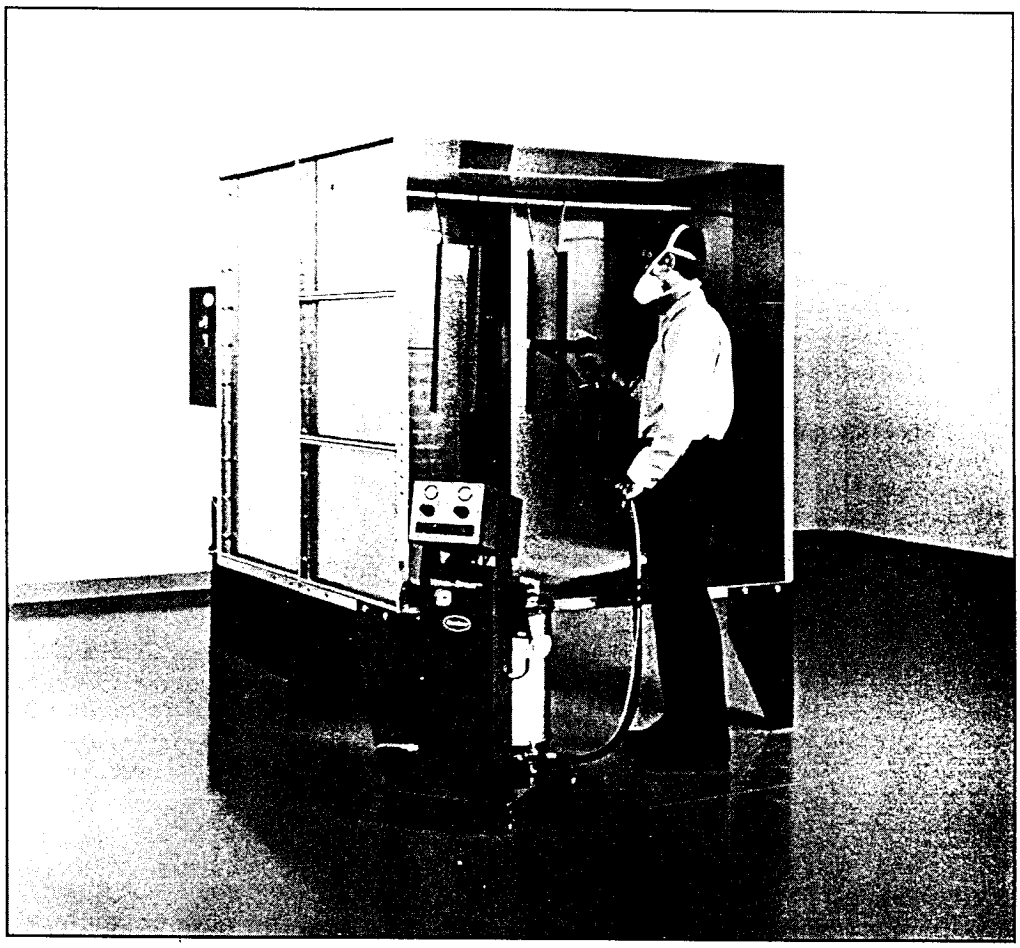
Econo-Coat™ Powder Booth Recovery System Manual

Manual No. 35-9
Publication P/N 108082

Nordson®

The Econo-Coat Powder Booth / Recovery System



The Econo-Coat Powder Booth / Recovery System is designed to be used with separate Nordson application equipment, as shown. Review all installation instructions before attempting booth assembly; and all safety precautions for all equipment before beginning spray operation.

About Nordson . . .

Nordson Corporation is a worldwide organization whose business is the manufacture of equipment and systems for the application of liquid and powder coatings, adhesives, and sealants. Our company's primary manufacturing location is in Amherst, Ohio. The worldwide sales and service of Nordson equipment and systems, and selected product development are the responsibility of four geographic divisions: North American, European, Japan, and Pacific/South.

Your Nordson representative and the customer service representatives are available to help you with any questions concerning the operation of, and ordering parts or equipment for your powder coating system.

How To Order Nordson Parts

Replacement parts shown in "Section 8 – Parts List" may be ordered through your local Nordson representative or by contacting our Customer Service Center.

When ordering parts, please use the description shown in the parts list, the part number (when listed), and the quantity desired.

Address your correspondence to:

United States

Nordson Corporation
Customer Service Center – Nortech
5875 Peachtree Industrial Boulevard
Norcross, GA 30092
(800) 241-8777 • (404) 441-3040
FAX: (404) 242-7350

Canada

Nordson Canada, Ltd.
849 Progress Avenue
Scarborough, Ontario M1H 2X4

(416) 438-6730
FAX: (416) 438-6714

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Section 1
Safety Summary

General Safety Precautions • Powder Spray Equipment / Systems

Introduction

Included in this summary are safety guidelines for the use of Nordson electrostatic and non-electrostatic powder spray equipment. Other warnings and cautions specific to a particular piece of equipment are included in the equipment manual.

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

It is also 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 National Fire Protection Association publication NFPA 33 for standards on 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.

General Safety Precautions, cont.

Personal Safety

- Wear a filter-type respirator whenever handling powder containers, filling hoppers, operating spray equipment, 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.
- Gloves should be worn whenever handling powder to minimize skin reactions. Obtain and read Material Safety Data 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 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/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.

General Safety Precautions, cont.

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 the system immediately.***

- Do not smoke in the spray area. A fire can 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 spray area or room. An accidental spark could ignite them and if a fire or explosion occurs, presence of flammable materials will increase 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 temperature and power requirements. Only fuses of the correct type, voltage and current rating should be used—using incorrect fuses/wire gauge is a dangerous practice.

- Use only approved replacement parts. Use of unapproved parts or 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.

General Safety Precautions, cont.

- 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.

- 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 (100 mm) of a grounded conductor.

- Do not jerk, whip or snap electrostatic cable. Do not bend in a radius of less than 6 inches (152 mm) 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 resistance 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 the system immediately.***

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Section 2
Equipment Familiarization

The Nordson Econo-Coat Powder Booth / Recovery System consists of pre-engineered modular components which can be quickly and easily assembled. The system contains sprayed powder materials within the booth, providing a safe and clean working environment, and allowing the recovery and reuse of the material.

General

System Overview

The Econo-Coat powder booth/recovery system features a 25 square feet booth enclosure and a collector module which includes: a control panel, circulating fan, four primary Versa-Clean filter cartridges, and two high-efficiency final filters. The booth/recovery system is intended to work in conjunction with optional powder application equipment.

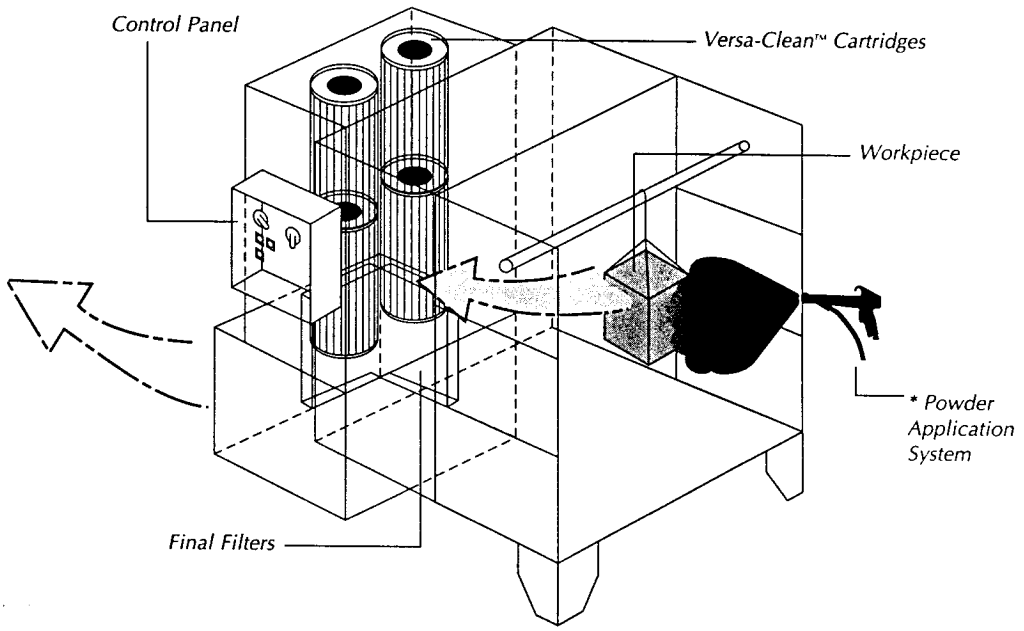


Figure 2.1 – System Overview
Powder-laden air is drawn into the primary cartridges and clean air is exhausted through the final filters back into the plant.

**Refer to the appropriate gun manual/powder application system manual for information on these products.*

Powder Coating Theory of Operation

Powder is fluidized in a feed hopper by compressed air diffused through a porous membrane called a fluidizing plate. The fluidized powder is supplied to spray guns by a powder pump operating on compressed air. A high voltage, low amperage power supply, connected to the gun electrode via cable, generates an electrostatic field at the end of the gun. Powder particles passing though this electrostatic field are charged and attracted to the grounded parts suspended within the booth enclosure.

Nordson-pioneered cartridge technology does not require ductwork or explosion venting.

Overspray (powder which has not adhered to the part) is carried by air circulating through the booth to the collector module where it is deposited on the external surfaces of the cartridge filters. Air used to contain and recover oversprayed powder is drawn into the four primary Versa-Clean cartridges by a centrifugal fan. The fan, enclosed within the collector module, discharges the powder-free air through the high efficiency final filters back into the plant environment. Periodic reverse-pulsing air through the cartridge filters blow the collected powder off the external surfaces of the filters. The powder falls to the bottom of the collector module where it can be recovered for reuse or disposal.

General, cont.

Prior to installation of the Econo-Coat system, user should verify these environmental and operating conditions. Please check with your Nordson representative if conditions exceed these guidelines.

Operating Environment

The Nordson Econo-Coat Powder / Booth Recovery 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 which maintains: temperature range of 70 – 80°F; and humidity range of 45 – 55% RH. Temperature and humidity ranges exceeding the above indicates the need for climate conditioning of the installation area.

Normal Design Conditions for the Econo-Coat System

1. **Cross Drafts** – air moving across the booth opening should not exceed 60 FPM.

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

3. **Part Temperature** – not exceeding 120°F.

4. **Total Area of Booth Opening** – canopy openings not to exceed 25 square feet.

5. **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 10 microns. When the percentage of fines (particles less than 10 microns) reaches 10% of the total, blinding or plugging of the filter media can occur.*

6. **Cartridge Filters** – 4 cartridge filters are provided with each system.

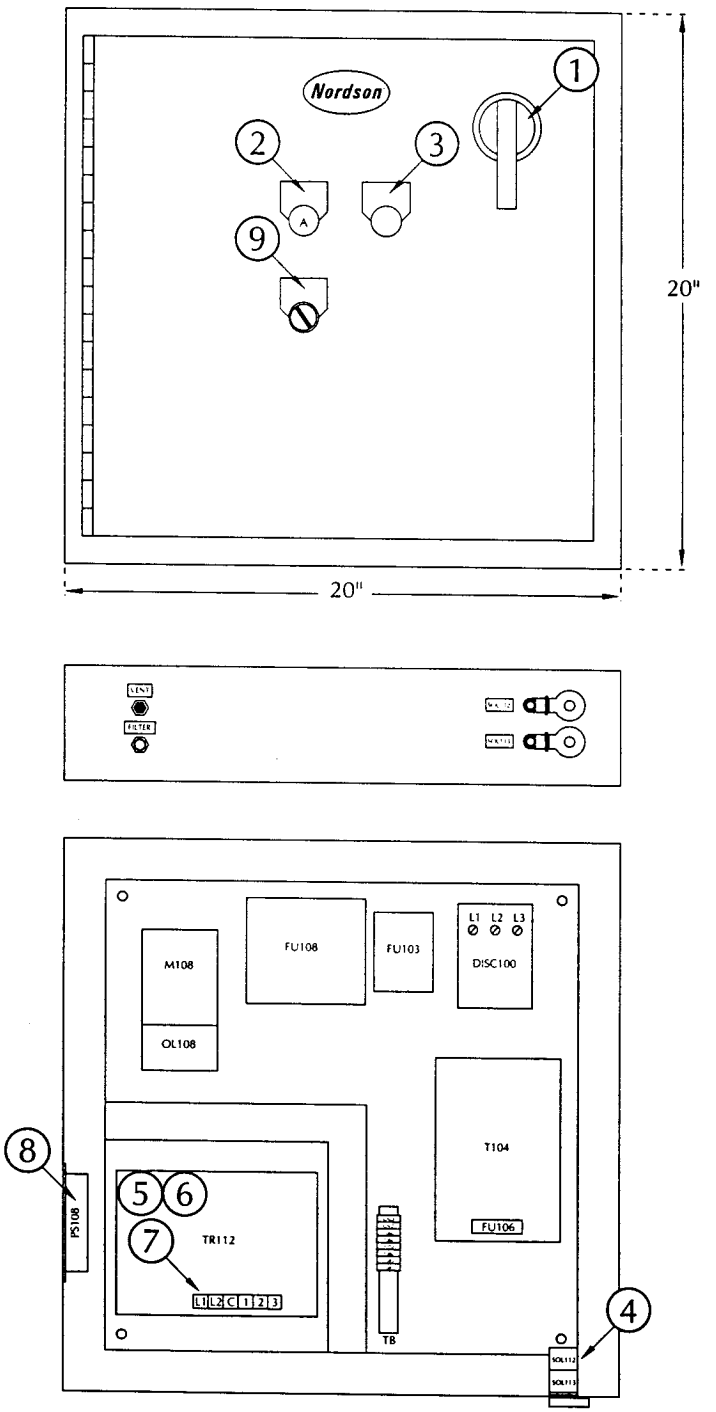
   NOTE: *Cartridge filters are considered a wear item in a powder coating system. Life expectancy of a cartridge filter depends on many variables including: type of coating material; particle size distribution; humidity and temperature in the spray area; number of hours of operation; dew point and cleanliness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

7. **Compressed Air** – supplied at 60 to 100 psi. Use of a dedicated refrigerated or regenerative air dryer capable of a maximum pressure dewpoint of 38° F is recommended. A 0.3 micron coalescer filter should be used to prevent oil and water from contaminating the powder supply and damaging the booth cartridges.

General, cont.

The chart on the opposite page explains the operating controls and indicators for the Econo-Coat System.

Figure 2.2 – System Control Panel [Front, Bottom, and Internal Views]



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General, cont.

System (Electrical) Control Panel

Item	Description of Purpose or Function
1. **Main Disconnect Switch**	Removes or applies primary voltage service for the system.
2. **Exhauster Start Pushbutton/Light**	Starts circulating fan. Lights "amber" when fan is on and energizes system electrical and pneumatic controls.
3. **Exhauster Stop Pushbutton**	Stops fan. De-energizes system electrical and pneumatic controls. When depressed, the exhauster "amber" start light will go out.
4. **Solenoid Valves**	Provide pilot air to trigger cartridge pulse valves.
5. **Pulse Valve(s) Timer "Off"**	(Adj. 1.5 – 30 secs.) Sets time between air pulses for cartridge filter blowdown.
6. **Pulse Valve(s) Timer "On"**	(Adj. 0.05 – 0.5 secs.) Sets duration of air pulses for cartridge filter blowdown.
7. **Red LEDs (Pulse Time Board)**	Indicates which air pulse valve is activated. Can be used when troubleshooting cartridge filters to isolate powder leakage.
8. **Pressure Switch Adjusting Screw**	Changes sensitivity to pressure drop across final filters. *(When setting is exceeded, system will shut down.)*
9. **Selector Switch, "On/Off"**	Selects cartridge pulsing On or Off.

General, cont.

Utilities Provided By User

1. **Primary Electrical Service** – should include a fused disconnect switch with lock-out capability.

2. **Compressed Air Piping to the System** – should be a minimum of 1/2" NPT. Supply pressure must be 60 – 100 psi. Air must be clean and dry. OSHA Rule 29 CFR 1910.147 requires energy sources for certain equipment turned off or disconnected and that the device be locked or labeled with a warning tab.

Optional Equipment

1. Air Dryers

2. Air Filter Packages

3. Portable Powder Application Systems consisting of:

   - Feed Hopper
   - Powder Pump
   - Electrostatic Powder Spray Handgun
   - Gun Control Console
   - Dolly
   - Air Tubing, Powder Feed Tubing, Power Cords and Ground Cables

   NOTE: *Components of systems can also be ordered separately.*

Section 3
Installation Procedures

Installation of the Nordson Econo-Coat Powder Booth / Recovery System should be carried out in accordance with local, state, and national codes — including NFPA Bulletin 33.

The following installation procedures are provided as guidelines to assist the user in effecting a timely and least-costly completion.

Safety Precautions

General

Before installing the Econo-Coat system, review and become familiar with the warnings and cautions in "Section 1 – Safety Summary" in addition to the warnings in this section.

WARNING! – All electrical wiring should be completed in accordance with National Code NFPA70 and all state and local codes.

WARNING! – A breaker or disconnect should be installed in the service line ahead of the system (electrical) control panel. Power to the panel should be disconnected and locked out before wiring the panel.

Pneumatic Connections

WARNING! – A manual shut-off valve should be installed in the air supply line ahead of the air dryer filters so that pressure can be relieved before undertaking maintenance or repairs.

WARNING! – Do not operate equipment at a pressure greater than the rated maximum working pressure of any component in the system.

Mechanical Installation

WARNING! – Lift equipment using only designated lifting points and lugs. Do not attempt to lift using covers, doors, enclosure panels, cables, or hose connections. Always balance the load when lifting. Never put stress on flat sheet panels.

WARNING! – Use only lifting equipment with a rated capacity greater than the load. Make sure personnel stand clear while lifting.

Installation

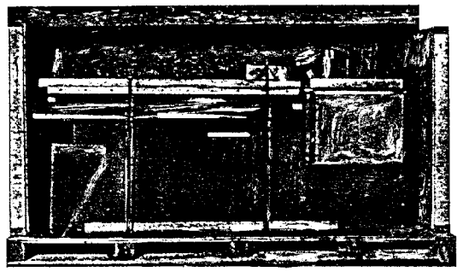
Uncrating

The Econo-Coat system is shipped crated and attached to a wooden pallet *(see below)*. The pallet should be moved to a clean area close to the pre-cleaned installation location.

1. Remove crating and lay out enclosure panels in a clean area. Side and floor panels are stainless steel; roof panels are translucent polypropylene.

2. Remove collector module and fan housing from pallet. Module is shipped secured to pallet, with enclosure side down on pallet.

3. Lift collector module and fan housing (being careful not to damage fan motor or projecting air fittings) to an upright position and move to installation location.



Mechanical

1. Locate and identify fasteners to be used to assemble enclosure:

   a. Nylon hex bolts and nuts (5/16-18 x 1-1/4") for joining polypropylene to polypropylene panels.

   b. Steel hex bolts (5/16-18 x 1-1/4"), nuts, and washers for joining polypropylene panels to steel panels.

   c. Steel hex bolts (5/16-18 x 3/4") for joining steel to steel panels and securing legs to floor panels.

2. Level fan housing from side-to-side and end-to-end to ± 1/16 inch. Shim under corners as necessary.

3. Remove metal strips used to secure the collector module and fan housing during shipment.

4. Assemble panels in sequence as shown in Figure 3.1 on page 3.4a.

Open for Assembly Sequence.

Assembly Sequence

Step A

1. Bolt floor panel (Item1) to floor panel (Item 2).
2. Bolt legs (Items 3 and 4) to floor panel (Item 2).
3. Bolt panel (Item1) to Section A of collector module.

Step B

1. Bolt left side of panel (Item 5) to Section B3 of collector module and bottom of panel (Item 5) to panel (Item 1).
2. Bolt right side of panel (Item 6) to section B4 of collector module and bottom of panel (Item 6) to panel (Item 1).
3. Bolt angle plate (Item 7) to section B1 of collector module and to top of panels (Item 5 and 6).

Step C

1. Bolt panel (Item 8) to panels (Items 10, 11 and 12).
2. Bolt panel assembly (Items 8, 10, 11 and 12) to panels (Items 1, 2 and 5).
3. Bolt panel (Item 9) to panels (Items 13, 14 and 15).

Step D

1. Bolt panel assembly (Items 9, 13, 14 and 15) to panels (Items 1, 2 and 6).
2. Bolt angle plate (Item 16) to panels (Items 13, 14 and 15).
3. Bolt angle plate (Item 17) to panels (Items 10, 11 and 12).

Step E

1. Bolt polypropylene roof panel (Item 18) to angle plate (Item 7) and panels (Items 8 and 9).

Step F

1. Bolt polypropylene roof panel (Item 19) to panels (Items 12 and 15).
2. Drill ten (10) 3/8" holes in polypropylene roof panels (Items 18 and 19). Bolt together using poly nuts and bolts (3/8" x 1") provided by Nordson.

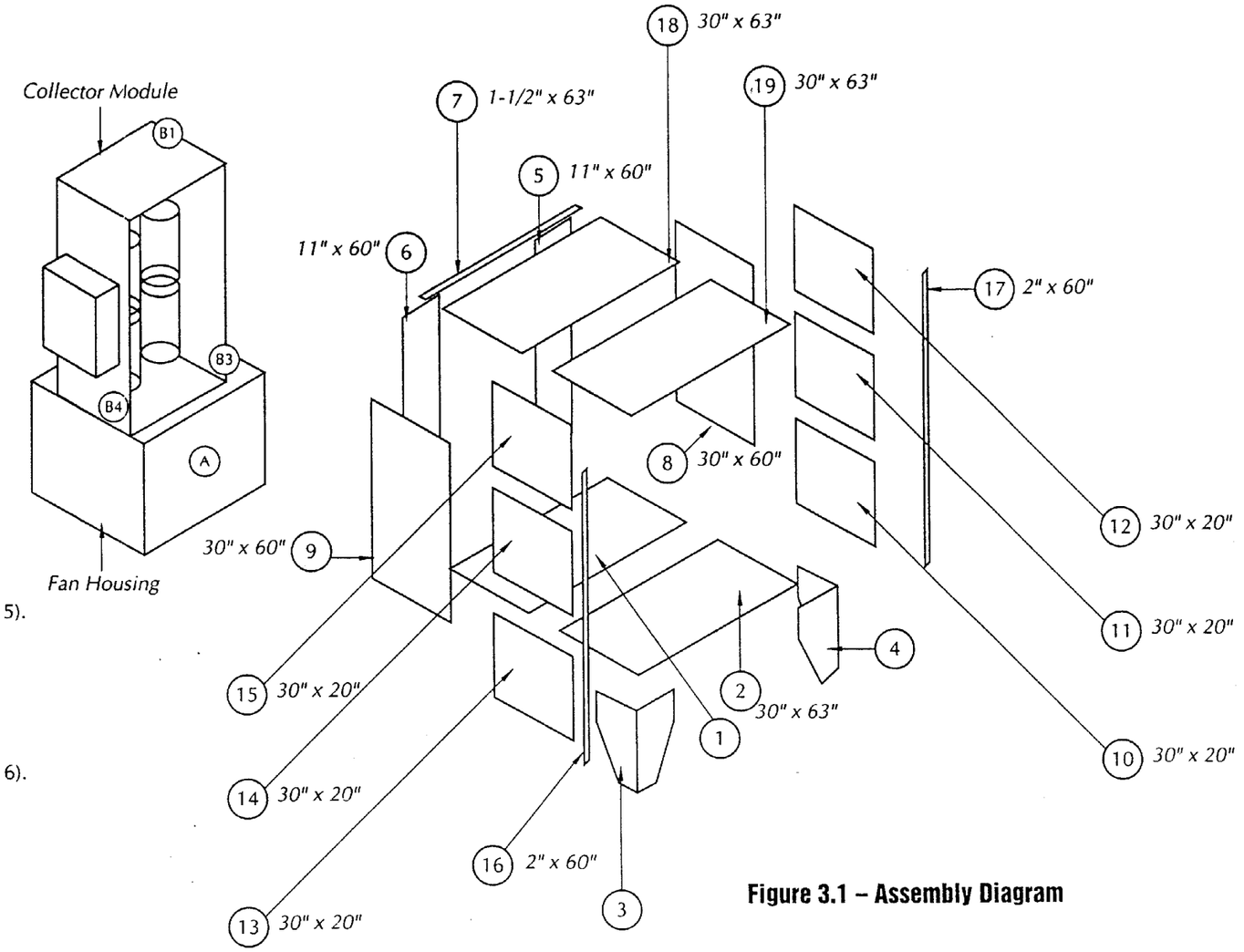


Figure 3.1 – Assembly Diagram

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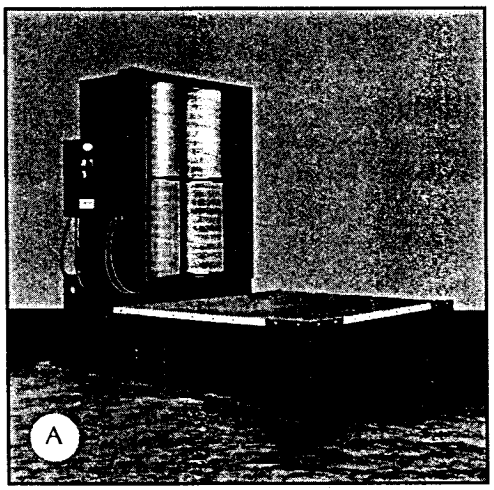
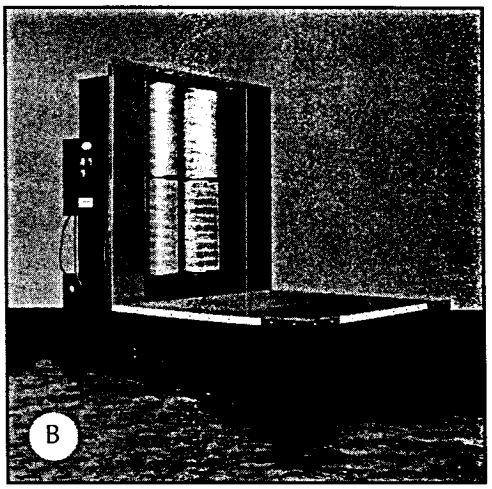
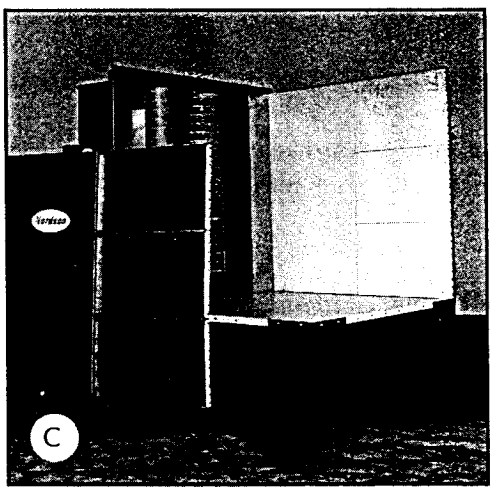
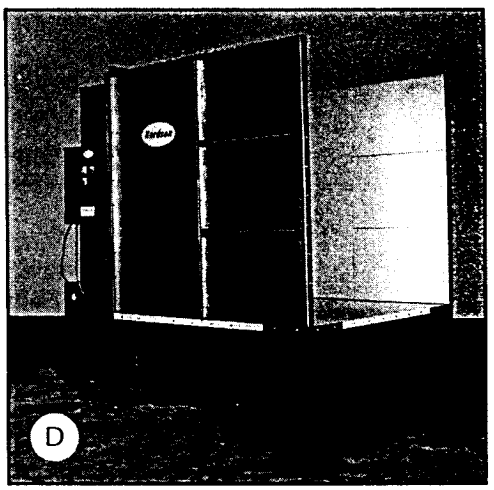
Photographic Guide

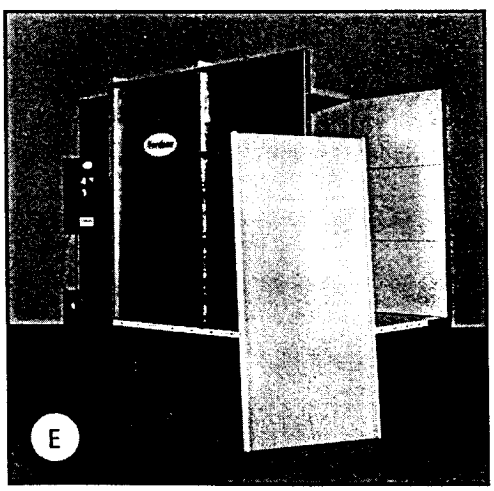
Photographs correspond to the assembly steps on foldout, opposite page.

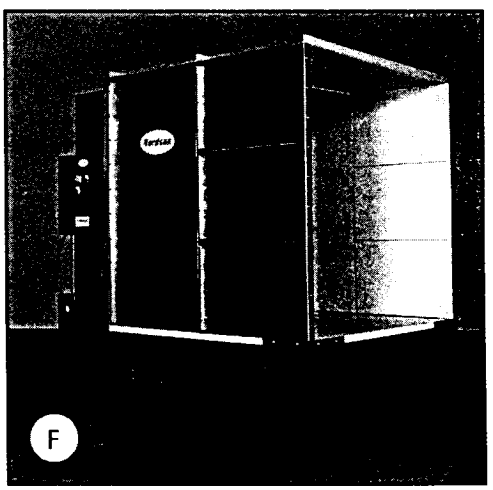












Installation, cont.

System Wiring

WARNING! – Before connecting the service line, disconnect and lock out electrical power at a breaker or disconnect in the service line ahead of the booth system (electrical) control panel. Failure to observe this warning could result in serious injury or death from electrocution.

1. Install fused service disconnect and lockout switch at plant source. Service amperage should be 30 amp, 3Ø at the appropriate voltage. Refer to the electrical schematic (Figure 9.1, page 9.3a) for full load amperage and wiring information.
2. Route conduit and wiring from plant disconnect to a knockout at the top right side of the booth system (electrical) control panel.
3. Connect wiring to L1, L2, L3 and Ground connections at panel disconnect.
4. Check panel wiring and tighten any loose connections.
5. Make sure booth and electrical enclosure are properly grounded to a ***true earth ground*** in accordance with local electrical codes.

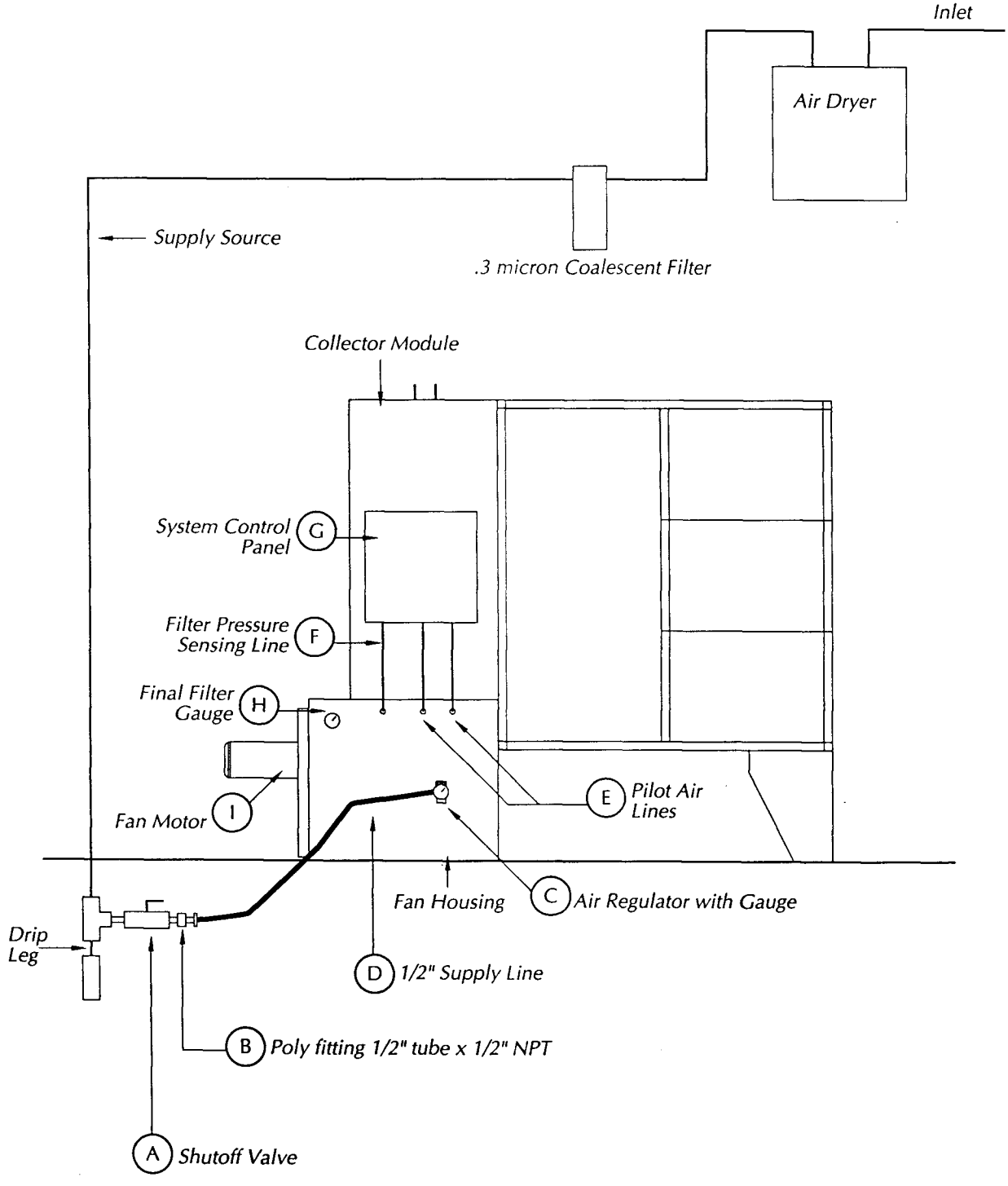
Pneumatic Connections

NOTE: Before proceeding to Step 1, make sure air dryer is installed and operational. ***Air supply pipe must be clean and free of oil, rust, water, and chips.***

Refer to Figure 2.2 – System (Electrical) Control Panel, page 2.4, Item 4, and Figures 3.2 – Econo-Coat System Key Components, and 3.3 – Pneumatic Diagram, pages 3.7 and 3.8.

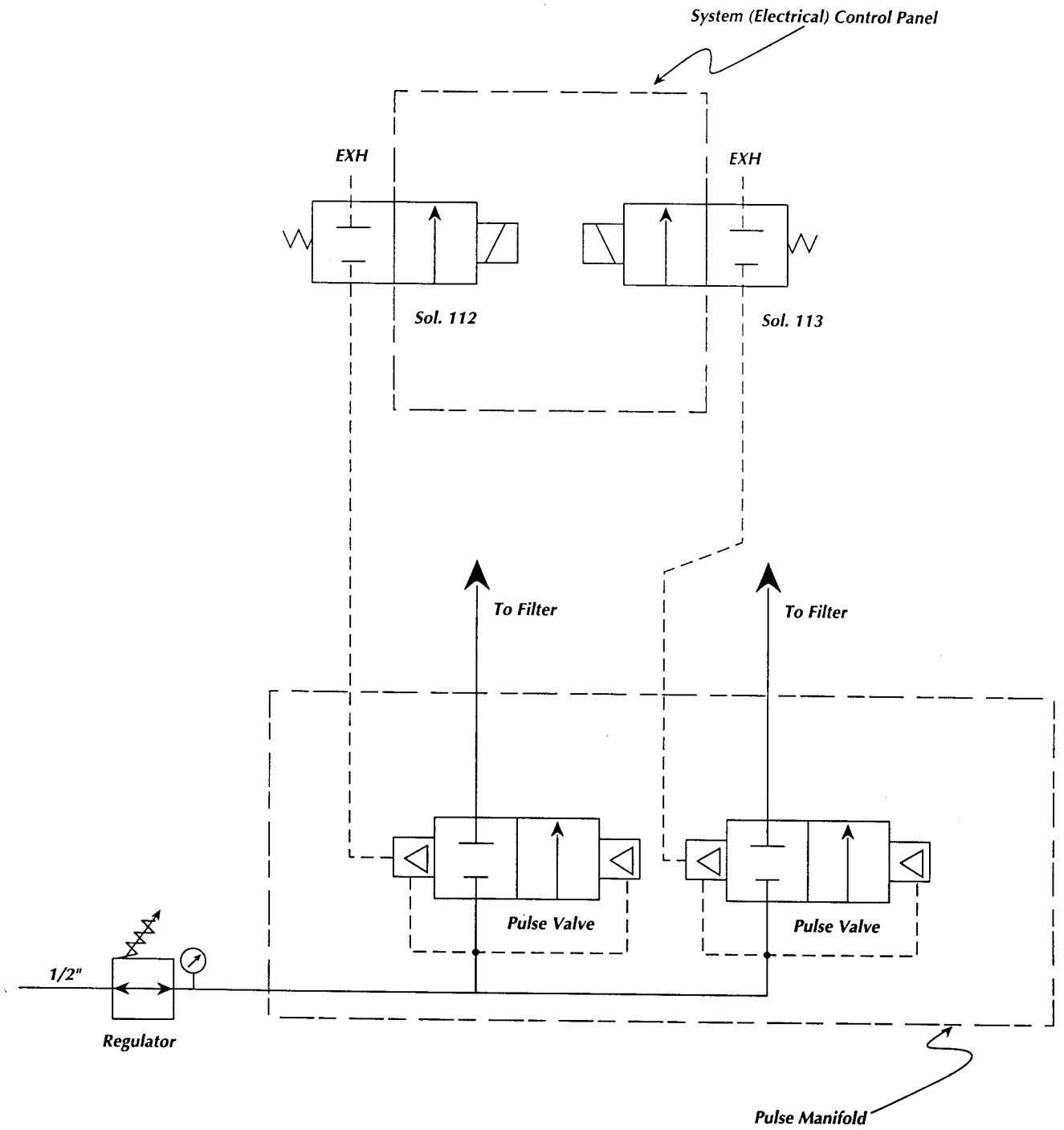
1. Install a manual shutoff valve (A) at the air supply source. Install a 1/2" O.D. polypropylene tube fitting (B) at shutoff valve to the air regulator and gauge (C).
2. Route 1/2" O.D. tubing (D) from the fitting to the air supply regulator and gauge located below the system (electrical) control panel (G).
3. Check to ensure pilot air tubing (E) is connected between solenoid valves (112 and 113) mounted on the underside of the system (electrical) control panel (G) and the diaphragm valves (pulse valves) mounted on the manifold under the cartridge filters (inside the lower portion of the fan housing).
4. Check connection of filter pressure sensing line (F).

Figure 3.2 – Econo-Coat System Key Components



Installation, cont.

Figure 3.3 – Pneumatic Diagram



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Final Assembly and Inspection

1. The cartridges are installed and torqued at the factory. The proper sealing of the cartridge gaskets must be checked to see if loosening has occurred during shipment. Using the white plastic ruler (.020 feeler gauge supplied with the system) check the gasket seals by attempting to insert the ruler under the bottom cartridge seal. If the gauge slides under the seal, additional tightening of the torque screws is required. ***Do not overtighten.***

2. Check to ensure final filters are sealed. Tighten if necessary.

3. Turn ***pulse selector*** switch to OFF position. Open system (electrical) control panel door and (using a screwdriver) adjust pulse timers to:

   OFF – 15.0 seconds

   ON – 0.07 seconds

4. Turn plant electrical disconnect ON. Open manual air supply shutoff valve. Check for air leaks.

5. Press ***exhauster start*** pushbutton on system (electrical) control panel. Check to ensure motor is running in a clockwise direction. If not, disconnect and lock out power at the disconnect ahead of the system (electrical) control panel. Reverse the L1 and L2 wires at the panel disconnect switch. Restore power and restart fan. Check for air flow through booth.

   NOTE: *Refer to the appropriate manuals for installing any optional powder application equipment.*

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Section 4
Operating Instructions

Operation

Safety

CAUTION! – Before operating the equipment described in this manual, review and become familiar with the warnings and cautions in "Section 1 – Safety Summary."

WARNING! – Thoroughly review the powder application equipment manuals to ensure all components are properly installed. Become familiar with safety warnings, operating instructions, and the KV and air flow settings.

WARNING! – Always ensure that application equipment and parts to be coated are properly grounded to a true earth ground.

Start-up

1. Turn ***pulse selector switch*** to OFF position.

2. Turn ON electrical power and compressed air to system. Adjust main air regulator to 60 psi.

3. Press ***exhauster start*** pushbutton. Check final filter differential pressure gauge on side of fan housing. Pressure should be less than 5.0" w.c. A reading above 5.0" indicates clogged final filters. *[A preset pressure switch inside the electrical control panel is interlocked with the electrical supply and will shut the system down if this setting is exceeded (indicating the need to change final filters).]* Reference "Periodic Maintenance" for final filters, page 5.3.

4. Check to ensure that air is circulating through the booth filters. Make sure powder in feed hopper is properly fluidized.

5. Test spray items to be coated. Adjust KV and air flow settings to obtain desired results.

Operation, cont.

Shutdown

1. Turn OFF electrostatic power and air at gun console. Ground gun electrode.

2. Turn ***pulse selector switch*** to ON position. Wait 5 minutes and turn pulsing OFF. This procedure will clean the cartridge filters of oversprayed powder.

3. Press ***exhauster stop*** pushbutton to turn OFF fan. Turn disconnect switch handle to OFF position.

4. Perform daily preventive maintenance procedures as described in "Section 5 – Preventive Maintenance," of this manual and the appropriate sections in powder application system manuals.

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Section 5
Preventive Maintenance

Before performing any of the following procedures, review and become familiar with the warnings and cautions in Section 1 – Safety Summary.

Daily Maintenance

Booth Enclosure	With the fan ON and cartridge pulsing OFF, clean booth interior with a rubber squeegee or other grounded, non-sparking device. Remove collected powder from booth for reclaim.
Powder Guns	Clean guns according to instructions in gun manuals. Replace any worn parts as necessary.
Powder Pumps	Clean pumps according to instructions in pump manuals. Replace any worn parts as necessary.
Compressed Air	Open drip leg and check for water, oil, or other contaminants with a clean white cloth. If contaminants are found, correct problem before resuming spray operations. Check and correct regulator settings.
Air Dryers and/or Filters	Clean and drain filters. Check air dryer for proper operation.
Grounding	Continually check equipment and part grounds. Clean and strip part hangers regularly.

Periodic Maintenance

Electrical Connections	Tighten electrical connections and inspect for loose or broken wires.
Gun and Electrostatic Cables	Check gun resistor and electrostatic cable resistance with a megohm meter regularly — as described in gun and cable manuals.
Pump Feed Tubing	Check flexible tubing carrying powder from pump to gun. Disconnect tubing from pump and gun. Blowout tubing (into booth) with exhaust fan ON. If powder has "impact-fused" inside tubing, replace tubing.
Cartridge Filters	Visually check cartridge filters for damage. Remove final filters and check for signs of powder inside fan housing. Replace cartridge filters if necessary.
Final Filters	Check differential pressure gauge on side of fan housing. System will automatically shut down when pressure drop reaches 5.0" w.c. (indicating final filters are clogged). Clean or replace final filters. (Reference "Start-up," page 4.2.) Disconnect and lockout power to system. Check for signs of powder inside fan housing. Replace cartridge filters if necessary.
Fan Motor	Lubricate motor bearings every six months with one of the following greases: Dolium R (Shell); SRI No. 2 (Chevron); Premium RB (Texaco). Shut OFF motor. Install grease gun on clean grease fitting. Apply two full strokes to each fitting. Do not overgrease.

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Section 6
Troubleshooting

Troubleshooting guides are provided in chart form to assist the user in finding possible causes of abnormal conditions and provide suggested corrective measures.

Obvious causes of conditions (such as broken wires, disconnected tubes, etc.) are not included in this guide.

Call your Nordson representative if difficulty arises in using a troubleshooting procedure, or if a condition is encountered which has not been discussed.

How To Use

This section is compiled in chart form to assist you in finding a probable cause to an abnormal condition. Where repair or replacement of components is necessary, refer to "Section 7 – Disassembly and Repair," and "Section 8 – Parts Lists."

Charts

Charts are broken down into the following:

Obvious causes of conditions (such as broken wires, disconnected tubes, etc.) are not included in this guide.

If any difficulty should arise using this guide, or a condition is encountered which has not been covered, please contact your Nordson representative for assistance.

Condition-A

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

Probable Cause	Suggested Correction
1. Unsuitable fluidization of feed hopper.	a. Adjust (increase or decrease fluidizing pressure).
	b. Check for moisture or oil in air supply.
2. Low powder level in feed hopper.	a. Add powder.
3. Powder gun pump.	a. Inspect and clean venturi nozzles and throats. Replace if worn.
	b. Verify sealing of suction adapter O-rings.
	c. Check for obstructions in suction tube or hoses. Look for large contaminants floating in powder feed hopper.
4. Obstruction in feed tubing to gun.	a. Remove feed tube at gun. Look for smooth powder outflow. Remove tubing at pump and blow out.
	b. Eliminate kinks, severe bends, pinching, or any cause of impact fusion.
	c. Reduce length of hose to 25' maximum, and vertical rise of 9' maximum.

Condition-A, cont.

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

Probable Cause	Suggested Correction
5. Severe tribo-charging in feed tube to gun.	a. Contact Nordson representative for alternate tubing material. b. Review problem with powder supplier.
6. Gun obstruction, parts worn–*flat spray.*	a. Refer to gun manual. Clean nozzle and internal passages. b. Replace worn parts.
7. Gun obstruction, parts worn–*conical spray.*	a. Refer to gun manual. Clean nozzle, and internal passages. b. Verify that gap between deflector and nozzle is approximately 1/8" all around. c. Replace worn parts.
8. Flow rate or atomizing air pressure.	a. Adjust settings in accordance with gun console manual.
9. Low electrostatic voltage (KV).	a. Increase and check KV at gun with KV meter.

Condition-B

When powder coating parts, problems occur with the following:
- *Uniformity*
- *Edge Coverage*
- *Film Build*
- *Wrap Around*
- *Penetration into recesses or corners (Faraday Cage Effect)*

Probable Cause	Suggested Correction
1. Poor ground (>1 megohm).	a. Clean hangers, fixtures, and hooks. b. Assure conveyor grounding.
2. Gun placement.	a. Keep gun 10 - 14" from part.
3. Gun pump pressure settings.	a. Change flow rate air pressure for more or less powder. b. Change atomizing pressure to alter spray 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. Gun nozzle selection.	a. Normally use flat spray for large, regular-shaped parts. b. Use conical spray for deep recesses and most hand touch-up.
6. Powder feed.	a. Refer to Condition-A.
7. Wrong powder for application.	a. Contact powder supplier and/or Nordson representative.

Condition-C

	Probable Cause	Suggested Correction
Final Filters: *• Clogged* *• Powder in fan compartment*	1. Leaking cartridge filters.	a. Observe differential pressure gauge on side of collector module. A reading close to or above 5" w.c. indicates that final filters are clogged. Remove cartridges. Clean gaskets. Reinstall. Replace final filters.
	2. Damaged cartridge filter gaskets.	a. Replace cartridge and final filters.

Condition-D

Cartridge Filters:
• Clogged
(Powder escapes from booth due to poor air circulation through booth)

Probable Cause	Suggested Correction
1. Inadequate pulse blowdown.	a. Increase pulse pressure.
	b. Decrease "OFF TIME" of pulse timers. *(Refer to page 2.7, Item 5.)*
2. Powder too fine or contaminated.	a. If using reclaimed powder, reduce ratio of reclaim-to-virgin powder.
	b. Check particle size of powder.
	c. Replace contaminated powder.
3. Pulse valve is not operating.	a. Diaphragm ruptured. Replace diaphragm.
	b. Spring broken and is preventing valve from operating properly. Replace spring.
	c. Pulse solenoid is clogged. Remove restriction. Clean.

Condition-E

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

Probable Cause	Suggested Correction
1. Final filter pressure switch (PS108).	a. Drop out / clogged filters. 1) Locate source of powder leakage and correct problem. (See "Condition-C.") b. Failed switch. Replace switch.
2. Fuse(s) blown.	a. Replace fuse(s).
3. Motor overload shutdown.	a. Possible motor, contactor or operational problem. 1) Check exhauster fan for proper direction. 2) Check for mechanical binding of motor assembly. 3) Check for contact corrosion at M108. 4) Check operation of OL108 for failure.
4. Electrical wiring problem.	a. Possible circuit failure. Contact qualified electrician.

Condition-F

Powder:
• Escaping from booth openings

Probable Cause	Suggested Correction
1. Cartridge filters clogged.	a. Refer to "Condition-D."
	b. Pulse the cartridge.
2. Cross drafts.	a. Check air conditioning system intake/discharge or other sources.
3. Entering parts are too hot.	a. Cool parts before they enter the 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. Parts larger than design specifications.	a. Contact Nordson representative.
7. Fan rotation backwards.	a. Reverse rotation of motor.

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Section 7
Disassembly and Repair

This section provides instructions for repair and replacement of various parts of the Nordson Econo-Coat Powder Booth / Recovery System.

Repair instructions for powder application equipment can be found in manuals included with the equipment.

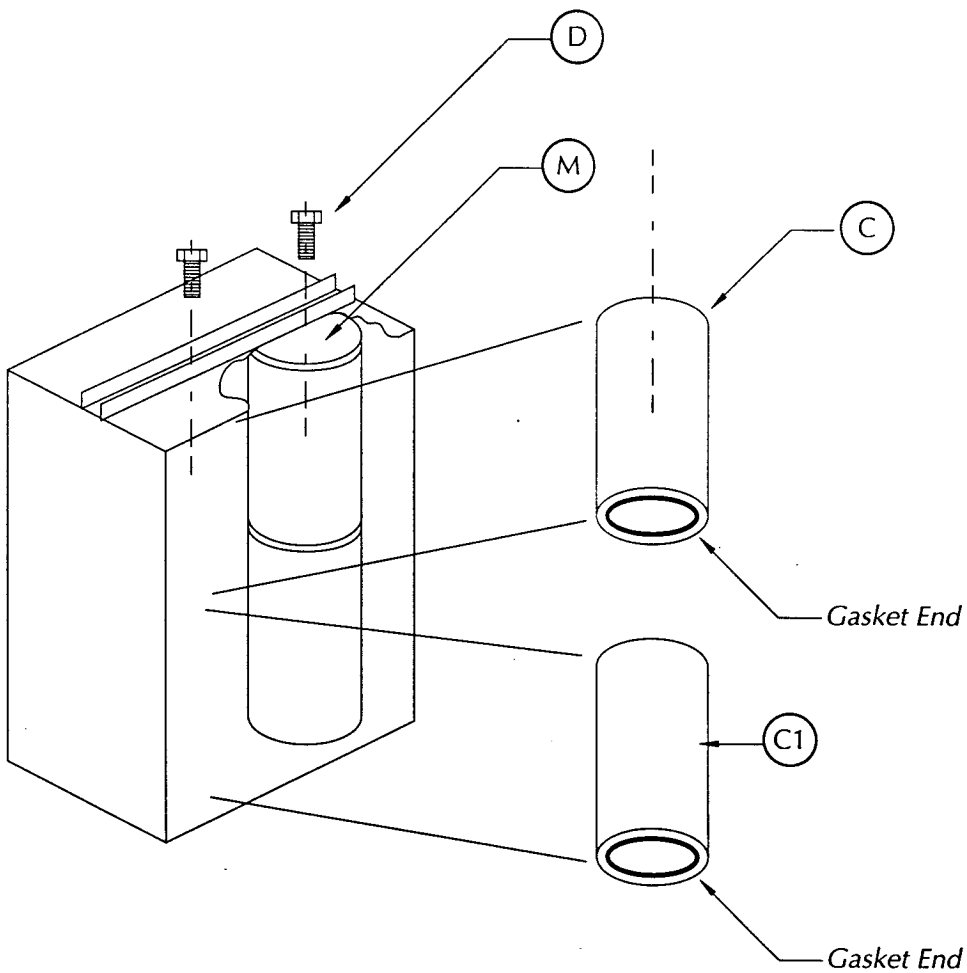
Safe Operating Guidelines

Safety Precautions

WARNING! – Disconnect and lock out electrical power to the system at a disconnect or breaker in the service line ahead of the electrical control panel before removing any panels or performing repair procedures.

WARNING! – If using a conveyor, make sure it is shut down and locked out before performing any maintenance or repairs on the powder booth/ recovery system.

Figure 7.1 – Cartridge Removal and Replacement



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Cartridge Filters

Removal and Replacement

Note: 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 booth / recovery system.

[Refer to Figure 7.1 on opposite page.]

1. Turn exhaust fan ON. Pulse cartridge filters for five minutes. Shut OFF filter pulsing and exhaust fan.

2. Disconnect and lock out electrical power. Shut off compressed air supply and relieve system pressure.

3. Squeegee booth and remove collected powder. Wear OSHA-approved respirator.

4. Back out two push plate torque screws (Item D) until they no longer contact upper cartridge push plates.

5. Remove cartridge filters. Remove push plates (Item M) from upper filters and clean RTV sealant from push plates.

6. Remove new filters from cartons. Two open-ended filters (Item C1) and two filters with one closed end (Item C) are needed. Inspect filters and gaskets for damage. DO NOT use damaged filters.

7. Apply two short beads of RTV sealant around the recessed diameter of the concave closed ends of the two cartridges (Item C). Install push plates (Item M) into the recesses with counter-bores facing outwards. The RTV sealant will cure and hold the push plates in place in approximately sixty minutes.

8. Install the two opened-ended cartridges (Item C1) in the collector module over the openings to the fan compartment.

9. Install the remaining two cartridges (Item C) in the collector module, on top of the open-ended cartridges, with push plates up. Make sure cartridge gaskets match-up.

NOTE: Tightening in excess of this torque limit will cause destruction of the cartridge.

10. Inspect cartridges for alignment and proper gasket sealing. Using the white plastic ruler, (.020 feeler gauge originally supplied with the system), check the gasket seals by attempting to insert the ruler under the bottom cartridge seal. If the gauge slides under the seal, additional tightening of the torque screws is required. ***Do not overtighten.***

Final Filters

Reference Figure 8.1 – Exploded System View, page 8.2a.

Removal and Replacement

WARNING! – The interior of the fan compartment contains moving parts which can cause serious personal injury. Disconnect and lock out electrical power before removing and replacing final filters.

1. Turn OFF exhaust fan. Disconnect and lock out electrical power.
2. Remove screws, springs, and upper filter Z-brackets. Loosen lower Z-brackets.
3. Remove filters.
4. Remove new filters from cartons and inspect for damage. DO NOT USE DAMAGED FILTERS.
5. Install new filters on bottom Z-brackets. Do not damage gaskets. Install springs, upper Z-brackets and screws. Finger-tighten all screws.
6. Check position of filters to ensure adequate sealing on all four sides. Tighten Z-bracket screws to slightly compress gaskets.

Pulse Valves

Reference Figure 8.1 – Exploded System View, page 8.2a.

Removal and Replacement

1. Disconnect and lock out electrical power to system. Shut off compressed air supply and relieve air pressure.

2. Remove 12 screws from around the perimeter of rectangular panel at lower front of collector module (below enclosure).

3. Remove panel, being careful not to damage gasket. Replace gasket if damaged.

4. Remove supply air and pilot air tubing from manifold and pulse valves. Remove manifold from brackets. Unscrew valves from pipe nipples.

5. Apply Teflon tape to nipple threads and screw new valves onto nipples. Position valves so that when tightened on nipples, valves point straight upwards toward cartridge filters. Do not tighten at this time.

6. Install manifold on brackets. Position manifold and tighten valves on nipples so that valve nozzles are 17" apart, center-to-center, 10-5/8" from nozzle centers to side walls, and nozzles are centered under cartridges.

7. Reconnect supply air tubing to manifold and pilot tubing to valves.

Fan and Motor

Reference Figure 8.1 – Exploded System View, page 8.2a.

Removal and Replacement

1. Disconnect and lock out electrical power to the system.
2. Remove the flexible conduit from the motor. Tag and disconnect the three wires from the motor leads.
3. Remove 12 bolts securing the motor plate to the collector module.
4. Pull the entire assembly straight out of the compartment. Do not damage the fan inlet cone or the fan wheel.
5. Remove the fan wheel from the motor shaft by loosening three square head set screws and pulling wheel off the shaft. Save the shaft key for reuse. *The fan wheel must be keyed to the shaft.*
6. Reassembly is accomplished by performing Steps 1 through 5 in reverse.

Section 8
Parts List

Assembly components are shown and referenced by item number where appropriate.

Your Nordson representative and the customer service representatives are available to help you with any questions concerning the operation of, and ordering parts for your Econo-Coat Powder Booth / Recovery System.

Order Information

Replacement Parts – New

Replacement parts may be ordered through your local Nordson representative or by contacting our Customer Service Center.

When ordering parts, use the description shown in the parts list, the part number (if given), and the quantity desired.

Address your correspondence to:

United States

Nordson Corporation
Customer Service Center – Nortech
5875 Peachtree Industrial Boulevard
Norcross, GA 30092
(800) 241-8777 • (404) 441-3040
FAX: (404) 242-7350

Canada

Nordson Canada, Ltd.
849 Progress Avenue
Scarborough, Ontario
M1H 2X4
(416) 438-6730
FAX: (416) 438-6714

RBX

Nordson's "Rebuilt Exchange" program can save you up to 50% of the cost of a new component while eliminating downtime and costly in-plant repairs. Old, worn-out units, hoses, and guns may be traded for rebuilt Nordson equipment which has the same warranty as new Nordson equipment. Contact Nordson at the above numbers for further information.

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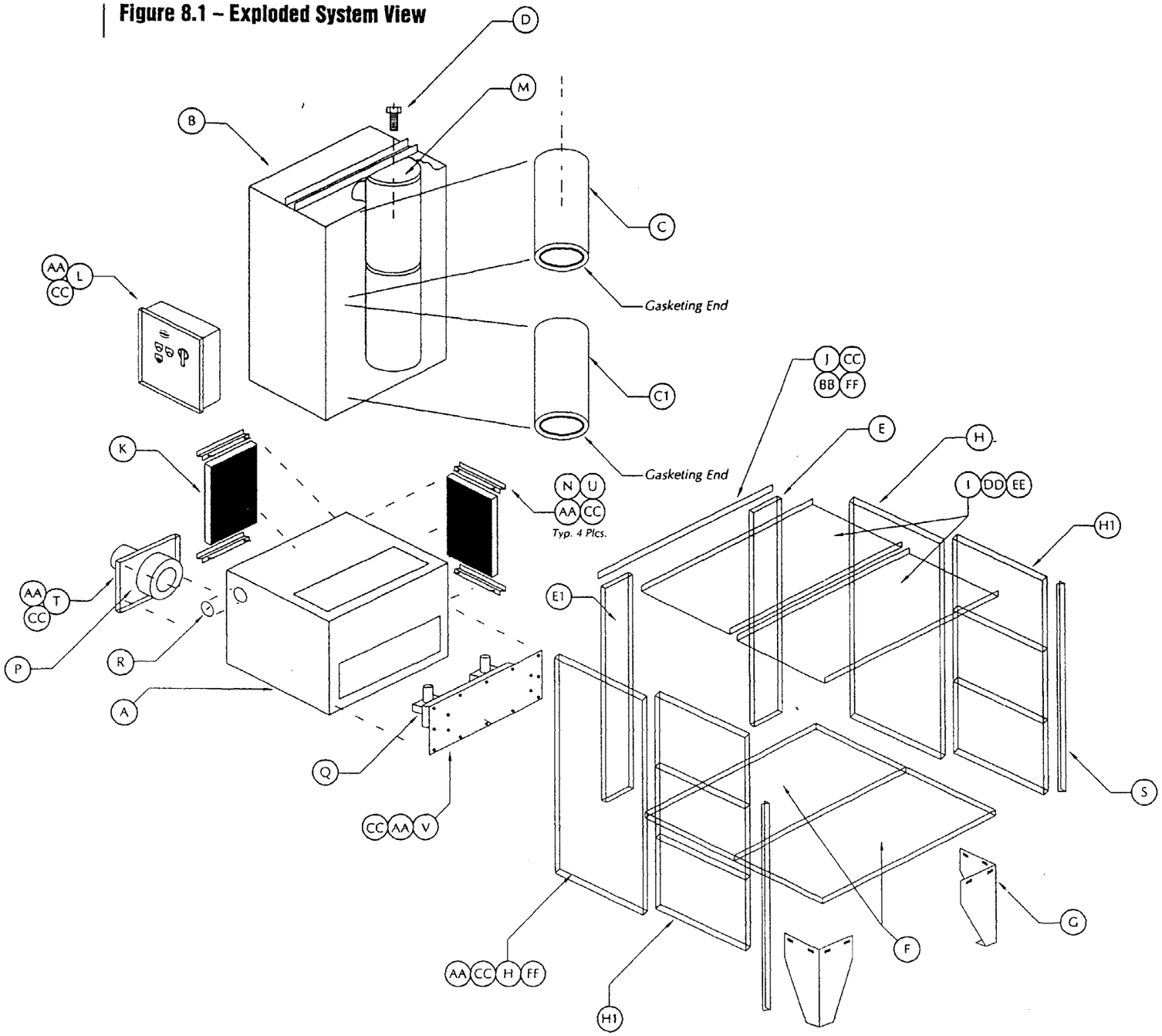
Part Diagram and List

Figure 8.1 – Exploded System View



	P/N		Qty.
A		Base (fan housing) 898976-05	1
B		Cartridge Housing 898976-04	1
C	101414	Cartridge, one end open	2
C1	101413	Cartridge, both ends open	2
D		Torque Bolt, 1/2-13 x 6.0" Hex Hd Scr	2
E		Panel, St.Stl. 11" W x 61-1/2" L 898976-03	1
E1		Panel, St.Stl. 11" W x 61-1/2" L 898976-03A	1
F		Panel, St.Stl. 30" W x 63" L ... 898976-63	2
G		Leg 898976-06	2
H		Panel, St.Stl. 30" W x 60" L ... 898976-03	2
H1		Panel, St.Stl. 30" W x 20" L ... 898976-03	6
I		Panel, Poly 30" W x 63" L 898976-03	2
J		Top Angle Bracket 63.0" L	1
K	101432	Final Filter	2
L		Electrical Control Panel 898976-01	1
M		Push Plate 898839	2
N		Final Filter Bracket 898973	4
O*		Motor, Bldr 3 HP, 208/230/460VAC, 60Hz	1
P		Fan	1
Q		Pulse Valves, RCA 25TD (GOYEN)	2
R		Final Filter Gauge, 2-5005 (DWYER)	1
S		20" Panel Angle Bracket	2
T		Fan Mounting Plate	1
U	247206	Spring (Final Filter Bracket)	4
V		Manifold Mounting Plate	1
AA		5/16-18 x 3/4 Hex Hd Bolt	160
BB		5/16-18 x 1-1/2 Hex Hd Bolt	10
CC		5/16 Flat Washer	320
DD		3/8-16 x 1-1/2 Hex Hd Poly Bolt	10
EE		3/8-16 Hex Nuts, Poly	10
FF		5/16-18 Hex Nuts	160

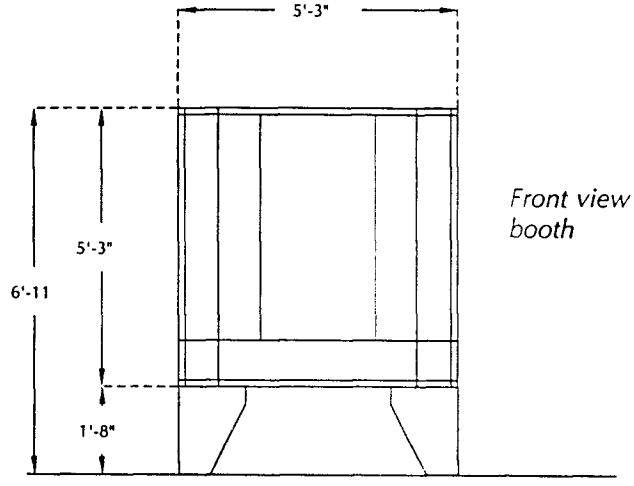
**O — Standard voltage.*

Section 9
Technical Data

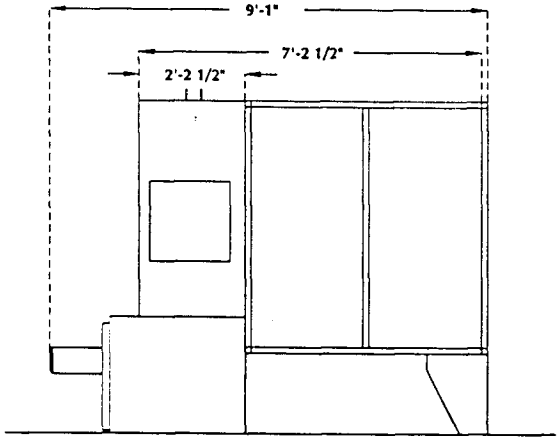
Because of possible technological or quality improvements, equipment specifications are subject to change without notice.

Equipment Specifications

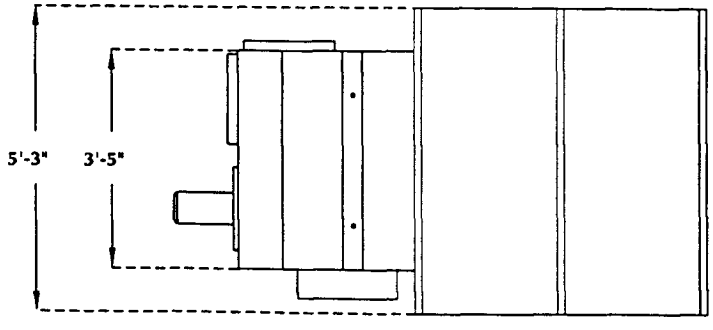
Figure 9.1 – System Dimensions



Front view of booth



Side view of booth



Top view of booth

Electrical

230/460V, 3Ø, 60 Hz is standard.

Compressed Air

60 – 100 psi clean, dry air. Pressure dewpoint 38°F.

Ambient (Room) Air

70 – 80°F

45 – 55% RH

NOTE: Refer to "Section 2 – Equipment Familiarization" for further information on normal design conditions.

System Weight

Shipping weight ..... 1900 lbs.

Completed system ..... 1030 lbs.

Nordson Locations Worldwide

Nordson Corporation • World Headquarters

Nordson Corporation
28601 Clemens Road
Westlake, Ohio 44145
FAX (216) 892-9507

North American Division

Nordson Corporation
Powder Systems Group
1150 Nordson Drive
P.O. Box 151
Amherst, OH 44001
(216) 988-9411
FAX (216) 985-1471

Nordson Corporation
350 Research Court
Technology Park
Norcross, GA 30092
(404) 449-7570

Canada

Nordson Canada, Ltd.
849 Progress Avenue
Scarborough, Ontario M1H 2X4
(416) 438-6730

Nordson Canada, Ltd.
2670 Rue Paulus
Ville St. Laurent, Quebec H4S 1G1
(514) 332-6770

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Head Office European Division
Postfach 3234
Heinrich-Hertz-Strasse 42
4006 Erkrath
West Germany, Germany
49-211-2002-0

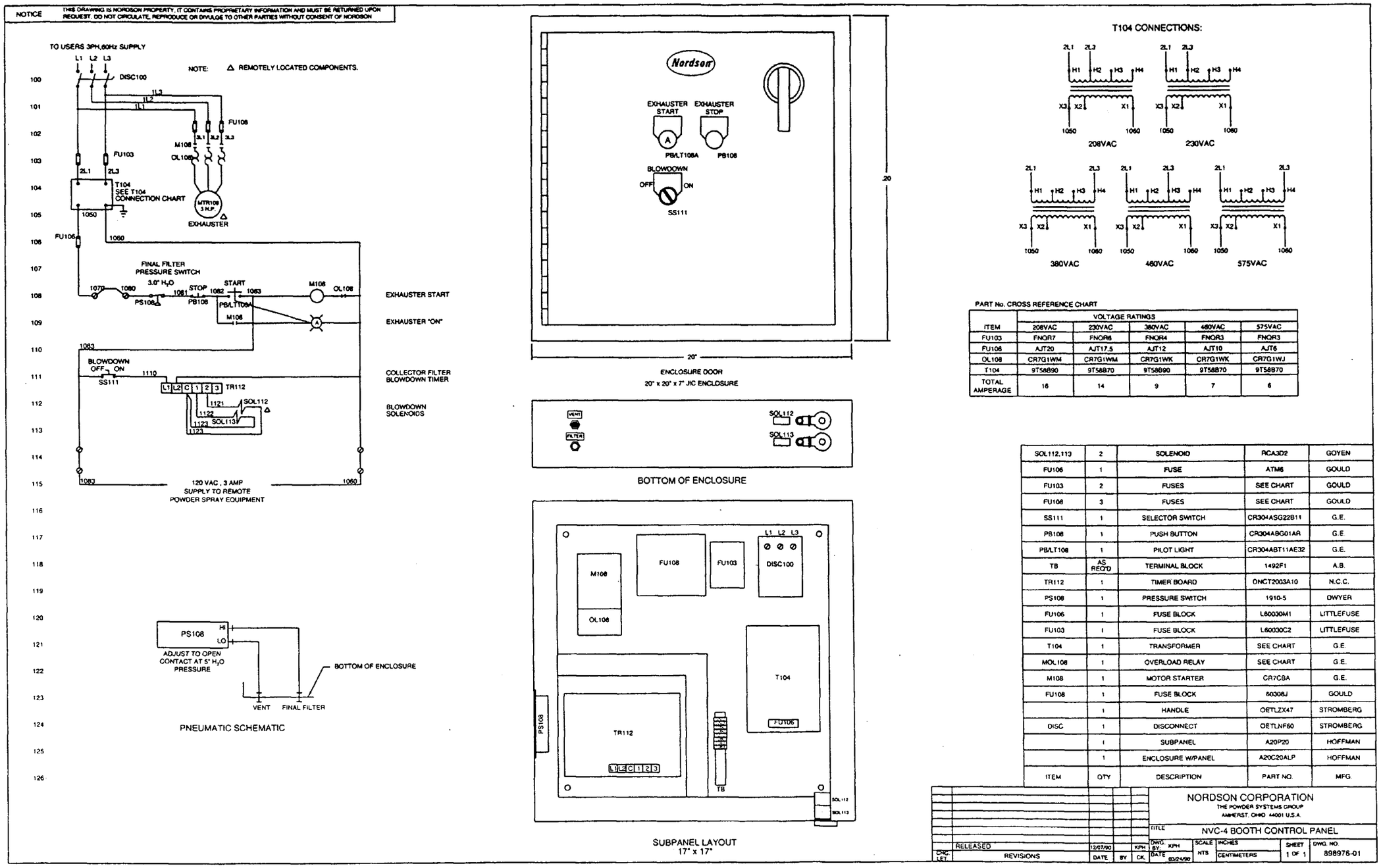
Japanese Division

Nordson K.K.
#32-36, 3-Chome
Higashi-Shinagawa
Shinagawa-Ku
Postal Code No. 140
Tokyo, Japan
81-3-450-8822

Pacific / South Division

Nordson Corporation
555 Jackson Street
P.O. Box 151
Amherst, OH 44001
(216) 988-9411

Figure 9.2 – Electrical Schematic



PART No. CROSS REFERENCE CHART

ITEM	VOLTAGE RATINGS				
	208VAC	230VAC	380VAC	460VAC	575VAC
FU103	FNQR7	FNQR6	FNQR4	FNQR3	FNQR3
FU108	AJT20	AJT17.5	AJT12	AJT10	AJT6
OL108	CR7G1WM	CR7G1WM	CR7G1WK	CR7G1WK	CR7G1WJ
T104	9T58890	9T58870	9T58890	9T58870	9T58870
TOTAL AMPERAGE	16	14	9	7	6

ITEM	QTY	DESCRIPTION	PART NO.	MFG.
SOL112,113	2	SOLENOID	RCA3D2	GOYEN
FU106	1	FUSE	ATM6	GOULD
FU103	2	FUSES	SEE CHART	GOULD
FU108	3	FUSES	SEE CHART	GOULD
SS111	1	SELECTOR SWITCH	CR304ASG22B11	G.E.
PB108	1	PUSH BUTTON	CR304ABG01AR	G.E.
PB/LT108	1	PILOT LIGHT	CR304ABT11AE32	G.E.
TB	AS REQ'D	TERMINAL BLOCK	1492F1	A.B.
TR112	1	TIMER BOARD	ONCT2003A10	N.C.C.
PS108	1	PRESSURE SWITCH	1910-5	DWYER
FU106	1	FUSE BLOCK	L60030M1	LITTLEFUSE
FU103	1	FUSE BLOCK	L60030C2	LITTLEFUSE
T104	1	TRANSFORMER	SEE CHART	G.E.
MOL108	1	OVERLOAD RELAY	SEE CHART	G.E.
M108	1	MOTOR STARTER	CR7C8A	G.E.
FU108	1	FUSE BLOCK	60308J	GOULD
	1	HANDLE	OETLZX47	STROMBERG
DISC	1	DISCONNECT	OETLNF60	STROMBERG
	1	SUBPANEL	A20P20	HOFFMAN
	1	ENCLOSURE W/PANEL	A20C20ALP	HOFFMAN

NORDSON CORPORATION
THE POWDER SYSTEMS GROUP
AMHERST, OHIO 44001 U.S.A.

TITLE: NVC-4 BOOTH CONTROL PANEL

CHG LET	REVISIONS	DATE	BY	CK
	RELEASED	12/07/90	KPH	

DWG. BY: KPH
DATE: 03/24/90
SCALE: NTS
INCHES / CENTIMETERS
SHEET: 1 OF 1
DWG. NO.: 898976-01

Notes