Nordson 500 Series Powder Coating System

Part 108 101B

NORDSON CORPORATION • AMHERST, OHIO • USA

Nordson Corporation welcomes requests for information, comments and inquiries about its products.

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Notice

Trademarks

Nordson's Support System

Customer Support

For more than 25 years, Nordson has offered unparalleled field service to its customers before, during, and after a sale. Nordson representatives will work with you to decide the best system for the application. Nordson will be there to help you during start up, training your employees to maintain and run your equipment, and we're only a phone call away at any time thereafter.

Parts and Accessories

Besides standard replacement parts, many accessories are available to help improve productivity and reduce downtime. Contact your Nordson representative for further information.

System Engineering

Custom design and modifications to standard equipment are available through Nordson's Finishing Systems Group. Your representative will have complete details.

RBX

Nordson has developed a "Rebuilt Exchange" program which can save you up to 50% of the cost of a new component while also eliminating downtime and costly in-plant repairs. Old, worn-out components may be traded for rebuilt Nordson equipment which has the same warranty as new equipment.

Package of Values

Specification assistance to post-installation troubleshooting, Nordsons package of values is designed to keep you productive and profitable. We provide:

- carefully engineered, high quality products;
- strong service support;
- backing of a financially and technically strong, well-established company; and
- field service representatives who believe in delivering to our customers the benefits for which you have paid - all of which is backed by a corporate commitment to deliver the product specified.

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Section 1
Safety Summary

Included in this summary are safety guidelines for the use of the NORDSON® 500 Series Powder Coating System.

Other warnings and cautions specific to a particular piece of equipment or procedure are included in the manual text where appropriate.

General Safety Precautions

Introduction

Failure to follow these recommendations may result in personal injury or property damage from electrocution, fire or explosion.

It is important to understand that these warnings and cautions are not exhaustive but are developed to assist the installer and operator in safely installing or operating the equipment. NORDSON® could not possibly know, evaluate and advise of all conceivable ways in which installation or service might be done and of the possible hazards related to each. Anyone who undertakes to install or service this equipment must first ensure that the method to be used is safe and also conforms to all local, state and federal code requirements.

Refer to the National Fire Protection Association publication NFPA 33 for standards on the installation and operation of powder spray systems, and to federal, state, regulatory agency, and local codes for laws governing installation and operation of these systems.

Terms And Symbols

The following safety symbols and terms are used throughout this manual to alert the reader to safety hazards and to conditions that may result in personal injury or damage to equipment or property.

WARNING: General warning. Failure to observe may result in personal injury or death from fire or explosion.

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

CAUTION: Failure to observe may result in minor personal injury or property damage.

NOTE: Important information. Failure to observe may result in property damage.

Personal Safety

- Wear a filter-type respirator whenever handling powder containers, filling hoppers, operating spray equipment or performing maintenance or cleaning operations. Always wear safety glasses.

- Wash skin frequently with soap and water, especially before eating or drinking. Do not use solvents to remove powder from skin. Do not use high pressure compressed air to blow powder off skin or clothes. Compressed air injected under skin can cause serious injury or death.

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General Safety Precautions, cont.

Personal Safety, cont.

- Gloves should be worn whenever handling powder to minimize skin reactions. Obtain and read Material Data Safety Sheets for all powders used.
- Do not allow unqualified personnel to service electrical equipment.
- Lock out and tag external power sources at a disconnect switch or breaker in service line ahead of electrical equipment before servicing.
- Never touch exposed electrical connections or equipment while the power is on.
- Do not operate equipment at a pneumatic pressure higher than the rated maximum working pressure of any component in the system. Manual shut-off valves should be installed in the air supply lines to pneumatic equipment, so that pressure can be relieved before undertaking maintenance or repairs.
- Do not operate equipment with covers, panels, or safety guards removed.
- Lift equipment using only designated lifting points or lugs. Do not attempt to lift using covers, doors, panels, or cable or hose connections. Always balance load when lifting and never put stress on flat sheet metal panels.
- Remove all jewelry (rings, watches, etc.) before operating or servicing equipment.
- Do not attempt to service equipment when standing water is present. Work on a rubber mat, if possible. Avoid servicing electrical equipment in a high humidity environment.
- Do not perform internal service or adjustment on any equipment unless another person capable of rendering first aid and CPR is present.
- Whenever undertaking maintenance or repairs on equipment, make sure that all moving equipment (robots, reciprocators, conveyors, etc.) that could endanger service personnel are shut down and locked out.

Electrical and Fire Safety

- All electrically conductive equipment in spray area must be grounded. Ungrounded conductors can store a charge which could cause a spark hot enough to cause ignition if a grounded object comes near enough to attract that charge. Sparks in a powder spray area are a fire hazard. If sparking is noticed, **SHUT DOWN SPRAY SYSTEM IMMEDIATELY.**

General Safety Precautions, cont.

Electrical and Fire Safety, cont.

- Do not smoke in the spray area. A fire could be ignited by a lit cigarette or cigar.
- Safety interlocks and approved, fast acting fire detection systems should always be installed to shut down the spray system in the event the booth ventilation system shuts down, a fire is detected, or a grounded workpiece comes too close to the gun electrode, causing sparking.
- Interlock systems should be checked periodically to ensure their effectiveness. Optical fire detector lenses should be cleaned daily. Do not operate spray system with fire detection system in by-pass mode. Detection system will then be inoperative and if a fire occurs it will be fed by powder spray system.
- Do not keep containers of flammables in the spray area or room. An accidental spark could ignite them and if a fire or explosion occurs the presence of flammable materials will increase the chances of personal injury and property damage.
- Know where "EMERGENCY STOP" buttons are located.
- Know where the nearest fire extinguisher is located. Make sure extinguishers are fully charged.
- Check cartridge filters daily. Reductions in air flow can diminish the ability of the booth to capture overspray powder.
- Practice good housekeeping procedures. Clean booth daily with squeegee or non-sparking device. Do not allow dirt or powder to build up on electrostatic system gun cables or power units, or on any electrical equipment.
- Power supply wire gauge and insulation must be sufficient to meet the temperature and power requirements. Only fuses of the correct type, voltage and current rating should be used. Using incorrect fuses or wire gauge is a dangerous practice.
- Use only approved replacement parts. Use of unapproved parts or unapproved modifications to equipment may void any agency approvals and create safety hazards.
- A disconnect switch or breaker with lockout capability must be installed in the service line ahead of any electrical equipment.
- Establish and maintain a protected path for power cables and electrostatic cables, if used, that will prevent their being abraded, cut, run over by heavy equipment, or bent around an extremely small radius.

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General Safety Precautions, cont.

Electrical and Fire Safety, cont.

- Do not operate equipment in a flammable environment unless equipment is rated and approved for such use.

Electrostatic Systems

- Wear shoes with conductive soles, such as leather, to maintain a connection to ground and prevent shocks. Grounding straps must be used if rubber soled shoes are worn to prevent potentially harmful shocks. The spray area floor must be conductive to ground and the operator's platform, if used, must be grounded.

- Personnel in spray area must not wear or carry metallic objects on their person. Ungrounded metal can store a static charge and cause harmful shocks.

- Do not make gun adjustments without turning off the high voltage output at the power unit or master control console. Ground tip of gun before cleaning or changing nozzles.

- If using hand gun, operator must maintain skin-to-metal contact between his hand and gun handle to prevent shocks and spark hazards. If wearing gloves, cut away palm or fingers.

- Turn OFF power and ground tip of gun before cleaning or changing nozzles. When handgun is not in use, hang so nozzle is within 4 inches (100mm) of a grounded conductor.

- Do not jerk, whip or snap electrostatic cable. Do not bend in a radius of less than 6 inches (152mm). Check cable condition daily. Always keep electrostatic cable ends, power unit wells, and gun resistors clean. Use approved dielectric grease and insulating oil in appropriate locations. Make resistance checks on gun resistor and electrostatic cable part of a periodic maintenance program. Operating with damaged electrostatic equipment is hazardous to the operator and can cause a fire to occur.

- Powder feed, application and recovery equipment and conveyors, hangers, and workpieces (all conductive equipment in spray area) should be grounded with a resist-ance to ground not exceeding 1 megohm. Check all ground connections, including workpiece to ground, periodically with a megohm meter. Keep conveyors, chains, rollers and hangers clean. If sparking is noticed, **SHUT DOWN SYSTEM IMMEDIATELY.**

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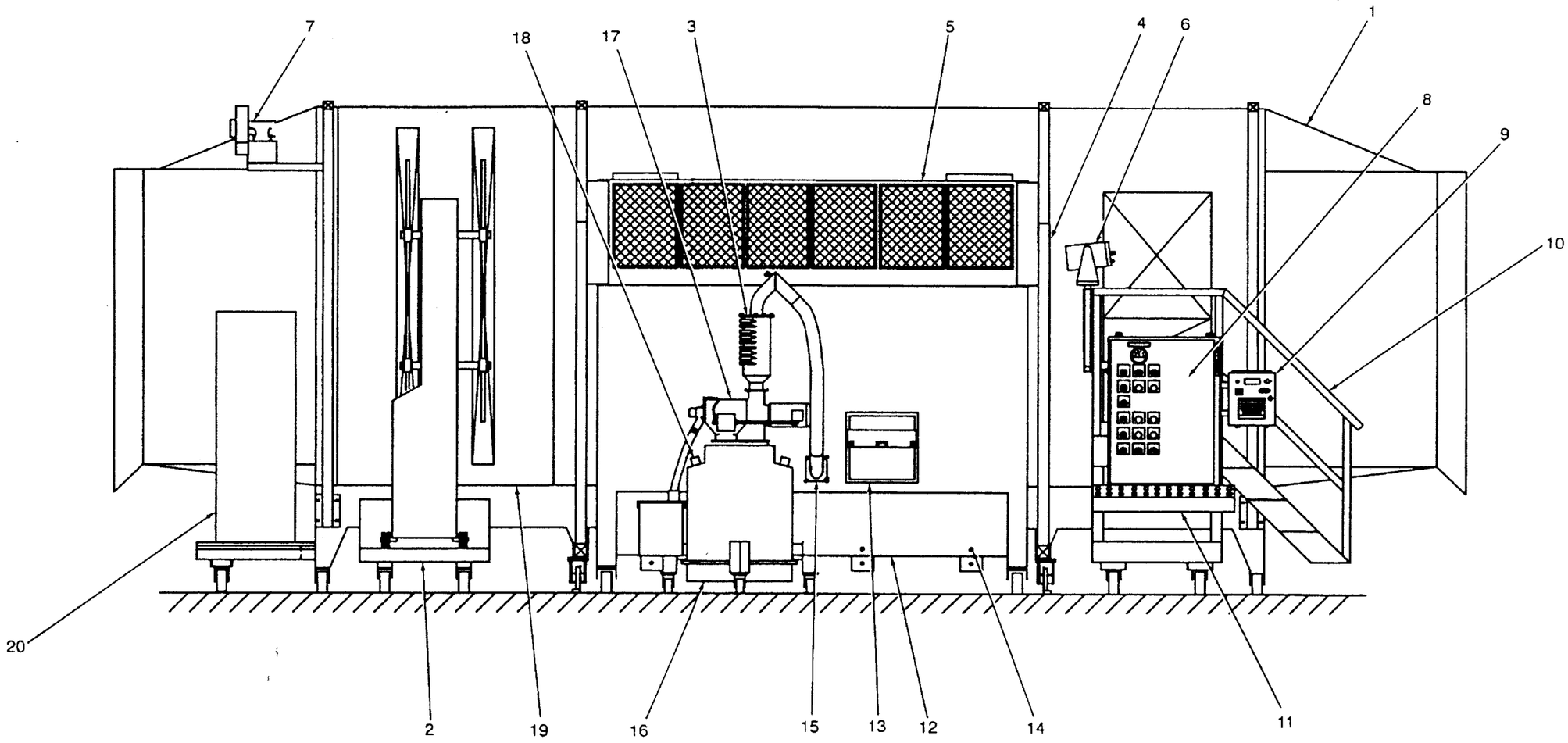
Section 2
Equipment Familiarization

Nordson®
500 Series Powder Coating Systems consist of modular application and recovery equipment, allowing each system to be tailored for specific applications.

Typical powder application and recovery systems are closed-loop systems. The sprayed powder materials are contained within the system and recycled back to the application equipment, allowing high material utilization rates, minimizing powder contamination, and providing a safe and clean working environment.

Figure 2.1



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Typical System Components and Functions, cont.

Nordson® 500 Series System Familiarization

Reference Figure 2.1 on opposite page.

Figure 2.1 is a front view of a typical Nordson® 500 Series Powder Coating System. This drawing will assist you in identifying most of the components of a typical system and their relative positions.

System components shown include:

1. **Booth Enclosure (Canopy)**
2. **Gun Mover (Reciprocator or Oscillator), or Fixed Gun Stand**
3. **Accumulator (Cyclone)**
4. **Fan Section Support Legs**
5. **Fan Section**
6. **Manual Gun Control Console (Manual Guns Not Shown)**
7. **Air Knife**
8. **System Electrical Control Panel**
9. **Fire Detection System Controller**
10. **Operator Platform**
11. **System Pneumatic Control Panel**
12. **Color Module**
13. **Powder Loading Chute**
14. **Transfer Pumps**
15. **Vent Assist Plate**
16. **Feed Hopper**
17. **Rotary Sieve**
18. **Powder Pumps**
19. **Booth Base**
20. **Automatic Gun Control Console (Automatic Guns Not Shown)**

Typical System Components and Functions, cont.

For fluidizing and applying powder.

Powder Delivery Equipment

1. **Feed Hopper**—stores and fluidizes powder supply for guns. Recycle systems include a level control mounted on the side of the hopper. When transfer pump control is set to automatic, the level control starts recycling of powder overspray. The feed hopper is typically vented to the color module.

2. **Powder Pumps**—draw powder from the feed hopper and convey it through hoses to guns. Air pressure to the pumps is regulated by the gun control consoles.

3. **Guns**—electrostatically charge powder particles and spray them towards the target parts.

For powder containment during spraying; collection of overspray; and recycling powder to feed hopper.

Powder Recovery and Recycle Equipment

1. **Color Module**—houses cartridge filters, fluidizing pans, and transfer pumps. Accumulates oversprayed powder. Transfer pumps recycle powder back to the feed hopper on signal from level control (recycle systems)

2. **Booth Enclosure (Canopy)**—engineered to each individual application. Negative air pressure inside canopy, generated by exhaust fan, confines the powder within the booth. Canopy has conveyor slot in roof, openings at either end for hangers and parts, and openings at sides for automatic and manual guns, and color module.

3. **Booth Base**—supports canopy, includes powder inlet frame for mating color module to canopy, provides mounting points for other equipment. Mounted on underside of base are pre-plumbed compressed air lines and electrical conduit and wiring.

4. **Fan Section**—houses exhaust fan and motor, cartridge filter pulse valves and manifold, and high efficiency final filters. Exhaust fan draws air through canopy openings and cartridge filters, and returns cleaned air through final filters.

5. **Accumulator and Sieve**—Used in recycle systems to collect and screen powder overspray returned from color module hoppers. Contaminants and powder clumps are collected in scrap pail. Accumulator is typically vented through color module.

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Typical System Components and Functions, cont.

System electrical, and pneumatic controls, gun controls, fire detection systems and safety interlocks.

Control Equipment

1. **Gun Control Consoles**—control air pressure to powder pumps and generate and control electrostatic voltage to the guns. One gun control console is needed for each gun. Automatic gun control consoles include both gun control consoles and a master control unit. Gun triggering controls, or interfaces with programmable logic controllers (PLCs) or other devices may also be included.

2. **System Pneumatic Control Panel**—provides regulation of hopper and color module powder fluidization, transfer pump air pressure, and other pneumatic functions.

3. **System Electrical Control Panel**—for system power distribution and control. Houses system motor starters, safety interlocks, operating pushbuttons, and indicator lights. Optional programmable booth controller can be installed.

4. **Fire Detection System**—for systems with automatic guns. Includes controller, sensors, and light sources (depending on system used). NFPA-33 required safety feature provided to either shut down all powder flow, the booth exhaust fan, and system electrical power and compressed air within one-half second after detection of spark or flame within the booth.

Available options may include those listed as well as other components. Please contact your Nordson representative for further information.

Optional Components

1. **Additional Color Modules**—one or more for additional powder colors.

2. **Additional Feed Hoppers**—one or more for additional powder colors.

3. **Vibratory or Rotary Powder Sieves**—mounted on feed hoppers. Screen out contaminants and powder clumps from recycled powder.

4. **Gun Movers**—oscillators or reciprocators. Move automatic guns in a repetitious pattern for better part coverage.

5. **Regenerative or Refrigerant Compressed Air Dryer**—removes moisture and other contaminants from the system air supply.

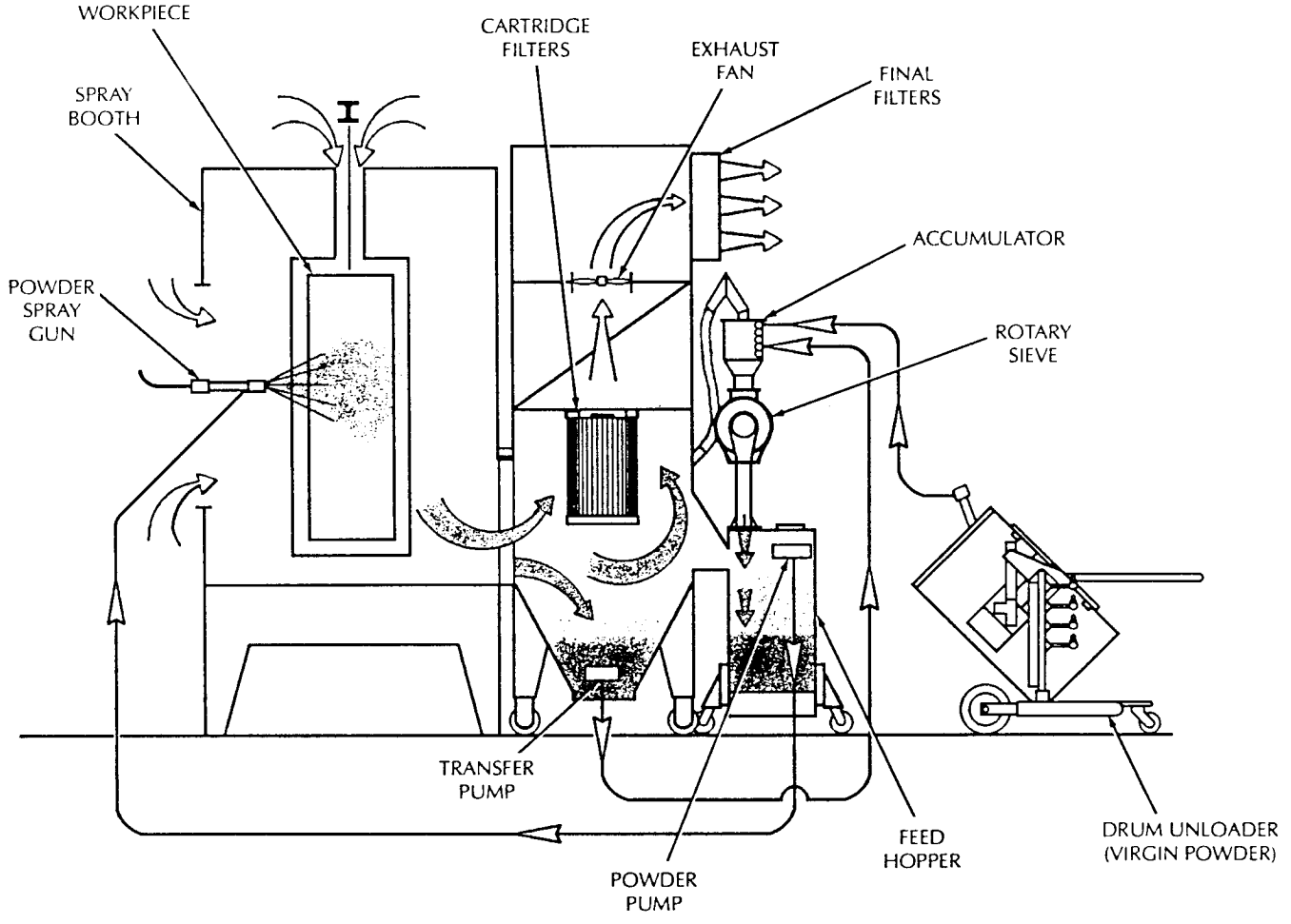
6. **Powder Drum Unloaders**—transfer powder from drums to feed hoppers.

7. **Miscellaneous Roll On/Off Line Equipment**—manual or powered.

System Operation

Figure 2.2

Refer to page 2.7 for detailed information corresponding to this drawing.



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System Operation, cont.

Reference Figure 2.2 on opposite page.

General Powder Coating System Operation

Powder Delivery

The powder supply is fluidized in the feed hopper. Powder pumps mounted on the feed hopper draw fluidized powder out of the hopper and mix it with a high velocity stream of clean, dry air. The powder and air mixture is delivered to the powder spray guns through flexible hoses. At the guns, the powder particles receive an electrostatic charge as they are sprayed toward the grounded parts moving through the booth enclosure.

Powder Recovery and Recycle

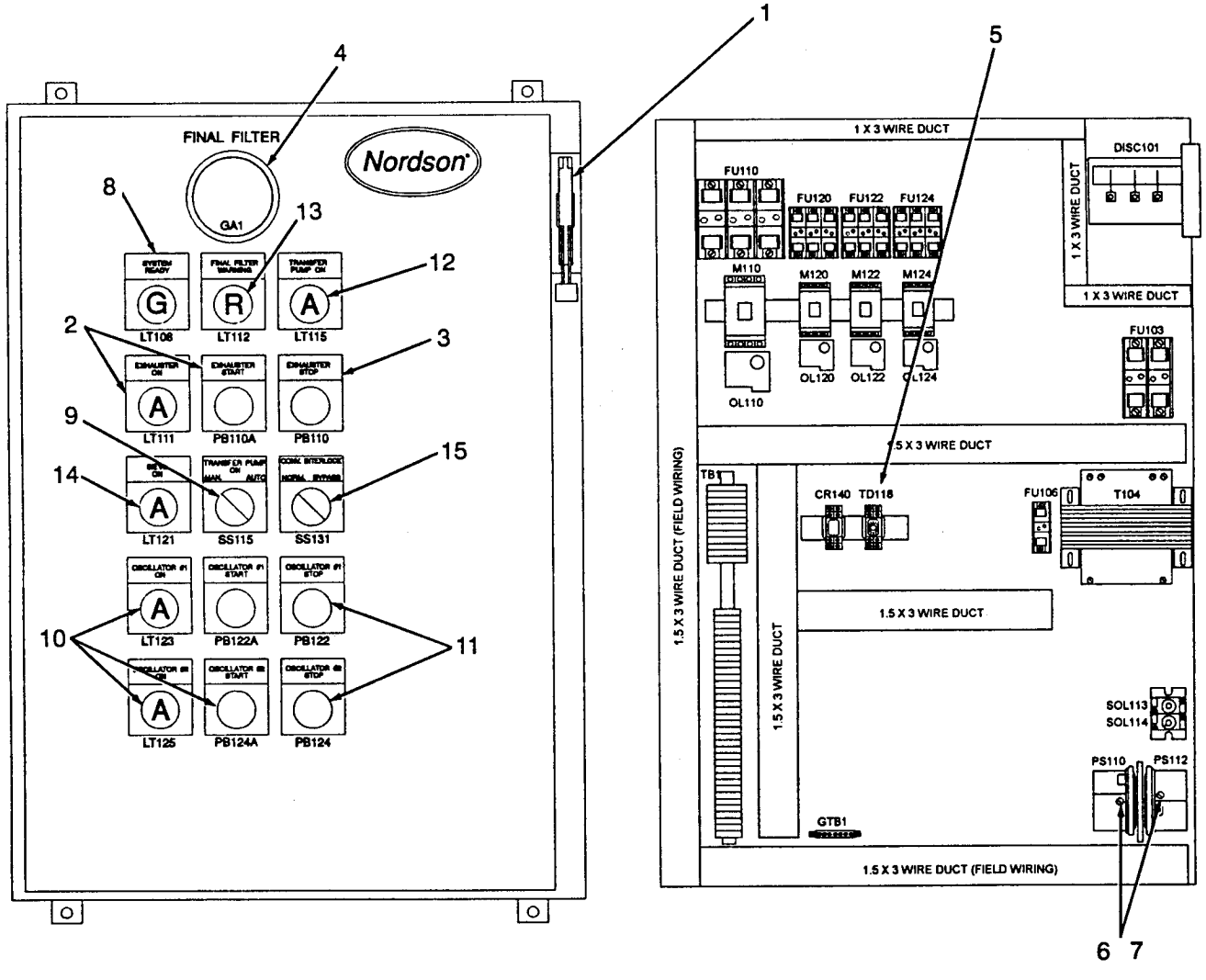
The exhaust fan mounted in the fan section pulls air through the booth enclosure openings, into the color module, and through the cartridge filters. This air is then returned to the room through the final filters. Powder not deposited on the parts (overspray) is carried by this air flow into the color module, where it accumulates on the outside surface of the cartridge filters.

At timed intervals, reverse pulses of air are directed into the cartridge filters, blowing the accumulated powder off the outside surfaces. The powder falls into the fluidizing pans at the bottom of the color module, where it is fluidized and pumped by transfer pumps back to the feed hopper. At the feed hopper, the recycled powder is normally screened by a rotary or vibratory sieve before it is mixed with virgin powder.

Operating Controls and Indicators

Figure 2.3 - Typical System Electrical Control Panel

The chart on the opposite page explains the operating controls and indicators illustrated in this figure.



Operating Controls and Indicators, cont.

System Electrical Control Panel

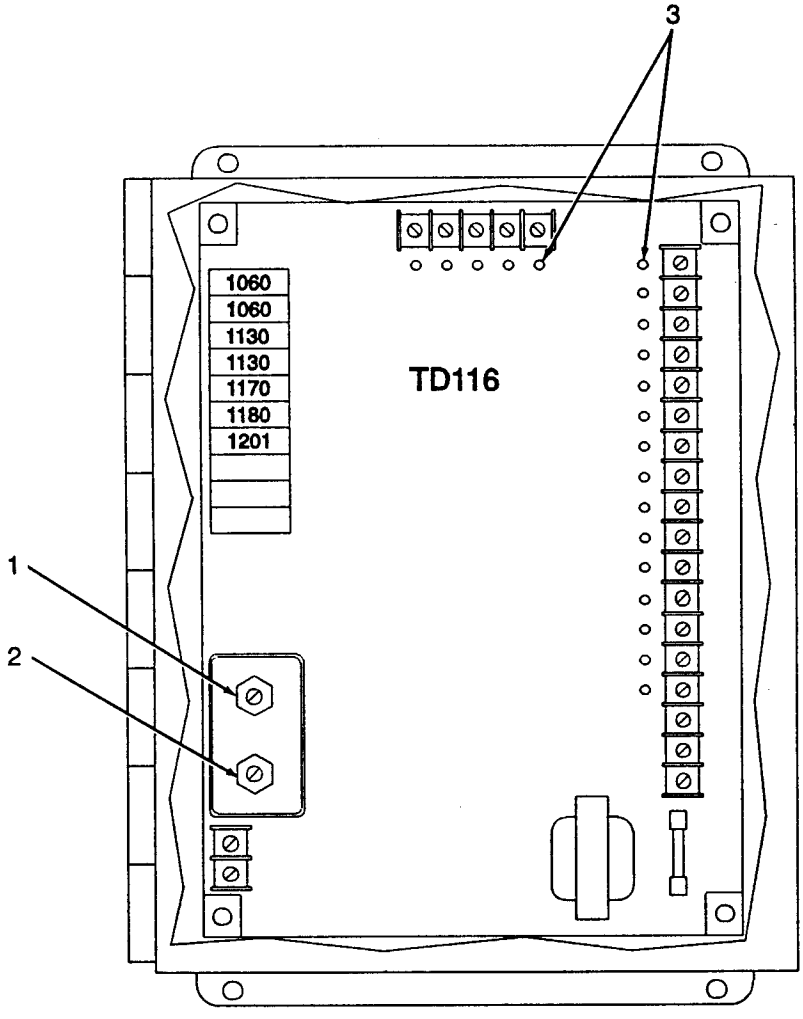
See Figure 2.3 on opposite page.

Item	Description of Purpose or Function
1. **Main Disconnect Switch**	Removes or applies power to the system (230/460/575V).
2. **Exhaust Fan Start Pushbutton & Light** (Amber)	Starts exhaust fan and energizes system electrical controls. Lit when energized.
3. **Exhaust Fan Stop Pushbutton**	Stops fan and de-energizes electrical controls. Amber light goes out.
4. **Differential Pressure Gauge***	Indicates in inches of water (w.c.) the pressure drop across the final filters.
5. **Adjustable Time Delay Relay*** (TD118)	Delays the activation of the collector module transfer pumps by the feed hopper level control
6. **Differential Pressure Switch Adjusting Screw**	Changes sensitivity to pressure drop across final filters. Lights red warning light on panel door should pressure drop across filters exceed setting.
7. **Differential Pressure Switch Adjusting Screw**	Changes sensitivity to pressure drop across final filters. Shuts down system when pressure drop across filters exceed setting.
8. **"SYSTEM READY" Light** (Green)	Indicates that all system and safety interlocks are closed.
9. **3-Position Selector Switch** (MAN - OFF - AUTO)	Selects powder transfer pump operation: "OFF"—no transfer. "MAN"—continuous transfer. (non-reclaim). "AUTO"—powder transfer controlled by feed hopper level sensor.
10. **Oscillator #1 & 2 Start Push-button & Light** (Amber)	Starts electrically-driven Oscillators #1 & 2. Lit when operating.
11. **Oscillator #1 & 2 Stop Pushbutton**	Stops oscillators #1 & 2.
12. **Transfer Pump Indicator Light** (Amber)	When lit, indicates that collector module transfer pumps are activated.
13. **Final Filter Indicator Light** (Red)	When lit, indicates pressure drop across final filters has exceeded pressure switch setting. Final filters are clogging.
14. **Sieve "ON" Indicator Light** (Amber)	When lit, indicates that rotary sieve has been activated.
15. **Conveyor Interlock Selector Switch** (NORM-BYPASS)	Selects conveyor interlock operation. "NORM"—gun master control (MC-3 or PLC) powered only while conveyor is running. "BYPASS"—interlock defeated, power delivered to master control when conveyor not running. Used for gun setup or troubleshooting.
16. **Air Knife Selector Switch** (ON-OFF)	Starts and stops air knife motors. (Not Shown)
17. **Air Knife "ON" Indicator Light** (Amber)	When lit, indicates air knifes motors are on. (Not Shown)

Operating Controls and Indicators, cont.

Pulse Valve Timer Enclosure - Figure 2.4

The chart on the opposite page explains the operating controls and indicators illustrated in this figure. Callouts refer to item numbers in the charts.



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Operating Controls and Indicators, cont.

Pulse Valve Timer Enclosure

This enclosure is typically mounted on a fan section support leg, and electrically connected to the system electrical panel, and the pulse valve solenoid enclosure inside the fan section, next to the manifold. Pulsing begins when the exhaust fan is energized.

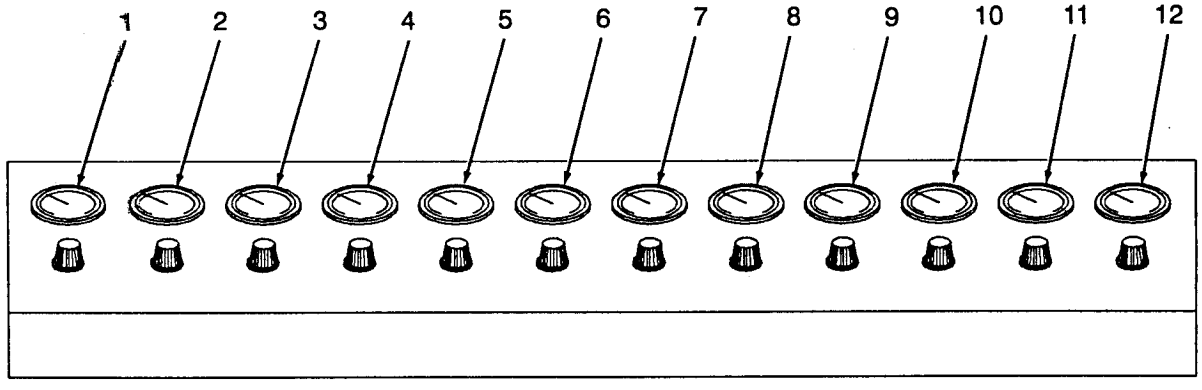
See Figure 2.4 on opposite page.

Item	Description of Purpose or Function
1. **Pulse Valve "OFF" Timer*** (Adj. 1.5 - 30 secs.)	Sets time between air pulses for cartridge filter blowdown.
2. **Pulse Valve "ON" Timer*** (Adj. 0.05 - .5 secs.)	Sets duration of air pulses for cartridge filter blowdown.
3. **RED LEDs**	Indicates which air pulse valve is activated.

Operating Controls and Indicators, cont.

12 Function Pneumatic Control Panel - Figure 2.5

The chart on the opposite page explains the operating controls and indicators illustrated in this figure. Callouts refer to item numbers in the charts.



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Operating Controls and Indicators, cont.

Typical 12 Function Pneumatic Control Panel

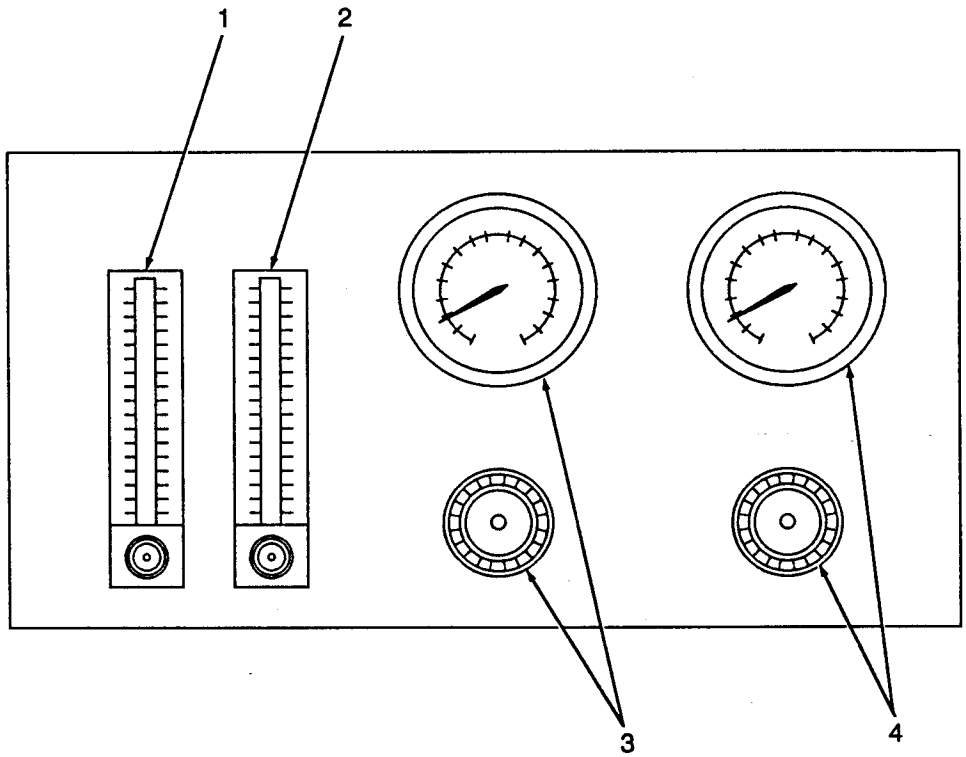
See Figure 2.5 on opposite page.

Item	Description of Purpose or Function
1. **Pressure Regulator and Gauge—Color Module Fluidize #1**	Regulates and indicates air pressure delivered to collector module plenum #1.
2. **Pressure Regulator and Gauge—Color Module Fluidize #2**	Regulates and indicates air pressure delivered to collector module plenum #2.
3. **Pressure Regulator and Gauge—Color Module Fluidize #3**	Regulates and indicates air pressure delivered to collector module plenum #3.
4. **Pressure Regulator and Gauge—Color Module Fluidize #4**	Regulates and indicates air pressure delivered to collector module plenum #4.
5. **Pressure Regulator and Gauge—Feed Hopper Fluidizing**	Regulates and indicates air pressure delivered to feed hopper plenum. Used for optional components. Labelled when used.
6. **Pressure Regulator and Gauge—Vent Assist**	Regulates and indicates air pressure delivered to "vent assist" on color module, to increase or decrease exhaust flow from sieve accumulator.
7. **Pressure Regulator and Gauge—Transfer Pump #1**	Regulates and indicates air pressure delivered to collector module transfer pump #1, to increase or decrease powder transfer rate.
8. **Pressure Regulator and Gauge—Transfer Pump #2**	Regulates and indicates air pressure delivered to collector module transfer pump #2, to increase or decrease powder transfer rate.
9. **Pressure Regulator and Gauge—Transfer Pump #3**	Regulates and indicates air pressure delivered to collector module transfer pump #3, to increase or decrease powder transfer rate.
10. **Pressure Regulator and Gauge—Transfer Pump #4**	Regulates and indicates air pressure delivered to collector module transfer pump #3, to increase or decrease powder transfer rate.
11. **Spare Regulator and Gauge**	Used for optional components. Labelled when used.
12. **Spare Regulator and Gauge**	Used for optional components. Labelled when used.

Operating Controls and Indicators, cont.

AZO Rotary Sieve Control Panel - Figure 2.6

The chart on the opposite page explains the operating controls and indicators illustrated in this figure. Callouts refer to item numbers in the charts.



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Operating Controls and Indicators, cont.

AZO Rotary Sieve Control Panel*

See Figure 2.6 on opposite page.

Item	Description of Purpose or Function
1. **Flowmeter** (0 - 200 SCFH)	Controls volume of air flow to cover end air purge seal.
2. **Flowmeter** (0 - 200 SCFH)	Controls volume of air flow to drive end air purge seal.
3. **Air Pressure Regulator and Gauge**	Regulates air pressure to air purge seals.
4. **Air pressure Regulator and Gauge**	Regulates air pressure to vent assist on collector module.

*Used with AZO® Rotary Sieve only.

General

Suggested Review of Drawings

In addition to the drawings in "Controls and Indicators", the user should review the following drawings, to become familiar with the location of components and connection points:

Operating Environment

The Nordson® 500 Series Powder Coating System will give the user the best performance when operated in a proper environment and within design conditions. The user should plan to locate the system in an area where the following conditions can be maintained:

temperature range of 70 - 80° F; and

humidity range of 45 - 55% RH.

If temperature and humidity exceed the ranges given, the installation area must be climate conditioned.

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General, cont.

Normal Design Conditions for a 500 Series System Include:

NOTE: Special design conditions may exist for certain applications.

1. **End Opening Silhouettes**—allowing 6" clearance around all four sides of largest part.

2. **Part Hanger Keyhole Slot**—18" in height.

3. **Cross Drafts**—not exceeding 60 FPM.

4. **Average Face Velocity**—100 FPM (minimum) through all openings in the booth enclosure.

5. **Entering Part Temperature**—not exceeding 120° F.

6. **Powder**—Nordson® Powder Coating Systems are designed to operate with commercially available powders.

   NOTE: The characteristics and properties of a powder coating material 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 fines (particles less than 15 microns) reaches 10% of the total, blinding or plugging of the filter media can occur.

7. **Cartridge Filters**—12 cartridge filters are provided with each 512 system, 18 filters with each 518 system, and 24 with each 524 system.

   NOTE: Cartridge filters are considered a wear item. Life expectancy of a cartridge filter depends on many variables including: type of coating material; particle size distribution; humidity and temperature in the spray area; number of hours of operation; dew point and cleanliness of the compressed air used to clean the cartridges; and the pressure and frequency of blowdown air pulses.

8. **Compressed Air**—supplied by a dedicated air dryer at 80 to 100 psi with a maximum pressure dewpoint of 38° F.

Prior to installation of a 500 Series Powder Coating System, make sure the above environmental and operating conditions can be met. Please check with your Nordson representative if conditions exceed these guidelines.

General, cont.

Utilities Provided By User

1. **Primary Electrical Service**—(230/460/575VAC) should include a fused disconnect switch with lock-out capability, wired in accordance with the National Electic Code, NFPA70.

2. **Compressed Air Lines to the System**—should be a minimum of 1-½" NPT. Supply pressure must be 80 - 100 psi. Air must be clean and dry.

System Manuals

Before attempting to install the components which make up a 500 Series System, become familiar with the contents of this manual. Identifying the components in the Parts Lists in Section 7 and reviewing the Operating Controls and Indicators in Section 2, and the Pneumatic and Electrical Schematics in Section 9, should be done before installation and start up. Carefully review other drawings and manuals supplied with your system. These will typically include:

1. **Booth Enclosure (Canopy) Drawing**

2. **System Layout Drawing**

3. **Powder Application Equipment Manuals:**
   Guns
   Pumps
   Gun Control Consoles
   Master Controls
   Portable Powder Application Systems

4. **Gun Mover (Oscillators and Reciprocators) Manual**

5. **Air Dryer Manual**

6. **Fire Detection System Manual**

7. **Rotary Sieve Manual**

Refer to the checklist at beginning of Section 9—Optional Parts and Equipment to identify included manuals and drawings.

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Section 3
Operating Instructions

Before operating your Nordson® 500 Series Powder Coating System, review safety precautions, new equipment start-up, routine operating procedures, and the color change procedures.

Do not operate your 500 Series Powder Coating System before your Nordson representative has completed your instruction and training and you have read Section 2—Equipment Familiarization.

New Equipment Start Up

Safety Precautions

Read and observe the warnings and cautions in Section 1 of this manual before operating your Nordson® 500 Series Powder Coating System. Observe the specific warnings and cautions included with the procedures in this section.

New System Start-Up Procedures

Note: The instructions given in this section are for manually controlled systems. If your system is equipped with a Nordson Powder Booth Controller, refer also to the Booth Controller manual. If equipped with a PLC or other controller, refer to the system-specific information provided by your Nordson representative.

The following procedures describe the steps necessary to bring a new Nordson® 500 Series Powder Coating System to the pre-production trial state.

WARNING! This system contains energized electrical components with potentials that could be fatal. Disconnect and lock out system electrical power whenever the procedure being performed requires working on or around moving equipment or energized electrical devices. Turn OFF and lock out conveyor system and, if used, oscillators, reciprocators or gun movers.

WARNING! Never operate equipment at pneumatic pressures higher than the maximum rating of the components. Relieve pressure before disconnecting air lines.

WARNING! Wear a filter-type respirator and other appropriate safety equipment whenever handling powder containers, filling hoppers, operating spray equipment, or performing maintenance or cleaning operations. Obtain and read Material Safety Data Sheets for each powder used.

Initial Start Up

1. Turn OFF system compressed air supply. Disconnect and lock out system electrical power.

2. Remove all final filters.

3. Open system electrical panel door.

4. Verify continuity and size of all fuses. Replace any blown fuses.

5. Set pulse valve timer (TD116). Timer enclosure is typically located on fan section support leg. Refer to Figure 2.4.

   OFF Time — 15 secs.
   ON Time — .07 secs.

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New Equipment Start Up, cont.

6. Set transfer pump time delay relay (TD118): This timer is typically located inside system electrical panel. Refer to Figure 2.3.

   Time delay to pump start — 60 seconds

7. Close the electrical panel door.

8. Check exhaust fan motor rotation:

   a. Turn on electrical supply (230/460/575 volt, 3-phase, 60 Hz) at the service disconnect and on the cabinet door.

   b. Jog fan motor by depressing "Exhauster Start" pushbutton, and then by depressing "Stop" pushbutton.

   c. Observe direction of fan rotation with respect to the yellow arrow. If direction is o.k., go to next procedure. If the rotation is backward, proceed to the next step. (Rotation of fan shaft is clockwise when viewed from the sheave or pulley end.)

WARNING! Make sure system electrical power is disconnected and locked out before performing the following procedure.

   d. Open the electrical panel door and reverse any 2 wires (L1, L2, or L3) connected to fan motor starter M110. Close electrical panel door.

9. Check sieve motor rotation:

   a. If your system is equipped with an electrically driven rotary sieve, observe the direction of rotation at the motor end. Motor shaft should be rotating clockwise. If the rotation is backward, proceed to the next step.

WARNING! Make sure system electrical power is disconnected and locked out before performing the following procedure.

   b. Open system electrical panel door and reverse any 2 wires (L1, L2, or L3) connected to motor starter M120. Close electrical panel dooor.

10. Restore electrical power.

11. Set all air pressure regulators to "0" by turning handles fully counterclockwise.

New Equipment Start Up, cont.

12. Turn ON compressed air supply to the system.

13. Adjust primary service air regulator (user-supplied) to 80 psi.

*NOTE: If the system uses automatic powder guns an interlocked fire detection system **MUST** be installed.*

14. Detronics Fire Detection System—Adjust detector head pressure regulator to 12 psi and flowmeter to 60 SCFH. Refer to Detronics manual.
Nordson NFS-1000 System—typically uses a 10 psi preset regulator. Make sure air is being supplied to sensor heads.

15. Adjust vent assist pressure regulator to 40 psi.

16. Season new cartridges by using the procedure described in "New Cartridge Seasoning".

New Cartridge Seasoning

*NOTE: **At this point in new system start up, you MUST season new cartridges.** This procedure may require 2 to 8 hours and should not be hurried.*

The following steps describe procedures for seasoning cartridge filters. These steps must be followed whenever a new color module or one or more new cartridges are installed. Failure to properly season new cartridges can result in early clogging of filter media and loss of use.

1. Remove all final filters.

2. Open seasoning slide dampers (one on each side of the fan section).

3. Start exhaust fan. Take initial readings of the face velocity in the entrance and exit vestibules with a hand-held velometer and record your readings.

4. Load virgin powder into the feed hopper.

5. Turn ON and adjust feed hopper fluidizing air regulator to approximately 8 psi. Allow adequate time for the powder to become uniformly fluidized. Look for slight bubbling at the surface, without geysering (erupting clouds of powder).

6. Disconnect powder feed tubing from powder guns and point tubing ends into booth enclosure. Make sure that feed tubes are not pointed directly at cartridge filters. Lightly fasten each tube to enclosure or gun mounting bar so it is restrained but not crimped.

7. Turn ON power at the gun control consoles. **DO NOT** turn on electrostatic power to guns.

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New Equipment Start Up, cont.

8. Start a light flow of powder through the feed tubing by adjusting the flow rate and atomizing air regulators on each gun console. Suggested initial pressure settings are 15 psi for both atomizing and flow rate air. Raise or lower both pressures to establish a light flow.

9. Turn ON and adjust color module fluidizing air regulators to 10 psi. Allow powder to accumulate to a few inches depth. Readjust the regulator so that powder "boils" slightly (bubbles present at surface). Bubbling will only be seen in narrow bands beneath the cartridges.

NOTE: On some systems, sieves start when exhaust fan is started, and run continously. On others, sieves are started when transfer pumps are started. Refer to your electrical schematics for control scheme.

10. Start sieves.

    a. Vibratory—Adjust the sieve air regulator to 50 psi to start the pneumatic vibrator motor. Raise or lower regulator pressure as necessary to just maintain the flow of powder through the screen into the feed hopper.

    b. Rotary—Refer to and follow the instructions given in the appropriate sieve manual.

    AZO Rotary Sieve—Turn ON and adjust regulator to 25 psi and flowmeters to 100 SCFH.

    Nordson Rotary Sieve—uses a preset regulator. A pressure switch prevents operation without air flow to the seals.

11. Turn ON transfer pumps, typically by turning electrical panel selector switch to the "MANUAL" position. Adjust transfer pump air regulators to 15 psi.

12. Take continuing readings with a hand-held velometer until the face velocity through the openings reaches ½ of the initial values recorded in Step 3.

13. Adjust pulse valve air pressure regulator (on fan section support leg) to 20 psi. Pulsed blowdown of the cartridges will become audible about every 15 seconds.

14. Continue to take velometer readings until the face velocity through openings again reaches ½ of the recorded initial values.

15. Adjust pulse valve air pressure regulator to 40 psi.

16. Repeat Step 14.

New Equipment Start Up, cont.

17. Adjust pulse valve air pressure regulator to 60 psi. Close gate valve (on fan section support leg, next to regulator) until the pressure gauge falls to 20 psi during a pulse. (This will prevent starving the powder pumps of air during pulses.)

18. Close seasoning slide dampers. Face velocity should rise to 100 FPM or greater and remain steady.

NOTE: Correct any powder leaks before proceeding further. Refer to Section 5 —Troubleshooting, for corrective measures.

19. Check for any powder leaks by observing air flow from fan section, or by shutting off fan and powder pumps and looking for powder accumulation on fan blades.

20. Reinstall final filters if no leaks are detected.

21. Using a velometer, make sure the face velocity at canopy openings is 100 FPM or greater. If below 100 FPM, contact your Nordson representative immediately.

22. Turn off all powder pump atomizing and flow rate air.

23. Reconnect powder feed tubes to all guns.

At this point in the start up procedure, the user should have the Nordson representative work directly with him to complete settings of gun pump pressures and electrostatic voltages for the initial powder coating trials. During trials system air pressures can be fined-tuned for optimum performance.

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Gun Activation

WARNING! All conductive equipment in the spray area, including workpieces, **must** be connected to a true earth ground. If sparking is noticed, shut down the system **immediately**. Do not restart the system until the fault has been corrected.

WARNING! Wear shoes with conductive soles, such as leather. Rubber soles are not conductive. The operator's platform floor must be grounded. The operator must maintain skin-to-metal contact between his hand and the gun handle to prevent shocks and spark hazards. If wearing gloves, cut away palm or fingers of the glove to maintain contact.

WARNING! Remove all jewelry (rings, watches, etc.) before operating or servicing this equipment. Metallic objects can store an electrostatic charge and cause a severe electrical shock upon discharge.

WARNING! Do not adjust gun position or nozzle, change nozzles, or clean gun without turning OFF the high voltage output at the power unit and grounding the electrode. Hang manual guns, when not using, with nozzle within 4" (100mm) of a grounded conductor.

WARNING! Before turning automatic powder guns ON, make sure that the fire detection system is functioning correctly and is interlocked with the powder system.

Manual and Automatic Guns

NOTE: If your system is equipped with a Nordson Smart Spray Controller, refer to Manual No. 33-11, Section 3, when setting up guns. If your system is equippped with a PLC-based controller, refer to the information provided by your Nordson representative for setup procedures.

The following steps cover the procedures for activating and spraying powder through Nordson powder spray guns.

1. Thoroughly review the gun and control console (power unit) manuals, to make sure that all components are properly installed. Become familiar with operating instructions.

2. Make sure all gun console power switches are OFF. Restore electrical power and compressed air to the system. Make sure the booth exhaust fan is operating and that powder in the feed hopper and color module is properly fluidized. Make sure automatic guns are positioned to spray powder only into the booth enclosure.

3. Proceed with the steps given in the "Operation" section of the gun control console manuals. Test spray parts and adjust air pressures and electrostatic volatges until desired performance is obtained. Record initial kV and µA readings and post next to consoles.

Daily Start-up and Shut-down Procedures

Shutdown

1. Allow the transfer pumps to pump powder from the color module back into feed hopper, if system is set up for recycling.

2. Turn OFF power at the gun control consoles, and/or the master control units.

3. Turn OFF booth fan with the "Exhauster Stop" pushbutton. Turn disconnect switch handle to "OFF."

4. Perform daily preventive maintenance procedures as listed in Section 4—Preventive Maintenance.

Daily Start Up

WARNING! All conductive equipment in the spray area, including workpieces, **must** be connected to a true earth ground. If sparking is noticed shut down the system **immediately**. Do not restart the system until the fault has been corrected.

1. Turn disconnect switch handle to "ON."

2. Turn ON exhaust fan.

3. Turn ON power at gun control consoles and/or master control units.

4. Adjust air pressure and kV settings, as necessary.

5. Make sure the fire detection system is functioning correctly and is interlocked with the powder system.

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Daily Start-up and Shut-down Procedures, cont.

Booth Enclosure and Gun Cleaning

Observe the following safety precautions while cleaning the booth and guns.

CAUTION! Wear an OSHA-approved respirator whenever handling powder containers, filling hoppers, operating spray equipment, or performing maintenance or cleaning operations. Gloves should be worn whenever handling powder to minimize skin reactions. Obtain and read Material Safety Data Sheets for all powders used.

WARNING! Remove powder from skin with soap and water only. Solvents can react with components in the powder, causing allergies and skin disorders. Wash hands before eating and smoking. Do not use compressed air to blow powder off hands or clothing. This practice may result in damage to eardrums or eyes. Compressed air injected under skin may cause serious injury or death.

1. Turn OFF all electrical power at the gun control consoles and/or the master control units.
2. Make sure the booth exhaust fan is running.
3. Disconnect powder feed tubing from feed hopper powder pumps and blow out with compressed air.
4. Ground gun electrodes before removing and cleaning guns. Clean guns according to instructions in gun manuals.
5. Clean entire interior of booth enclosure using a rubber (non-conductive or non-sparking) squeegee, drawing all powder toward the color module opening. (The color module is not normally cleaned when changing colors.)
6. Remove the remaining powder residue using an air-powered vacuum equipped with a soft brush. Follow-up by wiping down the booth with a damp, lint-free cloth. After removal of the color module, a second cleaning of the base pan and inlet frame may be required.
7. Turn OFF the exhaust fan.

Changing Powder Color

Color Change • Reclaim to Reclaim

Booth enclosure and gun cleaning is necessary to prevent mixing of differently colored powders.

1. Clean guns and booth as described under "Booth Enclosure and Gun Cleaning". Turn OFF all electrical power and compressed air supply to the system.

WARNING! Bleed off all air pressure from the entire system. Removal of quick-disconnects or hoses while under pressure could result in serious injury.

2. Unbolt and remove the air tubing quick-disconnect plate (typically mounted on the color module). Disconnect flow rate and atomizing air tubing from all feed hopper powder pumps (tubing is typically routed through a quick-disconnect fitting on the feed hopper).

3. Remove the ground strap from the color module.

4. Disconnect the rotary electric sieve power cords, if so equipped. (On electric rotary sieves, 2 cords are used: 230/460/575 volt and 120 volt.)

5. Unlock and remove the level control sensor from the side of the feed hopper. Store the sensor on the support leg bracket.

6. Remove the draw rods from either side of the color module. Save for re-use.

7. Release the ratchets on the side of the fan section and disconnect the clamping straps securing the color module to the fan section.

8. Roll the color module and feed hopper out from beneath the fan section.

9. Move the color module to a storage area and install the storage cover over the top of the module.

NOTE: The presence of excessive amounts of powder in the fan and blowdown cavity indicates cartridge filter leakage. Take corrective action by referring to Section 5—Troubleshooting, before proceeding further.

10. Thoroughly clean powder from the inlet frame and surrounding area.

11. Inspect the fan and blowdown valve compartments for powder and clean as necessary. Check the fan section-to-color module gasket and replace if damaged.

12. Remove the storage cover from the new (alternate color) color module. Inspect all gaskets and replace if damaged.

13. Level the new color module by raising or lowering the adjustable casters on each leg.

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Changing Powder Color, cont.

NOTE: If the cartridge filters in the new collector module have not been previously seasoned, perform the seasoning procedures described previously in this section before proceeding.

14. Position the color module at the inlet frame, align and re-level as necessary. The color module gasket must line up with and be square with the inlet frame.

15. Install the draw rods and securely clamp the color module to the inlet frame. Hook the strap clamps to the color module and tighten the rachet to compress the gasket by 1/8 to 1/4 inch.

16. Inspect all four sides of the color module-to-fan section joint for equal sealing. A thin rigid plastic gauge (provided with cartridge filters) or .015" feeler gauge should not slip between the gasket and the color module. Correct any sealing problems by re-leveling color module or fan section.

17. Mate up and secure the color module quick-disconnect plates.

18. Make sure the limit switch on the side of the inlet frame has been closed by contact with the color module.

19. If not already attached to the color module, assemble, level, and attach feed the hopper and sieve as described in the 500 Series Installation Manual. Complete all tubing and electrical connections.

20. Connect the pump flow rate and atomizing air tubing to the powder pumps (quick-disconnect fitting). Install the level sensor on the feed hopper.

21. Make sure the vent hose is connected from the top of the accumulator to the vent plate on the side of the color module with clamps and that the vent assist air tubing is connected from the quick-disconnect plate to the fitting above the vent hose connection.

22. Make sure feed tubing is installed between the transfer pumps on the color module and the accumulator. Plug all unused accumulator ports.

23. Install new (alternate color) powder feed tubing between the pumps and guns.

24. Install all ground connections.

Changing Powder Color, cont.

Color Change • Reclaim to Non-reclaim

Non-reclaim systems use a feed hopper and color module. Used powder is pumped from the color module into a scrap container, such as a 55 gallon drum, instead of being recycled back to the feed hopper. No sieve or accumulator is used.

If the non-reclaim system utilizes an attached (bolt-on) hopper, complete Steps 1 through 24 of "Color Change - Reclaim to Reclaim." If the non-reclaim system utilizes portable round hoppers, complete Steps 1 through 18, plus the following steps:

1. Review the system layout drawings furnished with your system. Position the portable feed hoppers (if used), with powder pumps and covers installed.

2. Install vent or cover plates on the color module as required.

3. Connect air tubing from the quick-disconnect plate to the fluidizing ports on the hopper(s).

4. Connect flow rate and atomizing air tubing to the feed hopper powder pumps.

5. Connect flexible hose, with clamps, from the vent on the cover of the portable hopper to the vent connections on the color module.

6. Install the scrap drum lid on top of a user-supplied 55 gallon drum.

7. Connect hoses between the transfer pumps on the color module and the scrap drum lid.

8. Clean the powder guns. Install (alternate color) powder feed tubing between the pumps and the guns.

9. Connect all ground straps.

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Coating With A New Color

Preparation

Before commencing spray operations, make sure all color change procedures have been performed, as previously described. Check all tubing, electrical, and ground connections.

1. Restore electrical power and compressed air to the system.

2. Start exhaust fan.

3. Fill feed hopper(s) 2/3 full with powder. Start fluidizing air and adjust until slight boil is seen at the surface. Allow time for powder to become adequately fluidizied.

4. Make sure all booth equipment is operating correctly. Check settings for air and electrostatic voltage. (Different colors or powders may require adjustment of these settings for optimum coating results.)

5. Color change is complete. Part spraying can begin.

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System Settings

	Initial Set-up	Final Set-up	Changes
Primary Air Pressure (plant supply)	80 psi		
Collector Module			
#1 Fluidizing	10 psi		
#2 Fluidizing	10 psi		
#3 Fluidizing	10 psi		
#4 Fluidizing	10 psi		
#1 Transfer Pump	25 psi		
#2 Transfer Pump	25 psi		
#3 Transfer Pump	25 psi		
#4 Transfer Pump	25 psi		
Feed Hopper • Reclaim			
Fluidizing	8 psi		
Vent Assist	40 psi		
Feed Hopper • Non-reclaim			
#1 Fluidizing	8 psi		
#2 Fluidizing	8 psi		
#3 Fluidizing	8 psi		
Vent Assist	40 psi		
Pulse Manifold			
Pressure	60 psi		
During pulse	20 psi		
Detronics Fire Detector			
Pressure	12 psi		
Flow #1	60 SCFH		
Flow #2	60 SCFH		
AZO Rotary Sieve			
#1 Flow	100 SCFH		
#2 Flow	100 SCFH		
#3 Pressure	25 psi		
#4 Pressure (vent assist)	40 psi		
Vibratory Sieve			
Pressure	50 psi		

System Settings, cont.

	Initial Set-up	Final Set-up	Changes
Pulse Timer			
OFF Time	15.0 secs.		
ON Time	0.07 secs.		
Transfer Pump Timers			
TD118 Delay-to-start	15 secs.		
Filter Pressure Drop Max. Readings			
Cartridge Filters	4.5 (in. w.c.)		
Final Filters	1.5 (in. w.c.)		
Guns			
#1 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#2 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#3 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#4 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#5 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#6 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#7 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#8 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		

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System Settings, cont.

	Initial Set-up	Final Set-up	Changes
Guns *(continued)*			
#9 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#10 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#11 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#12 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#13 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#14 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#15 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		
#16 Flow Rate	30 psi		
Atomizing	20 psi		
kV	90/100		

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Section 4
Preventive Maintenance

Recommended preventive maintenance guidelines are designed to achieve the best performance and the longest life for your Nordson® 500 Series Powder Coating System.

These procedures are organized according to the recommended frequency of performance, i.e., daily, weekly, and periodically (those procedures depending upon varying factors, such as operating conditions and the environment).

Regular and thorough maintenance provides better and more cost-effective operation.

Safety Precautions

Observe all safety precautions when performing maintenance on your system

Read and observe the warnings and cautions in Section 1 of this manual before performing the following procedures. Observe the warnings and cautions included with the procedures in this section.

WARNING! Wear an OSHA-approved respirator whenever handling powder containers, filling hoppers, operating spray equipment, or performing maintenance or cleaning operations. Always wear safety glasses. Wear gloves to minimize skin contact with powders. Obtain and read Material Safety Data Sheets for all powders used.

WARNING! Wash skin frequently with soap and water, especially before eating and drinking. Do not use solvents to remove powder from skin. Do not use high pressure compressed air to blow powder off skin or clothes. Compressed air injected under skin can cause serious injury or death.

WARNING! Disconnect, lock out and tag system electrical power at a disconnect switch or breaker in the service line ahead of the system before performing maintenance procedures.

WARNING! Whenever undertaking maintenance, or repairs on your system, make sure that all moving equipment (robots, reciprocators, conveyors) that could endanger service personnel are shut down and locked out.

WARNING! Do not adjust guns or nozzles, or clean guns, without turning OFF the high voltage output at the power unit or master control console and grounding electrode first.

WARNING! Relieve system air pressure before disconnecting any hoses or quick-disconnect fittings or plates.

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Daily Maintenance

Booth Enclosure

NOTE: Do not use any type of tack cloths to clean booth.

With the fan ON, clean the booth interior with a rubber squeegee (or other grounded, non-sparking device), pulling the powder to the color module opening. Wipe down enclosure with lint-free cloths.

Vibratory Sieve

Remove the screen basket from the interior of the feed hopper and vacuum clean. Inspect screen and replace if damaged; reconnect ground clip after replacing.

Rotary Sieve (AZO)

Refer to AZO sieve manual. Empty scrap pail on a daily basis and (with a soft brush) clean out sieve housing and screen. Replace the screen if damaged.

Rotary Sieve (Nordson)

Refer to Nordson sieve manual for maintenance instructions.

Transfer Pumps

1. Place a small container under transfer pumps to catch powder and remove pumps from color module. Remove pump hoses and blow out with a low-pressure compressed air gun, from pump end into accumulator.

2. Disassemble pump and clean all parts with an air gun and a clean cloth. Replace worn or damaged parts.

Fan Section

NOTE: If significant amounts of powder have accumulated in either compartment, the cartridge filters may be leaking. Correct by referring to Section 5 —Troubleshooting.

1. Open and inspect the fan/motor/drive compartment. Vacuum out any powder.

2. Inspect pulse valve compartment. Vacuum out any powder.

Daily Maintenance, cont.

Powder Guns

1. Clean guns according to instructions in appropriate manuals.

2. Perform electrostatic system resistance checks as described in Manual No. 0-8, Electrostatic System Periodic Checks, and gun manuals. Resistance values are given in gun manuals.

Powder Pumps

Clean pumps according to instructions in pump manuals.

Fire Detection System

Clean detector head lenses every 4 hours. Make sure detector system is operating, and is properly interlocked with powder system. Check flowmeter (Detronics System) for signs of oil or water each day. Correct problem if it occurs.

Compressed Air Supply

Open drip leg. Using a clean, white cloth, check for water, oil, or other contaminants. Drain filter/separators and check filter elements. Check all regulator settings.

NOTE: Air dryer should remain ON at all times to prevent moisture from accumulating in compressed air system.

Air Dryers

Refer to air dryer manual for maintenance procedures.

Gun Movers (Oscillators and Reciprocators)

On each shift, check for smooth stroking and proper speed. Correct and adjust if necessary. Lubricate as necessary.

Accumulator • Vent Hoses

Vacuum out accumulators and blow out vent hoses.

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Daily Maintenance, cont.

Part Clearance

Continually check clearance of parts through the booth. If part sizes change, hangers may not allow clearances sufficient to prevent damage to booth enclosure or guns.

Grounding

Continually check for grounding of parts to hangers. Resistance between parts and hangers, and hangers and ground, should be no more than one megohm. Clean or strip hangers regularly.

Weekly Maintenance

Booth Enclosure

Thoroughly clean the booth interior and surrounding area while the exhaust fan is ON. Squeegee all powder into collector module. Vacuum enclosure using a soft brush, and wipe down with damp, lint-free cloths.

Guns • Pumps • Hoses

Clean all parts per manuals. Replace worn parts.

Feed Hopper

Remove all powder, squeegee, and vacuum clean. Check fluidizing plates for signs of air supply contamination (staining).

Color Module

Remove all powder and vacuum clean. **DO NOT VACUUM CARTRIDGES.** Remove and clean transfer pumps. Inspect cartridge filters for damage and replace if necessary. Season new cartridges as described in Section 3 of this manual.

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Periodic Maintenance

Electrical Connections

Tighten electrical connections and inspect for loose or broken wires.

Guns and Cables

Check gun resistor and electrostatic cable resistance with a megohm meter on a regular basis. Refer to Manual No. 0-8, Electrostatic System Periodic Checks, Use the resistance values given in your gun manuals.

Air Dryer

Check air dryer operation. Refer to air dryer manual for maintenance procedures.

Gaskets

Inspect all foam gaskets for damage. Replace using rubber contact cement.

Exhaust Fan V-belts

Every 6 months, check tension of exhaust fan V-belt drive. Belt deflection should be no more than ½".

Bearings

Every 6 months, lubricate the 2 fan shaft bearings and 2 motor bearings with grease.

a. Shaft bearings . . . . . 2 shots of polyurea or lithium grease
b. Motor bearings . . . . . 2 shots of polyurea or lithium grease

Rotary Sieve (AZO)

Every 3 months, lubricate lip seals of the AZO rotary sieve according to instructions in the AZO manual.

Periodic Maintenance, cont.

Filter Gauges

Observe and record readings of the differential pressure gauge on the system electrical control panel and gauge on fan section. Readings should not exceed:

a. Across cartridge filters . . . . . 4" - 6" w.c.
b. Across final filters . . . . . 2" w.c.

Readings in excess of the above indicate clogging of the filters. Correct problem and replace with new filters. (See Section 5—Troubleshooting.)

Powder Tubing

Check all powder feed tubing. Blow out tubing ONLY when it is disconnected from guns and pumps. If powder has impact-fused inside the tubing, it must be replaced.

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Maintenance Check List

Activity	Each Shift	Daily	Weekly	6 Mos.	Color Change
Cleaning					
Booth Enclosure		❑	❑		❑
Color Module			❑		❑
Accumulator		❑			
Fan/Pulse Valve Compart.			❑		❑
Gun Pumps	❑	❑	❑		
Guns	❑		❑		
Part Grounding	❑				❑
Rotary Sieve		❑			
Transfer Pumps	❑	❑			
Fire Detector Lenses *	❑				❑
Vent Hoses		❑			
Vibratory Sieve	❑				
Visual Checks					
Air Drip Leg		❑			
Air Dryer Drain		❑			
Cartridge Filter Gauge	❑				
Electrical Connections			❑		
Final Filter Gauge	❑				
Gaskets			❑		
Gun Movers	❑				
Gun Resistors and Cable Resistance			❑		
Part Clearance**	❑				
Powder Levels	❑				❑
Fire Detector Lenses	❑				❑
Exhaust Fan V-belts				❑	

Maintenance Check List, cont.

Activity	Daily	Weekly	Monthly	Color Change
Lubrication				
Fan Bearings			❑	
Motor Bearings			❑	
AZO Sieve Lip Seals ***			❑	

* Every 4 hours.
** Continuously.
*** Every 3 months.

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Section 5
Troubleshooting

Troubleshooting procedures are provided to help you correct problems with your system.

Obvious causes of problems (such as broken wires or disconnected tubes) are not included in this guide.

Call your Nordson representative if you have difficulty using a troubleshooting procedure, or a problem is encountered which is not covered in this manual.

How To Use The Troubleshooting Procedures

This section is compiled in chart form to assist you in finding a probable cause to a problem. Where repair or replacement of components is necessary, refer to Section 6—Disassembly and Repair, and Section 7—Parts Lists.

Troubleshooting Charts

The following troubleshooting charts are included in this section: Page

Obvious causes of problems (such as broken wires or disconnected tubes) are not included here.

Refer to your powder application equipment manuals for additional troubleshooting proceudres.

If you have any difficulty using these procedures, or encounter a problem which is not covered here, please contact your Nordson representative for assistance. He will be glad to help you.

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Condition A

Powder feed to gun(s) experiencing:
- *Inadequate flow*
- *Surging*
- *Intermittent flow*
- *Spitting*

Probable Cause	Suggested Correction
1. Unsuitable fluidization of feed hopper.	a. Adjust fluidizing pressure. b. Proceed to Condition D—Improper Fluidization.
2. Low powder level in feed hopper.	a. Refer to Condition C—Powder Not Transferring.
3. Powder gun pump.	a. Inspect or clean venturi nozzles. Replace if worn. b. Inspect or clean venturi throat. Replace if worn. c. Make sure pick-up tube O-rings are sealing. d. Clear obstructions from pick-up tube or hoses. Check powder in hopper for foreign objects large enough to clog pick-up tube.
4. Obstruction in power feed tubing.	a. Remove feed tube at gun. Look for smooth powder flow. Remove tube at pump and blow out. b. Eliminate kinks, severe bends, pinching, or any cause of impact fusion. c. Tubing should be no longer than 25' with a maximum vertical rise of 9'.
5. Severe tribo-charging in powder feed tubing.	a. Contact Nordson representative for alternate tubing material. b. Review problem with powder supplier.
6. Obstruction in gun (flat spray).	a. Refer to appropriate gun manual. Clean nozzle, electrode, and internal passages. b. Replace worn parts.

Condition A, cont.

Powder feed to gun(s) is resulting in:
- *Inadequate flow*
- *Surging*
- *Intermittent flow*
- *Spitting*

Probable Cause	Suggested Correction
7. Obstruction in gun (conical spray).	a. Refer to appropriate gun manual. Clean nozzle, electrode, and internal passages. b. Make sure gap between deflector and nozzle is about 1/8" all around. c. Replace worn parts.
8. Flow rate or atomizing pressure.	a. Adjust settings according to appropriate gun controller manual.
9. Low electrostatic voltage (kV).	a. Increase kV at electrostatic power unit, check kV at gun with kV meter.

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Condition B

Problems with the following when powder coating parts:

- *Uniformity*
- *Edge coverage*
- *Film build*
- *Wrap around*
- *Penetration into recess or corners (Faraday Cage Effect)*

Probable Cause	Suggested Correction
1. Poor part grounding (less than 1 megohm to ground).	a. Clean hangers, fixtures, and hooks. b. Assure conveyor grounding.
2. Gun placement.	a. Position guns 10 - 14" from part. b. Stagger guns 12" vertically and 21" horizontally to avoid overlap of fan pattern and electrostatic fields. c. Contact Nordson representative and/or powder supplier.
3. Feed pump pressure settings.	a. Change flow rate pressure for more or less powder. b. Change atomizing pressure to alter fan pattern and distribution of powder.
4. Electrostatic voltage.	a. Adjust kV settings to: 90 - 100 kV for a large flat surface; 60 - 75 kV for recesses. (Never set below 60 kV.)
5. Nozzle selection.	a. Use flat spray nozzle for large regular-shaped parts. b. Use conical nozzle for deep recesses and most hand touch-up.
6. Powder feed.	a. Refer to Condition A—Powder Feed to Guns.

Condition C

Powder not transferring from color module to feed hopper.

Probable Cause	Suggested Correction
1. Transfer pump air pressure too low.	a. Increase pressure.
2. Transfer pump clogged.	a. Clean pump.
3. Transfer pump worn.	a. Replace worn parts.
4. Transfer hose clogged.	a. Clean out hose.
5. Sieve screens clogged.	a. Clean out sieves.
6. Accumulator plugged.	a. Clean out inlet ports. b. Clean inside of accumulator.
7. Accumulator vent-assist air pressure too high.	a. Reduce vent-assist air pressure.
8. Feed hopper level control system.	a. Decrease time delay to transfer pump start. b. Adjust sensitivity of level control sensor. c. Replace level sensor.
9. Powder "rat-holing" in color module.	a. Refer to Condition D, Probable Cause No. 1. b. Increase fluidizing pressure.
10. Damp or contaminated powder.	a. Refer to Condition D, Probable Cause No. 2.

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Condition D

Improper fluidization (geysering or dead-bed) in:
- *Color module*
- *Feed Hopper*

Probable Cause	Suggested Correction
1. Powder level not maintained at 6" to 8" in color module, or at level sensor in feed hopper.	a. Add powder. b. Refer to Condition C—Powder not transferring.
2. Moist or contaminated powder.	a. Check incoming air for water, oil, etc., at drip legs. Correct problem. b. Check for contaminants dripping from conveyor. c. Replace powder.
3. Fluidizing pressure too high or low.	a. Adjust pressure(s) for slight bubbling at surface.
4. Plugged or worn transfer pumps or hose. (Geysering in color module.)	a. Make sure ball valve is ON. b. Clean pumps. Replace worn parts. c. Clean hose.
5. Fluidizing plate(s).	a. Inspect for air leakage around flanges of plate. Correct if detected. b. Observe feed hopper fluidizing air pressure for sharp increase or decrease. Replace plate if necessary. c. If no variation in gauge pressure, inspect plate for severe scratches, cracks, polished surface, or discolorization. Replace plate if damaged.

Condition D, cont.

Improper fluidization (geysering or dead-bed) in:
- *Collector module*
- *Feed Hopper*

Probable Cause	Suggested Correction
6. Blend of reclaimed and virgin powder.	a. Complete "Daily Maintenance" of booth enclosure. b. Increase or decrease rate of powder transfer from color module to feed hopper. c. Adjust system so that blend is 3 parts reclaim to 1 part virgin powder.
7. Non-uniform distribution of powder in bed, i.e., stratification.	a. Increase fluidizing pressure. b. Refer to No. 2 above. c. Refer to No. 5 above.

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Condition E

Final filters:
- *Clogged*
- *Powder in fan compartment*

Probable Cause	Suggested Correction
1. Leaking cartridge filter gaskets.	a. Check to ensure hex nuts securing cartridges are torqued to 4 ft. lbs. maximum. Check sealing around circumference of gasket; a 0.015" feeler gauge should not slip between gasket and sealing surface. b. Remove cartridges, clean gaskets and sealing surface, re-install.
2. Damaged cartridge filter gaskets.	a. Replace cartridges. (Season new cartridges before use.)
3. Leak (crack or hole) in color module around the cartridge opening.	a. Locate and seal any crack or hole with RTV sealant.

Condition F

Cartridge filters:
- *Clogged (Observe differential pressure gauge)*

Probable Cause	Suggested Correction
1. Inadequate blowdown pulse.	a. Increase pulse pressure. b. Decrease "OFF TIME" of pulse timers.
2. Powder too fine or contaminated.	a. Reduce ratio of reclaim-to-virgin powder. b. Check particle size of powder. c. Replace contaminated powder.
3. Blowdown valves out of position.	a. Position valves according to procedures given in 500 Series Installation Guide.
4. Cartridge seasoning inadequate.	a. Replace cartridges. Season new cartridges properly.

Condition G

System:
- *Shuts down.*
- *Won't start.*

Probable Cause	Suggested Correction
1. Fire Detection System	a. Follow troubleshooting procedures in fire detection system manual. b. Check grounding of parts.
2. Final filters clogged.	a. Locate source of powder leakage and correct problem. Refer to Condition E—Final Filters Clogged.
3. Color module not activating limit switch.	a. Tighten collector draw rods. b. Reposition limit switch arm. c. Replace limit switch.
4. Final filter pressure switch failed.	a. Replace switch.
5. Air dryer interlock not activated. (Dryer not operating)	a. Start air dryer. b. Follow troubleshooting procedures in dryer manual.
6. Fuse(s) blown.	a. Replace fuse(s).
7. Electrical failure.	a. Trace circuits and correct problem.

Condition H

Powder:
- *Escaping from booth openings.*

Probable Cause	Suggested Correction
1. Cartridge filters clogged.	a. Observe differential pressure gauge. If gauge reading exceeds 6" w.c., proceed to Condition F.
2. Cross drafts.	a. Check air conditioning system intake/discharge or other sources.
3. Parts entering booth are too hot.	a. Cool parts before moving into booth.
4. Powder flow exceeds design criteria.	a. Reduce powder flow and/or number of guns.
5. Booth openings exceed design criteria.	a. Close off or decrease size of openings.
6. Seasoning slide dampers open.	a. Close dampers.
7. Parts larger than design specifications.	a. Contact Nordson representative.
8. Guns too close to vestibules or openings.	a. Reposition guns.
9. Fan rotation backwards.	a. Reverse rotation of motor.
10. Air leaks around color module.	a. Tighten strap clamps between the module and fan section, and draw rods between module and inlet frame, to compress gaskets. b. Inspect gaskets. Replace if damaged.

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Section 6
Disassembly and Repair

The instructions in this section describe the disassembly, repair, and re-assembly of key components of your Nordson® 500 Series Powder Coating System.

Application equipment and other optional components are not covered in this manual. Refer to the separate equipment manuals provided with your system.

Safety Precautions

General Safety Guidelines

Read and observe the warnings and cautions in this section as well as those in Section 1 of this manual when servicing your Nordson® 500 Series Powder Coating System.

WARNING! Do not allow unqualified personnel to service electrical equipment.

WARNING! Disconnect, lockout and tag electrical power at a disconnect or breaker in the service line ahead of the system before performing maintenance or service procedures.

WARNING! Whenever undertaking maintenance or repairs, make sure that all moving equipment (robots, reciprocators, conveyors, etc.) that could endanger service personnel are shut down and locked out.

WARNING! Wear a filter-type respirator whenever handling powder containers, filling hoppers, operating spray equipment, or performing maintenance or cleaning operations. Always wear safety glasses. Wash skin frequently with soap and water, especially before eating or drinking. Do not use solvents to remove powder from skin.

WARNING! Remove all jewelry (rings, watches, etc.) before operating or servicing equipment.

WARNING! Reconnect all ground wires and straps when repair is complete.

WARNING! Use approved replacement parts only. The use of unapproved parts may void any agency approvals.

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Cartridge Filters

Removal and Replacement

The following steps cover the replacement of spent or damaged cartridge filters.

WARNING! Shut off compressed air supply, relieve pressure, and disconnect and lock out primary electrical service to the system before performing the following procedures.

1. Unbolt and remove quick disconnect plate (with tubing) from color module.
2. Disconnect feed tubing, air lines, level sensor, and ground straps from feed hopper. Remove feed hopper from color module and roll aside. (Optional.)
3. Disconnect air line, feed tubing, and ground straps from color module. Disconnect draw bars and clamping straps. Remove color module from beneath the fan section and roll aside to suitable working area.
4. Lift out velocity baffle plate for access to cartridge filters.
5. Block up or hold cartridge to be removed.
6. Remove 3 hex nuts and lockwashers. Save for re-use.
7. Remove (optional) top hat and save for re-use.
8. Lower cartridge and remove from collector module.
9. Remove hex nuts and pulse deflector and save for re-use.
10. Remove hex nuts, bolts, and washers and save for re-use.
11. Locate new cartridge. Remove from carton and carefully inspect for damage. **DO NOT** install damaged cartridges.
12. Insert 3 bolts and washers through holes in cartridge flange, from inside.
13. Thread onto bolts 3 hex nuts. Tighten securely.
14. Place pulse deflector onto bolts. Thread 3 hex nuts onto bolts and tighten securely.

NOTE: *New cartridges must always be seasoned using the procedures in Section 3—Operation.* ***Do not*** *use any cartridge filters other than those approved by Nordson. The use of cartridges not specifically designed to Nordson standards could seriously affect the operation and performance of your 500 Series Powder Coating System.*

Cartridge Filters, cont.

16. Thoroughly clean sealing surface of color module filter mounting plate. A dirty surface will lead to powder leaks.

17. Install filter assembly into color module, so that ends of bolts pass through holes in mounting plate.

NOTE: Tightening in excess of this torque specification can cause damage to cartridges.

18. Install top hat (if used) over ends of bolts and secure in place with lock-washers and hex nuts. Tighten hex nuts to 4 ft. lbs. maximum, using a torque wrench.

19. Make sure the cartridge gasket is properly sealed against the mounting plate by trying to insert the thin plastic ruler (included with new cartridge) all around joint. Ruler should not slide between plate and gasket at any point.

20. Repeat Steps 6 through 19 for all cartridges to be replaced.

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Final Filters

Replacement

Follow these procedures if it becomes necessary to replace the final filters or to gain visual access to the interior of the fan section.

WARNING! The interior of the fan section contains moving parts which can cause serious personal injury. Never put hands inside when power is available to the fan. Disconnect and lock out primary electrical service before performing the following procedures.

1. Turn OFF fan. Disconnect, lock out, and tag power to system at service disconnect ahead of system electrical control cabinet.
2. Partially back out the two capscrews securing the top filter retaining bracket (Item 25) to the module. The bracket will spring away from the filter.
3. Repeat Step 2 for the lower bracket.
4. Remove the old filter and discard.
5. Remove new filter from carton and inspect for damage. **DO NOT** use damaged filters.
6. Insert new filter between the brackets and align so the filter gasket overlaps the opening equally on all four sides.
7. Loosely tighten capscrews on both top and bottom brackets just enough to hold the filter in place. Realign the filter to ensure sealing around all four sides.
8. Tighten capscrews to firmly press the filter against the fan section. **DO NOT** overtighten or filter may be crushed.
9. Restart exhaust fan.

Color Module Fluidizing Plates

Replacement

Replacement of the fluidizing plates will be a rare and unusual occurrence resulting from either equipment damage or contamination of the air supply or powder. If replacement is necessary, it is very important that these instructions be carefully followed.

WARNING! Wear a filter-type respirator whenever handling powder containers, filling hoppers, operating spray equipment, or performing maintenance or cleaning operations. Always wear safety glasses.

WARNING! Shut off compressed air supply and bleed off pressure before performing the following procedures.

1. Remove the feed hopper from the color module.
2. Disconnect all flexible tubing, wiring, and ground straps from the color module.
3. Disconnect draw bars and clamping straps from the color module and remove the module from under the fan section. Roll to a suitable work area.
4. Remove the transfer pumps from the color module.
5. Remove all powder from the color module hoppers. Vacuum hoppers and wipe clean with damp, lint-free cloths.
6. Inspect the fluidizing plates for red or brown stains indicating presence of moisture. If stained, the cartridge filters should also be removed and replaced with new, seasoned cartridges.
7. Using a forklift truck, or suitable jacks, raise the color module several feet off the floor and install safe, solid support blocks.

   WARNING! Lift equipment using only designated lifting points or lugs. Do not attempt to lift using covers, doors, panels, or cable or hose connections. Always balance load when lifting and never put stress on flat sheet metal parts.

8. Loosen capscrews from the clamping channels. Back out capscrews about 1/4 to 3/8 inch to clear gaskets. Remove channels with screws and save for re-use.
9. Remove the plenum and thoroughly clean.

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Color Module Fluidizing Plates, cont.

Replacement, cont.

10. Remove old fluidizing plate with gasket and discard.

11. Locate new fluidizing plate with gasket. Check its fit to plenum and module opening.

12. Clean all surfaces of the fluidizing plate, using a dry brush and lint-free cloth.

13. Thoroughly clean all fluidizing plate mating surfaces (plenum and hopper).

14. Position fluidizing plate, with gasket, on the plenum and align with flanges on all four sides.

15. Position plenum and fluidizing plate at the hopper opening and install clamping channels over plate, gaskets, and flanges.

16. Align and tighten the clamping channel capscrews in a crisscross pattern to prevent flange distortion and plate damage. Use a torque wrench and tighten to 25 inch-pounds.

17. Lower color module to floor, reinstall transfer pumps, and connect module to booth. Reconnect flexible tubing, wiring, ground straps, and feed hopper.

Feed Hopper

Disassembly and Repair

Disassembly and repair of the feed hopper is broken down into sections. The first sections (removal of rotary sieve, vibratory sieve, and powder pumps) are necessary to prepare for replacement of the feed hopper fluidizing plate.

WARNING! Wear a filter-type respirator whenever handling powder containers, filling hoppers, operating spray equipment, or performing maintenance or cleaning operations. Always wear safety glasses.

WARNING! Shut off compressed air supply, and disconnect and lock out primary electrical service to the system, before performing the following procedures.

1. Remove all flexible hoses and tubing.
2. Unplug electrical connections.
3. Remove the level sensor.
4. Remove the feed hopper from the module and roll to a suitable work area.
5. Remove powder pumps.
6. Remove powder, and thoroughly clean hopper and sieve.

Rotary Sieve-Equipped Hoppers

NOTE: The following procedures are for hoppers equipped with an AZO rotary sieve.

Rotary sieves may be disassembled while mounted on the feed hopper. Refer to the appropriate sieve manual.

1. Remove vent hose and transfer pump feed tubing from accumulator. Unbolt and remove accumulator from rotary sieve. Save all nuts, bolts and washers for reuse.
2. Remove discharge hose, adapter, and; if used, pail, and shelf. Save all parts removed for reassembly.
3. Loosen clamps around rubber boot. Pull boot and clamps off top and bottom adapters and save for re-use.
4. Remove bolts, nuts, and washers holding sieve to pedestal.

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Feed Hopper, cont.

Rotary Sieve Equipped, cont.

5. Lift sieve off pedestal and set aside.

6. Remove bolts, nuts and washers holding pedestal to hopper cover. Remove pedestal and set aside.

Vibratory Sieve Equipped

1. Reach inside the hopper and disconnect the ground wire clip.

2. Remove bolts and washers from the hopper cover.

3. Lift the cover (with accumulator and sieve) straight up and out of the hopper. Remove to a work bench for further disassembly. Place a block under the cover to prevent damage to the screen assembly.

4. Remove sieve basket by unfastening 2 toggle clamps. Discard powder residue and vacuum out sieve. Reattach basket if no further disassembly is necessary. Replace basket if damaged. If no further disassembly is necessary, disregard Steps 5 through 7.

5. To remove vibrator motor, remove 2 flexible tubes, 1 bolt, and 1 spacer.

6. Remove accumulator from sieve and disassemble rest of sieve. Note position of screws, washers, nuts, rubber grommets (or washers), and gaskets for later reassembly.

7. Clean accumulator and sieve parts to remove powder residue.

8. Reassemble in reverse order. Replace caps over unused accumulator inlet tubes.

Fluidizing Plate

NOTE: Sieve (if used), pumps, and cover must be removed prior to replacement of the fluidizing plate.

1. Remove all powder and vacuum interior.

2. Turn over feed hopper so that the bottom, or plenum, is now on top.

3. Follow Steps 8 through 16 in "Color Module Fluidizing Plates Replacement" in this section.

Feed Hopper, cont.

Fluidizing Plate, cont.

4. Turn the feed hopper back over to the normal position on casters.

5. Reassemble pumps, sieve, and cover. Reconnect flexible tubing and vent hose.

6. Connect the feed hopper to the color module and re-install tubing, hoses, level sensor, and ground straps.

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Blowdown Pulse Valves

Access and Replacement

NOTE: For repair of pulse valves or solenoid valve assembly, refer to the appropriate manual.

The pulse valves are located on the underside of the fan section. Access to the valves is gained by removing the color module.

WARNING! Shut off compressed air supply, bleed off air pressure, and disconnect and lock out primary electrical service to the system before performing the following procedures.

1. Remove feed hopper and color module.
2. Disconnect flexible tubing from top of pulse valves.
3. Unscrew pulse valves from the pipe nipples on the pulse manifolds.
4. Unscrew tube fitting from the top of the valves.
5. Locate new valves. Wrap Teflon® tape around threads of tube fittings and screw fittings into top of valves.
6. Wrap Teflon tape around threads of pipe nipples. Screw new valves onto pipe nipples. Position valves so that the final adjustment of the valves will tighten the threads and form an air-tight seal.
7. Adjust valves so that nozzles are vertically plumb and 15 inches from center of one nozzle to center of next.

Fan • Motor • V-Belt Drive

WARNING! The interior of the fan section contains moving parts and electrical potentials which can cause serious personal injury. Never put hands inside when power is available to the fan. Disconnect and lock out primary electrical service before performing the following procedures.

V-belt Replacement

1. Remove bolts, cover plate, and gasket from the top of the fan section.
2. Loosen four motor plate bolts.
3. Unscrew four tensioning bolts, allowing V-belts to become loose.
4. Rotate motor or fan by hand while rolling belts off either motor or fan sheave (pulley).
5. If replacing belts, use only properly sized, matched belts. Roll the belts onto the sheaves, making sure the V-sections are seated in the grooves.
6. Screw in the four tensioning bolts until the belts are tight. Depress belts midway between the sheaves; when properly tightened, the belts should not depress more than ¼ to ½".
7. Tighten the four motor plate bolts.

Motor Replacement

WARNING: Removal of the motor or fan from the top of the compartment requires the use of heavy lifting equipment such as a chain hoist or forklift truck and slings. Make sure equipment used is of adequate capacity and in good repair.

1. Remove flexible conduit from motor and disconnect wiring. Tag leads to motor to ensure proper connection.
2. Remove V-belts as described previously.
3. Secure a heavy duty sling or chains around the motor and attach to a properly suspended chain hoist or the forks of a lift truck. Take up tension on sling or chains.

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Fan • Motor • V-Belt Drive, cont.

Motor Replacement, cont.

4. Remove the four motor plate screws.

5. Lift and guide motor, with motor plate, out through the top of the compartment. Lower to a clean work area.

6. Remove the taper-lock sheave from the motor by loosening three capscrews and pulling the sheave off the fan shaft. Save the capscrews, sheave and key for reuse.

7. Follow Steps 1 through 6 in reverse to replace the motor and V-belt drive. Tighten V-belts as described previously.

8. Restore electrical power and start fan. Check for proper fan rotation direction.

Fan Removal

1. Remove V-belts and motor as described previously.

2. Remove bolts, nuts, and washers, securing fan frame to vertical supports.

3. Secure a heavy duty sling, or chain around the fan frame. Attach sling or chain to a properly suspended chain hoist or to the forks of a lift truck and hoist assembly straight up and out of the compartment. Lower to a clean work area.

4. The fan wheel is removed from the shaft by removing the retaining bolt and plate and then pulling the wheel off the end of the shaft. Save shaft key for reuse.

5. If the bearings or shaft must be replaced, remove the shaft first. Loosen the shaft locking collar set screws and pull the shaft out of the bearings.

6. If replacing the shaft, remove the taper-lock sheave and key and install on the new shaft.

7. If replacing the bearings, remove the four nuts, bolts, and washers securing each bearing to the fan frame. Save the locking collar for reuse. Use only specified bearings as replacements.

8. Follow Steps 1 through 7 in reverse to reassemble and reinstall fan in compartment.

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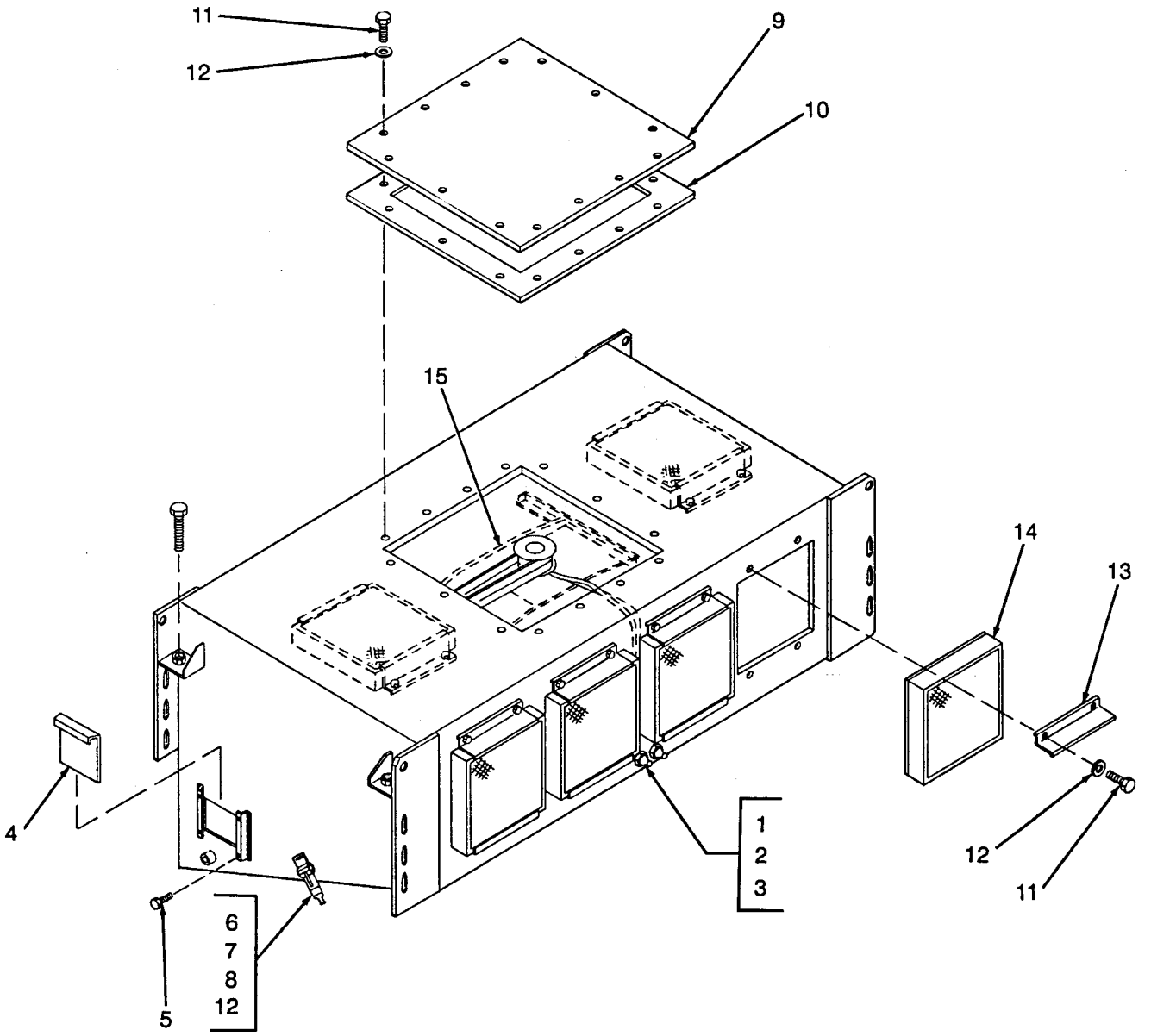
Section 7
Parts Lists

This section includes illustrated parts lists for the Nordson® 500 Series Powder Coating System.

Various assemblies and components are shown and referenced by item number where appropriate.

512 • 518 • 524 Fan Section

Figure 7.1



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512 • 518 • 524 Fan Section Parts List

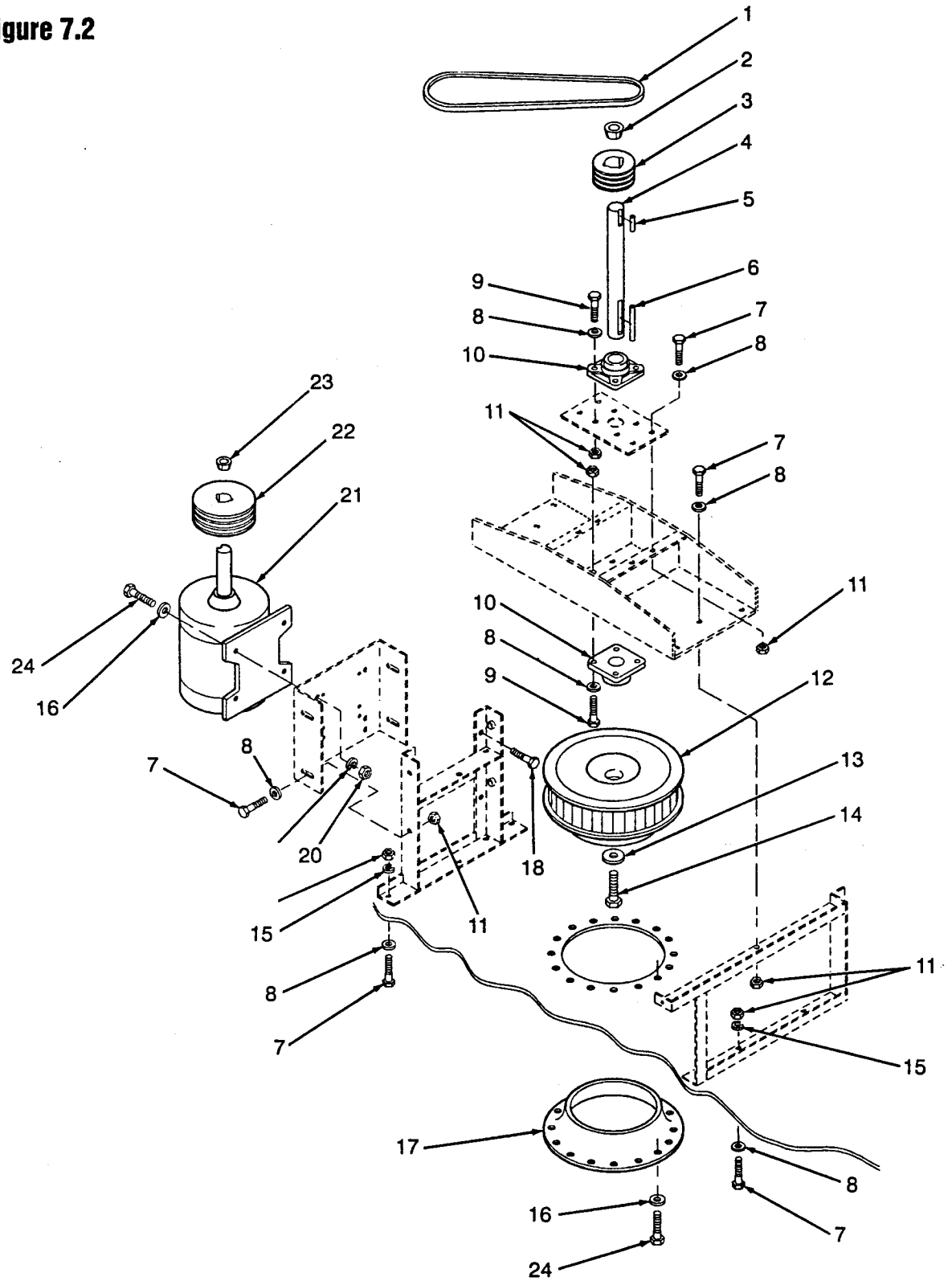
Refer to Figure 7.1

Ref.	512 Part No.	518 Part No.	524 Part No.	Description	Qty.
-	154 129	154 157	154 168	Assembly, Fan Unit	1
1	972 917	972 917	972 917	• Fitting, 1/8" NPT x 1/4 Tube	2
2	900 534	900 534	900 534	• Tubing, Poly, 1/4" O.D.	ASR
3	PM10815	PM10815	PM10815	• Fitting, Grease, 1/8 NPT	2
4	PM10203	PM10203	PM10203	• Gate, Slide	2
5	PM10817	PM10817	PM10817	• Screw, Thumb, 1/4-20 x 1.00"	8
6	PM10201	PM10201	PM10201	• Clamp, Rachet	2
7	981 309	981 309	981 309	• Screw, Hex Hd, Cap, 5/16-18 UNC x 3/4"	8
8	984 140	984 140	984 140	• Nut, Hex, 5/16"	8
9	154 139	154 139	154 172	• Plate, Cover	1
10	PM10211	PM10211	PM10211	• Gasket	1
11	981 315	981 315	981 315	• Screw, Hex Hd, Cap, 5/16-18 UNC x 1.00"	ASR
12	983 051	983 051	983 051	• Washer, Flat, 5/16"	ASR
13	PM10837	PM10837	PM10837	• Bracket, Filter	ASR
14	101 432	101 432	101 432	• Filter, Final	ASR
15	154 133	154 195	154 207	• Fan Drive Assembly	1
NS	PM10204	PM10204	PM10204	• Backing, Sound Deadening	ASR

Note: ASR - AS Required; NS - Not Shown

512 • 518 • 524 Fan/Drive Assembly

Figure 7.2



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512 • 518 • 524 Fan/Drive Assembly Parts List

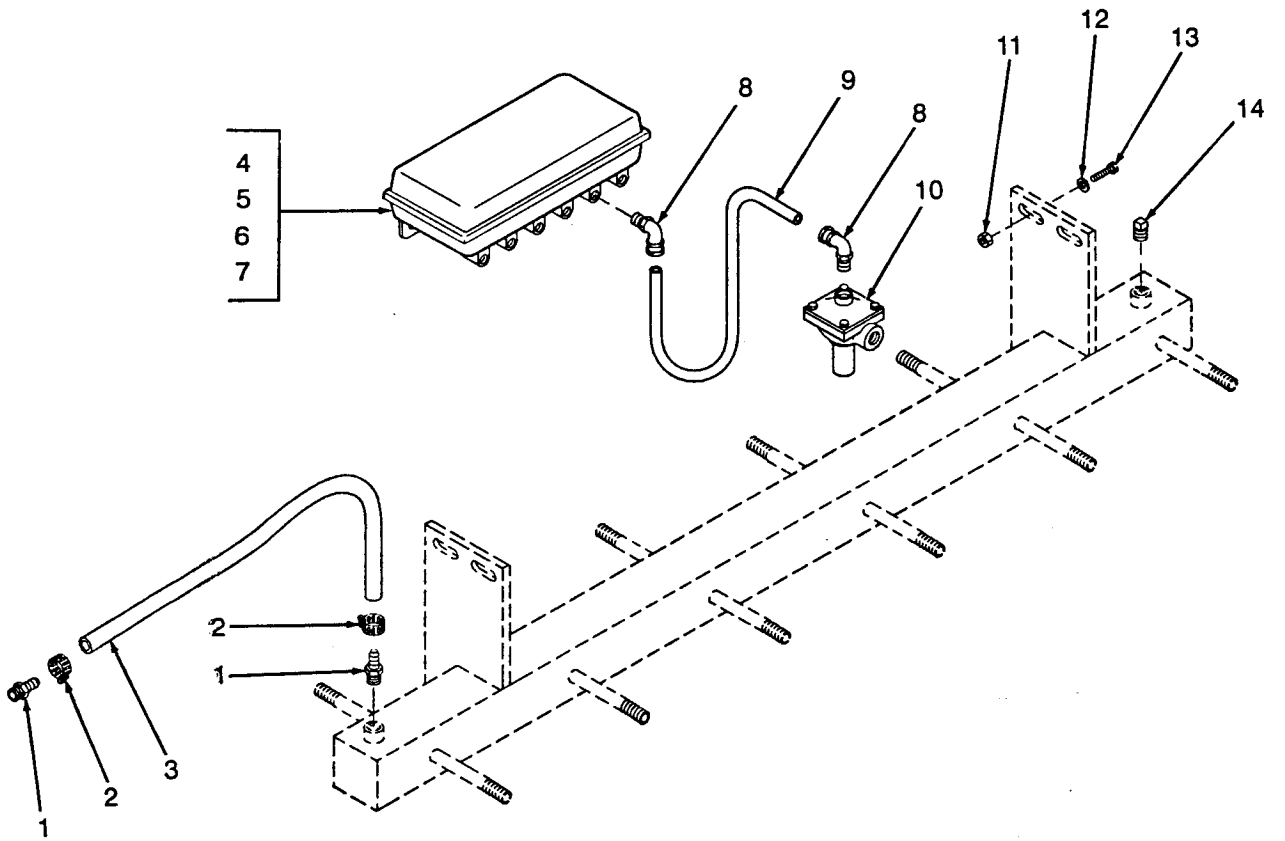
Refer to Figure 7.2

Ref.	512 Part No.	518 Part No.	524 Part No.	Description	Qty.
-	154 133	154 195	154 207	Fan/Drive Assembly	1
1	PM10229	PM10547	PM10547	• V-Belt	3
2	PM10843	PM10865	PM10865	• Bushing, 1-15/16, Fan Sheave	1
3	PM10844	PM10891	PM10893	• Sheave, Fan	1
4	PM10231	PM10234	PM10234	• Shaft, Fan, 1-15/16 x 18-1/2"	1
5	—	—	—	• Key, Steel, 1/2 x 5/16"	1
6	—	—	—	• Key, Steel, 1/2 x 1/2"	1
7	981 611	981 611	981 611	• Screw, Hex Hd, Cap, 1/2-13 UNC x 1"	ASR
8	983 063	983 063	983 063	• Washer, Flat, 1/2"	ASR
9	981 601	981 601	981 601	• Screw, Hex Hd, Cap, 1/2-13 UNC x 1-1/2"	ASR
10	PM10232	PM10235	PM10235	• Bearing, Flanged, Fan	2
11	984 170	984 170	984 170	• Nut, Hex, 1/2-13 UNC	ASR
12	PM10230	PM10233	PM10236	• Wheel, Fan, Stl	1
13	PM10816	PM10816	PM10816	• Washer, Retaining	1
14	981 892	981 892	981 892	• Screw, Hex Hd, Cap, 1/2-20 UNC x 1-1/2"	1
15	983 180	983 180	983 180	• Washer, Lock, 1/2"	ASR
16	983 061	983 061	983 061	• Washer, Flat, 3/8"	ASR
17	PM10838	PM10838	PM10877	• Cone, Fan Inlet	1
18	981 426	981 426	981 426	• Screw, Hex Hd, Cap, 3/8-16 UNC x 1-1/2"	ASR
19	983 160	983 160	983 160	• Washer, Lock, 3/8"	ASR
20	984 152	984 152	984 152	• Nut, Hex, 3/8-16 UNC	ASR
21	PM10613	PM10325	PM10853	• Motor (512 - 10HP, 518 - 15HP, 524 - 20HP)	1
22	PM10845	PM10890	PM10892	• Sheave, Motor	1
23	PM10961	PM10864	PM10864	• Bushing, Motor Sheave	1
24	981 402	981 402	981 402	• Screw, Hex Hd, Cap, 3/8-16 UNC x 1"	ASR

Note: ASR - AS Required, NS - Not Shown.

512 Pulse Manifold

Figure 7.3



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512 Pulse Manifold Parts List

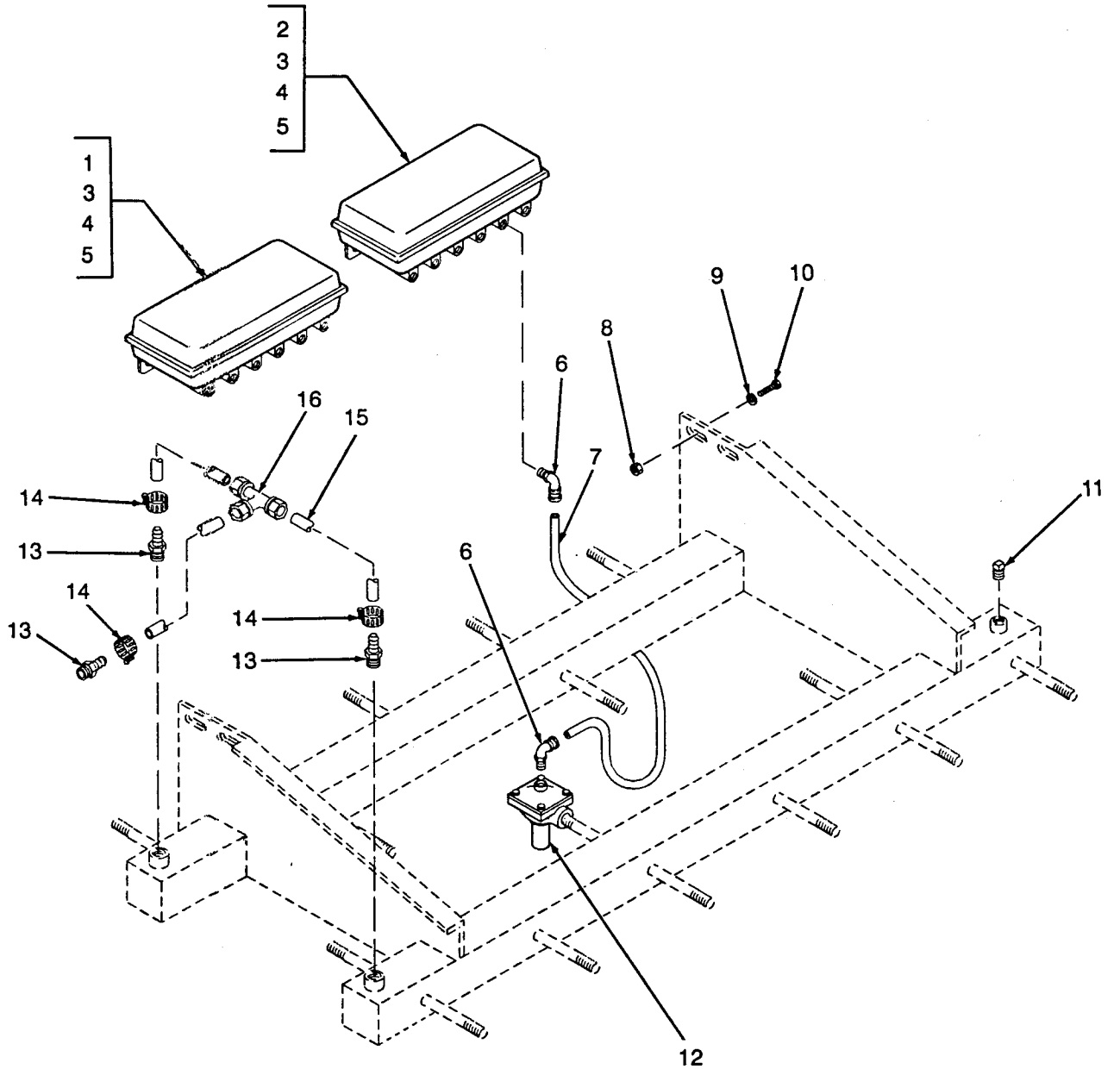
Refer to Figure 7.3

Ref.	512 Part No.	Description	Qty.
-	154 137	Pulse Manifold Assembly (512)	1
1	PM10813	• Fitting, Barbed, 3/4" Hose	2
2	970 958	• Clamp, Hose, 1"	2
3	802060	• Hose, Rubber, 3/4"	ASR
4	PM10811	• Enclosure, Valve, Solenoid, RCA V12T/965	1
5	984 140	• Nut, Hex, 5/16-18	ASR
6	983 051	• Washer, Flat, 5/16	ASR
7	981 315	• Screw, Hex Hd, Cap, 5/16-18 x 1"	ASR
8	972 119	• Elbow, 90°, 1/8" NPT x 1/4" Tube	ASR
9	900 534	• Tubing, Polyethylene, 1/4"	ASR
10	PM10373	• Valve, Blowdown, RCA25TD	12
11	984 152	• Nut, Hex, 3/8-16	ASR
12	983 061	• Washer, Flat, 3/8"	ASR
13	981 402	• Screw, Cap, 3/8-16 x 1"	ASR
14	973 567	• Plug, Pipe, 3/4" NPT	ASR

Note: ASR - AS Required, NS - Not Shown.

518 • 524 Pulse Manifold

Figure 7.4



518 • 524 Pulse Manifold

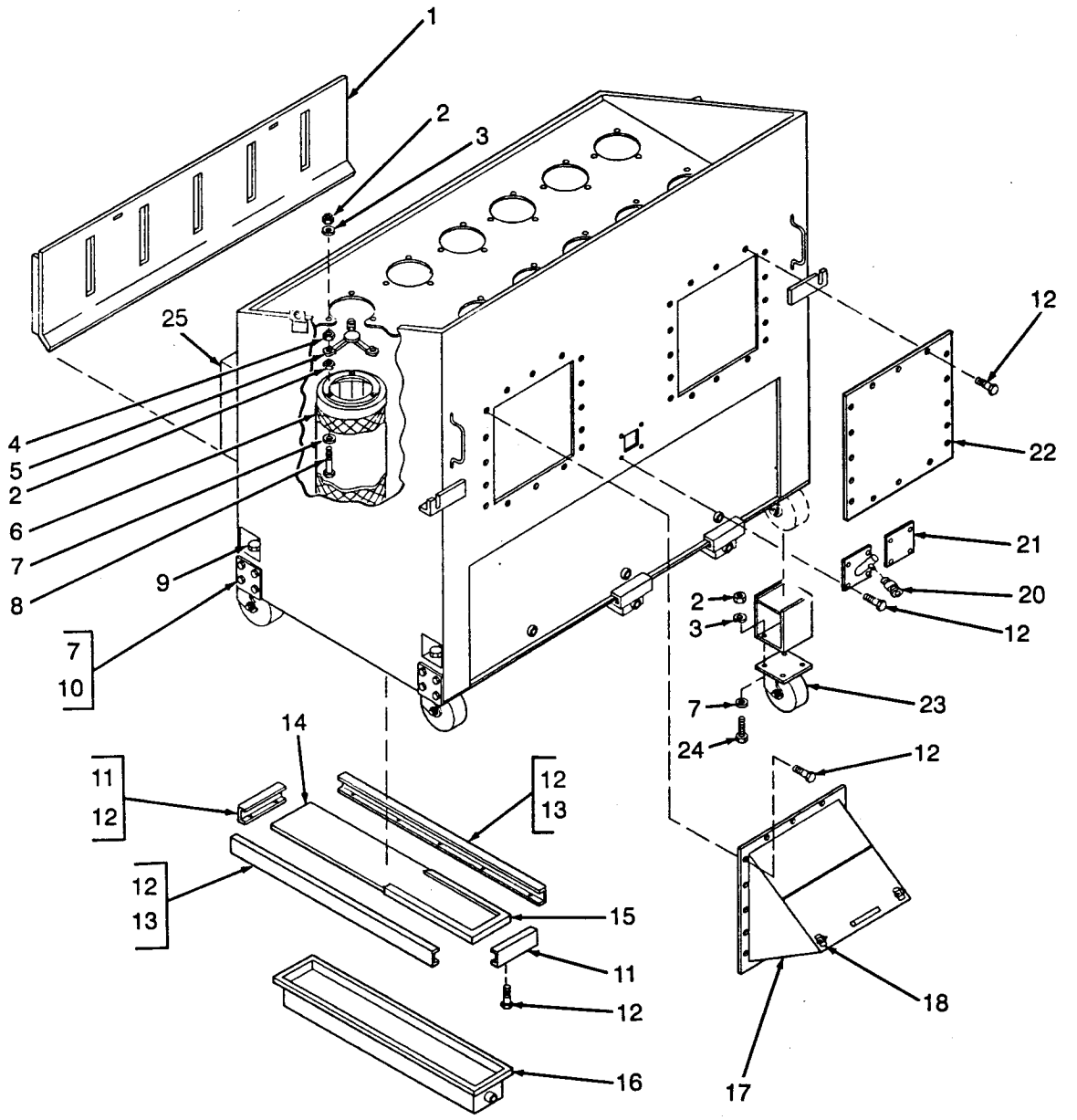
Refer to Figure 7.4

Ref.	518 Part No.	524 Part No.	Description	Qty.
-	154 159	154 170	Pulse Manifold Assembly	1
1	PM10184	—	• Valve, Enclosure, Pilot, RCA6	1
2	PM10811	PM10811	• Valve, Enclosure, Pilot, RCA V12T/965	2
3	981 315	981 315	• Screw, Hex Hd, Cap, 5/16-18 x 1.00"	ASR
4	983 051	983 051	• Washer, Flat, 5/16"	ASR
5	984 140	984 140	• Nut, Hex, 5/16-18	ASR
6	972 119	972 119	• Elbow, 90°, 1/8" NPT x 1/4" Tube	ASR
7	900 534	900 534	• Tubing, Polyethylene, 1/4"	ASR
8	984 152	984 152	• Nut, Hex, 3/8-16	4
9	983 061	983 061	• Washer, Flat, 3/8"	4
10	981 402	981 402	• Screw, Cap, 3/8-16 x 1"	4
11	973 567	973 567	• Plug, Pipe, 3/4" NPT	ASR
12	PM10373	PM10373	• Valve, Blowdown	ASR
13	PM10813	PM10812	• Fitting, Barbed, 3/4" Hose	3
14	970 958	970 958	• Clamp, Hose	ASR
15	802 060	802 060	• Hose, Rubber, 3/4"	ASR
16	973 265	973 265	• Tee, 3/4 NPT	1

Note: ASR - AS Required, NS - Not Shown.

512 • 518 • 524 Color Module

Figure 7.5



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512 • 518 • 524 Color Module

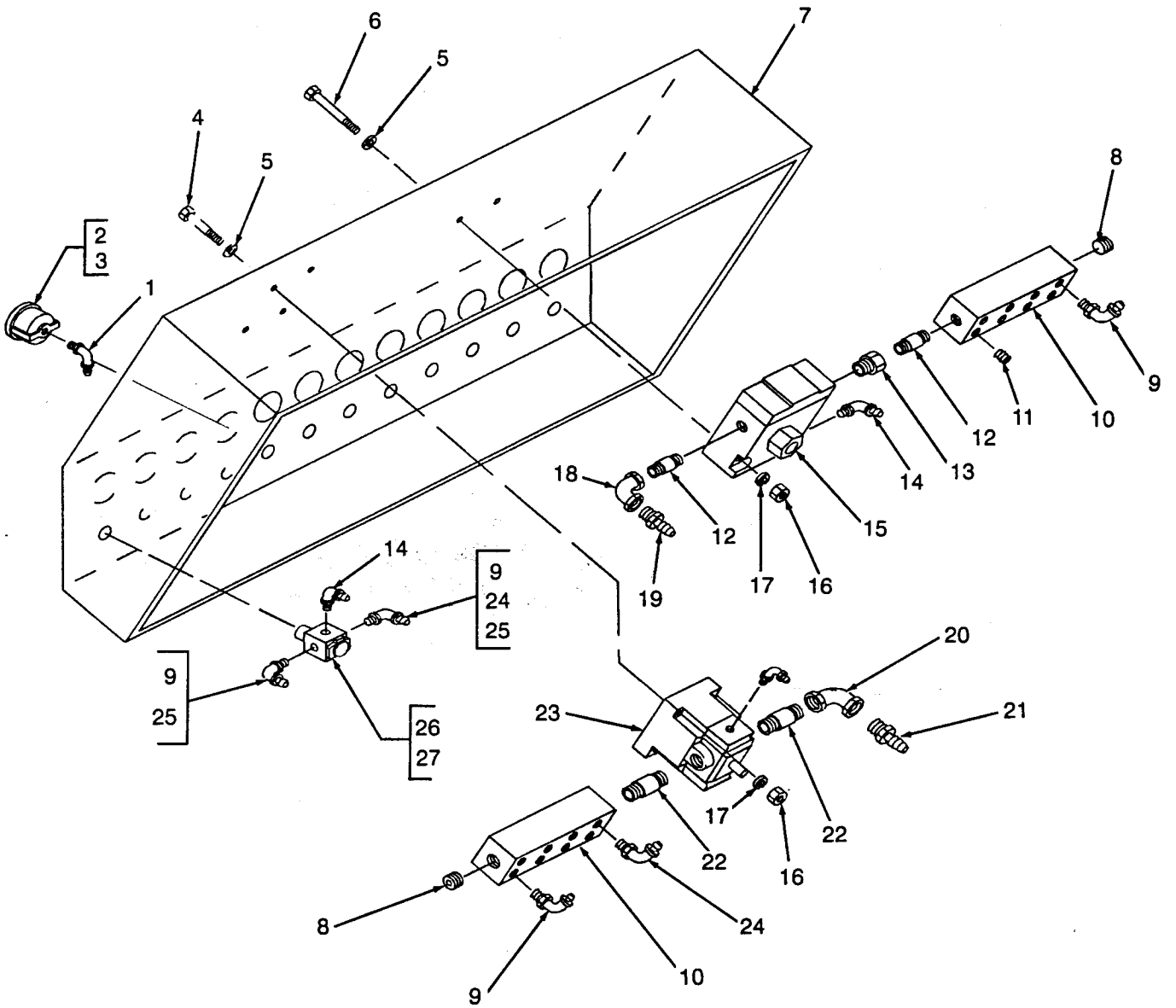
Refer to Figure 7.5

Ref.	512 Part No.	518 Part No.	524 Part No.	Description	Qty.
-	154 126	154 155	154 166	Module, Color	1
1	PM10839	PM10839	PM10905	• Plate, Velocity	1
2	984 152	984 152	984 152	• Nut, Hex, 3/8-16 UNC	ASR
3	983 160	983 160	983 160	• Washer, Lock, 3/8"	ASR
4	984 158	984 158	984 158	• Nut, Hex, Jam, 3/8"	ASR
5	PM10195	PM10195	PM10195	• Deflector, Pulse	ASR
6	146 417	146 417	146 417	• Cartridge, Flanged	ASR
7	983 061	983 061	983 061	• Washer, Flat, 3/8"	ASR
8	981 624	981 624	981 624	• Screw, Hex Hd, Cap, 3/8-16 UNC x 2-1/2"	ASR
9	981 622	981 622	981 622	• Screw, Hex Hd, Cap, 1/2-16 UNC x 3"	ASR
10	981 402	981 402	981 402	• Screw, Hex Hd, Cap, 3/8-16 UNC x 1"	ASR
11	PM10584	PM10585	PM10586	• Clamp, "C", 9"	ASR
12	981 315	981 315	981 315	• Screw, Hex Hd, Cap, 5/16-18 UNC x 1"	ASR
13	PM10584	PM10585	PM10586	• Clamp, "C" (512 - 33", 518/524 - 50.25")	ASR
14	PM10217	PM10218	PM10218	• Membrane, Fluidizing	ASR
15	PM10407	PM10408	PM10408	• Gasket, Channel	ASR
16	154 137	154 161	154 161	• Pan, Fluidizing	ASR
17	PM10193	PM10193	PM10193	• Chute, Load	1
18	PM10353	PM10353	PM10353	• Latch, T-handle	2
19	PM110534	PM10534	PM10534	• Vent Assist	1
20	898 991	898 991	898 991	• Connector, Union, 3/8" Tube	1
21	PM10827	PM10837	PM10827	• Plate, Cover, Vent Assist	1
22	154 142	154 142	154 142	• Plate, Cover	1
23	PM10175	PM10175	PM10175	• Caster, #16	4
24	981 353	981 353	981 353	• Screw, Hex Hd, Cap, 3/8-16 x 1-1/4"	16
25	PM10212	PM10212	PM10212	• Gasket, 1 x 1-1/2 x 22-1/2"	ASR

Note: ASR - AS Required, NS - Not Shown.

12 Function Pneumatic Control Panel

Figure 7.6



12 Function Pneumatic Control Panel

Refer to Figure 7.6

Ref.	Part No.	Description	Qty.
-	PM10243	Assembly, Pneumatic Panel, 12 Function	1
1	971 621	• Elbow, Female, 1/4" Tube x 1/8" NPT	12
2	901 228	• Gauge, Air, 0-100 psi	7
3	901 240	• Gauge, Air, 0-30 psi	5
4	981 203	• Screw, Hex Hd, Cap, 1/4-20 x 1-1/4"	4
5	983 504	• Washer, Flat, #4	6
6	981 229	• Screw, Hex Hd, Cap, 1/4-20 x 2"	2
7	154 173	• Housing, Pneumatic Panel	1
8	973 442	• Plug, Pipe, 3/4" NPT Flush	2
9	972 183	• Elbow, 3/8" Tube x 1/4" NPT	18
10	PM10713	• Manifold, 1/4", 3/4" NPT Port	2
11	973 411	• Plug, Pipe, 1/4" NPT Flush	4
12	973 082	• Nipple, 1/2" NPT, Close	2
13	PM10715	• Bushing, Pipe Reducing, 3/4 to 1/2"	1
14	972 119	• Elbow, 1/4 Tube x 1/8 NPT	14
15	PM10603	• Valve, Air, 2 Way, 1/2" NPT Port	1
16	984 210	• Nut, 1/4-20 Hex	6
17	983 140	• Washer, Lock, #4	6
18	973 200	• Elbow, Pipe, 1/2" NPT, 90°	1
19	PM10714	• Fitting, Brass, 1/2" NPT, Barbed	1
20	973 228	• Elbow, Pipe, 3/4" NPT, 90°	1
21	PM10813	• Fitting, Brass, 3/4" NPT, Barbed	1
22	973 109	• Nipple, 3/4" NPT, Close	2
23	PM10811	• Valve, Air, 2 Way, 3/4" NPT Port	1
24	972 192	• Elbow, 1/2" Tube x 1/4" NPT	8
25	972 122	• Elbow, 1/2" Tube x 3/8" NPT, 90°	10
26	PM10712	• Regulator, 1/4", 3/8" NPT	5
27	PM10711	• Regulator, 1/8", 1/4" NPT	7
NS	900 513	• Tubing, Poly, 1/2" O.D.	ASR
NS	900 511	• Tubing, Poly, 3/8" O.D.	ASR
NS	900 509	• Tubing, Poly, 1/4" O.D.	ASR

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Section 8
Equipment Specifications

Because of possible technological or quality improvements, equipment specifications are subject to change without notice.

Equipment Specifications

Because of possible technological or quality improvements, equipment specifications are subject to change without notice.

	Booths			
Specifications	**512**	**516**	**518**	**524**
Base:				
Overall Height	30.5 in.	30.5 in.	30.5 in.	30.5 in.
Overall Width	5 - 6 ft.	5 - 6 ft.	5 - 6 ft.	5 - 6 ft.
Overall Length	19 ft.	19 ft.	22 ft.	22 ft.
Free Vol. in Cartridge	9.3 $ft.^3$	12.4 $ft.^3$	13.9 $ft.^3$	18.6 $ft.^3$
Min. Air Flow Required	5000 cfm	6700 cfm	7500 cfm	10000 cfm
Max. Air Flow Allowable	6000 cfm	8000 cfm	9000 cfm	12000 cfm
Fan Rating in Booth at 4" w.c. (min.)	8120 cfm	10124 cfm	11956 cfm	14518 cfm
Number of Filters	12	16	18	24
Filter Area	2340 $ft.^2$	3120 $ft.^2$	3510 $ft.^2$	4680 $ft.^2$
Number of Pulse Valves	12	16	18	24
Max. Air Pressure	100 psig	100 psig	100 psig	100 psig

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Section 9
Optional Parts and Equipment

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Customer _____

Date _____

System No. _____

The following checklist details all drawings and manuals which are included with your Nordson® 500 Series Powder Coating System.

	Manual No.	Pub. P/N	Description
☐	0-8	107964	Electrostatic System Periodic Checks
☐	0-9	107913	Electrostatic Cable Installation and Care
☐	31-3	104325	NPE-2A Automatic Gun
☐	31-4	104328	NPE-2M Manual Gun
☐	31-11	107912	100 PLUS® Automatic Series II Gun
☐	31-13	108129	Versa-Spray® Cable-Fed Automatic Gun
☐	31-16	108131	Versa-Spray Cable-Fed Manual Gun
☐	31-17	108132	Versa-Spray IPS Manual Gun
☐	31-21	108250	Versa-Spray IPS-100 Automatic Gun
☐	31-22	108385	Versa-Spray IPS PRX Automatic Gun
☐	31-23	106584	Versa-Spray IPS Porcelain Enamel Automatic Gun
☐	32-6	104345	HR3 Powder Feed Hopper
☐	32-7	104339	Conical Hopper and Pump
☐	32-8	104361	100 PLUS Standard and Low-Flow Powder Pumps
☐	32-10	108192	100 PLUS Porcelain Enamel Powder Pump
☐	32-15	107987	High-Flow Powder Pump
☐	32-16	108530	HRS-1 Feed Hopper (50 lb.)
☐	32-17	108117	Standard Transfer Pump (244721)
☐	32-18	108118	Porcelain Enamel Transfer Pump
☐	32-19	108083	Dolly System, w/25 lb. Hopper
☐	32-20	108084	HRV-1 Feed Hopper (25 lb.)
☐	32-21	108172	Mobile System, w/50 lb. Hopper
☐	32-22	108608	HRM-1 Mini Hopper

Manual No.	Pub. P/N	Description
☐ 32-28	108231	HRS-II Hopper (50 lb.)
☐ 32-29	108241	Versa-Spray® Cable-Fed Mobile System
☐ 32-30	108654	55 Gallon Drum Truck
☐ 32-31	108655	Transfer Pump Kit (248681)
☐ 32-32	108656	Porcelain Enamel Transfer Pump Kit (248683)
☐ 32-34	106539	Vibratory Box Feeder
☐ 33-5	104360	100 PLUS Master Control Unit
☐ 33-6	107951	100 PLUS Electrostatic Power Unit
☐ 33-9	108120	Versa-Spray IPS Power Unit
☐ 33-10	108192	Versa-Spray MC-3 Master Control Unit
☐ 33-11	108198	Smart Spray Controller
☐ 33-13	108242	EXP-100 Electrostatic Power Unit
☐ 34-13	104651	Panel Mounted Air Manifold (Pneumatic 5-Function Box)
☐ 34-15	104654	NPE-2A, 2M Lance Extension
☐ 34-16	104652	NPE-2A, 2M Flat Spray Nozzle
☐ 34-20	104743	100 PLUS Gun Mounting Bar
☐ 34-21	107950	Rotary Sieve (240VAC) - Nordson
☐ 34-22	108051	NFS-1000 Fire Detection System
☐ 34-23	108167	Rotary Sieve (110VAC) - Nordson
☐ 34-24	108590	Versa-Spray Gun Mounting Bar
☐ 34-26	106585	Versa-Screen Workstation
☐ 35-4	107916	Powder Booth Controller
☐ 37-1	104366	TRIBOMATIC® Automatic Powder Spray Gun and Diffuser
☐ 37-3	104368	TRIBOMATIC Hoppers
☐ 37-4	104370	TRIBOMATIC Mobile Shop System
☐ 37-6	104369	TRIBOMATIC Powder Spray Handgun and Diffuser
☐ 37-7	104365	TRIBOMATIC Powder Pump
☐ 37-8	104376	TRIBOMATIC 19-inch Control Module
☐ 37-9	107914	TRIBOMATIC Master Control Module and Powder Spray System

Manual No.	Pub. P/N	Description
☐ 37-12	108184	TRIBOMATIC 14 Gun Master Control Module
☐ 37-13	108188	Tribomatic Single Gun System
☐ 37-16	108599	Tribomatic Generation 3 Powder Pump
☐ 37-17	108600	TRIBOMATIC Generation 3 Diffuser
☐ 37-18	106569	TRIBOMATIC II™ Control Module
☐ 37-19	106570	TRIBOMATIC II Pump
☐ 37-20	106571	TRIBOMATIC II Automatic Gun

Other Equipment

Manual No.	Description
☐ E240	Rotary Sieve (AZO)
☐ 801	Detector Electronics
☐	Deimco Reciprocator
☐	Nutro Oscillator
☐ LSM 1700	Endress & Hauser Level Control
☐	Proximity Switch and/or Level Control
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____

Special Drawings

☐ _____	Booth Enclosure (Canopy)
☐ _____	System Layout
☐ _____	Utility Drops
☐ _____	Electrical Schematic
☐ _____	Pneumatic Diagram
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____