td>
<td>Empty condensate bowl of air conditioning unit; check that air conditioning unit is functioning correctly, if necessary</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Compressed air atomized with oil?</td>
<td>Ensure that only non-lubricated air is used</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Is fluidizing air connected?</td>
<td>Ensure that the air hose(s) is/are connected correctly to the back of the unit</td>
<td>Installation, Fig. 10</td>
</tr>
<tr>
<td></td>
<td>Air pressure for fluidization too low</td>
<td>Increase air pressure</td>
<td>Operation / Basic Settings</td>
</tr>
<tr>
<td>Powder comes out irregularly or not at all</td>
<td>Nozzles clogged</td>
<td>Clean nozzles</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Incorrect powder level indications</td>
<td>Level sensor set incorrectly</td>
<td>Calibrate</td>
<td>Calibration of Level Sensor</td>
</tr>
</tbody>
</table>
## 3. PFC: Incorrect Charge Display

In rare cases, the PFC control unit (option) may indicate an incorrect charge level. The display is close to zero, although other faults, e.g. loose plug connections, can be eliminated.

Then the PFC charge tube should be installed (Refer to Specifications / Accessories)

## 4. Calibrating Level Sensor

1. Measure/note distance that the actual sensor (2) protrudes from the tube (1).
2. Extract sensor (2).
3. Turn the sunken screw (4) in the end until the sensor switches at the desired distance (diode (3) lights up) when submerged into the fluidized powder in the powder hopper.
4. Slide the sensor into the tube until the distance measured in 1. is correct.

**NOTE:** The error indication should be acknowledged by pressing Reset on the FC control unit.
Specifications

**Voltage Supply**
240 VAC, 50/60 Hz, 1 phase with neutral conductor, max. voltage tolerance ± 10%

**Power Consumption**
Approx. 400 Watt

**Current Consumption**

<table>
<thead>
<tr>
<th>Component</th>
<th>Current</th>
<th>Fuse Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC system</td>
<td>1.5 A</td>
<td>5 A fast</td>
</tr>
<tr>
<td>Control unit Versa-Spray</td>
<td>0.5 A</td>
<td>1 A, 0.5 A fast</td>
</tr>
<tr>
<td>Control unit TRIBOMATIC II</td>
<td>0.1 A</td>
<td>0.2 A slow</td>
</tr>
<tr>
<td>Master control module</td>
<td>0.3 A</td>
<td>0.5 A ultra fast</td>
</tr>
<tr>
<td>Fan</td>
<td>0.2 A</td>
<td>via main control module</td>
</tr>
<tr>
<td>PFC control unit (Option)</td>
<td>0.45 A</td>
<td>3 A fast</td>
</tr>
<tr>
<td>FC control unit</td>
<td>0.1 A</td>
<td>0.2 A slow</td>
</tr>
<tr>
<td>Air blast cleaning of filters</td>
<td></td>
<td>0.5 A slow</td>
</tr>
</tbody>
</table>

(Refer to connecting panel 3, Fig. 10)

**Material Processing Capacity per Gun**

<table>
<thead>
<tr>
<th>Material</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talcum</td>
<td>Approx. 40 to 300 g/min</td>
</tr>
<tr>
<td>SAP</td>
<td>Approx. 40 to 100 g/min</td>
</tr>
</tbody>
</table>

**Degree of Protection (EN 60529)**
System
IP 65

**Noise Emission**
< 72 dB (A)

**Weight of Entire System**
Approx. 230 kg

**Max. Operating Air Pressure**
600 kPa (6 bar, 87 psi)

**Min. Operating Air Pressure**
500 kPa (5 bar, 73 psi)

**Max. Compressed Air Consumption**
36 m³/h (600 l/min) (21.2 SCFM)

**Permissible Ambient Temperature Range**
0 °C to 40 °C (32 °F to 104 °F) (system function), may be restricted by type of powder
**Dimensions**

All dimensions in mm.

![Diagram showing dimensions](image)

**Options**

<table>
<thead>
<tr>
<th>Designation</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air dryer with preliminary and after filters</td>
<td>634 807</td>
</tr>
<tr>
<td>PFC control unit</td>
<td>635 675</td>
</tr>
</tbody>
</table>

**Air dryer**

Also refer to *Installation / Compressed Air Supply* and separate manual for air dryer.

Pos. 1: After filter HFD (P/N 464 355)  
Pos. 2: Preliminary filter PFD (P/N 464 354)
### Installation of PFC charge tube

1. Switch off control unit(s) for powder gun(s).
2. Cut open powder hose (1) just past the pump and insert the charge tube (2).
3. Connect grounding cable (3) of charge tube to PFC 1/2 (connecting panel 2). Use the cable ducts (connecting panels 1 and 4, Fig. 10).

### Installation of refill hopper PC 80

**NOTE:** Unless indicated otherwise, the numbers in parentheses refer to Fig. 26.

1. Assemble feed pump (5).
   1. Replace fitting (1, Fig. 25) with the included screwed air fitting.
   2. Insert adapter (3, Fig. 25 – P/N 460 952) into pump body (2, Fig. 25).
   3. Insert suction tube (4, Fig. 25) in adapter.
2. Insert end of suction tube in hopper connection piece.
3. Connect powder hose (3) onto pump (5).

4. Connect the other end of the powder hose (1, Fig. 27) to the adapter (2, Fig. 27 – P/N 460 953).

5. Insert the adapter into the powder hose mount (8) on the system.
Installation of refill hopper PC 80 (contd.)

6. Measure the distance from the pump air connections to the fluidized bed connection on the feed hopper.

7. Cut lengths of hose to connect pump, needle valve, and fluidizing bed to the union Tee.

**NOTE:** Ensure that the needle valve is installed correctly (as indicated by arrow).

8. Cut length of hose from Automatic Refill (connecting panel 2, Fig. 10) to length needed to reach the union Tee.

**NOTE:** The factory setting for Powder Refill Air is 350 kPa/3.5 bar (Refer to Operation / Basic Settings).

9. Ground refill hopper. Do this by linking GROUND on refill hopper and GND on system (connecting panel 3, Fig. 10) with grounding cable (2).