

Vantage™ RCM Powder Coating Booth

Customer Product Manual
Part 1030157A

Issued 10/02

**For parts and technical support, call the Industrial Coating
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Section 1

Safety

Introduction

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

All phases of equipment installation must comply with all federal, state, and local codes.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding



WARNING: Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program. If you receive even a slight electrical shock or notice static sparking or arcing, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

All work conducted inside the spray booth or within 1 m (3 ft) of booth openings is considered within a Class 2, Division 1 or 2 Hazardous location and must comply with NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

- All electrically conductive objects in the spray areas shall be electrically connected to ground with a resistance of not more than 1 megohm as measured with an instrument that applies at least 500 volts to the circuit being evaluated.
- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator platforms, hoppers, photoeye supports, and blow-off nozzles. Personnel working in the spray area must be grounded.
- There is a possible ignition potential from the charged human body. Personnel standing on a painted surface, such as an operator platform, or wearing non-conductive shoes, are not grounded. Personnel must wear shoes with conductive soles or use a ground strap to maintain a connection to ground when working with or around electrostatic equipment.
- Operators must maintain skin-to-handle contact between their hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If gloves must be worn, cut away the palm or fingers, wear electrically conductive gloves, or wear a grounding strap connected to the gun handle or other true earth ground.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments or cleaning powder spray guns.
- Connect all disconnected equipment, ground cables, and wires after servicing equipment.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the equipment.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Section 2

Description

Introduction

NOTE: Refer to the *Vantage™ RCM Powder Coating Booth Installation Guide* for installation instructions.

The Vantage Removable Color Module (RCM) powder coating booth provides complete powder coating and powder recovery/reclaim.

Since powder coating systems are designed to each customer's requirements, each system has a different combination of equipment. This manual describes a basic, manually operated system. Your system may have equipment not described in this manual, such as automatic gun triggering and air management systems. Before operating your system, read the manuals for all equipment not covered in this manual.

The Vantage RCM powder coating booth is available in three base lengths (9, 12, and 15 ft) and can be used with any powder application system.

The system can be permanently located under the conveyor, or mounted on casters and rails (roll-on/roll-off system). The roll-on/roll-off system allows the booth to be moved off-line for color changes or maintenance.

Other options include a four-pump powder feed pump mounting plate, which allows fluidized, reclaimed powder in the color module hopper to be pumped directly to the spray guns; and a fire detection system, which must be installed in all spray booths with automatic spray guns.

Figure 2-1 illustrates the components and operation of a typical system.

Figures 2-2 and 2-3 illustrate the pneumatic and electrical controls of a typical system.

System Operation

See Figure 2-1.

Powder Application

The powder supply in the feed hopper is fluidized by forcing low-pressure compressed air through a porous plate in the bottom of the powder supply.

The feed hopper fluidizing air flows into the color module (9) through a vent duct. In the color module, cartridge filters (4) separate powder dust from the fluidizing air.

Powder pumps draw the fluidized powder out of the feed hopper, mix it with a high-velocity stream of air, and force it through feed hoses to the powder spray guns (1). The spray guns charge the powder and spray it onto the workpieces (3) passing through the booth. The charged powder sticks to the grounded workpieces.

System Components and Controls

The following tables and illustrations describe the components and controls of a typical system.

Powder Recovery and Reclaim

An exhaust fan (5) pulls spray room air into the enclosure (2), through the cartridge filters and color module, and into the fan section (6), where it passes through the final filters (7). The air then flows through the fan and is returned to the spray room free of powder.

The powder that does not stick to the parts (overspray) remains suspended in the air flowing into the cartridge filters. The powder collects on the external surfaces of the cartridge filters. At timed intervals, the pulse valves (8) release large volumes of air through the centers of the cartridge filters, blowing the powder off the filters. The powder falls into the color module hopper (10).

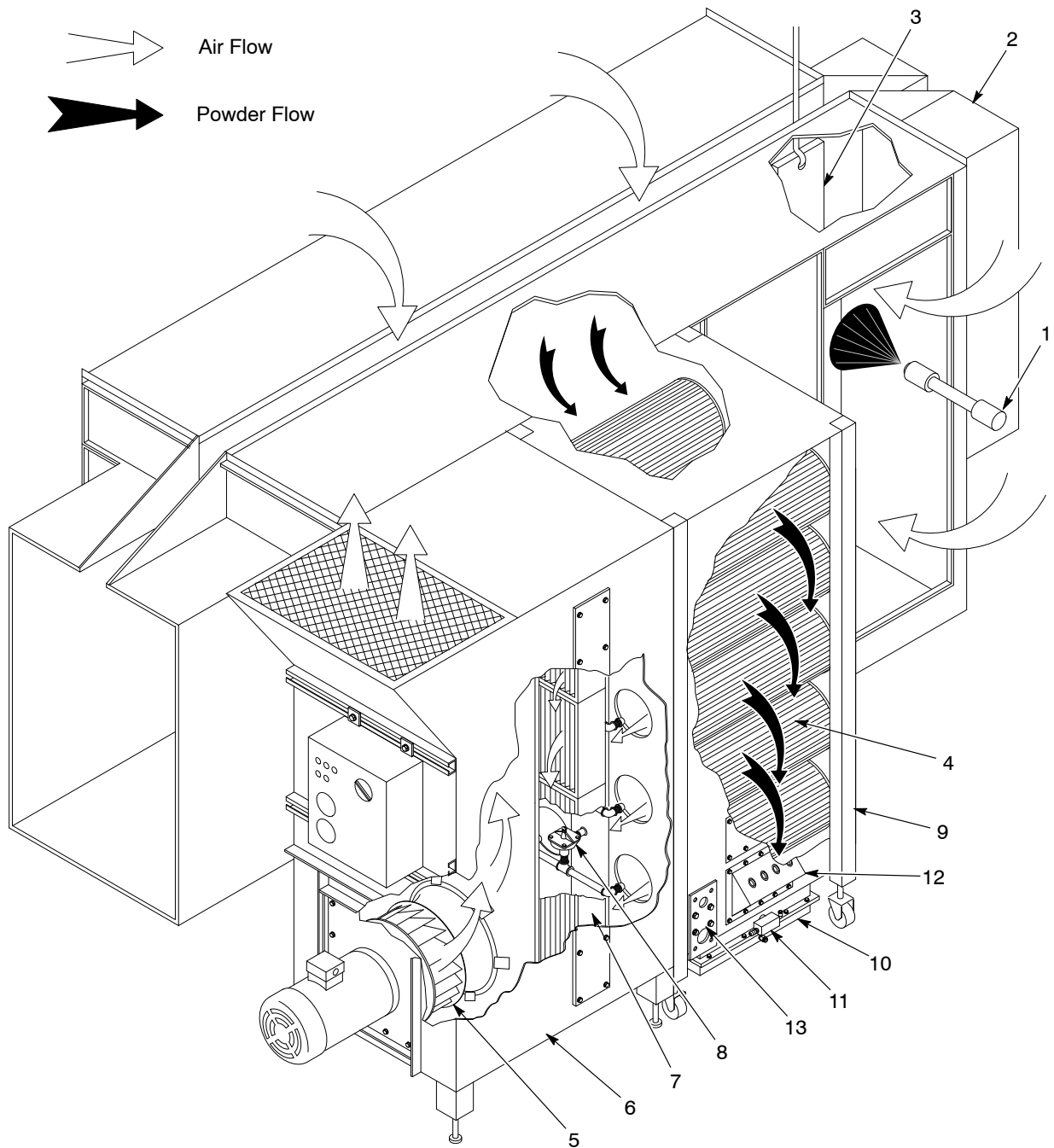
A transfer pump (11) pumps the reclaimed powder through a transfer hose to the feed hopper for reuse or to a scrap bucket. Typically, the reclaimed powder is fed through a sieve before being returned to the feed hopper.

Recovery and Reclaim Equipment

Refer to Table 2-1 and Figure 2-1.

Table 2-1 Recovery and Reclaim Equipment

Item	Equipment	Description
2	Booth enclosure (canopy)	Contains the sprayed powder within the booth. It has a conveyor slot in the roof, exit and entry vestibules, slots for automatic spray guns, and openings in the sides for manual gun operators. The color module is attached to a large opening on one side.
6	Fan section	Houses the exhaust fan, motor, cartridge filter pulse valves and air manifold, and final filters.
9	Color module	Houses cartridge filters, fluidizing plate and plenum, and transfer pump. Oversprayed powder accumulates in the hopper in the bottom of the module.
11	Transfer pump	Conveys the reclaimed powder out of the color module hopper to a sieve, feed hopper, or waste container. A regulator controls pump operation.



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Figure 2-1 System Components and Operation

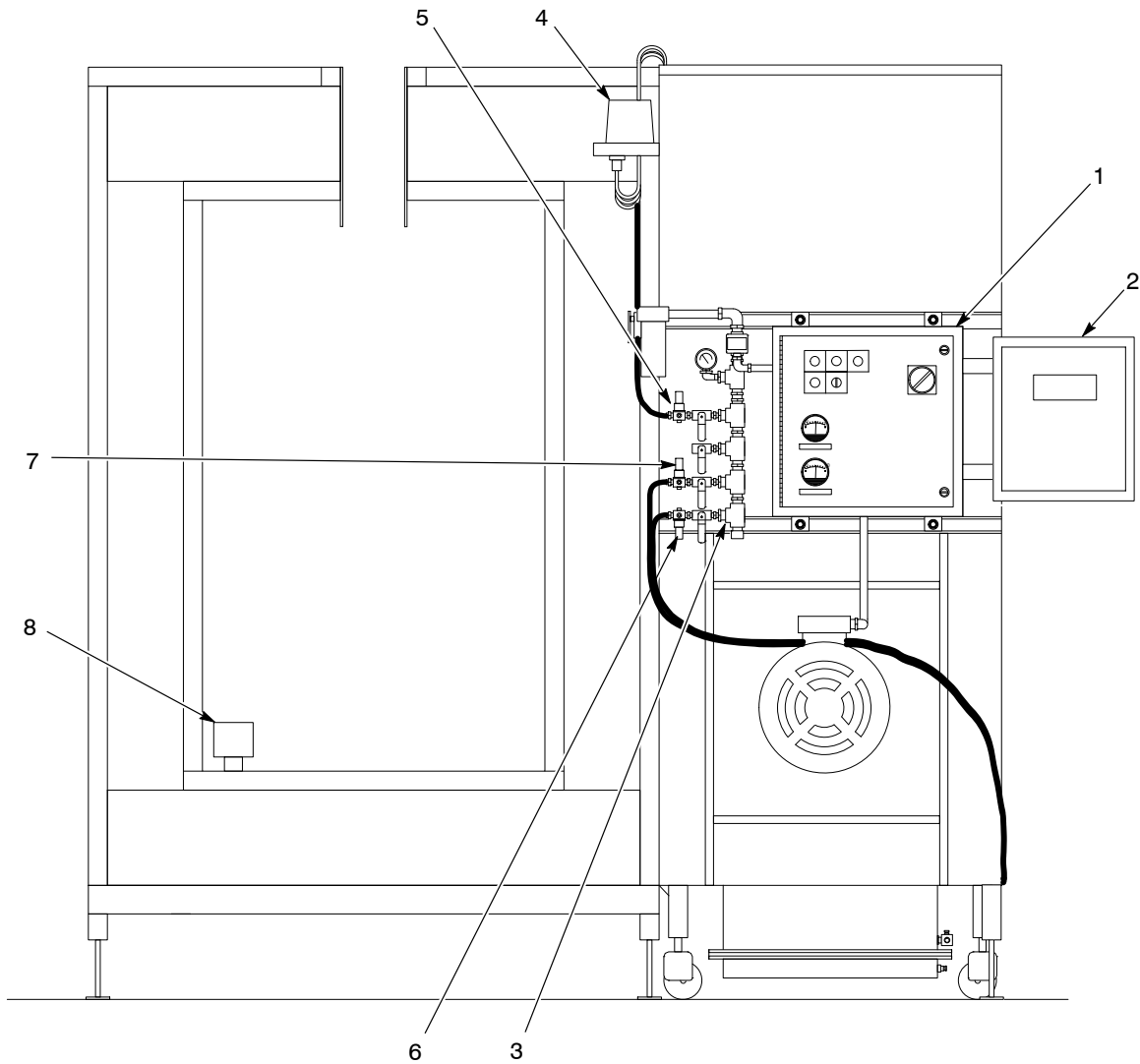
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|----------------------|-------------------------|--|
| 1. Powder spray gun | 6. Fan section | 11. Transfer pump |
| 2. Enclosure | 7. Final filters | 12. Powder feed pump mounting plate (optional) |
| 3. Workpiece | 8. Pulse valves | 13. Vent plate for 3.5 or 5 inch vent hose |
| 4. Cartridge filters | 9. Color module | |
| 5. Exhaust fan | 10. Color module hopper | |

System Controls

Refer to Table 2-2 and Figure 2-2.

Table 2-2 System Controls

Item	Equipment	Description
1	Electrical panel	Houses motor starters and overload protectors, fuses, relays, switches, basic system controls and indicator lights, and the pulse valve timer board. Refer to <i>System Electrical Panel</i> for more information.
2	Flame detector indicator/relay panel (optional)	Provides visible and audible fault and fire alarms and interlock relays. If a detector senses a flame the interlock relays shut down the conveyor, booth exhaust fan, compressed air, and electrical power to the spray guns. ANSI/NFPA-33 standards require flame detectors in all systems equipped with automatic spray guns.
3	Pneumatic manifold	Includes air-pressure regulators and gauges for cartridge pulsing, color module hopper fluidizing, transfer pump operation, and other pneumatic equipment.
4	Pulse air solenoids	Open and close the pulse valves on signals from the pulse valve timer in the electrical panel.
5	Pulse air controls	Regulate the pulse air pressure and volume. Controls include a regulator, pressure gauge, and gate valve.
6	Flame detectors (optional)	Monitor the enclosure interior for flames. The detectors use IR sensing technology and include a through-the-lens self test to check for lens blockage.
7	Fluidizing air controls	Regulate fluidizing air pressure to the color module hopper.



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Figure 2-2 System Controls

- | | | |
|--|--|------------------------------|
| 1. Electrical panel | 4. Pulse air solenoids | 7. Transfer pump air control |
| 2. Flame detector indicator/relay panel (optional) | 5. Pulse air control | 8. Flame detector (optional) |
| 3. Pneumatic manifold | 6. Color module fluidizing air control | |

System Electrical Panel

Refer to Table 2-3 and Figure 2-3.

Your system's electrical panel may be different.
Refer to *Troubleshooting* for electrical schematics.

Table 2-3 System Electrical Panel

Item	Component	Function
1	FAN START pushbutton/indicator	Starts the exhaust fan and indicates that the fan is on (amber light).
2	FAN STOP pushbutton	Stops the exhaust fan.
3	SIEVE indicator	Indicates that the sieve is on (amber light). Included with sieve option.
4	NO SIEVE TRANSFER ENABLE pushbutton/indicator	Allows the transfer pump to be turned on (in either Manual or Auto mode) if the sieve is disconnected (amber light). Included with sieve option.
5	TRANSFER switch	Three-position switch (Manual, Off, Auto). Controls operation of the transfer pump. In Auto mode, the transfer pump is turned on by a signal from the feed hopper level sensor, after the delay on timer runs out. Included with transfer option.
6	FINAL FILTER differential pressure gauge and switch	Senses and indicates the pressure drop across the final filters. At 3-in. wc, the final filter pressure switch opens and automatically shuts down the system.
7	PRIMARY (cartridge) FILTER differential pressure gauge	Senses and indicates the pressure drop across the cartridge filters.
8	Disconnect switch	Turns on and off power to panel and system.
9	Transfer pump delay on timer	Sets transfer pump delay on time. Provides a delay after the feed hopper level sensor signals for powder before starting the transfer pump. Prevents constant cycling of transfer pump. Included with transfer option.
10	Pulse valve timer board (mounted on inside of door)	Controls cartridge filter pulse frequency and duration. Off (frequency) time sets time between pulses, on (duration) time sets valve open time.

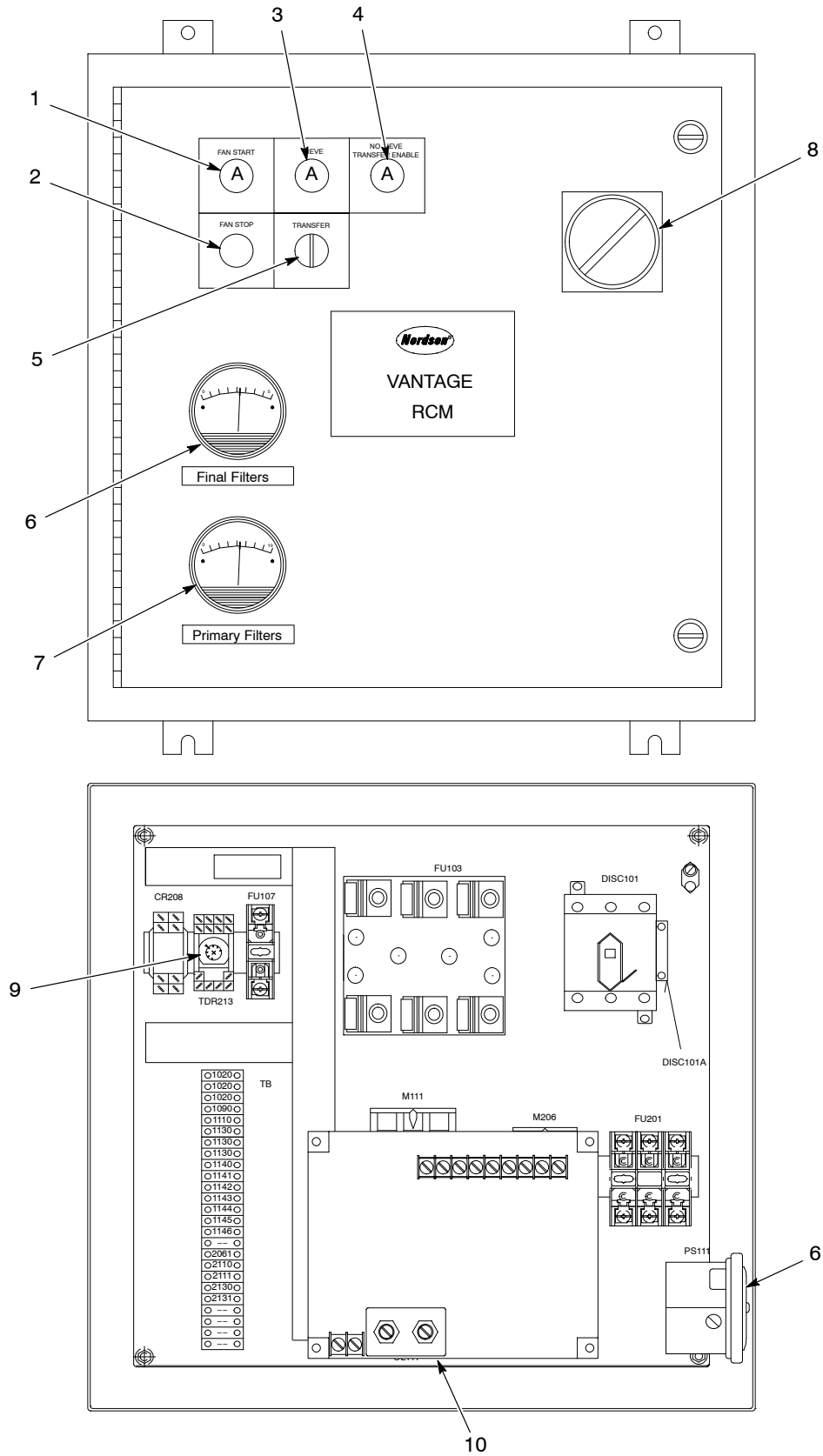


Figure 2-3 System Electrical Panel Controls and Indicators

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Specifications

NOTE: Equipment specifications are subject to change without notice due to continuing technological and quality improvements.

Table 2-4 Dimensions and Capabilities

Item	Specification
Booth base dimensions	
Overall height	305 mm (12 in.)
Overall width	1.5 m (5 ft)
Overall length	2.7 m (9 ft) 3.7 m (12 ft) 4.6 m (15 ft)
Air flow at 2-in. wc	226 m ³ /min (8000 cfm)
Number of cartridge filters	10
Number of final filters	4
Number of pulse valves	5
Maximum air pressure	7 bar (100 psig)
Spray gun maximum capacity	10
Manual/Automatic Spray Gun Combinations	4/0 2/8

Operating Environment

Locate your powder coating system in a proper environment. If temperature and humidity in the spray room exceed the following ranges, you must install air conditioning equipment.

Temperature 21–27 °C (70–80 °F)
Humidity 45–55% RH

Utilities

Primary Electrical Service: 200, 380, 460, or 575 Vac. The customer must install a fused disconnect switch with lock-out capability, wired in accordance with the National Electric Code NFPA-70.

Compressed Air Supply: The air supply line must be 13-mm (0.5-in.) ID minimum. Supply air pressure must be 5.5–7 bar (80–100 psi). The air must be clean and dry.

Normal Design Standards

Spray booths are custom-designed to each customer's requirements, so some booths may deviate from these design standards. Contact your Nordson representative if you need more information about the design of your booth.

End Openings: 91 x 152 cm (3 x 5 ft)

Part Hanger Keyhole Slot: 30.5 cm (12 in.) high

Cross Drafts: No more than 18.3 m/min (60 FPM)

Average Face Velocity: No less than 30.5 m/min (100 FPM) through all openings in the booth enclosure

Temperature of Parts Entering Booth: No more than 49 °C (120 °F)

Powder: Use commercially available powder coatings. Note that the characteristics and properties of a powder coating can affect system operation.

Powder coatings generally have an average particle size of 25–35 microns, with no more than 10% of the total being less than 15 microns. When the percentage of particles less than 15 microns exceeds 10% of the total, the filter media can clog.

Cartridge Filters: Cartridge filters are considered wear items. The variables affecting the life expectancy of a cartridge filter include

- type of coating material
- particle size distribution
- humidity and temperature of the spray room air
- hours of operation
- dew point and cleanliness of the compressed air supply
- pressure and frequency of air pulses used to clean the filters

Compressed Air Supply: The air must be conditioned by a dedicated, refrigerated or regenerative-desiccant air dryer that can produce a 3 °C (38 °F) or lower dewpoint at 7 bar (100 psi).

Section 3

Operation



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

New System Startup

Use these procedures to prepare your powder coating booth for production operation.

Your Nordson Corporation representative will help you set up your application equipment and adjust your system control settings before you start powder coating your products. Record the system settings on the charts provided at the end of this section. Make extra copies of the charts as needed.

NOTE: Since powder coating systems are custom-designed to each customer's requirements, each system has a different combination of equipment. Your system may have equipment not described in this manual.

System Settings



WARNING: Even with the electrical panel disconnect in the off position, the input terminals at the top of the switch are still live. Do not touch them. Failure to observe this warning could result in serious injury or death.

See Figure 3-1.

1. Disconnect and lock out the system electrical power and open the booth electrical panel door.
2. The timer board (10) is mounted on the inside of the door. Set the pulse valve OFF timer to 15 seconds and the ON timer to 110 milliseconds.

3. Close the electrical panel door.
4. Turn on the compressed air supply. Adjust the system air pressure to 5.5 bar (80 psi).
5. Turn on the disconnect switch (8).
6. Turn on the exhaust fan by pressing the FAN START (1) button. If your booth is equipped with the sieve option, the sieve will start.
7. Adjust the pulse-valve air pressure and volume.
 - a. Set the pulse valve regulator to 4.1–5.2 bar (60–75 psi). Watch the pressure gauge; the pressure will drop when the valves open.
 - b. Adjust the gate valve so the air pressure returns to 4.1–5.2 bar (60–75 psi) just before the next pulse. This will prevent the valves from being deprived of air during pulses.

Transfer Option Settings

Transfer Pump Operation

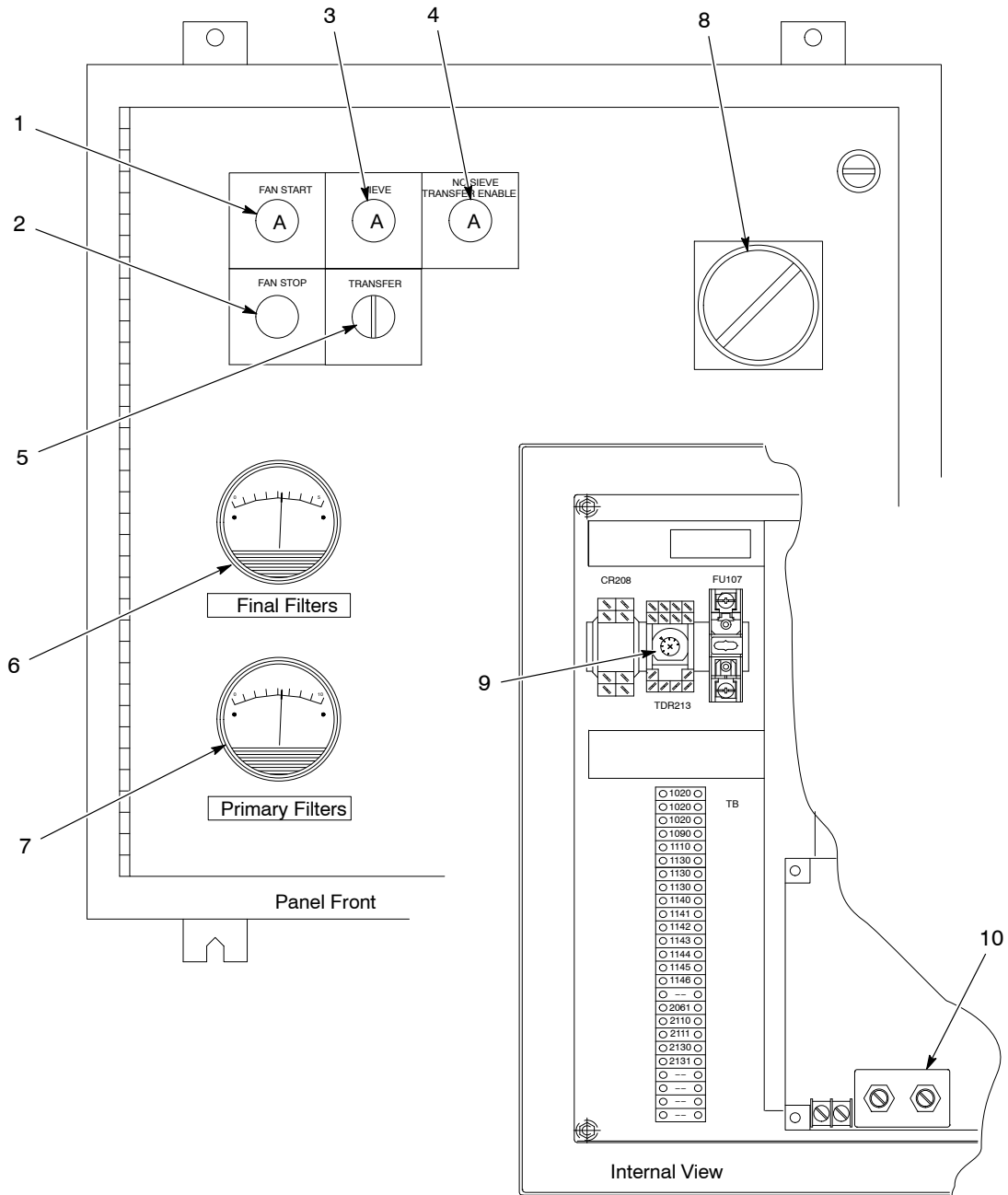
If you want the transfer pump to start automatically when the feed hopper level sensor signals for powder, turn the TRANSFER switch (5) to Auto.

If your booth is equipped with the sieve option, and you disconnect the sieve from the system, you must press the NO SIEVE TRANSFER ENABLE pushbutton (4) to operate the transfer pump in either Manual or Auto mode.

Delay-On Timer

The transfer pump delay-on timer range is 0–180 seconds. The default setting is 60 seconds. To prevent constant transfer pump cycling, do not make the delay shorter. Adjust the timer for a longer delay if desired.

Transfer Option Settings (contd)



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Figure 3-1 System Controls and Timers

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|--|--|---------------------------------|
| 1. FAN START pushbutton/indicator | 5. TRANSFER switch (manual/off/auto) | 8. Disconnect switch |
| 2. FAN STOP pushbutton | 6. Final filter pressure gauge | 9. Transfer pump delay-on timer |
| 3. SIEVE indicator | 7. Primary (cartridge) filter pressure gauge | 10. Pulse valve timer board |
| 4. NO SIEVE TRANSFER ENABLE pushbutton | | |

Note: Pulse valve timer board (10) is mounted on inside of door.

Daily Startup and Shutdown Procedures

Use these procedures for routine operation of your system.



WARNING: Wear an approved respirator and safety glasses or goggles when handling powder, operating spray equipment, or performing maintenance or cleaning operations. Obtain and read Material Safety Data Sheets for each powder used.

Startup

1. Turn on the system electrical power and compressed air supply.
2. Turn on the exhaust fan. If your booth is equipped with the sieve option, the sieve will also start.
3. Check the level of the powder in the feed hopper. Fill feed hoppers no more than $\frac{2}{3}$ full to leave room for expansion when fluidizing air is turned on.
4. Turn on the feed hopper fluidizing air.
5. Walk around the booth. Make sure the application equipment power and air is on. Make sure the transfer and feed hoses are securely connected at both ends.
6. Check all equipment ground connections.

7. Make sure the flame detector system, if used, is functioning correctly.
8. Turn on the automatic-gun master control unit and the manual-gun control units.
9. Adjust the kV settings and the powder feed pump air pressures, if necessary. Refer to your spray gun and control unit manuals.
10. Start the conveyor and start spraying workpieces.
11. Measure the air flow velocity at the vestibules with a velometer. The velocity should be 30.5–36.6 m/min (100–120 ft/min). Make sure the sprayed powder is not being pulled away from the workpieces, and that the powder is not escaping from the enclosure openings.

Shutdown

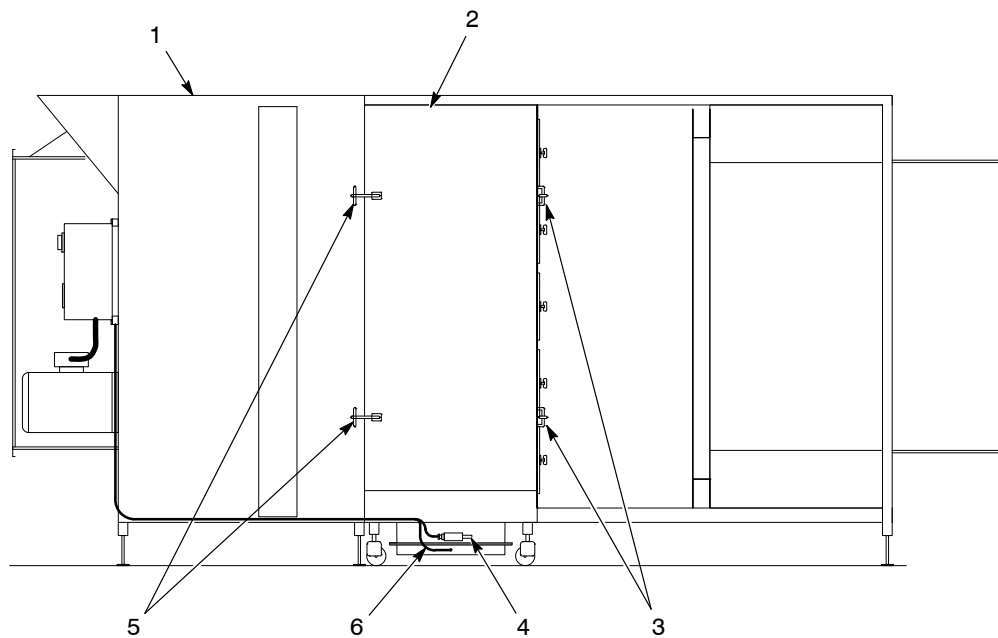
1. Turn on the color module fluidizing air. Start the transfer pump and pump the reclaimed powder from the color module hopper to the feed hopper.
2. Turn off the automatic-gun master control unit and the manual-gun control units.
3. Perform the daily maintenance procedures described in *Maintenance*. Clean the powder pumps and spray guns as described in their manuals. Perform daily maintenance procedures for other system equipment, as described in their manuals.
4. Turn off the exhaust fan. Shut off the system electrical power and compressed air supply.

Color Change

See Figure 3-2.

1. Clean the spray guns and feed hoses as described in the spray gun manuals.
2. Clean the enclosure as described in the *Daily Maintenance* procedures in *Maintenance*.
3. Shut off the system electrical power and compressed air supply. Relieve the system air pressure.

4. Disconnect the powder hose and air tubing from the transfer pump (4).
5. Disconnect the fluidizing air tubing (6) from the color module hopper plenum.
6. Release the clamps (3, 5) securing the color module (2) to the fan section (1) and enclosure.
7. Roll the color module away from the booth. Install the storage cover on the color module and move it to a storage area.



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Figure 3-2 Removing the Color Module

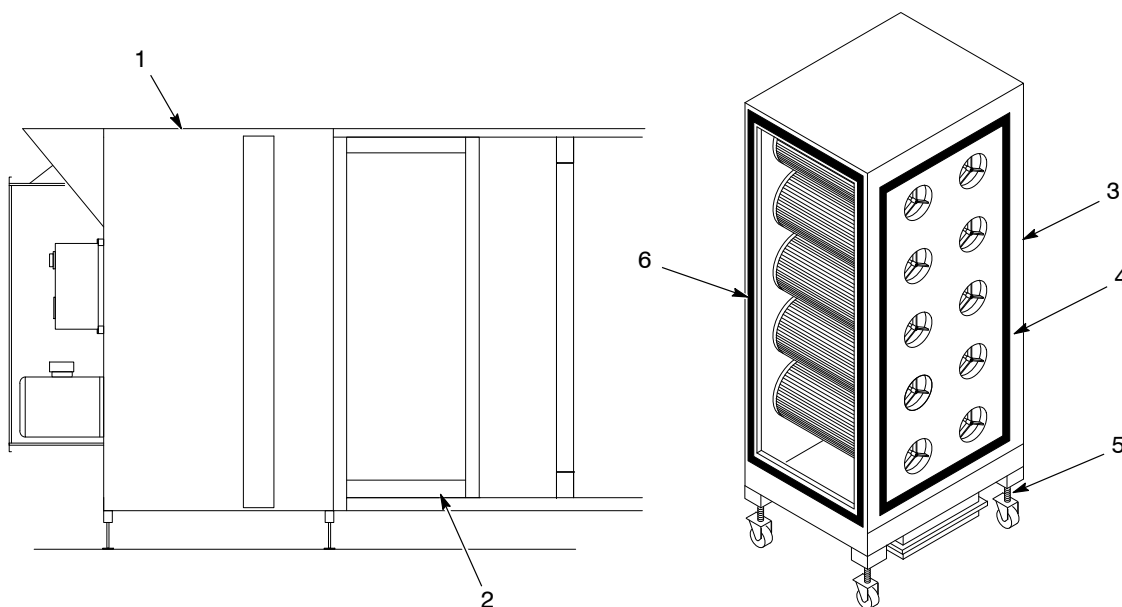
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|-----------------|------------------|--------------------------|
| 1. Fan section | 3. Clamps | 5. Clamps |
| 2. Color module | 4. Transfer pump | 6. Fluidizing air tubing |

See Figure 3-3.

8. Thoroughly clean any powder off the inlet frame (2) and the mating surface of the fan section.
9. Inspect the final filters. If there is a large amount of powder on the final filters, a cartridge filter in the color module you just removed may be leaking. Refer to *Troubleshooting and Repair* for instructions.

10. Remove the storage cover from the new color module (3). Inspect the gaskets (4, 6). Replace them if they are damaged.
11. Position the new color module against the fan section and the inlet frame.
12. Level the color module and adjust its height, if necessary, with the four leveling screws (5).

13. See Figure 3-2. Hook the clamps (3) to the enclosure. Engage the clamps to pull the color module against the stops and compress the gasket (6) against the inlet frame.
14. Hook the clamps (5) to the fan section (1) and engage them to compress the gasket (4) against the fan section.
15. Connect the air tubing and powder hose to the transfer pump (4) and the fluidizing air tubing (6) to the hopper plenum.
16. Turn on the system electrical power and compressed air supply.
17. Start the exhaust fan.
18. Change the powder supply and resume production.



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Figure 3-3 Installing a New Color Module

- | | | |
|----------------|---------------------|--------------------|
| 1. Fan section | 3. New color module | 5. Leveling screws |
| 2. Inlet frame | 4. Gasket | 6. Gasket |

System Settings

Equipment	Recommended Initial Settings	Final Setting	Changes
Primary Air Pressure (plant supply)	5.5 bar (80 psi)		
Collector Module			
#1 Fluidizing	0.7 bar (10 psi)		
#1 Transfer pump	1.7 bar (25 psi)		
Feed Hopper — Reclaim			
Fluidizing	0.5 bar (8 psi)		
Vent-assist	0.5 bar (8 psi)		
Feed Hopper — Non-Reclaim			
#1 Fluidizing	0.5 bar (8 psi)		
#2 Fluidizing	0.5 bar (8 psi)		
#3 Fluidizing	0.5 bar (8 psi)		
Vent-assist	0.5 bar (8 psi)		
Pulse Manifold			
Air pressure	4.1–5.2 bar (60–75 psi)		
NFS-1000 Fire Detector			
Air pressure	0.7 bar (10 psi) (preset)		
Vibratory Sieve			
Air pressure	3.5 bar (50 psi)		
Pulse Timer			
Delay (OFF) time	15.0 sec		
Duration (ON) time	110 msec		
Filter Pressure Drop Maximum Readings			
Cartridge filters	1–3 in. wc		
Final filters	2 in. wc		

Equipment	Recommended Initial Settings	Final Setting	Changes
Automatic Spray Guns			
#1 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#2 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#3 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#4 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#5 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#6 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#7 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		
#8 Flow-rate	2.1 bar (30 psi)		
Atomizing	1.4 bar (20 psi)		
Voltage	90–100 kV		
AFC	40 A		

Section 4

Maintenance



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

Daily Maintenance

Perform these procedures daily to keep your system clean and functioning properly.



WARNING: Wear an approved respirator and safety glasses or goggles when handling powder, operating spray equipment, or performing maintenance or cleaning operations. Obtain and read Material Safety Data Sheets for each powder used.


Cleaning

Perform this procedure daily and when changing powder color or type.

1. Turn off the spray gun control units.

2. Turn on the exhaust fan.
3. Disconnect the powder-feed hoses from the powder pumps. Blow the powder out of the hoses and spray guns with compressed air.
4. Ground the gun electrodes, if applicable, and clean the spray guns according to the instructions in their manuals.
5. Clean the enclosure roof, walls, and floor with a rubber squeegee. Push the collected powder into the color module.
6. Remove the remaining powder residue from the enclosure with an air-powered vacuum and a soft brush attachment. Wipe down all surfaces with a damp, lint-free cloth (do not use tack cloths). If you remove the color module, clean the inlet frame and fan section mating surfaces.
7. Turn off the exhaust fan by pressing the FAN STOP button on the electrical panel.
8. Clean the operator's platform and the floor around the booth.

Daily Equipment Maintenance

Equipment	Procedure
Filters	<ol style="list-style-type: none"> 1. Check the final filter differential pressure gauge. It should read between 0.25 and 2 in. of water (wc). Make sure no powder is leaking from around the filter gaskets or faces. 2. Check the cartridge filter differential pressure gauge. It should read between 1 and 3 in. of water (wc). Check the pulse valve timing.
Transfer Pump	<ol style="list-style-type: none"> 1. Disconnect the powder hose from the pump. Blow the powder out of the hose with compressed air. 2. Place a small container under the transfer pump to catch spilled powder. Remove the pump from the adapter. Blow out the adapter. 3. Disassemble the pump. Clean the parts with a low-pressure air gun and a clean cloth. Replace any worn or damaged parts.
Fan Section	<ol style="list-style-type: none"> 1. Remove the final filters and inspect them for powder accumulations or damage. Vacuum up any powder in the compartment. <p>NOTE: If significant amounts of powder have accumulated on the final filters, the cartridge filters may be leaking. Refer to <i>Troubleshooting</i> for instructions.</p>
Powder Spray Guns	Disassemble and clean the spray guns. Replace worn parts.
Powder Feed Pumps	Disassemble and clean the pumps. Replace worn parts.
Flame Detector System	Check the detector sensors every four hours and clean the lenses, if necessary. Make sure air is being supplied to the sensors. Make sure the detector system is operating properly.
Compressed Air Supply	<p>Hold a clean, white cloth under the drop leg and open the drain valve. Water, oil, or other contaminants will stain the cloth. Eliminate any source of contamination. Drain the filters and separators and check the filter elements. Check all air pressure regulator settings.</p> <p>NOTE: The air dryer should remain on at all times to prevent moisture from accumulating in the compressed air system.</p>
Workpiece and Conveyor Grounds	 <p>WARNING: An ungrounded or poorly grounded workpiece, hanger, or conveyor can cause electrical arcing. If arcing is observed, shut down the system immediately. Correct the cause before resuming operations. Failure to observe this warning could result in a fire or explosion, causing property damage and possible personal injury or death.</p> <p>Make sure all workpieces are grounded through the hangers and conveyor. Resistance between the workpieces and the hangers, and the hangers and ground, must be less than one megohm. You will get better transfer efficiency and workpiece coverage at 500 ohms or less. Clean or strip the hangers regularly.</p>
Air Dryers (Optional)	Refer to your air dryer manual for maintenance procedures and schedules.
Gun Movers (Optional)	Each shift, make sure the gun movers are stroking smoothly and at the proper speed. Make repairs and adjustments if necessary. Lubricate the gun movers as described in their manuals.
Sieve Accumulators and Vent Hoses (Optional)	Vacuum out the accumulators and blow the powder out of the vent hoses with compressed air.
Sieves (Optional)	Clean the sieve screens. Perform other maintenance as described in the sieve manuals.

Weekly Maintenance

Equipment	Procedure
Powder Spray Guns and Cables	Clean the spray guns. Perform electrostatic resistance checks as described in the spray gun manuals.
Powder Feed Pumps and Feed Hoses	Disassemble the pumps and clean them. Replace any worn or damaged parts. Blow out the feed hoses with compressed air, from the pump end into the booth. Replace damaged hoses.
Powder Feed Source (feed hopper, box feeder, etc.)	Remove the powder from the source. If using a feed hopper, vacuum the interior and check the fluidizing plate. If the plate is stained, the air supply could be contaminated by oil or moisture. Check the air dryer and air filters. Replace the fluidizing plate if it is contaminated.
Color Module	<p>Start the exhaust fan and pulse the cartridge filters to blow off as much powder as possible. Pump the powder out of the color module.</p> <p>Disconnect the powder hose from the transfer pump. Blow the powder out of the hose with compressed air. Remove the transfer pump and clean it.</p> <p>Vacuum the color module fluidizing plate and check it. If the fluidizing plate is stained, the air supply could be contaminated by oil or moisture. Check the air dryer and air filters. Replace the fluidizing plate if it is contaminated.</p> <p>Check the gaskets and replace any that are cracked or damaged.</p>
Booth Enclosure	Turn on the exhaust fan and vacuum the enclosure roof, walls, and floor with a soft brush attachment. Wipe down the enclosure with damp, lint-free cloths. Clean the booth exterior, all attached equipment, and the spray room.

Periodic Maintenance

Equipment	Procedure
Electrical Connections	Check all terminal blocks and junction boxes for loose wires. Tighten any loose connections and inspect all wiring for damaged insulation. Replace the wiring if the insulation is damaged.
Spray Guns and Cables	Perform electrostatic resistance checks as described in the spray gun and spray gun control unit manuals.
Air Dryer	Check the air dryer operation. Refer to your air dryer manual for maintenance procedures and schedules.
Gaskets	Inspect all gaskets and seals for damage. Replace any that are damaged.
Fan Motor Bearings	Every six months, lubricate the motor bearings with two shots of lithium or polyurea grease from a grease gun. The grease fittings are on the motor housing.
Differential Pressure Gauges	<p>Observe and record the differential pressure gauge readings. Readings greater than the following mean that the filters are clogged and must be replaced. Correct the cause of the clogging before resuming operations.</p> <p>Primary Filter: 1–3 in. wc Final Filters: 0.25–2 in. wc</p>
Powder Feed Hoses	Disconnect the powder feed hoses from the powder pumps. Blow the powder out of the hoses with compressed air. Never blow air through the hoses toward the pumps. Replace the hoses if they are clogged with impact-fused powder.
Castors	Lubricate the color module and roll-on/roll-off castors with a lithium grease.

Maintenance Check List

Activity	Each Shift	Daily	Weekly	Monthly	Color Change
Cleaning					
Accumulator		✓			
Booth enclosure		✓	✓		✓
Color module			✓		✓
Fan and pulse-valve compartments			✓		✓
Feed hoses and transfer hoses	✓				✓
Fire detector head lenses*	✓				✓
Spray gun pumps	✓	✓	✓		✓
Spray guns	✓		✓		✓
Transfer pump	✓	✓			✓
Vent hoses		✓			✓
Sieve	✓				✓
Resistance Checks—Guns and Cables			✓		
Visual Checks					
Air supply drop leg		✓			
Air dryer		✓			
Cartridge filter differential-pressure gauge	✓				
Final filter differential-pressure gauge	✓				
Electrical connections			✓		
Fire detector sensors	✓				✓
Gaskets			✓		
Gun movers	✓				
Workpiece clearance**	✓				
Workpiece grounding	✓				✓
Powder levels	✓				
Lubrication					
Motor bearings***					
Casters (color module and roll-on/roll-off)***				✓	
* Every 4 hours.					
** Clearances should be monitored continuously.					
*** Every 6 months.					

Section 5

Troubleshooting



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

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

To troubleshoot electrical problems, see the *System Schematics* in Figures 5-1 and 5-2.

No.	Problem	Page
1.	Spray guns are surging or spitting; powder flow is inadequate or intermittent	5-2
2.	Problems with coating uniformity, edge coverage, film build, wrap, or penetration into recesses	5-2
3.	Powder not transferring from color module to powder source	5-3
4.	Powder not fluidizing, or clouds of powder erupting from surface	5-3
5.	Final filters clogged; powder in fan compartment	5-4
6.	Cartridge filters clogged	5-4
7.	System shuts down or will not start	5-5
8.	Powder escaping from booth openings	5-5

Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
<p>1. Spray guns are surging or spitting; powder flow is inadequate or intermittent</p>	<p>Powder in feed hopper inadequately fluidized</p> <p>Low powder level in feed hopper</p> <p>Powder pump venturi nozzles or throats worn; adapter O-rings leaking; pump or pickup tube clogged</p> <p>Obstruction in powder-feed hose</p> <p>Severe tribo-charging in powder feed hose</p> <p>Obstruction in spray gun</p> <p>Flow-rate or atomizing air pressure incorrect</p>	<p>Adjust the fluidizing air pressure. The powder should be gently boiling. Refer to problem 4.</p> <p>Add powder to the feed hopper. Refer to problem 3.</p> <p>Clean the pump and pickup tube. Replace any worn parts. Replace the adapter O-rings if they are damaged.</p> <p>Disconnect the feed hose from the pump. Blow the powder out of the hose with compressed air. Make sure the hose is clear. Eliminate kinks or severe bends in the hose. The hose should be no longer than 7.6 m (25 ft) with a maximum 2.7-m (9-ft) vertical rise.</p> <p>Contact your Nordson Corporation representative for a suitable hose material. Contact your powder supplier.</p> <p>Clean the spray gun. If you are using conical nozzles, make sure there is a 3-mm (0.125-in.) or larger gap between the deflector and the nozzle.</p> <p>Refer to the spray gun and control unit manuals for recommended air pressures and ratios.</p>
<p>2. Problems with coating uniformity, edge coverage, film build, wrap, or penetration into recesses</p>	<p>Poor workpiece grounding</p> <p>Spray gun placement incorrect</p> <p>Flow-rate and atomizing air pressure incorrect</p>	<p>Resistance from workpiece to ground must be less than one megohm. For best results, resistance should not be more than 500 ohms. Clean the workpiece hangers, fixtures, and hooks if necessary. Check the conveyor ground.</p> <p>Position the spray guns 25.4–35.6 cm (10–14 in.) from the workpieces. Stagger the spray guns 30.5 cm (12 in.) apart vertically and 53.3 cm (21 in.) apart horizontally to avoid fan pattern and electrostatic field overlap. Contact your Nordson Corporation representative.</p> <p>Refer to the spray gun and control unit manuals for the recommended air pressures and ratios.</p>

Continued...

Problem	Possible Cause	Corrective Action
<p>2. Problems with coating uniformity, edge coverage, film build, wrap, or penetration into recesses <i>(contd)</i></p>	<p>Electrostatic voltage (kV) or AFC setting incorrect for workpieces being coated</p> <p>Wrong nozzles being used</p> <p>Powder feed problems</p>	<p>Adjust the voltage to 90–100 kV for large flat surfaces and 60–75 kV for recesses. Never set the voltage below 60 kV. Refer to the spray gun and control unit manuals for the recommended voltage, AFC, and air pressure settings and ratios.</p> <p>Use flat-spray nozzles for large regular-shaped workpieces. Use conical nozzles for deep recesses and most manual touch-ups.</p> <p>Refer to problem 1.</p>
<p>3. Powder not transferring from color module to powder source</p>	<p>Transfer pump air pressure too low</p> <p>Transfer pump clogged or venturi nozzle or throat worn</p> <p>Transfer hose plugged</p> <p>Powder in color module not fluidized; deep hole in powder around pickup tube</p> <p>Powder damp or contaminated; cannot be fluidized or pumped</p>	<p>Increase the air pressure.</p> <p>Clean the pump and replace worn parts.</p> <p>Blow the powder out of the hose with compressed air.</p> <p>Increase the fluidizing pressure. If the problem continues, go to the next cause.</p> <p>Refer to problem 4.</p>
<p>4. Powder not fluidizing, or clouds of powder erupting from surface</p>	<p>Fluidizing pressure too low or too high</p> <p>Moist or oil-contaminated powder</p> <p>Air leaking from fluidizing plenum gasket instead of diffusing through fluidizing plate, or contaminated air plugging pores in fluidizing plates</p> <p>Fluidizing plate in color module or feed hopper cracked</p>	<p>Check the fluidizing air pressure. Increase the fluidizing air pressure until the powder is gently boiling. Decrease the pressure if clouds of powder are erupting from the surface.</p> <p>Open the drain valve at the air-supply drop leg and check the air supply for water or oil. Check the filters, separators, and air dryer.</p> <p>Replace the powder in the hoppers. Refer to the next cause.</p> <p>Check for air leaks around the fluidizing plenum gaskets. If leaks are found, remove the plenum and replace the gasket.</p> <p>If fluidizing air pressure increases or decreases abruptly, remove the powder from the hopper and inspect the fluidizing plate for stains, discoloration, or polished surfaces. replace the fluidizing plate if it is contaminated or plugged.</p> <p>Remove the powder and check the fluidizing plate. Replace it if it is cracked.</p>

Continued...

Troubleshooting Procedures *(contd)*

Problem	Possible Cause	Corrective Action
4. Powder not fluidizing, or clouds of powder erupting from surface <i>(contd)</i>	Incorrect ratio of reclaimed-to-new powder Uneven distribution of powder in hopper	Adjust the transfer pump air pressure to increase or decrease the transfer rate. Add new powder to the hopper. The powder supply should be no more than three parts reclaim-to-one part new powder. Increase the fluidizing pressure. check the powder and the fluidizing plate for contamination as previously described.
5. Final filters clogged; system shuts down	Leaking cartridge filter gaskets, or hole in filter media Leak in color module cartridge filter mounting plate	Make sure the cartridge filter gaskets are sealing correctly. If you can slip a 0.4-mm (0.015 in.) feeler gauge between the gasket and the sealing surface, tighten the draw-rod nut to compress the gaskets. If the gaskets continue to leak, remove the cartridges. Clean and inspect the gaskets, sealing surfaces, and filter media. Replace the cartridges if the gaskets or filter media are damaged. Replace clogged final filters. Refer to <i>Repair</i> . Locate and seal leak with RTV sealant.
6. Cartridge filters clogged	Pulse air pressure inadequate Powder too fine or contaminated Pulse valve nozzles out of position Pulse timer settings incorrect Pulse valve or solenoid valves clogged or malfunctioning	Increase the pulse air pressure or volume. Decrease the pulse timer delay (off time). Reduce the ratio of reclaim-to-new powder. Check the powder particle size. Replace contaminated powder and fix the source of contamination. Position the nozzles as described in <i>Repair</i> . Adjust the timer settings as described in <i>Operation</i> . Open the system panel. If you do not hear a pulse each time an LED on the timer board lights, the solenoid valve or the pulse valve connected to that LED may be clogged or failed. Check the wiring to the solenoid valve before opening the solenoid box and replacing the solenoid valve.

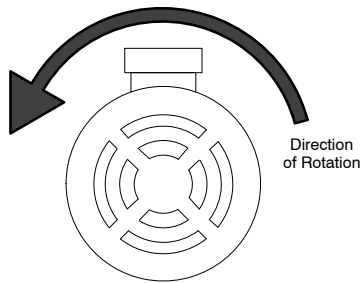
Continued...

Problem	Possible Cause	Corrective Action
<p>7. System shuts down or will not start</p>	<p>Flame detector system sees a flame or spark, or is malfunctioning</p> <p>Final filters clogged</p> <p>Final filter pressure switch failed</p> <p>Fuse(s) blown</p> <p>Electrical failure</p>	<p>Check the inside of the enclosure and color module, the detector head aim, and the workpiece and conveyor grounds.</p> <p>Follow the troubleshooting procedures in the flame detector system manual.</p> <p>Locate the source of powder leakage and correct the problem. Refer to problem 5.</p> <p>Replace the switch.</p> <p>Check the fuses in the system electrical panel. Replace the blown fuse(s). If the fuses continue to blow, fix the electrical problem.</p> <p>Trace the circuits and correct the problem.</p>
<p>8. Powder escaping from booth openings</p>	<p>Cartridge filters clogged</p> <p>Cross drafts interfering with exhaust fan draw</p> <p>Workpieces entering booth are too hot</p> <p>Powder spray gun output exceeds booth containment capability</p> <p>Booth openings too large</p> <p>Workpieces too large for booth</p> <p>Fan rotation backward</p> <p>Air leaks around color module</p>	<p>If the differential pressure gauge shows more than 4-in. wc, refer to problem 6.</p> <p>Check for cross drafts at all of the enclosure openings. Eliminate or divert any drafts.</p> <p>Cool the workpieces before moving them into the booth. The workpiece temperature should not exceed 49 °C (120 °F).</p> <p>Reduce the powder flow and/or the number of the spray guns.</p> <p>Close or decrease the size of the openings.</p> <p>Contact your Nordson Corporation representative.</p> <p>Reverse the rotation of the motor. Refer to <i>Reversing Motor Direction</i> in this section.</p> <p>Inspect the gasket and replace it if it is damaged. Tighten the clamps to compress the gasket.</p>

Reversing Motor Direction

Improperly connecting the exhaust fan and sieve motors will cause them to rotate in the wrong direction. If the exhaust fan is rotating in the wrong direction, the air flow will be reduced. If the sieve rotates in the wrong direction, powder will back up in the accumulator. Use the following procedures to check and correct, if necessary, the exhaust fan and sieve motor rotation direction.

1. Turn on system electrical power.
2. Start the exhaust fan.
3. Observe the direction of motor rotation. The motor cooling fan should rotate counter-clockwise. If the rotation is backward, go to the next step.



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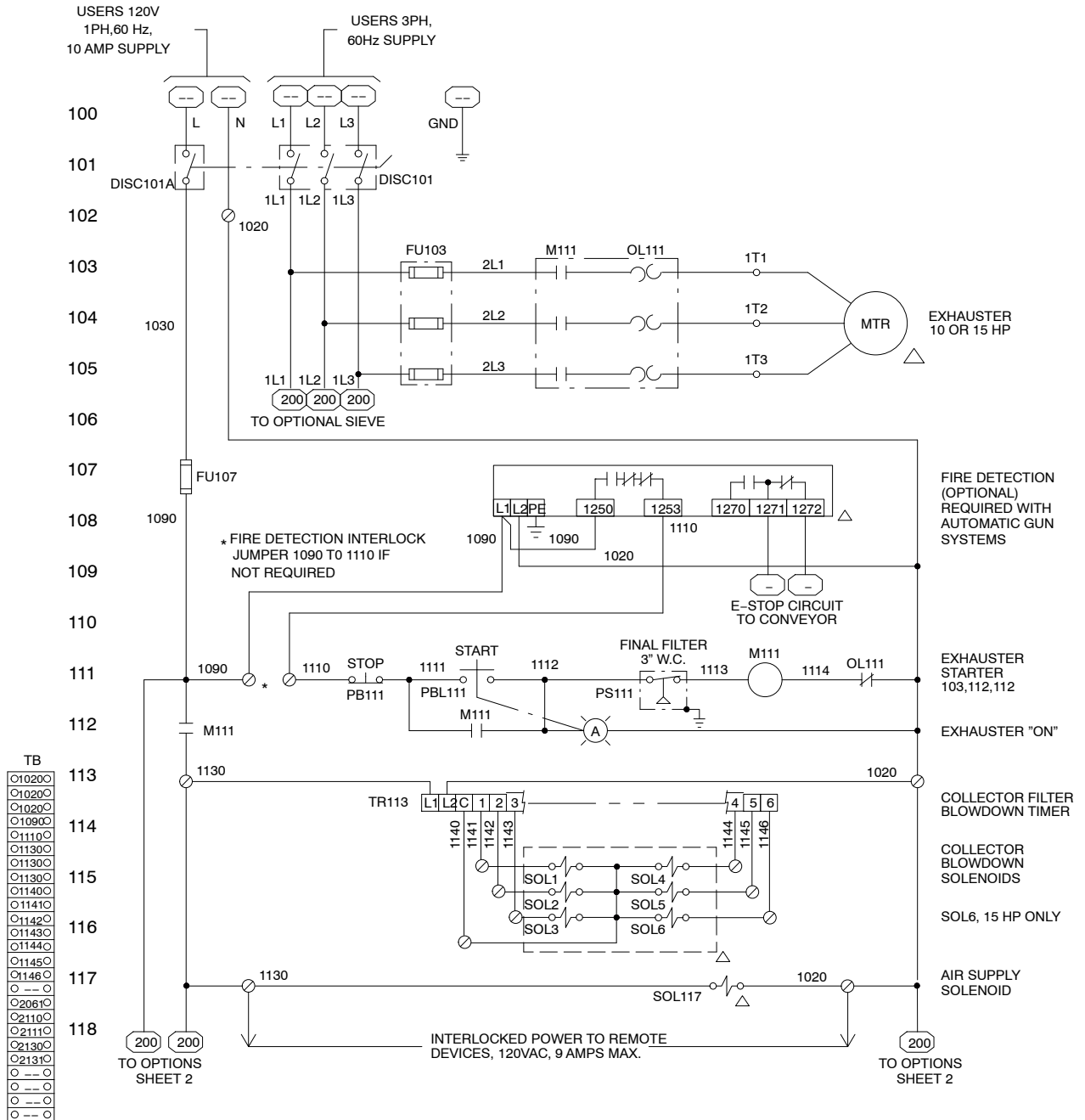
Figure 5-1 Correct Motor Rotation



WARNING: Even with the electrical panel disconnect in the off position, the input terminals at the top of the switch are still live. Do not touch them. Failure to observe this warning could result in serious injury or death.

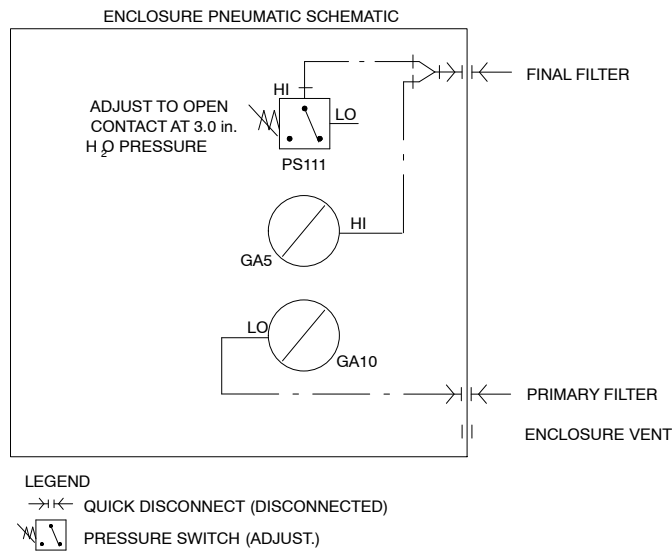
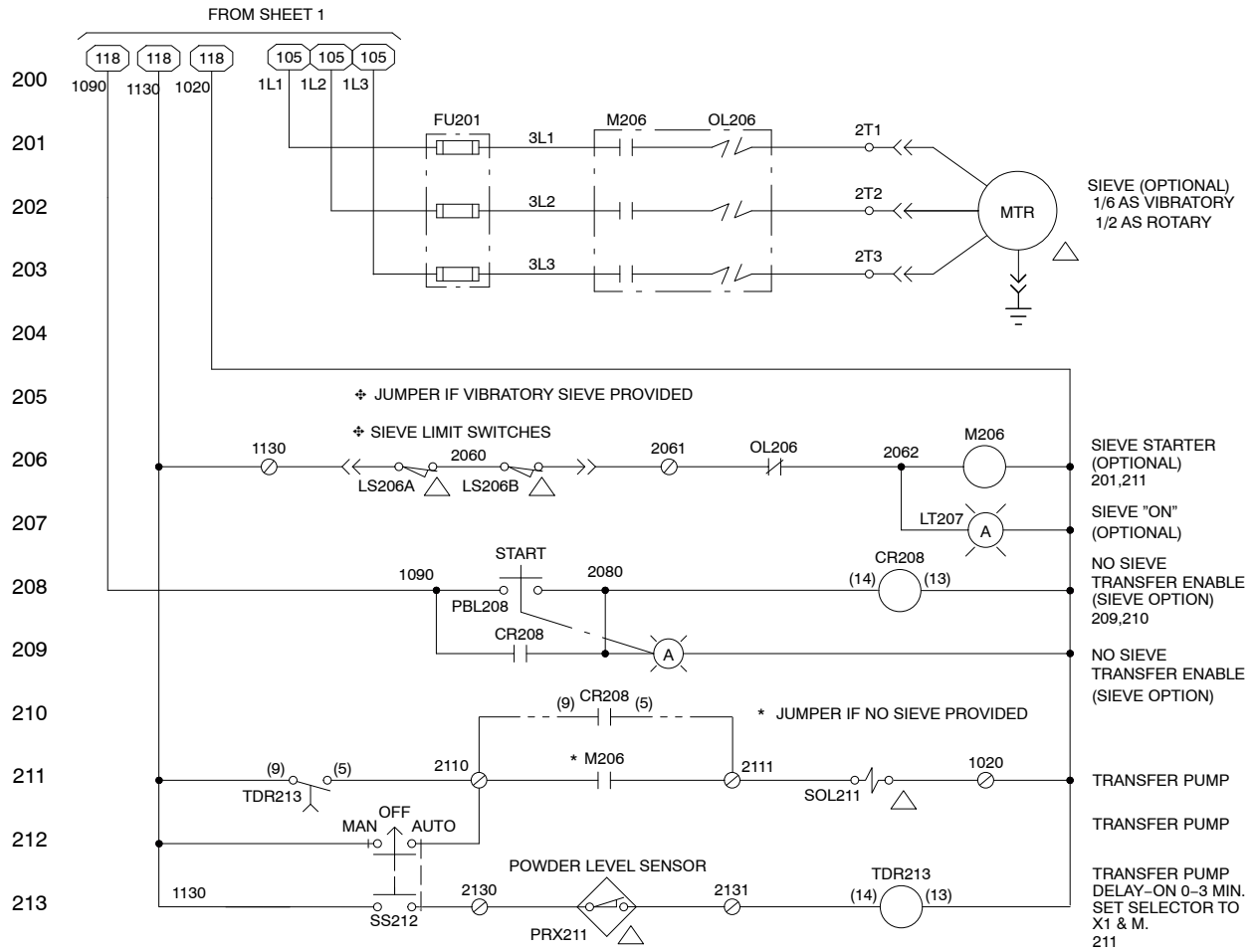
4. Shut off system electrical power. Open the electrical panel door and reverse any two wires (L1, L2, or L3) connected to the fan motor starter (M111). Close the electrical panel door.
5. Turn on electrical power. Start the fan and check the rotation direction.

System Schematics



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Figure 5-1 System Schematic (1 of 2)



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Figure 5-2 System Schematic (2 of 2)

Section 6

Repair



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

NOTE: Use only approved Nordson Corporation replacement parts. Refer to *Parts* for part numbers and ordering information. Contact your Nordson Corporation representative for more information.

Final Filter Replacement



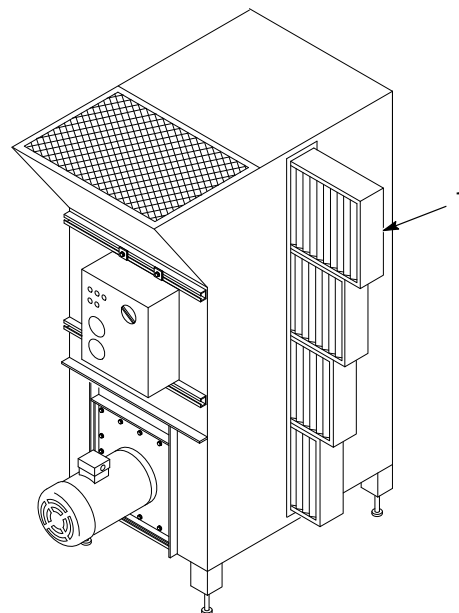
WARNING: Before performing this procedure, shut off electrical power at the system electrical panel. Lock and tag the switch. Failure to observe this warning could result in personal injury.

See Figure 6-1.

1. Shut off the exhaust fan. Shut off electrical power at the system electrical panel. Lock and tag the disconnect switch.
2. Remove the final filter access panel. Inspect the gasket and replace it if it is damaged.
3. Remove the old filters (1) and discard them.
4. If there is large amounts of powder on the old final filters, powder is leaking through the cartridge filters. Fix the leak before starting the system.

NOTE: Do not use damaged filters.

5. Remove the new filters from their cartons. Inspect the filter housings, gaskets, and media for damage.
6. Slide the the new filters into the support brackets.
7. Replace the final filter access panel.
8. Restore system electrical power. Start the exhaust fan.



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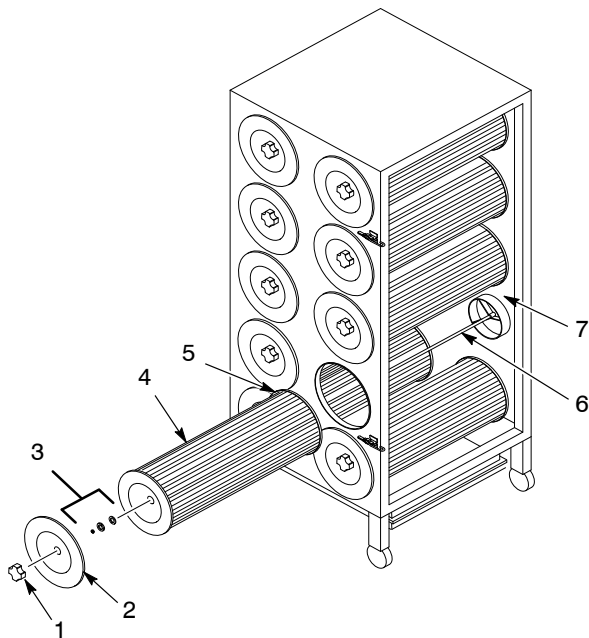
Figure 6-1 Final Filter Replacement

1. Final filters

Cartridge Filter Replacement

Removal

1. Remove the color module from the powder booth as described in the *Color Change* procedure in *Operation*.
2. See Figure 6-2. Unscrew and remove the threaded knob (1) and cover plate and gasket (2).
3. Remove the nut, lock washer, and flat washer (3) from the draw rod (6).
4. Slide the cartridge filter (4) out of the color module.



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Figure 6-2 Cartridge Filter Replacement

- | | |
|----------------------------------|---------------------|
| 1. Threaded knob | 4. Cartridge filter |
| 2. Cover plate and gasket | 5. Gasket |
| 3. Nut, lock washer, flat washer | 6. Draw rods |
| | 7. End plate |

Installation

NOTE: Do not use any cartridge filters other than those specified for your system. Using unapproved cartridge filters could seriously affect the operation and performance of your system.

Do not use damaged cartridge filters. Carefully inspect the new cartridge filters for

- cuts or other damage to the rubber gaskets
- bent or dented end caps
- holes or other damage to the filter media

See Figure 6-2.

1. Thoroughly clean the gasket sealing surfaces on the color module. Dirty surfaces will prevent the cartridge filter gaskets from sealing properly and allow powder to leak into the fan section.

NOTE: There are two gaskets for each cartridge filter. One gasket is glued to the back of the cover plate (2) and seals the filter opening. The second gasket (5) is glued to the insertion end of the cartridge filter and seals the filter to the end plate.

2. Slide the new cartridge filter (4) onto the threaded end of the draw rod (6) and into the color module.
3. Center the cartridge filter over the filter opening in the end plate (7). Push the cartridge filter against the end plate.
4. Install the flat washer, lock washer, and nut (3) on the draw rod.



CAUTION: Do not overtighten the nut, or you may damage the cartridge filter.

5. Tighten the nut until the gasket (5) on the end of the cartridge filter is compressed to $\frac{3}{8}$ in. thick. This will seal the cartridge against the end plate.
6. Center the cover plate and gasket (2) over the filter opening. Screw the threaded knob onto the draw rod until hand tight.
7. Clamp the color module to the inlet frame and fan section.
8. Connect the air tubing to the plenum and transfer pump. Connect the powder hose to the transfer pump.

Color Module Fluidizing Plate Replacement

Fluidizing plate replacement is only necessary if the plate is contaminated or damaged.

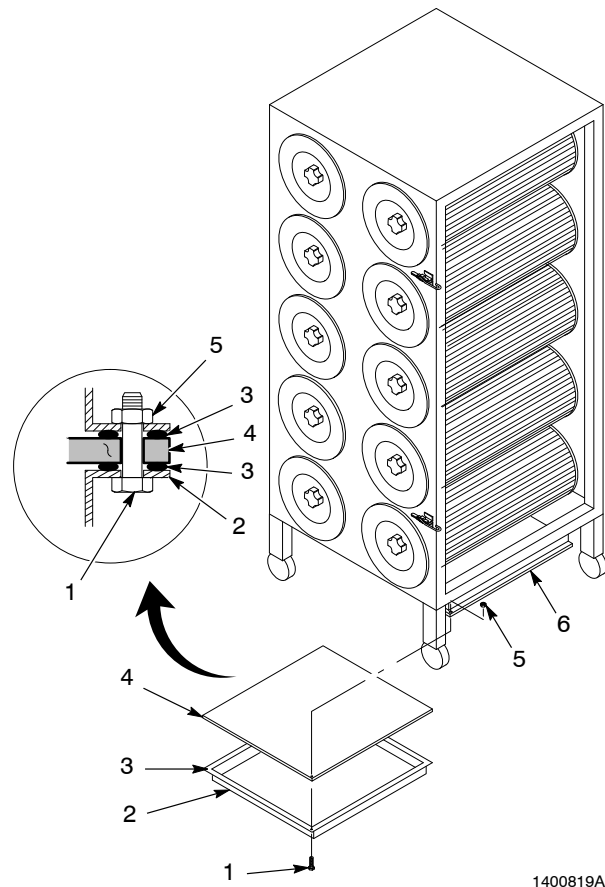
Preparation

1. Pulse the cartridge filters, then start the transfer pump and pump the powder out the color module hopper.
2. Remove the color module from the fan section as described in the *Color Change* procedure in *Operation*.
3. Remove the transfer pump and bottom two or four cartridge filters from the color module.
4. Vacuum the remaining powder out of the color module hopper. Vacuum the hopper and fluidizing plate and wipe them clean with damp, lint-free cloths. Do not use tack cloths.

Replacement

1. See Figure 6-3. Remove the bolts (1) and nuts (5) from the plenum (2) and hopper (6) flanges.
2. Slide the plenum and fluidizing plate (4) out from under the hopper.
3. Discard the old fluidizing plate and clean the old caulk off the plenum and hopper flanges.
4. Apply a bead of latex caulk (3) to the plenum flange, circling each bolt hole. Place the new fluidizing plate on the plenum, aligning the fluidizing plate bolt holes and edges with the plenum bolt holes and flange edges on all four sides.
5. Apply a bead of latex caulk all the way around the fluidizing plate, about 13 mm ($1/2$ in.) in from the edge. Circle each bolt hole.
6. Slide the fluidizing plate and plenum assembly under the hopper, align the plenum and fluidizing plate edges with the hopper flange edge, and lift the assembly up against the hopper.

7. Install the nuts and bolts through the flanges and tighten them in a criss-cross pattern to prevent flange distortion and fluidizing plate damage.
8. Re-install the cartridge filters and transfer pump.
9. Clamp the color module to the inlet frame and fan section as described in the *Color Change* procedure in *Operation*.
10. Connect the air tubing to the plenum and transfer pump. Connect the powder hose to the transfer pump.



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Figure 6-3 Color Module Fluidizing Plate Replacement

- | | |
|-----------|---------------------|
| 1. Bolts | 4. Fluidizing plate |
| 2. Plenum | 5. Nuts |
| 3. Caulk | 6. Hopper |

Pulse Valve Replacement

See Figure 6-4.

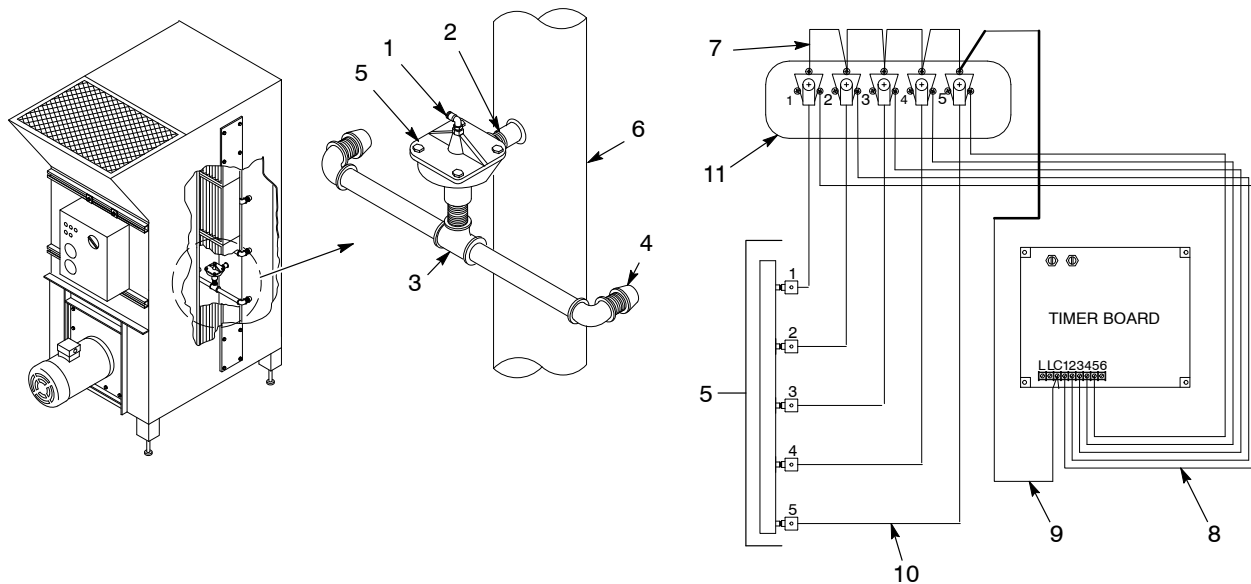
The pulse valves are connected directly to the air manifold (6) in the open end of the fan section. To avoid connecting the valves to the wrong solenoids, either mark the pilot air tubing or remove and replace one valve at a time. Incorrect connections will cause the valves to open in the wrong order.

The pulse air solenoid valves are mounted on the side of the fan section. Timer board terminal 1 is wired to solenoid valve 1. Solenoid valve 1 is connected by air tubing to pulse valve 1. The rest of the solenoids and valves are connected in the same way.



WARNING: Before performing the following procedure, shut off the system compressed-air supply and relieve the system air pressure. Shut off and lockout electrical power at a disconnect switch ahead of the system electrical panel. Failure to observe this warning could result in personal injury.

1. Remove the color module as described in the *Color Change* procedure in *Operation*.
2. Disconnect the pilot air tubing from the elbow fitting (1).
3. Remove the pilot valve (5) and extension pipe (3) assembly from the coupling (2).
4. Remove the extension pipe assembly from the pilot valve.
5. Wrap PTFE tape around the threads of the coupling and extension pipe.
6. Install the new pilot valve on the extension pipe. When the pilot valve is tightened to form an air-tight seal, the extension pipe must be at a right angle to the centerline of the pilot valve inlet port.
7. Install the pilot valve on the coupling. When the pilot valve is tightened on the coupling to form an air-tight seal, the extension pipe must be level and the nozzles (4) must point into the center of the cartridge filter openings.
8. Connect the pilot air tubing to the elbow fitting.



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Figure 6-4 Pulse Valve Replacement

- | | | |
|-------------------|--|----------------------------------|
| 1. Elbow fitting | 5. Pulse valve | 9. 14-gauge white common wire |
| 2. Coupling | 6. Air manifold | 10. 6-mm tubing to each solenoid |
| 3. Extension pipe | 7. 14-gauge white wire jumper to all solenoids | 11. Solenoid enclosure |
| 4. Nozzle | 8. 14-gauge red wire (positive) | |

Motor and Fan Replacement



WARNING: Before performing the following procedures, shut off and lockout electrical power at the system electrical panel. Failure to observe this warning could result in personal injury or death.



WARNING: Heavy equipment. Use approved, inspected lifting equipment and tackle. Make sure the capacity of the lifting equipment and tackle exceeds the weight of the equipment being lifted.

Fan and Motor Assembly Removal

See Figure 6-5.

1. Remove the cover from the motor junction box (2). Tag and disconnect the wiring from the motor leads. Disconnect the conduit (8) from the junction box.
2. Secure a heavy nylon strap around the motor and attach it to a forklift or other lifting equipment. Take up the slack in the strap.
3. Remove the screws and washers (4) securing the fan mounting plate (3) to the fan section. Save the screws and washers for reuse.
4. Pull the fan and motor assembly straight away from the fan section.

Fan Removal

1. Measure from the end of the motor shaft to the top of the bushing. Record this measurement.
2. Unscrew the three cap screws (9) from the unthreaded holes in the bushing (10). Thread the screws into the threaded holes in the bushing until they bottom out on the fan hub.
3. Tighten the screws evenly, a quarter turn at a time, until the bushing breaks loose from the fan hub.

4. Pull the bushing and key (11) off the motor shaft. Remove the screws from the bushing.

Motor Replacement

Remove the screws and washers securing the motor to the mounting plate. Install a new motor on the mounting plate.

Fan Installation

1. Install the fan and bushing on the motor shaft so that:
 - the unthreaded holes in the bushing line up with the threaded holes in the fan hub
 - the keyway in the bushing lines up with the keyway in the shaft
 - when the bushing and fan are pulled together the distance from the top of the bushing to the end of the motor shaft will be the same as measured in step 1 of *Fan Removal*.

2. Install the three cap screws through the unthreaded holes in the bushing and thread them into the fan hub.

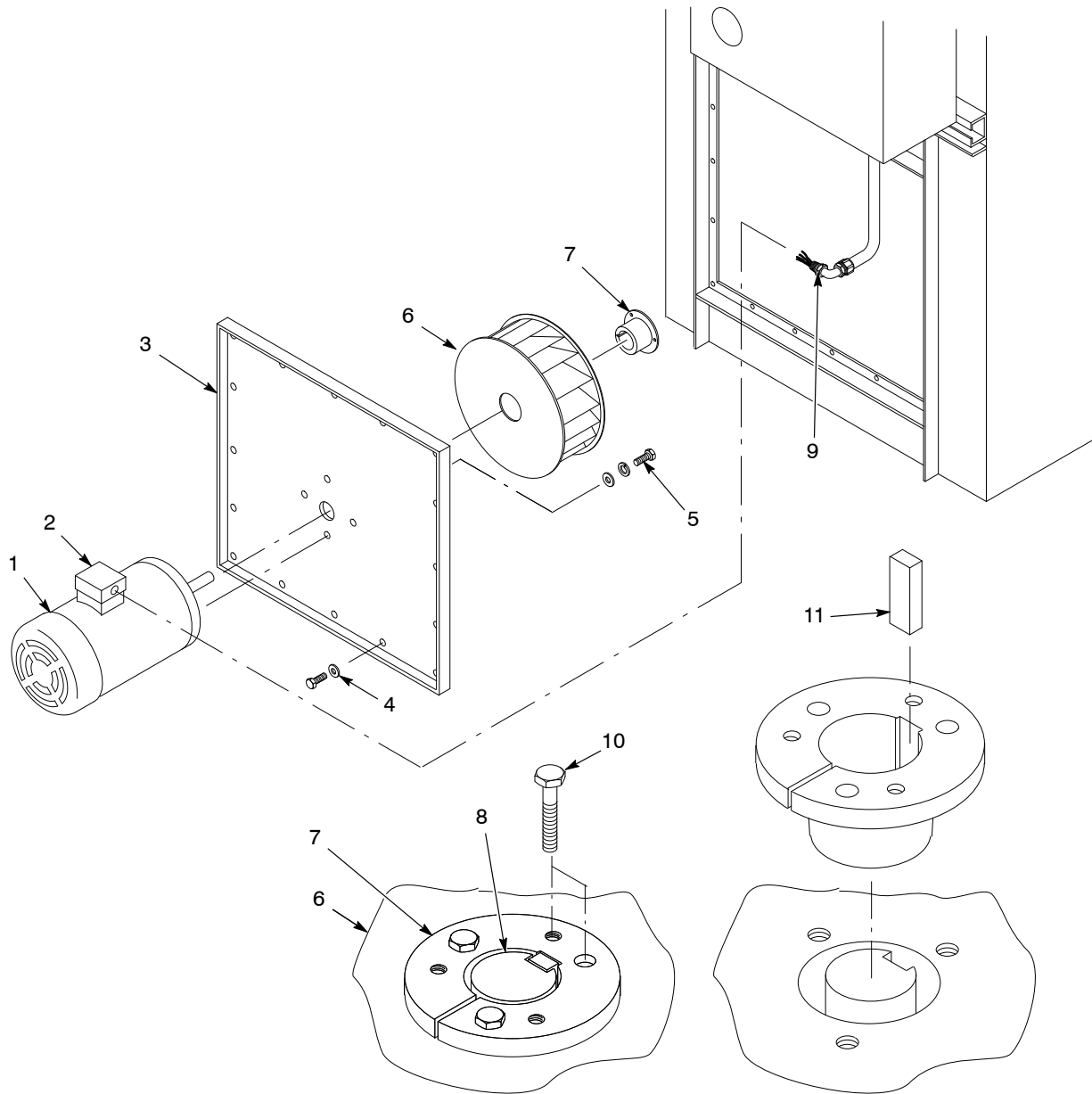
3. Install the key into the keyway.

NOTE: Do not overtighten the screws. You could crack the fan hub or break off the screws.

4. Tighten the cap screws evenly, a quarter turn at a time, to the torque specified in Table 6-5. The bushing and fan will be pulled together. Maintain a gap of 3–6 mm (0.125–0.25 in.) between the bushing flange and the fan hub.
5. Measure from the top of the bushing to the end of the motor shaft. If the distance is not the same as that measured in step 1 of *Fan Removal*, loosen the bushing, reposition the fan and bushing on the motor shaft, and tighten the bushing again. The fan must be positioned properly to fit into the inlet cone.

Table 6-5 Fan Bushing Cap Screws Torque and Pull Specifications

Screw Size	Torque, N•m (ft-lb)	Wrench Pull, kg (lb)
1/4-20	12 (9)	12 (27)
5/16-18	20 (15)	14 (30)



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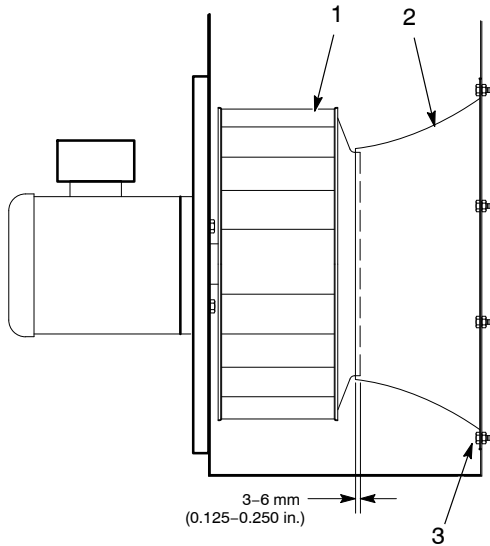
Figure 6-5 Fan and Motor Replacement

- | | | |
|-----------------------|-----------------------|----------------|
| 1. Motor | 5. Screws and washers | 9. Conduit |
| 2. Junction box | 6. Fan | 10. Cap screws |
| 3. Mounting plate | 7. Bushing | 11. Key |
| 4. Screws and washers | 8. Motor shaft | |

Fan and Motor Assembly Installation

1. Lift the fan and motor assembly and guide it carefully back into the fan section, making sure the fan fits inside the cone.
2. Secure the mounting plate to the fan section with the screws and washers.
3. Remove the final filters as described in *Final Filter Replacement*.
4. See Figure 6-6. Check the fan position. The bottom of the fan should be 3–6 mm (0.125–0.250 in.) inside the inlet cone.

5. Rotate the fan and make sure it is not rubbing against the inlet cone. The gap between the fan and the cone should be the same all the way around. If it is not, loosen the cone fasteners and adjust the cone position.



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Figure 6-6 Checking Fan Position and Clearance

- | | |
|---------------|-------------------|
| 1. Fan | 3. Cone fasteners |
| 2. Inlet cone | |

6. Re-install the final filters.
7. See Figure 6-5. Remove the cover from the motor junction box (2). Connect the conduit (9) to the motor junction box and the wiring to the motor leads. Install the cover.
8. Turn on the system electrical power and start the fan. Make sure the fan
 - rotates in the direction shown by the arrow on the side of the motor. Refer to *Reversing Motor Direction* in the *Troubleshooting* section.
 - does not rub against the inlet cone.

Section 7

Parts

Introduction

To order parts, call the Nordson Finishing Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

Use the illustrations and parts lists to locate and describe parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

Color Module Parts

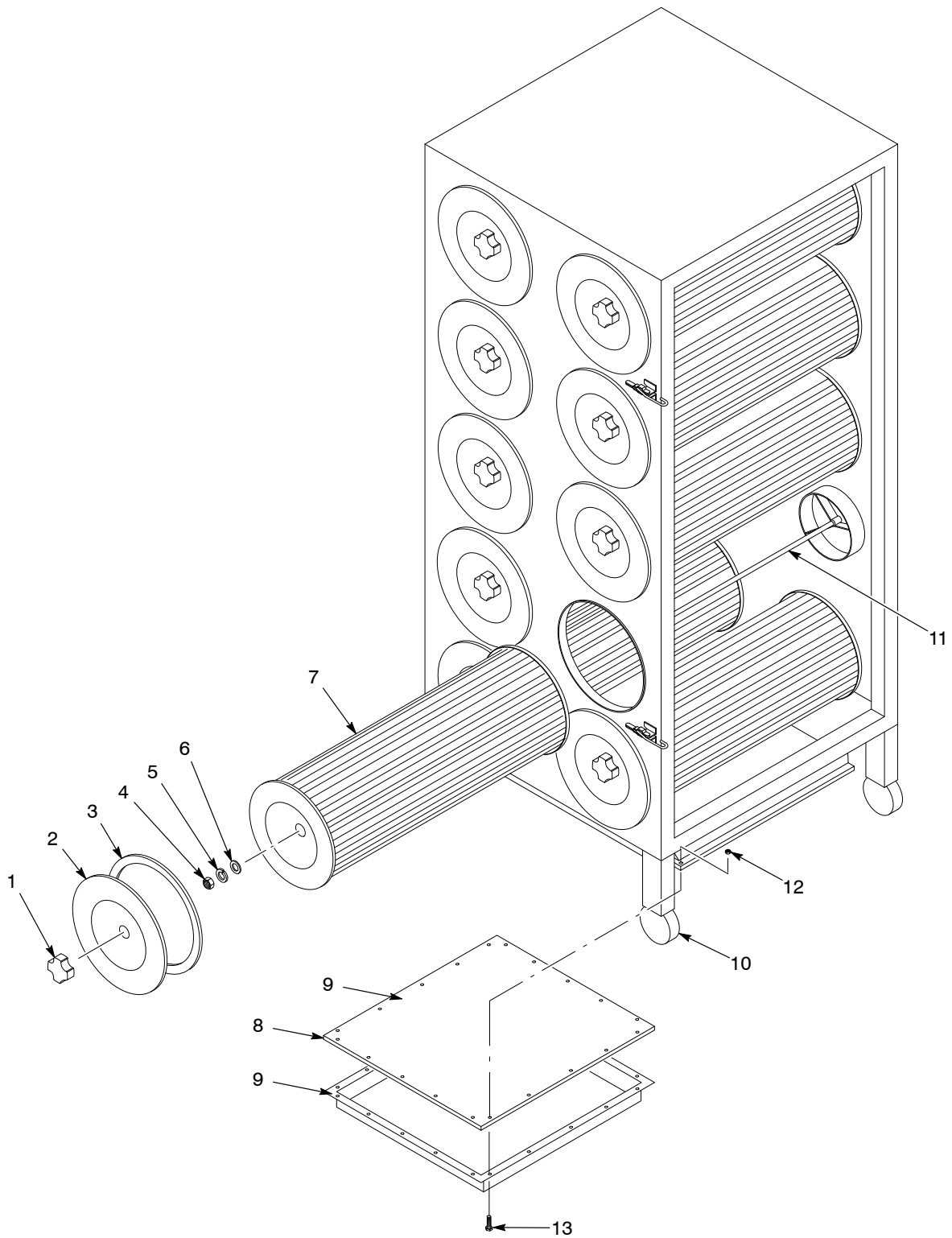
See Figure 7-1.

Item	Part	Description	Quantity	Note
1	1014953	KNOB, filter cover	10	
2	1014954	COVER, filter, RCM	10	
3	1018852	• GASKET, filter, cover, RCM	1	
NS	1018853	• GASKET, booth interface, RCM	1	
4	984152	NUT, hex, regular, $\frac{3}{8}$ -16 in., steel, plain	10	
5	983160	WASHER, lock, E, split, $\frac{3}{8}$ in., steel, nickel	10	
6	983255	WASHER, flat, 0.406 x 1.250 x 0.1000 in., zinc	10	
7	1014921	FILTER, 36 in., bolt through, RCM	10	
8	1014923	PLATE, fluidizing, RCM	1	
9	-----	• CAULK, latex	1	A
10	1014924	CASTER, 4 in., $\frac{3}{4}$ in., stem, swivel, RCM	4	
11	1014922	ROD, filter support	10	
12	336281	NUT, hex, serrated, $\frac{5}{16}$ -18 in., zinc	16	
13	336282	SCREW, hex head, serrated, $\frac{5}{16}$ -18 x 0.75 in., zinc	16	

NOTE A: Apply when assembling fluidizing plate and plenum. Refer to *Repair* for assembly procedures.

Color Module Options

Part	Description	Quantity	Note
1033028	PLATE, pump mount (for mounting 4 powder feed pumps on color module hopper)	1	
1033273	KIT, vent stub, 2 in.	1	
1033274	KIT, vent stub, 3.5 in.	1	



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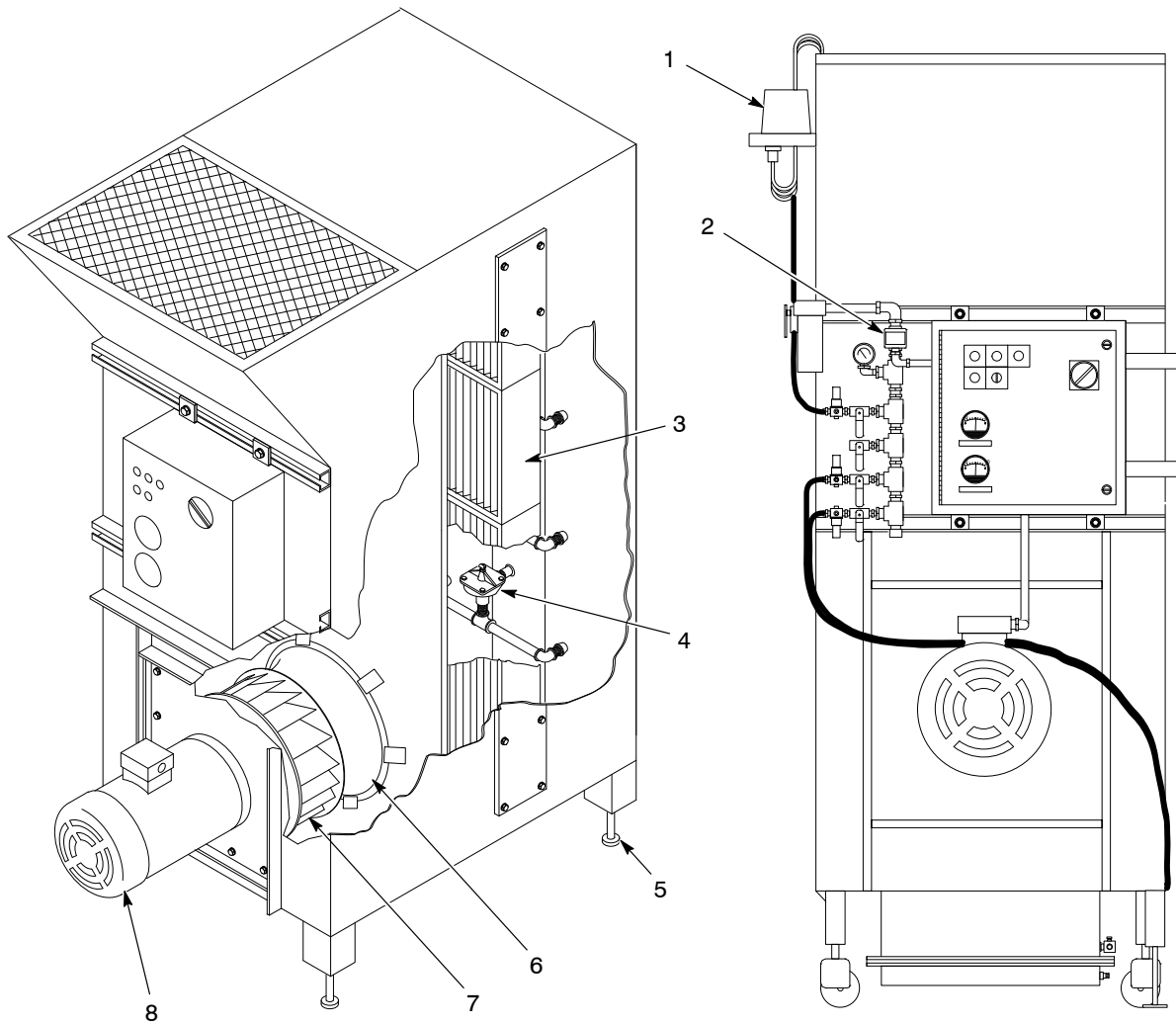
Figure 7-1 Color Module Parts

Fan Section Parts

See Figure 7-2.

Item	Part	Description	Quantity	Note
1	1014961	VALVE, solenoid, enclosure, 5 port	1	
2	1014962	VALVE, solenoid, shut off	1	
3	1032826	FINAL FILTER, RCM	4	
4	1014960	VALVE, diaphragm, pulse, 1 in.	5	
5	1014956	FOOT, leveler, RCM	-	A
6	1014952	CONE INLET, BI22, RCM	1	
7	1014950	FAN WHEEL, BI22, counter-clockwise, RCM	1	
8	1022543	MOTOR, extend shaft, 10 hp, 200 Volt	1	B
8	1014957	MOTOR, extend shaft, 10 hp, 230/460 Volt	1	B
8	1022544	MOTOR, extend shaft, 10 hp, 380 Volt	1	B
8	1014958	MOTOR, extend shaft, 10 hp, 575 Volt	1	B

NOTE A: Quantity varies depending on base length: 9 ft – 6, 12 ft – 8, 15 ft – 8.
 B: Order correct motor for your voltage.



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Figure 7-2 Fan Section Parts

Canopy/Base

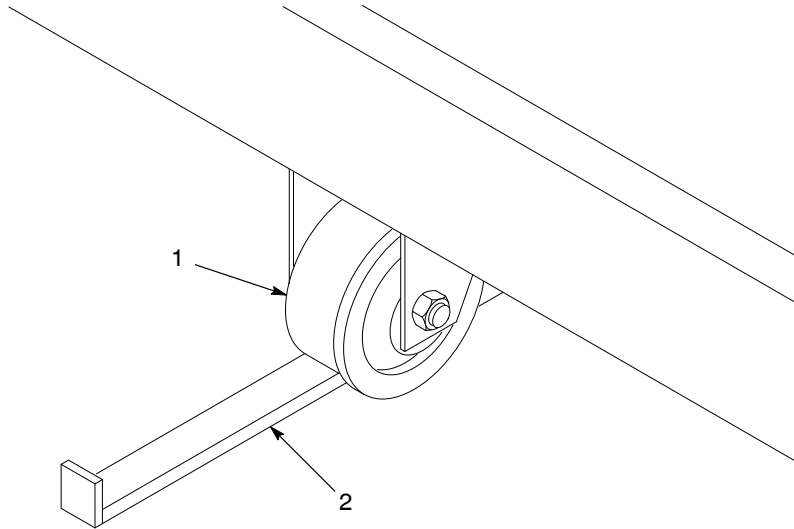
See Figure 7-3.

Item	Part	Description	Quantity	Note
1	1034139	CASTER, 6 in. flanged	4	A
2	1014929	TRACK, roller base	2	A
NS	1014956	FOOT, leveler, RCM, base	6	B

NOTE A: Used with the roll-on/roll-off system. For field upgrade from fixed to roll-on/roll-off, order kit 1033275, which includes casters and tracks.

B: Used with the fixed-base system in place of the flanged casters and roller base track.

NS: Not Shown



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Figure 7-3 Casters and Track Parts

Electrical Panel

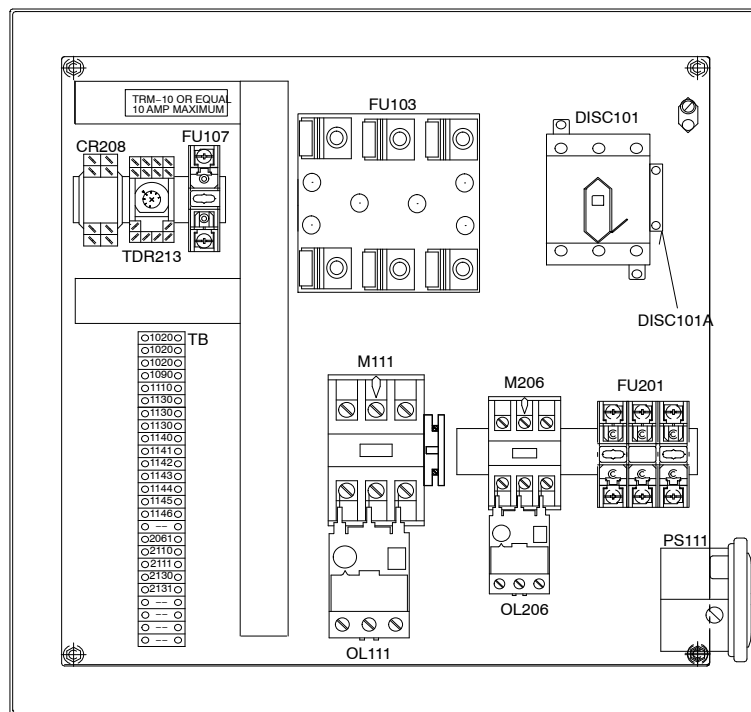
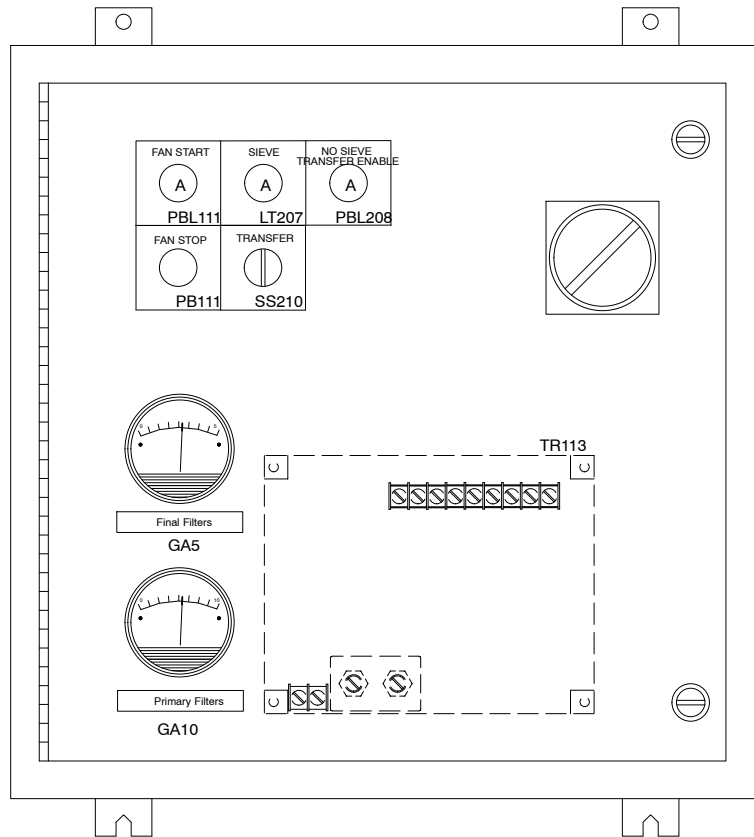
See Figure 7-4. System schematics are in *Troubleshooting*.

Item	Part	Description	Quantity	Note
Standard System without options				
DISC101	See chart	Disconnect, non-fused	1	ABB
DISC101	OXZ549	Disconnect, handle	1	ABB
DISC101	OHB80J6	Disconnect, extended shaft	1	ABB
DISC101A	OA1G10	Aux. contact, disconnect	1	ABB
M111	See chart	Contactor, overload	1	Allen Bradley
OL111	See chart	Overload, motor	1	Allen Bradley
M111	100-SA10	Contact, auxiliary	1	Allen Bradley
FU103	See chart	Fuse, J-type, time delay	3	Gould
FU103	See chart	Fuse block	1	Marathon
FU107	TRM10	Fuse, control	1	Gould
FU107	-	Fuse block	1	-
PBL111	-	Pushbutton, illum., amber, LED	1	Telemecanique
PBL111	-	Pushbutton, base	1	Telemecanique
PB111	ZBABA9	Pushbutton, head, red	1	Telemecanique
PB111	ZB4BZ102	Pushbutton, base	1	Telemecanique
TB, FU107, Options	-	DIN rail	AR	-
TB	-	Terminals	25	-
TR113	DNC-T2005-B10	Timer board	1	NCC
GA10	2-5010	Minihelic gauge, 0–10 in. w.c.	1	Dwyer
GA5	2-5005	Minihelic gauge, 0–5 in. w.c.	1	Dwyer
PS111	1910-5	Pressure switch	1	Dwyer
PS111, GA5, GA10	KQ2E06-00	Bulkhead union, 6 mm	2	SMC
PS111	KQ2H06-01S	Male connector, 6 mm x 1/8 in. NPT	1	SMC
ATM1	AN203-KMB	Breather vent	1	SMC
PS111, GA5	KQ2U06-99	Plug-in Y, 6 mm	1	SMC
PS111, GA5, GA10	-	Tubing, 6 mm	AR	-
Automatic Transfer Option				
SS210	-	Switch, selector, 3-position, maintained	1	Telemecanique
TDR211	GT5Y-2SN1A100	Timer, delay-on	1	IDEC
TDR211	SY4S-05	Base, timer	1	IDEC
Sieve Option				
M206	100-C09D10	Contactor, motor	1	Allen Bradley
OL206	See chart	Overload, motor	1	Allen Bradley
FU201	See chart	Fuse, class CC, time delay	3	Gould
FU201	-	Fuse block, DIN rail	1	-
LT207	-	Light, indicating, amber, LED	1	Telemecanique
CR208	RH2B-UAC120V	Relay, control, 120V	1	IDEC
CR208	SH2B-05	Base, relay	1	IDEC
PBL208	-	Pushbutton, illum., amber, LED	1	Telemecanique

Disconnect (DISC101)	
Total System Current	Disconnect
21.4–25.5	OT32E3
25.6–34.0	OT45E3
34.1–51.0	OT63E3
51.1–86.9	OT100E3

Exhaust Fan Fuses, Motor Starter, and Overload						
Size	Item	208 Volt	230 Volt	380 Volt	460 Volt	575 Volt
10 HP	FLA	32.2	28	17	14	11
	FU103	AJT 60	AJT 50	AJT 30	AJT 25	AJT 20
	FU103	6J60A3B	6J60A3B	6J30A3B	6J30A3B	6J30A3B
	M111	100-C37D10	100-C37D10	100-C30D10	100-C16D10	100-C16D10
	OL111	193-EA1HC	193-EA1HC	193-EA1GB	193-EA1GB	193-EA1FB
15 HP	FLA	46.2	42	25	21	17
	FU103	AJT 60	AJT 70	AJT 45	AJT 35	AJT 30
	FU103	6J100A3B	6J100A3B	6J60A3B	6J60A3B	6J30A3B
	M111	100-C60D10	100-C43D10	100-C30D10	100-C23D10	100-C23D10
	OL111	193-EA1KE	193-EA1JD	193-EA1HC	193-EA1GB	193-EA1GB

Sieve Option Fuse and Overload						
Size	Item	208 Volt	230 Volt	380 Volt	460 Volt	575 Volt
1/2 HP	FLA	2.2	2.0	1.2	1.0	0.8
	FU206	ATDR 4	ATDR 4	ATDR 2.5	ATDR 2	ATDR 2
	OL206	193-EA1DB	193-EA1DB	193-EA1DB	193-EA1DB	193-EA1CB
1/6 HP	FLA	1.4	1.2	0.6	0.6	0.5
	FU206	ATDR 3	ATDR 2.5	ATDR 2	ATDR 2	ATDR 2
	OL206	193-EA1DB	193-EA1DB	193-EA1CB	193-EA1CB	193-EA1CB



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Figure 7-4 Electrical Panel Parts

