Sure Clean™ Powder Coating System

Customer Product Manual
Part 1009153B
Issued 2/02

NORDSON CORPORATION • AMHERST, OHIO • USA

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

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Notice

Trademarks

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Section 1
Safety

Introduction

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

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

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include

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

Regulations and Approvals

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

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

Personal Safety

To prevent injury follow these instructions.

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

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.

- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding

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

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

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

Action in the Event of a Malfunction

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

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

Disposal

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

Section 2
Description

Introduction

This manual covers standard Sure Clean powder coating systems. It includes a description of the major system components and their operation; daily operation procedures; maintenance, troubleshooting, and repair procedures; and part numbers for normal wear items.

Because powder coating systems are customized to meet customer requirements, your system may have controls and equipment not described in this manual or located in different positions. Your Nordson representative can provide you with additional information and training to supplement this manual.

NOTE: This manual covers the standard 11250-cfm Sure Clean powder coating system. Other cfm ranges can be custom configured, but are not covered in this manual.

Subsystems

Refer to Table 2-1 for a description of the subsystems in a basic system.

See Figure 2-1.

Table 2-1 Subsystems

Item	Component	Function
1	After Filter	Filters unusable powder from the air before returning the air to the spray area.
2	Cyclone System	Reclaims usable powder and returns it to the powder feed center.
3	Booth Enclosure	Contains oversprayed powder while parts are being coated.
4	Powder Feed Center	Supplies powder to the spray guns and recycles reclaimed powder.
5	Gun Movers/Gun Blow-Off Assist System	Blows powder off the spray guns while moving the spray guns out of the booth enclosure.
Not Shown	Roll-On/Roll-Off System (Optional)	Moves the system offline for cleaning, color change, or repair.

Subsystems *(contd)*

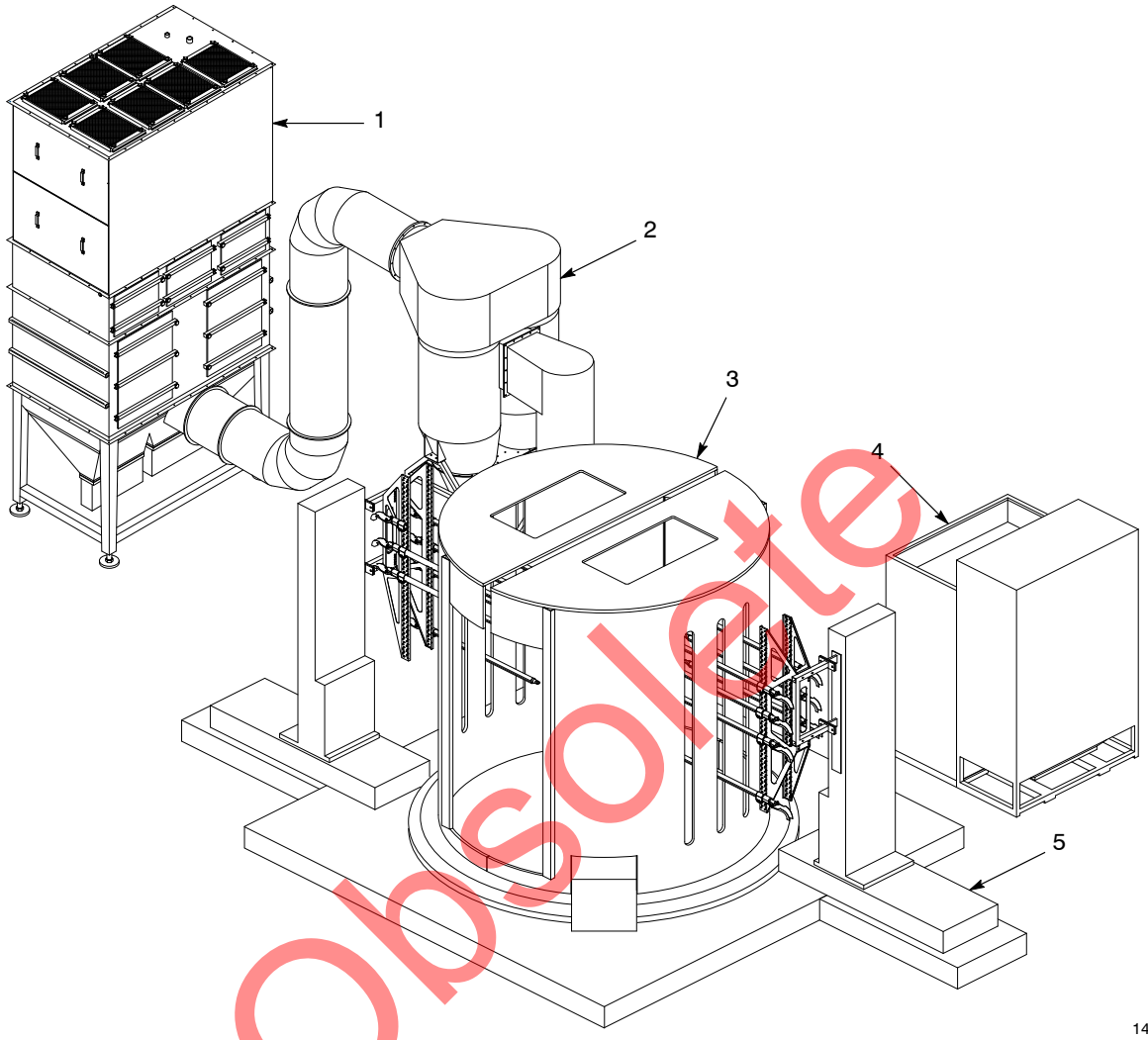

Figure 2-1 Sure Clean Subsystems

Note: Typical Sure Clean system shown. Your system may appear slightly different.

Booth Enclosure

Refer to Table 2-2 for a description of the major components of the booth enclosure.

See Figure 2-2.

Table 2-2 Booth Enclosure Components

Item	Component	Description
1	Canopy	Contains the oversprayed powder. Air flow through the canopy openings carries overspray (powder not deposited on the parts being coated) suspended in the air into the AeroDuct.
2	Floor	Rotates during powder coating operations, moving oversprayed powder on the floor into the AeroDuct. Raises up during the color change process to allow the operator to clean the booth interior and keep powder from accumulating under the booth.
3	AeroDuct	Draws the oversprayed powder off the floor and conveys it to the cyclones.
Not Shown	AeroWash System	Periodically sends pulses of air down the AeroDuct to reduce powder accumulation.

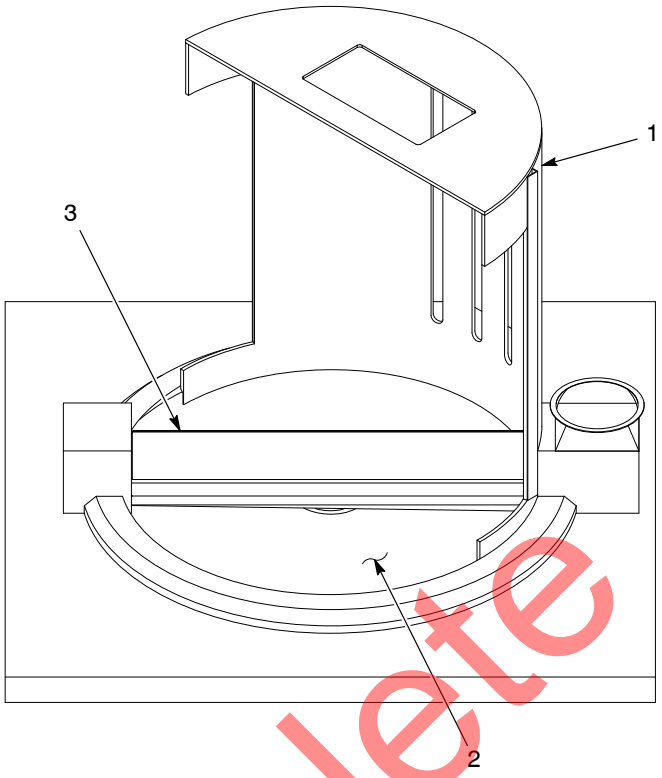

Figure 2-2 Booth Enclosure Components

Note: Half of canopy removed for clarity.

Gun Movers/Gun Blow-Off Assist System

Refer to Table 2-3 for a description of the major components of gun movers/gun blow-off assist system.

See Figure 2-3.

Table 2-3 Gun Movers/Gun Blow-Off Assist System Components

Item	Component	Description
1	Air Manifolds	Supply air to the blow-off nozzles.
2	Blow-Off Nozzles	Blow off oversprayed powder from the spray guns as the spray guns are being pulled out of the booth enclosure.
3	In/Out Gun Positioners	Move the spray guns into or out of the booth enclosure.
4	Oscillators (Optional)	Move the spray guns in repetitive patterns for through part coverage; position spray guns in between blow-off nozzles during color change.

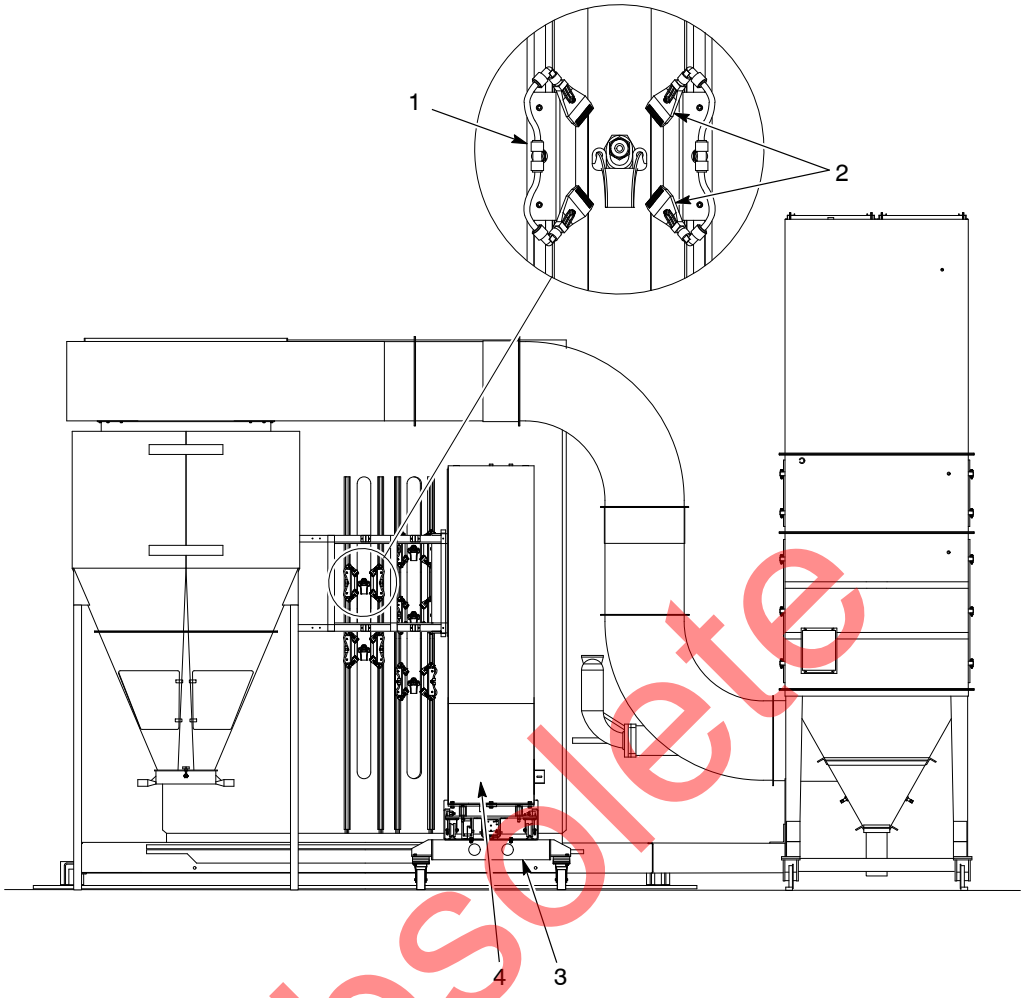

Figure 2-3 Gun Movers/Gun Blow-Off Assist System

Note: Oscillator shown is optional.

Cyclone System

The cyclone system reclaims usable powder from the airflow.

Cyclone System Components

Refer to Table 2-4 for a description of the cyclone system components.

See Figure 2-4.

Table 2-4 Cyclone System Components

Item	Component	Description
1	Cyclones	Separate the usable powder from the air flow through the recovery system. Twin tapered cylinders, connected to the inlet air ducts at the top and the transfer pan at the bottom.
2	Transfer Pan	Collects and stores reclaimed powder until the powder is transferred to the feed center.
3	Conveyor Line	Transports reclaimed powder from the transfer pan to the powder feed center.

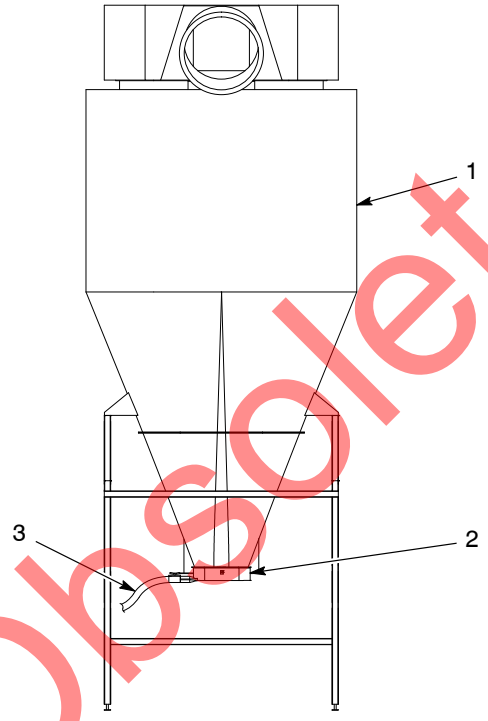

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Figure 2-4 Cyclone System (Front View)

Cyclone System Operation

See Figure 2-4.

System air flow draws oversprayed powder into the cyclones (1). Centrifugal force separates the usable powder from the air, and the usable powder falls into the transfer pan (2). The unusable powder, which is too fine to be reused, remains in the air flow and is drawn up the center of the cyclones and carried through the ducts to the after filter.

The Sure Max powder transfer system (located in the powder feed center) draws reclaimed powder through the conveyor line (3) to the powder feed center. The reclaimed powder is then sieved and returned to the powder feed source.

In systems without a powder feed center, a surge hopper with a transfer pump are located at the bottom of the cyclones, in place of the transfer pan. The transfer pump conveys powder to a rotary sieve. The rotary sieve breaks up any clumps of powder and transfers the powder to a hopper.

NOTE: If your system uses a rotary sieve and hopper instead of a powder feed center with Sure Max powder transfer system, refer to your sieve and hopper manuals for more information.

After Filter

The after filter filters unusable powder from the air before returning the air to the spray room.

After Filter Components

Refer to Table 2-5 for a description of the major components of the after filter.

See Figure 2-5.

Table 2-5 After Filter Components

Item	Component	Description
1	Final Filters	Remove fine powder particles from the air before returning the air to the spray room.
2	Fan/Motor Assembly	Draws powder-laden air out of the booth enclosure; through the cyclones and ductwork; into the after filter; and back into the spray room.
3	Waste Hoppers	Collect powder particles that are blown off the cartridge filters.
4	Fluidizing Plates	Fluidize the powder in the waste hoppers, allowing the powder to be pumped out of the waste hoppers.
5	Intake Duct	Brings powder-laden air from the cyclones to the after filter.
6	After Filter Panel	Contains after filter pulse timer panel, PULSE ON DEMAND switch, and differential pressure switches and gauges. Refer to *After Filter Panel* for more information.
7	Cartridge Filters	Filter powder particles out of the air before the air is drawn into the fan section.
8	Pulse Valves	Periodically send pulses of air through the cartridge filters to blow off powder collected on the cartridges.
9	Pulse Air Manifolds	Distributes compressed air to the pulse valves.
10	Pulse Valve Solenoid Boxes	Signal the pulse valves to open based on settings made in the pulse valve timer panel.
NOTE: The after filter may have either deflagration vents or an explosion suppression system. Contact your Nordson representative for information about your after filter's explosion venting or suppression equipment.		

After Filter Operation

See Figure 2-5.

Powder is conveyed through the intake duct (5) into the collector section, where the powder collects on the external surfaces of the cartridge filters (7). The air passes through the cartridge filters and flows up into the final filter section, through the fan (2) and final filters (1) back into the spray room.

The pulse valves (8) periodically release large volumes of compressed air into the centers of the cartridge filters, blowing the accumulated powder off the filters. Pulsing is controlled by the pulse valve timer in the after filter panel (6), which allows you to set both the time between pulses (delay) and the length (duration) of the pulse. The PULSE ON DEMAND switch on the after filter panel allows the operator to set cartridge pulsing to be either continuous or on-demand:

- CONTINUOUS: Cartridges are pulsed at operator-specified intervals set at the pulse valve timer.
- ON-DEMAND: Cartridges are pulsed continuously, but only when the cartridge filter differential pressure switch detects a pressure drop across the cartridge filters of 6.5-in. water column (wc).

The powder falls into the waste hoppers (3) in the bottom of the collector section. The waste hoppers are equipped with fluidizing plates (4), which diffuse air into the powder so that it will flow easily when the waste hoppers are emptied.

The final filter differential pressure switch monitors the pressure drop across the final filters. At 2.5-in. wc, a red warning light on the system control panel lights. At 3-in. wc, the entire system shuts down.

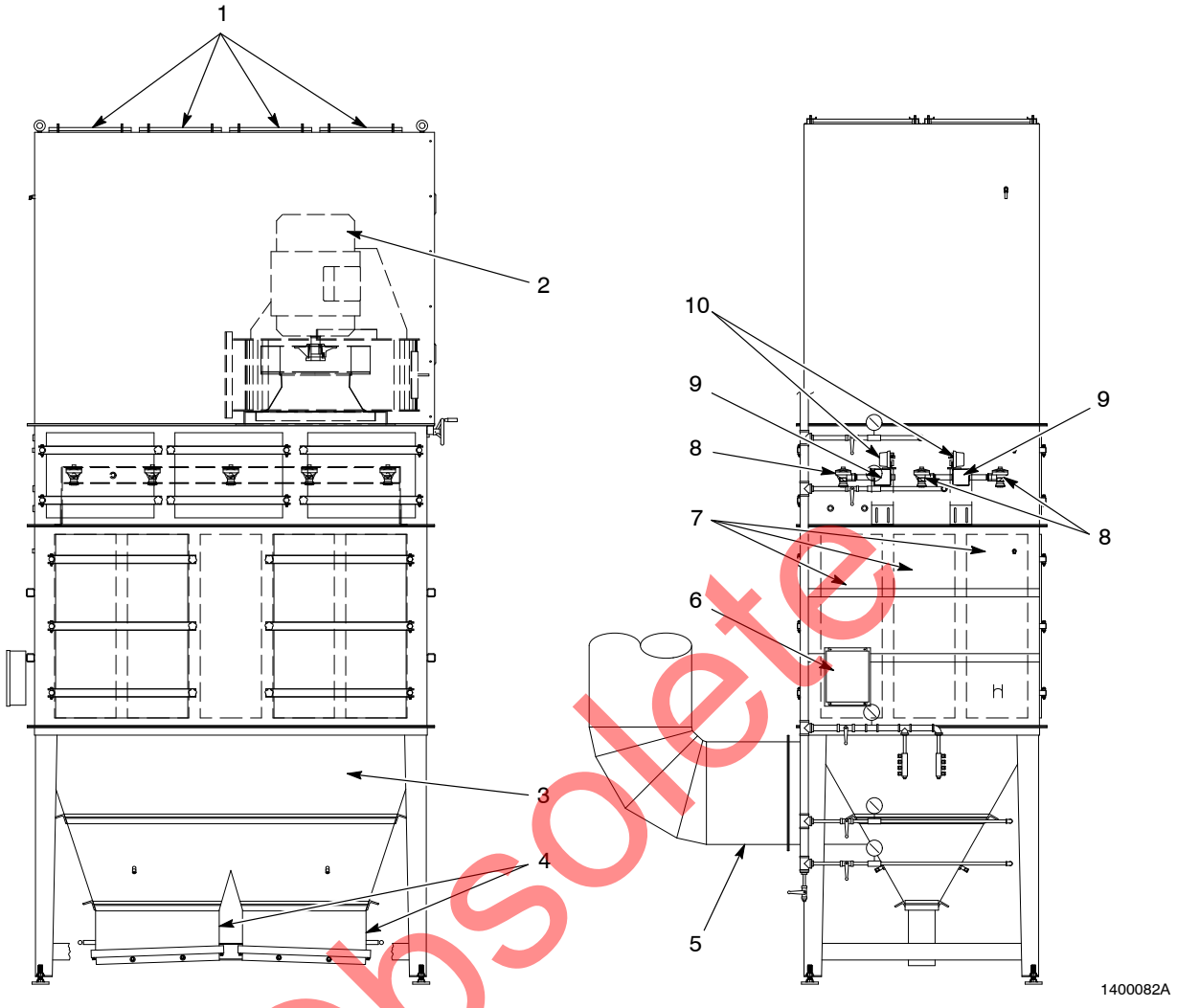

Figure 2-5 After Filter—Front and Side Views

Powder Feed Center

The powder feed center conditions reclaimed and virgin powder and delivers it to the spray guns. It also provides pneumatic and mechanical systems to aid in quick color changes.

NOTE: Refer to the *Powder Feed Center* manual for a detailed description of the powder feed center and its functions.

Powder Feed Center *(contd)*

Refer to Table 2-6 for a description of the major components of the powder feed center.

See Figure 2-6.

Table 2-6 Powder Feed Center Components

Item	Component	Description
1	Fan/Filter Section	Filters the air in the powder feed center enclosure before returning it to the spray room.
2	Enclosure	Contains fluidized powder within the feed center.
3	Powder Feed Center Control Panel	Houses powder feed center electrical and pneumatic controls; refer to *Control Panels* for information about the operator interface.
4	Sure Max Powder Transfer System	Draws powder from cyclones and drops powder into sieve.
5	Lance Assembly	Consists of a vertical slide assembly and one, two, or three pump block assemblies. Each pump block assembly consists of up to nine inline powder pumps and pickup tubes. A pneumatic cylinder raises and lowers the pump assemblies in and out of the feed source and onto the purge manifold. The pump is operated by the spray gun control system. While feeding from a standard box of powder, the lance assembly fluidizes the powder. The operator adjusts the fluidizing air pressure using a needle valve located on the lance assembly.
6	Sieve	Breaks up clumps of reclaimed powder and separates usable reclaimed powder from waste. **NOTE:** An optional, higher throughput Vibrasonic sieve screen is available. Refer to the *Options* section of the *Powder Feed Center* manual for parts and installation information.
7	Feed Source	Stores the powder supply for the spray guns. The source may be either a standard box of powder or an optional fluidizing hopper. **NOTE:** Optional fluidizing hopper is shown. Refer to the *Options* section of the *Powder Feed Center* manual for more information.
8	Vibratory Table	Vibrates to prevent cavitation when feeding powder from a standard box of powder. **NOTE:** The vibratory table does not vibrate while the optional fluidizing hopper is being used.
9	Purge Manifold	Pulses compressed air through the pickup tubes, pumps, powder feed hoses, and spray guns to blow out all loose powder. Consists of one manifold block for each lance assembly. Each manifold block is equipped with up to nine nozzles.

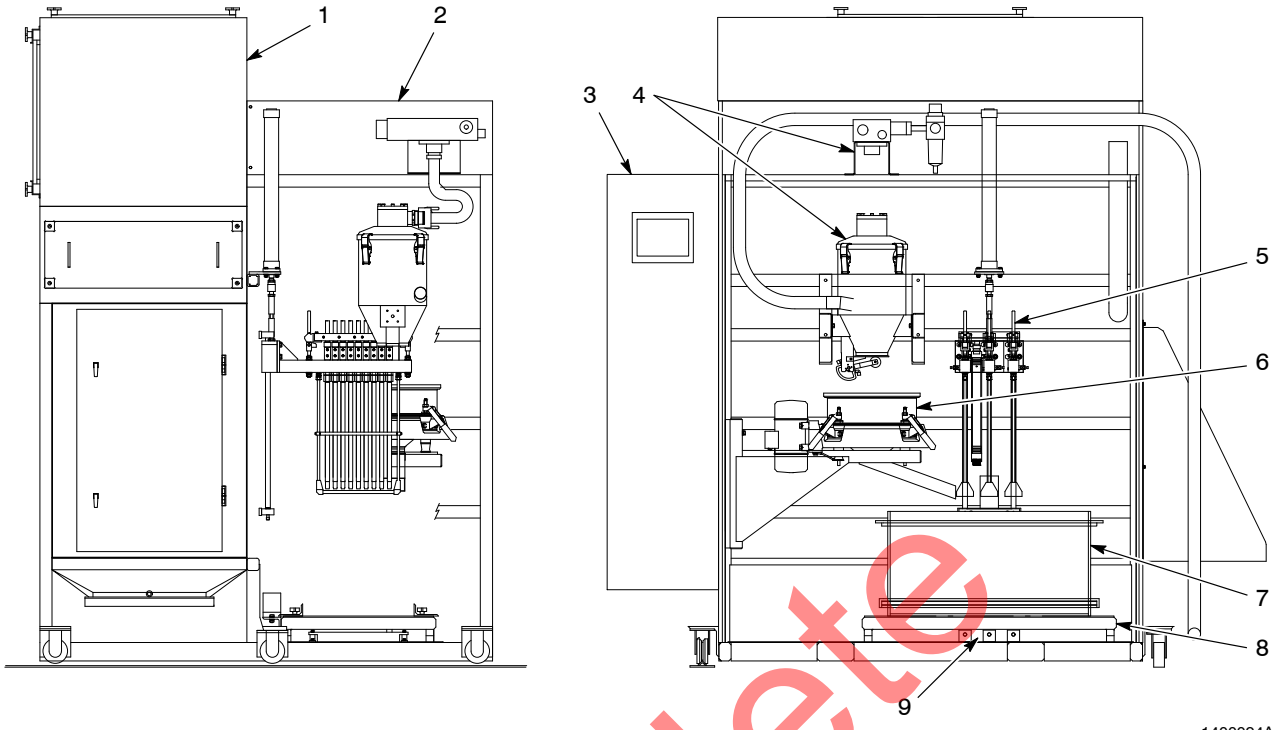

Figure 2-6 Powder Feed Center—Side and Front Views

Roll-On/Roll-Off System (Optional)

Roll-on/roll-off systems move the booth offline for color change, cleaning, and maintenance.

In roll-on/roll-off systems, the booth base and all related components are equipped with casters and motor drives. The casters ride on rails installed in the spray room floor. The motor drives move the platform online and offline.

Booth movement is controlled by online and offline end-of-travel limit switches. Operator controls consist of a **Booth Moving** screen on the operator interface and pendant buttons on the system control panel.

Control Panels

Refer to the following tables for a description of typical system controls. The contents and locations of the control panels vary depending on the system configuration and options installed.

Powder Feed Center Control Panel

Refer to Table 2-7.

Table 2-7 Powder Feed Center Control Panel

Component	Description
Operator Interface	Allows the operator to configure and operate the system; controls color change operations.
BOOTH LIGHTS Switch	Turns on or off lights inside the powder feed center enclosure.
Disconnect Switch	Turns on or off power to the powder feed center.
COLOR CHANGE CYCLE DONE Indicator	Amber. Blinks to indicate that an automated cycle of the color change process has been completed. Lights to indicate that the entire color change process has been completed.

System Control Panel

Refer to Table 2-8.

Table 2-8 System Control Panel

Component	Description
Disconnect Switch	Turns on and off system power and power to the powder feed center control panel.
SYSTEM START Button and Indicator	Green. Turns on power to the system control panel.
SYSTEM STOP Button	Red. Turns off power to the system control panel.
SYSTEM READY Indicator	Green. Lights when the SYSTEM START button is pressed and the safety duct gate is fully open.
LOCKOUT ENABLED Indicator	Red. Lights to indicate that the LOCKOUT keyswitch is in the LOCKED position. Blinks to indicate that a spray booth access door is opened.
LOCKOUT Keyswitch	Locks out the system for maintenance, repairs, or color change. NORMAL position: System is operating; all system components are enabled; floor is rotating and in the down position. LOCKED position: System is locked out; oscillators and in/out gun positioners are disabled; floor stops rotating and raises against the booth canopy.
BOOTH LIGHTS Switch	Turns on or off the customer-supplied external spray area lighting.

After Filter Panel

Refer to Table 2-9.

Table 2-9 After Filter Panel

Component	Description
PULSE ON DEMAND Switch	CONTINUOUS: Cartridges are pulsed at operator-specified intervals set at the pulse valve timer. ON-DEMAND: Cartridges are pulsed continuously, but only when the cartridge filter differential pressure switch detects a pressure drop across the cartridge filters of 6.5-in. wc.
Differential Pressure Gauges and Switches	Detect the pressure drop across the cartridge and final filters to indicate degree of clogging of the filter media. The final filter differential pressure switch is set to light a red warning light at 2.5-in. wc and shut down the entire system at 3-in. wc.
Pulse Valve Timer	Allows the operator to set the duration (on time) and delay (off time) of cartridge pulsing.
Air Flow Diverter Valve (Roll On/Roll Off Systems Only)	Controls the position of the duct diverter, directing air flow from either the on-line or off-line booth position.

Typical System Options

Refer to Table 2-10 for a description of typical system options. Refer to the manuals shipped with optional equipment for more information, or contact your Nordson Corporation representative.

Table 2-10 Typical System Options

Equipment	Description
Air Dryer	Removes moisture from the system air supply. Most systems use regenerative-desiccant or refrigerated air dryers.
Spray Gun Oscillators	Move the spray guns in repetitive vertical patterns for thorough part coverage.
Powder Drum Unloaders	Transfer powder from shipping drums to the powder feed center.
Fluidizing Hopper	Plastic box with a fluidizing plate in the bottom, allowing powder to fluidize using air pressure.
Part Identification and Spray Gun Triggering Systems	Identify and track parts on the conveyor line and control automatic spray gun movement, triggering, air pressure, and voltage.

Section 3
Operation

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

Introduction

The PLCs in the powder feed center and system control panels control the automatic processes in a typical system. The PLCs are typically programmed by your Nordson application engineer to suit your application requirements.

NOTE: The operator interface allows the operator to control system operation. The operator interface is typically located in the powder feed center control panel.

Main Menu

See Screen 3-1.

The **Main Menu** is the first menu that appears when you start up the system. Touching the buttons at the bottom of the menu allow you to access the system controls.

The **Auto**, **Manual**, **Setup**, and **Special Functions** buttons appear at the bottom of every screen.

- Touching the **Auto** button causes the **Auto Menu** to appear. Refer to *Auto Menu Functions* in this section for more information.
- Touching the **Manual**, **Setup**, and **Special Functions** buttons causes a row of buttons to appear directly above the existing buttons.

Main Menu *(contd)*

NOTE: Refer to *Manual Functions* in this section for more information about the **Manual** functions. Contact your Nordson representative for information about the **Setup** and **Special Functions** buttons.

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Screen 3-1 Main Menu

Auto Menu Functions

The **Auto Menu** allows you to control the automated functions of the system. Refer to Table 3-1 for a description of the functions of the buttons on the **Auto Menu**.

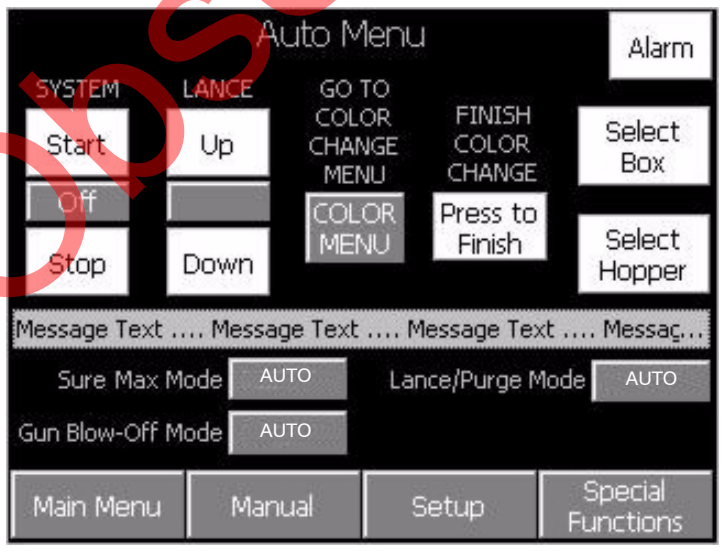
See Screen 3-2.

Table 3-1 Auto Menu Functions

Button	Function
Alarm	Opens the **Alarm Display** menu. **NOTE:** Refer to *Alarm Messages* in the *Troubleshooting* section for more information about the **Alarm Display** menu.
SYSTEM Start/Stop	Enables and disables all normal system functions.
LANCE Up/Down	Raises and lowers the powder feed center lance assembly.
GO TO COLOR CHANGE MENU	Opens the **Color Change Control** menu. **NOTE:** Refer to the *Color Change* section for more information about the **Color Change Control** menu.

Continued...

Button	Function
FINISH COLOR CHANGE	Returns the system to normal operation after the color change process is complete.
Select Box	When using a box of powder as a feed source, the • vibratory table turns on; • lance assembly fluidizing air turns on; and • lance assembly lowers as the powder level lowers.
Select Hopper	When using the fluidizing hopper as a feed source, the • vibratory table turns off; • lance assembly fluidizing air turns off; and • lance assembly maintains fixed position and activates bulk feed as the powder level lowers.
Sure Max Mode	Switches between **MANUAL** and **AUTO** Sure Max powder transfer system operating modes. Overrides the automated Sure Max powder transfer system.
Gun Blow-Off Mode	Switches between **MANUAL** and **AUTO** gun blow-off operating modes. Overrides the automated spray gun blow-off process.
Lance/Purge Mode	Switches between **MANUAL** and **AUTO** lance assembly/purge operating modes. Overrides the automated lance purge process.
Main Menu	Opens the **Main Menu**.



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Screen 3-2 Auto Menu

Manual Functions

The **Manual** function buttons display menus that allow you to control the system functions that are normally automated.

Refer to Table 3-2 for a description of the manual function buttons.

Table 3-2 Manual Functions

Button	Function
Feed Center	Allows the operator to manually control the following powder feed center functions: • fan motor (start/stop) • powder pumps (start/stop) • sieve (start/stop) • vibratory table or fluidizing air (start/stop) • lance assembly (raise/lower) • purge process (start/stop)
Spray Booth	Allows the operator to manually start or stop the following motors: • booth (after filter) fan • oscillators 1 and 2 (if applicable) • floor rotation (start/stop) • floor position (raise/lower) **NOTE:** The **BOTTOM OF STROKE STOP** button places the oscillators in the home position, in which the spray guns are lowered and centered between the blow-off nozzles.
Transfer Control	Allows the operator to manually control the following Sure Max powder transfer system functions: • mode (automatic/manual) • Sure Max pump (start/stop) • discharge valve (open/close)
Gun Blow-Off Control	Allows the operator to manually control the following functions for either spray gun station: • blow-off cycle (start/stop) • gun position (in/out)

Setup and Special Functions

The **Setup** and **Special Functions** buttons display buttons that can adjust system operating parameters and other functions. These functions are customized to your system and should only be adjusted under the supervision of your Nordson representative.

Typical Operating Settings

The settings listed here are approximate. You may need to adjust these settings to obtain the desired results.

Operating Air Pressures

Refer to Table 3-3.

Table 3-3 Typical Operating Air Pressures

Air Pressure	Setting
Input (System)	6 bar (90 psi)
Cartridge Filter Pulse (After Filter/Powder Feed Center)	4 bar (60 psi)
Waste Hopper Fluidizing (After Filter)	1 bar (15 psi)
Floor Lifter	4 bar (60 psi)
Vibratory Table (Powder Feed Center)	2 bar (30 psi)
Lance Assembly (Powder Feed Center)	6 bar (90 psi)
Horizontal Gun Movers	4 bar (60 psi)
AeroWash	5.5 bar (80 psi)

Pulse Valve Timer Board Settings

Refer to Table 3-4.

Table 3-4 Typical Pulse Valve Timer Board Settings

Timer	Setting
After Filter	
On Time (Duration)	0.07 seconds
Off Time (Delay)	90 seconds
AeroWash	
On Time (Duration)	5 seconds
Off Time (Delay)	2 minutes

Startup

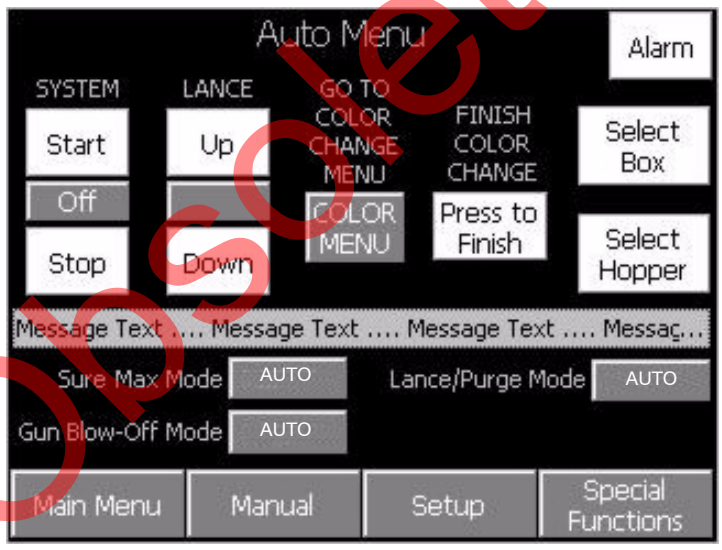
Use the following procedure to start up the system on a daily basis.

NOTE: These procedures assume that the system has been cleaned.

1. Turn the system, feed center, and exhauster (if applicable) control panel disconnect switches to the on position.
2. If applicable, move the system into the online position. Refer to *Booth Moving* in this section for more information.
3. Press the SYSTEM START button on the system control panel. The SYSTEM START indicator will light.

   The safety duct gate (located between the cyclones and the after filter) opens. When the gate is fully open, the SYSTEM READY indicator lights and the system is ready to start.
4. See Screen 3-3.

   Touch the **Auto** button on the **Main Menu** to display the **Auto Menu**.



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Screen 3-3 Auto Menu

5. Install the appropriate feed source. Refer to *Powder Feed Source Installation* in this section for instructions on installing the feed source.

NOTE: Make sure that the **Sure Max Mode**, **Gun Blow-Off Mode**, and **Lance/Purge Mode** buttons display **AUTO**. If a button displays **MANUAL**, touch it and it will display **AUTO**.

6. Touch the **SYSTEM Start** button. All of the motors in the system turn on.

7. Touch either the **Select Box** or **Select Hopper** button to activate the appropriate fluidizing operation.

NOTE: Before spraying powder, wait several minutes for the powder in the feed source to fluidize. When properly fluidized, the powder in the feed source will be gently boiling. Adjust the fluidizing air pressure as needed.

8. Start spraying powder.

Powder Feed Source Installation

Use one of the following procedures to install a powder feed source into the powder feed center.

Powder Box Installation

Use the following procedure to install a standard powder box into the feed center.

1. On the **Auto Menu**, touch the **LANCE Up** button to raise the lance assembly.
2. Open the box of powder and place it on the vibratory table.
3. Make sure that the box is centered under the lance assembly, then secure the box to the vibratory table using the box guides and clamping knobs.
4. Touch the **FINISH COLOR CHANGE Press to Finish** button.
5. Set the **Lance Purge Mode** to **AUTO**.
6. Touch the **Select Box** button. The following things happen automatically:
   - lance assembly lowers to the appropriate setting
   - vibratory table starts
   - lance assembly fluidizing air pressure turns on
7. Adjust the needle valve on the lance assembly to adjust the fluidizing air pressure.

   Allow the powder in the hopper to fluidize for several minutes, until the powder boils gently. Adjust the fluidizing air pressure at the pneumatic panel if necessary.

When all system modes are set to **AUTO**, the lance assembly lowers as the powder level falls. When the level sensor senses that the lance assembly has lowered below a set limit, the sensor activates either a low-powder alarm or automatic bulk feed.

Fluidizing Hopper Installation

Use the following procedure to install a fluidizing hopper into the feed center.

1. On the **Auto Menu**, touch the **LANCE Up** button to raise the lance assembly.
2. Remove the front box guide and place the hopper on the vibratory table.
3. Make sure that the hopper is centered under the lance assembly. Remove the lid from the hopper.
4. Connect the fluidizing air tubing to the air fitting on the front of the hopper.
5. Touch the **FINISH COLOR CHANGE Press to Finish** button.
6. Set the **Lance Purge Mode** to **AUTO**.
7. Touch the **Select Hopper** button to turn on the fluidizing air. The lance assembly lowers to the appropriate setting.

   Allow the powder in the hopper to fluidize for several minutes, until the powder boils gently. Adjust the fluidizing air pressure at the pneumatic panel if necessary.

When all system modes are set to **AUTO**, the lance assembly stays at a fixed position. When the level sensor senses that the powder level has fallen below a set limit, the sensor activates either a low-powder alarm or automatic bulk feed.

Booth Moving

Perform this procedure to move the system online or offline.

NOTE: Disregard this procedure if your system is not equipped with a roll-on/roll-off system.

1. From the **Main Menu**, touch the **Booth Move** button.
2. Touch the **Exhauster Stop** button. The after filter exhaust fan stops.
3. Touch the **Duct Lifter Open** button. The cyclones disconnect from the after filter inlet duct.
4. When **BOOTH MOVER READY** is displayed on the booth moving menu, press the BOOTH MOVER ENABLE button on the system control panel. The booth mover buzzer sounds and the pendant button is enabled for three minutes.
5. Visually check the area around the booth for obstructions. Clear the area of all obstructions and personnel.
6. Press the pendant button to move the booth to the desired position. The booth moves as long as the button is held down. The booth stops moving when either you release the button or the booth reaches either the online or offline position.
7. When either **ONLINE READY** or **OFFLINE READY** is displayed on the booth moving menu, touch the **Duct Lifter Close** button. The cyclones connect to the after filter inlet duct.
8. When **EXHAUSTER READY** is displayed on the booth moving menu, touch the **Exhauster Start** button. The after filter exhaust fan starts.

Shutdown

Use the following procedure to shut down the system.

1. Move the booth offline, if desired. Refer to *Booth Moving*.
2. Clean the system by performing the color change process, but do not install a new powder source. Refer to the *Color Change* section for more information.
3. See Screen 3-3.

   From the **Auto Menu**, touch the **SYSTEM Stop** button. All of the motors in the system turn off.

NOTE: If you are shutting down the system for a short break in production, do not perform step 4.

4. If you will be shutting down the system for maintenance, repair, or an extended period of time, perform these steps:
   a. Press the SYSTEM STOP button on the system control panel.
   b. Turn the disconnect switches on the system, powder feed center, and exhauster (if applicable) control panels to the off position.

Section 4
Color Change

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

Introduction

This section explains the procedures necessary to change colors in the Sure Clean powder coating system. The necessary procedures and total amount of time that it takes to perform a color change vary based on the type of color change you are performing, options in your system, and operator experience.

Types of Color Changes

Refer to Table 4-1 for descriptions of the two basic types of color changes.

Table 4-1 Types of Color Changes

Color Change Type	Description
Similar Shade	When changing from either • a light powder to another light powder or • a dark powder to another dark powder.
Different Shade	When changing from either • a light powder to a dark powder or • a dark powder to a light powder.
NOTE: The time that it takes to perform a different shade color change will depend on how many spray guns are in your system.	

Conditions for an Effective Color Change

In order for the color change process to be effective, the following conditions must be met:

- Keep spare sieve screens, Sure Max reclaim receiver filters, and powder supply containers available to allow quick replacement during color change and thorough cleaning while the system is coating parts.
- Operate the system in spray-to-reclaim mode during normal operation.
- Keep the area on and around the booth base clean to avoid cross-contamination of powder.
- Condition the booth interior at least once each week. Refer to *Booth Canopy Conditioning* in the *Maintenance* section for more information.

Color Change Control Menu

The operators start the automated tasks of the color change process by using the **Color Change Control** and **Auto Menu** screens.

Menu Navigation

Figure 4-1 illustrates how to access the menus necessary to perform a color change.

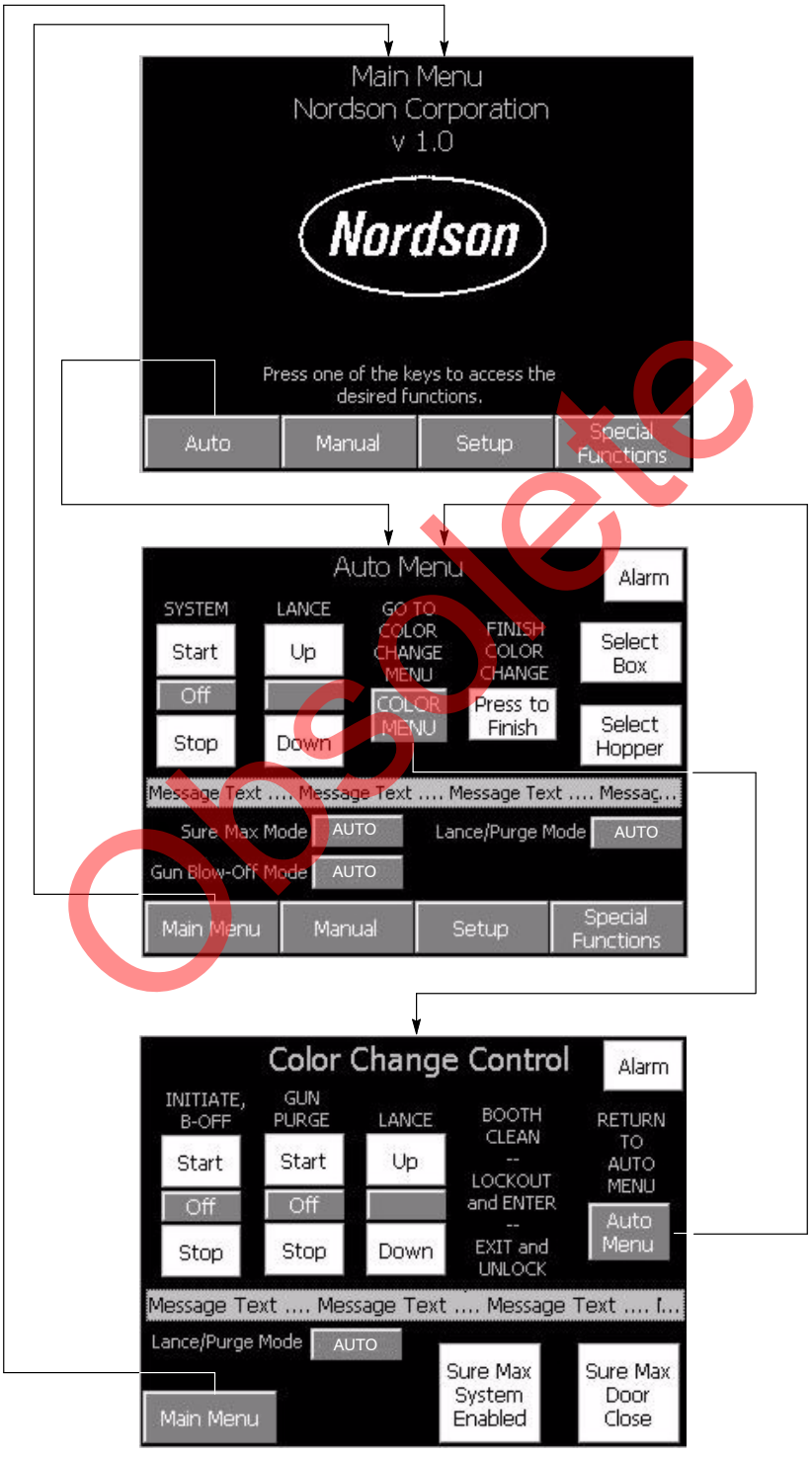

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Figure 4-1 Color Change Menu Navigation

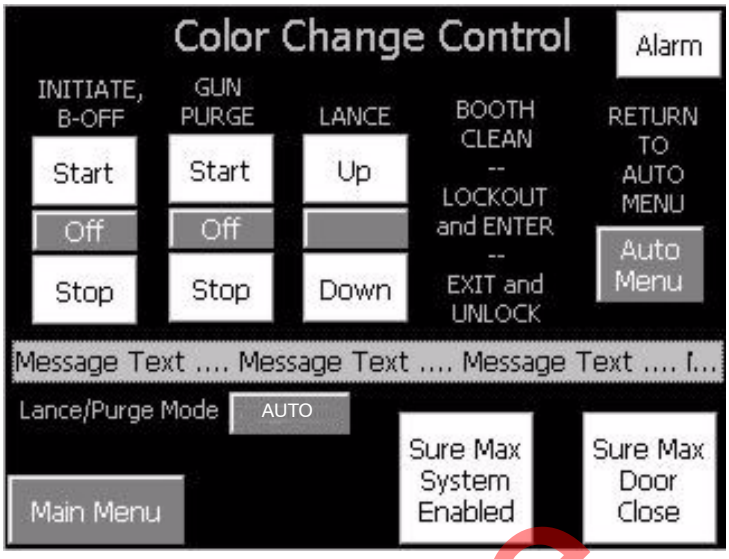
Color Change Control Menu Functions

Refer to Table 4-2 for a description of the functions of the buttons on the **Color Change Control** menu.

See Screen 4-1.

Table 4-2 Color Change Control Menu Functions

Button	Function
Alarm	Opens the **Alarm Display** menu. **NOTE:** Refer to the *Troubleshooting* section for more information about the **Alarm Display** menu.
INITIATE, B-OFF Start/Stop	Starts or stops the spray gun blow-off cycle. Moves lances to fully raised position and stops oscillators at gun blow-off position.
GUN PURGE Start/Stop	Starts or stops the spray gun purge cycle. Lowers lances to fully lowered position.
LANCE Up/Down	Raises or lowers the lance assembly (when **Lance/Purge Mode** is set to **MANUAL**).
Auto Menu	Opens the **Auto Menu**.
Message Text Area	Displays the status of the color change process and alarm messages. Refer to *Alarm Messages* in the *Troubleshooting* section for possible causes of the alarm messages and their corrective actions.
Lance/Purge Mode	Selects the lance purge mode; allows operator to override automated lance and purge functions.
Main Menu	Opens the **Main Menu**.
Sure Max System Enabled/Disabled	Enables and disables the Sure Max powder transfer system.
Sure Max Door Close/Closed	Closes the Sure Max reclaim receiver door.



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Screen 4-1 Color Change Control Menu

Color Change Process

CAUTION: Operators must wear shoe covers when entering the booth. Failure to wear shoe covers will result in damage to the floor surface.

To perform a color change in the shortest time possible, two operators must be present. A single operator could perform the entire process, but it would take longer. The operators are responsible for cleaning the following items:

- **Operator A:** Interior of the booth canopy and cyclones
- **Operator B:** Powder feed center

The two operators' tasks should be performed at the same time. Unless otherwise noted, do not move on to the next procedure until both operators' tasks have been completed.

Use the following procedures to perform a color change in the Sure Clean booth. Perform all of the applicable steps in each procedure.

Color Change Process *(contd)*

NOTE: When an automated procedure affects both operators, it is shown straddling both operator's columns in the following table.

Procedure	Tasks	
	Operator A **See Figure 4-2**	**Operator B** **See Figure 4-3**
1	1. Turn the LOCKOUT keyswitch on the system control panel to the LOCKED position. 2. Wearing shoe covers, enter the booth and open the AeroDuct doors. 3. Exit the booth and turn the LOCKOUT keyswitch to the NORMAL position. 4. Close the canopy doors and, if applicable, move the booth offline.	
2	From the **Auto Menu**, touch the **COLOR MENU** button to access the **Color Change Control** menu. Touch the **INITIATE, B-OFF Start** button. The system automatically performs the following tasks: **NOTE:** Perform procedure 3 while the system is performing these tasks. **NOTE:** The **INITIATE, B-OFF Stop** button interrupts the gun blow-off cycle. • Oscillators (if used) stop and the spray guns move into the fully extended position. • Booth floor stops rotating and raises against the canopy. • Feed center's sieve, fluidizing air, and vibrating table stop, and lance assembly raises. • In/out gun positioners retract (one at a time) and powder is blown off the spray guns. When the gun blow-off cycle is complete, the COLOR CHANGE CYCLE DONE indicator flashes.	
3	1. Disengage the coupling connecting the reclaim conveyor line (2) to the reclaim port (3). 2. Open the transfer pan (6) and blow out all powder remaining in the pan. 3. Send three cleaning sponges through the reclaim conveyor line. **NOTE:** Do not close the transfer pan at this time.	1. Unclamp the underpan (3) and turn it counterclockwise until the chute is directly over the chute on the back wall of the feed center. **NOTE:** If you are using the optional fluidizing hopper, disconnect the air tubing before removing the hopper from the feed center. 2. Remove the powder source from the feed center.

Continued...

Procedure	Tasks	
	Operator A **See Figure 4-2**	**Operator B** **See Figure 4-3**
4	Touch the **GUN PURGE Start** button. The system automatically performs the following tasks: **NOTE:** Perform procedure 5 while the system is performing these tasks. **NOTE:** The **GUN PURGE Stop** button interrupts the gun purge cycle. • Lance assembly lowers onto the purge manifold. • Purge manifold sends pulses of air through the lances, pumps, feed hoses, and spray guns. • Lance assembly raises and sieve restarts. When the gun purge cycle is complete, the COLOR CHANGE CYCLE DONE indicator flashes. The floor will lower and start rotating.	
5	Blow off all door seams from the outside of the booth.	Blow powder off the lance assembly (7).
		Continued...

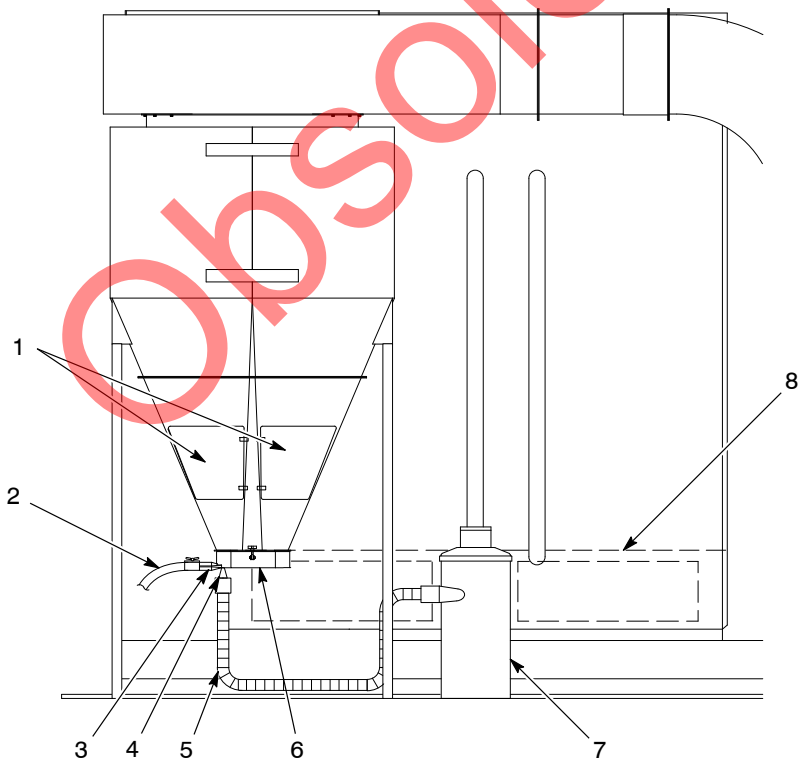

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Figure 4-2 Operator A Color Change Tasks

1. Cyclone access doors
2. Reclaim conveyor line
3. Reclaim port
4. Scrap port
5. Scrap conveyor line
6. Transfer pan
7. Scrap receiver
8. AeroDuct

Color Change Process *(contd)*

Procedure	Tasks	
	Operator A **See Figure 4-2**	**Operator B** **See Figure 4-3**
6	1. Turn the LOCKOUT keyswitch on the system control panel to the LOCKED position. This locks out in/out gun positioner and oscillator operation and causes the floor to stop rotating and raise up against the bottom of the canopy. 2. Wearing shoe covers, enter the booth and blow out the interior using the following steps: a. Close the lower doors on the entry end of the booth. Close the upper doors as much as possible. b. Close the doors on the AeroDuct (8) and blow it off. c. Working from the top of the booth to the bottom, blow off the ceiling, upper doors, walls, lower doors, and outer booth base. d. Exit the booth and close the upper and lower doors on the entry end of the booth. e. Walk over to the exit end of the booth and repeat steps a–d. f. Open the two AeroDuct doors at the end of the booth farthest from the vertical duct. Blow powder off the bottom, inside edge of the AeroDuct, working toward the vertical duct. g. Close the AeroDuct doors and exit the booth. h. Turn the LOCKOUT keyswitch on the system control panel to the NORMAL position. The floor drops and the automatic floor and floor seal blow-off cycle begins. **NOTE:** The floor and floor seal blow-off cycle lasts until the floor completes one full rotation. When the floor and floor seal blow-off cycle is complete, the COLOR CHANGE CYCLE DONE indicator flashes.	1. Touch the **Sure Max System Enabled** button. This causes the following things to happen: • The sieve and Sure Max powder transfer system are disabled and the **Sure Max System Disabled** button appears. • The reclaim receiver discharge door opens. • The reclaim filter is pulsed 3 times (10 seconds total). 2. Disconnect the amplifier hose and pulse air tubing from the top of the reclaim filter assembly (6). 3. Disengage the coupling connecting the reclaim conveyor line to the reclaim receiver (5). 4. Rotate the reclaim receiver so that it is at a 45° angle. 5. Remove the reclaim filter assembly. Remove the filter element and place it in its dedicated plastic container. 6. Remove the three cleaning sponges from the reclaim receiver and place them in their dedicated plastic container. 7. Rotate the reclaim receiver so that the small opening is facing the operator, then blow as much powder out of the receiver as possible. Rotate the reclaim receiver so that the large opening is facing the operator, then blow out any powder remaining in the receiver.

Continued...

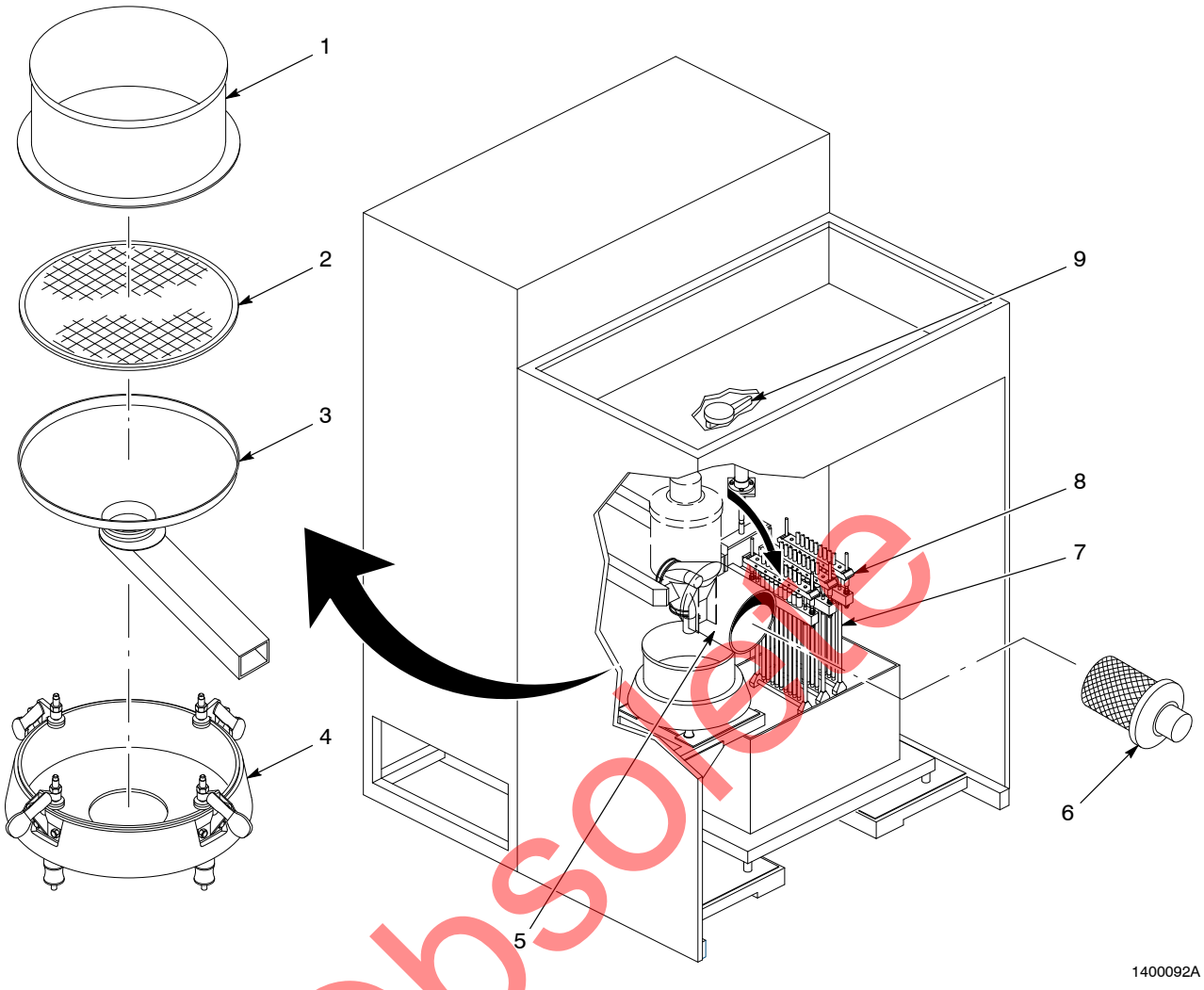

Figure 4-3 Operator B Color Change Tasks

1. Sieve deck
2. Sieve screen
3. Sieve underpan
4. Sieve
5. Reclaim receiver
6. Reclaim filter assembly
7. Lance assembly
8. Feed hose manifold
9. Vacuum diverter handle

Procedure	Tasks	
	Operator A **See Figure 4-2**	**Operator B** **See Figure 4-3**
7	1. Open the vertical duct access door and blow all powder out of the vertical duct. Close and latch the vertical duct access door when done. 2. Remove the plug from the scrap port (4), blow off the plug, and set it aside. 3. Install the plug into the reclaim port (3). 4. Blow off any powder remaining in the transfer pan (6), being careful not to get any powder into the reclaim conveyor line (2). 5. Open the cyclone access doors (1). 6. Blow down all interior surfaces of the cyclones. 7. Depending on whether the system will be operating in either spray-to-reclaim or spray-to-waste mode, follow one of these procedures: **Spray-to-Reclaim Mode Operation:** a. Close and latch the cyclone access doors (1). b. Close and latch the transfer pan (6). c. Install the scrap conveyor line (5) onto the scrap port (4). **Spray-to-Waste Mode Operation:** Leave the cyclone access doors (1) and transfer pan (6) open.	**NOTE:** Each color must have a dedicated reclaim filter element. Using a filter element for multiple colors will result in cross contamination. 1. Install the appropriate color-specific filter element and install the filter assembly (6) into the reclaim receiver (5). 2. Rotate the reclaim receiver so that it is in the upright position. 3. Connect the amplifier hose, pulse air tubing, and reclaim conveyor line to the reclaim receiver. 4. Touch the **Sure Max Door Close** button to close the reclaim receiver door. **NOTE:** If your system has the optional Vibrasonic sieve screen, unplug the Vibrasonic transducer cable from its support bracket and use caution when cleaning around the screen's Vibrasonic transducer. 5. Remove the sieve deck (1) and screen (2). • **Similar Shade Color Change:** Blow off the sieve screen. • **Different Shade Color Change:** Set the sieve screen aside and clean it later. Install a clean sieve screen. 6. Blow off the sieve deck and underpan (3). Turn the underpan clockwise until the chute is directed toward the lance assembly (7). 7. Install the appropriate sieve screen and the sieve deck, and connect the Vibrasonic transducer cable if applicable. 8. Touch the **Sure Max Disabled** button to enable the Sure Max powder transfer system. Turn the vacuum diverter handle to the counterclockwise position. • **Similar Shade Color Change:** Install the powder source into the feed center and connect the fluidizing air tubing (if applicable). • **Different Shade Color Change:** Do not install a new powder source until the end of procedure 8.

Continued...

Procedure	Tasks	
	Operator A **See Figure 4-2**	**Operator B** **See Figure 4-3**
NOTE: Only perform procedure 8 if you are performing a different shade color change. If you are performing a similar shade color change, proceed to procedure 9.		
8	Remove the powder feed hose from each spray gun and install the other feed hose.	1. Remove the feed hose manifold (8) from the lance assembly (7). 2. Blow down into the powder pumps on the lance assembly to clear away any remaining powder. 3. Install the other feed hose manifold. 4. Install the new powder source into the feed center and connect the fluidizing air tubing (if applicable).
9	1. Touch the **Auto Menu** button to return to the **Auto Menu**. 2. Touch the **FINISH COLOR CHANGE Press to Finish** button. The spray guns move back into the booth and begin oscillating (if applicable). 3. Touch either the **Select Box** or **Select Hopper** button to lower the lance assembly to the appropriate location. 4. If you want to operate the booth in spray-to-reclaim mode, touch the **Spray to Waste** button. The button's text changes to **Spray to Reclaim** to indicate the currently selected operating mode. After a few minutes, the powder in the feed source will fluidize and the system will be ready for operation. **NOTE:** Spray approximately 0.5 kg (one lb) of powder to waste before performing procedure 10. The amount of time that it takes to spray 0.5 kg (one lb) of powder will vary depending on the components in your system. Spraying the powder to waste seasons the ducts and cyclones to allow for more effective powder reclaim.	
10	**Spray-to-Reclaim Mode Operation Only:** 1. Disengage the scrap conveyor line (5) from the scrap port (4). 2. Remove the plug from the reclaim port (3) and set it aside. 3. Install the plug into the scrap port. 4. Install the reclaim conveyor line (2) and coupling onto the reclaim port.	**Spray-to-Reclaim Mode Operation Only:** Turn the vacuum diverter handle (9) to the fully clockwise position.

Section 5
Maintenance

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

Daily Maintenance

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

System Cleaning

Perform this procedure daily.

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

1. Perform all procedures in the *Color Change* section.
2. Clean the spray guns according to the instructions in their manuals.

WARNING: Use only non-conductive tools to clean the booth interior. Do not use any tools that could create friction sparks. A hot spark could be pulled into the recovery system and ignite an explosion or fire.

3. Remove any powder residue from the enclosure using an air-powered vacuum with a soft brush attachment. Wipe down all surfaces with a damp, lint-free cloth (do not use tack cloths).
4. Clean the floor around the booth.

Daily Equipment Maintenance

Refer to Table 5-1 to establish a daily maintenance schedule for your Sure Clean powder coating system.

Table 5-1 Daily Equipment Maintenance

Equipment	Procedure
Flame Detector System	Check the detector sensors every four hours and clean the lenses, if necessary. Make sure air is being supplied to the sensors. Make sure the detector system is operating properly.
Air Dryers	Perform any required maintenance as described in your air dryer manual.
Air Velocity	Measure the air velocity at all booth openings with a velometer. Minimum velocity is 36 m/min (120 fpm).
Compressed Air Supply	Hold a clean, white cloth under the supply line drop leg and open the drop-leg drain valve. Water, oil, or other contaminants will stain the cloth. Eliminate any source of contamination. Drain the filters and separators and check the filter elements. Check all air pressure regulator settings. **NOTE:** The air dryer should remain on at all times to prevent moisture from accumulating in the compressed air system.
Cartridge Filters and Housings	Pulse the cartridge filters. With the exhaust fan operating, check the cartridge filter differential pressure gauge. It should read between 4- and 6-in. wc. Check the pulse valve timing to make sure that the cartridge filters are being pulsed often enough to prevent clogging.
Final Filter Housing and Fan	With the exhaust fan operating, check the final filter differential pressure gauge. It should read between 1- and 2.5-in. wc.
Oscillators and In/Out Gun Positioners	Each shift, make sure the oscillators and in/out gun positioners are stroking smoothly and at the proper speed. Lubricate the oscillators and gun positioners and make repairs and adjustments if necessary.
Powder Spray Guns	Clean the spray guns according to the instructions in their manuals.
Powder Pumps	Disassemble and clean the pump blocks, venturi throats, and throat holders. Replace worn parts.
Sieve	Remove and clean the screen. Replace the screen if it is damaged. Check the rubber seals. Replace any damaged or worn parts.

Continued...

Equipment	Procedure
Bulk Feed Transfer Pumps	Disconnect the transfer hoses from the pumps. Blow out the powder from the hoses with compressed air. Remove the transfer pumps from the adapters. Blow out the adapters and pickup tubes. Disassemble the pumps. Clean the parts with a low-pressure air gun and a clean cloth. Replace any worn or damaged parts.
Workpiece and Conveyor Grounds	 **WARNING:** An ungrounded or poorly grounded workpiece, hanger, or conveyor can cause electrical arcing. If arcing is observed, shut down the system immediately. Correct the cause before resuming operations. Failure to observe this warning could result in a fire or explosion, causing property damage and possible personal injury or death. Make sure all workpieces are grounded through the hangers and conveyor. The resistance between the workpieces and the hangers, and the hangers and ground, must be less than 1 megohm. Use a megohm meter to check resistances. You will get better transfer efficiency and workpiece coverage at 500 ohms or less. Clean the hangers regularly.

Weekly Maintenance

Use the following guidelines to establish a weekly maintenance schedule for your Sure Clean powder coating system.

Weekly Equipment Maintenance

Perform all of the procedures listed in Table 5-2 once each week.

Table 5-2 Weekly Maintenance

Equipment	Procedure
Booth Enclosure	Perform the *Booth Canopy Conditioning* procedure in this section. Clean the booth exterior, all attached equipment, and the spray room. Check the enclosure for cracks, damage, and dirt. Seal any cracks.
Differential Pressure Gauges	Observe and record the differential pressure gauge readings. • Cartridge Filters Pressure Drop: 4–6.5-in. wc • Final Filters Pressure Drop: 1–2.5-in. wc If the pressure drop across the cartridge filters exceeds 6.5-in. wc, the filters are clogged. If the pressure drop across the final filters exceeds 2.5-in. wc, the final filter warning light on the system control panel will light. At 3-in. wc the system will shut down.
Powder Spray Guns and Cables	Clean the spray guns. Perform electrostatic resistance checks as described in the spray gun and control unit manuals.
Powder Pumps and Feed Hoses	Purge the lance assemblies. Disassemble the pumps and clean the venturi throats and nozzles. Replace any worn or damaged parts. Blow out the feed hoses with compressed air. Replace damaged or clogged hoses.

Booth Canopy Conditioning

Perform this procedure during initial system setup and as part of your weekly maintenance program. Conditioning will keep the canopy easy to clean and reduce the potential for contamination of reclaimed powder.

The conditioning process requires two wash cycles and three rinse cycles. The canopy must be completely dry before spraying powder.

1. Fill two clean buckets with water.
2. Put 2–3 drops of mild dish washing detergent into one of the buckets. This will be the soap bucket.
3. Soak and wring out a hand sponge or a sponge mop in the soap bucket. Wipe down the entire inside of the canopy, frequently wringing out the sponge in the rinse bucket and then resoaping the sponge in the soap bucket.
4. Empty the buckets, rinse them, and repeat steps 1–3, for a total of two wash cycles.
5. Empty the buckets and rinse them. Fill the buckets with clean water and rinse the entire inside of the canopy, frequently wringing out the sponge in the rinse buckets.
6. Repeat step 5 two times, for a total of three rinse cycles.

Monthly Maintenance

Use the guidelines listed in Table 5-3 to establish a monthly maintenance schedule for your Sure Clean powder coating system.

Monthly Equipment Maintenance

Perform all of the procedures listed in Table 5-3 once each month.

Table 5-3 Monthly Equipment Maintenance

Equipment	Procedure
After Filter Waste Hoppers	Empty the after filter waste hoppers monthly. Refer to *Emptying the Waste Hoppers* for instructions.
Air Dryer	Check the air dryer operation. Refer to your air dryer manual for maintenance procedures and schedules.
Electrical Connections	Check all terminal blocks and junction boxes for loose wires. Tighten any loose connections and inspect the system wiring. Replace any damaged wires.
Gaskets	Inspect all gaskets and seals for damage. Replace them if they are damaged.
Fan and Roll-On/Roll-Off System Bearings	Every six months, lubricate the fan bearings and all motor bearings with two shots of No. 2 lithium grease from a grease gun.
Roll-On/Roll-Off Wheels	Lubricate the flanged wheel bearings with two shots of white lithium grease every six months.

Emptying the Waste Hoppers

Use the following procedure to empty the after filter's waste hoppers.

See Figure 5-1.

1. Secure the waste lid (8) to an empty 55-gallon drum (5).
2. Connect the ground clamp (4) to a true earth ground.
3. Attach $^{3}/_{4}$-in. transfer hoses (9) between the transfer pumps (3) and the hose connectors (6) on the waste lid. Use hose clamps on both ends of the transfer hoses.

   NOTE: Make sure that all unused hose connectors on the waste lid are plugged.

4. Attach the vent hose (2) to the waste lid vent stub (7). Attach the other end of the vent hose to the after filter vent stub (1).
5. Open the fluidizing air valve on the after filter air manifold. Air pressure turns on simultaneously to the fluidizing bed and fluidizing valves on the waste hopper walls. Allow the powder in the waste hoppers to fluidize for several minutes.
6. After the waste powder is fluidized, open the transfer pump air valve on the after filter manifold.

   NOTE: The normal operating air pressure for the transfer pump is 2 bar (30 psi). Increase the transfer pump air pressure if desired.

7. When the transfer pump is not drawing any more powder out of the waste hopper, close the fluidizing and transfer pump air valves.

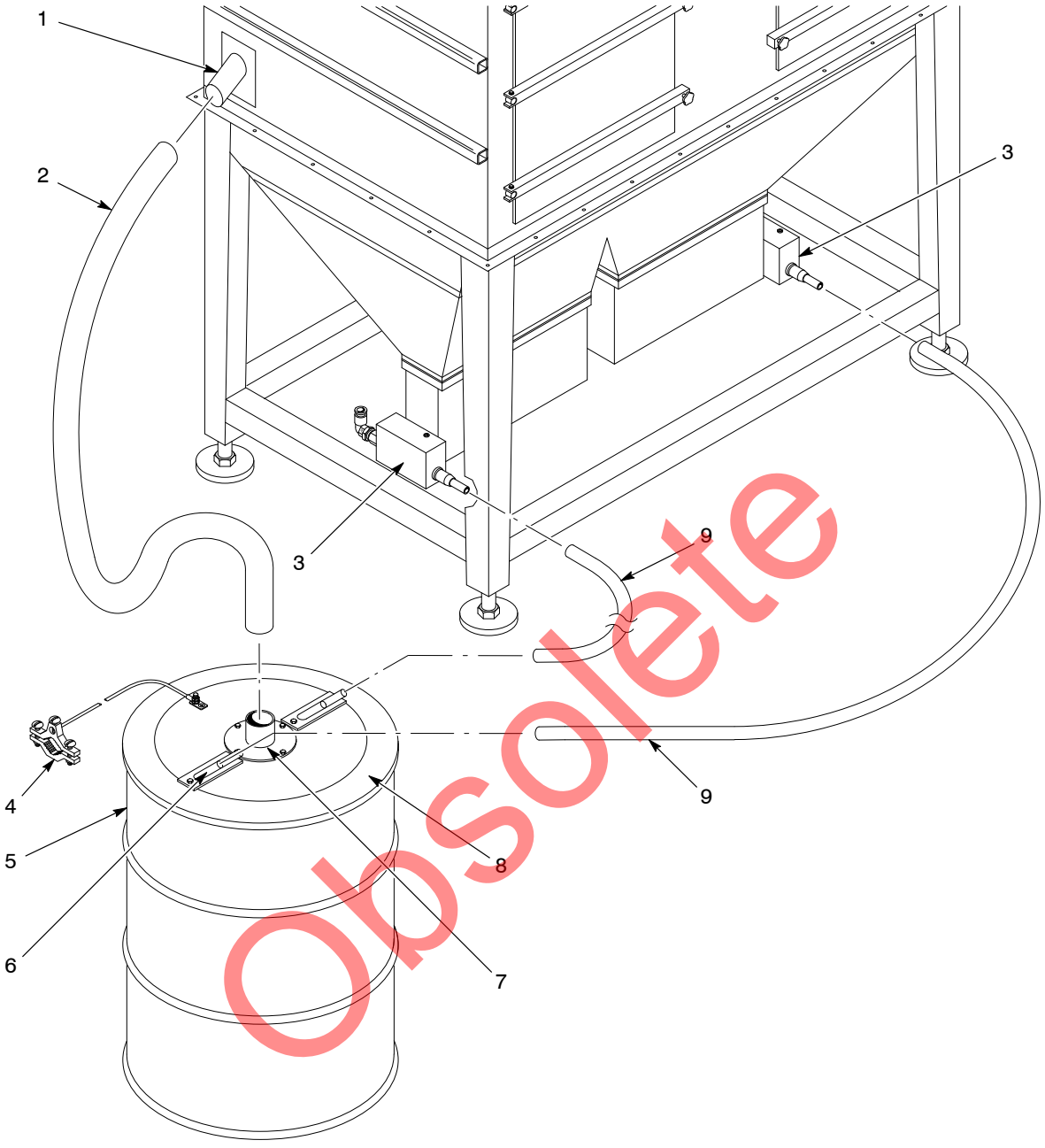

Figure 5-1 Emptying the Waste Hoppers

1. After filter vent stub
2. Vent hose
3. Transfer pumps
4. Ground clamp
5. 55-Gallon drum
6. Hose connectors
7. Lid vent stub
8. Waste lid
9. $^{3}/_{4}$-in. Transfer hoses

Maintenance Check List

Activity	Color Change	Each Shift	Daily	Weekly	Monthly
Cleaning					
Fire detector head lenses*		✓			
Booth enclosure	✓	✓			
Final filter compartment	✓			✓	
Feed and bulk transfer hoses	✓	✓			
Pump assemblies	✓	✓			
Spray guns	✓	✓			
Sieve	✓	✓			
Bulk transfer pumps	✓	✓			
Condition the Booth Canopy				✓	
Resistance Checks—Spray Guns and Cables				✓	
Visual Checks					
Air supply drop leg			✓		
Air dryer drain			✓		✓
Cartridge filter differential pressure gauge		✓			
Electrical connections					✓
Final filter differential pressure gauge		✓			
Fire detector sensors	✓	✓			
Gaskets					✓
Oscillators and in/out gun positioners		✓			
Workpiece clearance**		✓			
Workpiece grounding	✓	✓			
Powder supply levels	✓	✓			
After filter waste hoppers					✓

* Clean the fire detector head lenses every 4 hours.

** Continuously monitor the workpiece clearance.

Lubrication	Every 6 months
Roll-on/roll-off wheel bearings	✓
Fan and motor bearings	✓

Section 6
Troubleshooting

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

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

Common Problems

Use the following tables to correct common problems with the Sure Clean powder coating system.

Common Problems *(contd)*

Problem	Possible Cause	Corrective Action
1. Spray guns are surging or spitting; powder flow is inadequate or intermittent	Insufficient air volume in feed hose; powder is settling out	Increase the atomizing air pressure and decrease the flow rate air pressure. Refer to the spray gun and control unit manuals for recommended air pressures and ratios.
	Powder in feed source inadequately fluidized; cavities forming in powder below pickup tube ends	Adjust the fluidizing air pressure. The powder should be gently boiling. Refer to problem 5.
	Low powder level in feed source	Add powder to the feed source.
	Powder pump venturi throats worn; pickup tube sucking air at connection to pump mounting arm; pump or pickup tube clogged	Clean the pump and pickup tube. Replace any worn parts. Replace any damaged O-rings.
	Obstruction in powder feed hose	Disconnect the feed hose from the pump. Blow the powder out of the hose with compressed air. Make sure the hose is clear. Eliminate kinks or severe bends in hose. Hose should be no longer than 7.6 m (25 ft) with a maximum 2.7-m (9-ft) vertical rise.
	Severe tribo-charging in powder feed hose	Contact your Nordson Corporation representative for a suitable hose material. Contact your powder supplier.
	Obstruction in spray gun	Clean the spray gun.
2. Problems with coating uniformity, edge coverage, film build, wrap, or penetration into recesses	Poor workpiece grounding	Resistance from the workpiece to the ground must be less than 1 megohm. For best results, resistance should not be more than 500 ohms. Clean the workpiece hangers, fixtures, and hooks if necessary. Check the conveyor ground.
	Spray gun placement incorrect	Position the spray guns 254–355 mm (10–14 in.) from the workpieces. Stagger the spray guns 304 mm (12 in.) apart vertically and 381 mm (15 in.) apart horizontally to avoid fan pattern and electrostatic field overlap. Contact your Nordson Corporation representative for advice.
	Powder pump flow rate and atomizing air pressure incorrect	Refer to the spray gun and control unit manuals for the recommended air pressures and ratios.

Continued...

Problem	Possible Cause	Corrective Action
2. Problems with coating uniformity, edge coverage, film build, wrap, or penetration into recesses *(contd)*	Electrostatic voltage (kV) or AFC setting incorrect for workpieces being coated	Adjust the voltage to 90–100 kV for large flat surfaces and 60–75 kV for recesses. Never set the voltage below 60 kV. Refer to the spray gun and control unit manuals for the recommended voltage, AFC, and air pressure settings and ratios.
	Wrong nozzles being used	Use flat spray nozzles for large, regular-shaped workpieces. Use conical nozzles for deep recesses and most manual touch-ups.
	Powder feed problems	Refer to problem 1.
3. Powder in sieve contaminated	Screen torn	Replace the screen.
4. Excessive noise from sieve while operating, powder leaking from sieve	Sieve clamps not tightened, isolators loose or damaged, rubber sleeves damaged	Make sure the sieve clamps are tight. Check the isolators for looseness or damage. Tighten the isolator mounting screws. Check the rubber sleeves for damage, replace if necessary.
5. Powder in feed source not fluidizing, or clouds of powder erupting from surface	Fluidizing air pressure too low or too high	Check the powder in the feed source. Increase the fluidizing air pressure until the powder is gently boiling. Decrease the pressure if clouds of powder are erupting from the surface.
	Moist or oil-contaminated powder	Open the drain valve at the air-supply drop leg and check the air supply for water or oil. Check the filters, separators, and air dryer.
	Incorrect ratio of reclaimed-to-new powder	Add new powder to the feed source. The powder supply should be no more than 3 parts reclaim-to-1 part new powder.
	Uneven distribution of powder in feed source	Increase the fluidizing air pressure. Check the powder and the fluidizing plate (if applicable) for contamination.
6. Final filters clogged, powder in fan or final filter housing	Leaking cartridge filter gaskets, or damaged filter media	Make sure the gaskets are sealing correctly. If you can slip a 0.4 mm (0.015-in.) feeler gauge between the gasket and the sealing surface, tighten the tension nuts to compress the gaskets. Refer to the *Cartridge Filter Replacement* procedure in the *Repair* section for instructions.
		If the gaskets continue to leak, remove the cartridges. Clean and inspect the gaskets, sealing surfaces, and filter media. Replace the cartridges if the gaskets or filter media are damaged. Replace clogged final filters.

Continued...

Common Problems *(contd)*

Problem	Possible Cause	Corrective Action
6. Final filters clogged, powder in fan or final filter housing *(contd)*	Leaks in collector housing allowing powder to bypass filters	Locate and seal any leaks with RTV sealant.
7. Cartridge filters clogged	Pulse air pressure inadequate	Increase the pulse air pressure or volume. Decrease the pulse timer delay (off time).
	Powder contaminated	Replace contaminated powder and fix the source of contamination.
	Timer board settings incorrect	Adjust the timer board settings. Refer to the *Operation* section for typical operating settings.
	Pulse valve or solenoid valves clogged or malfunctioning	Open the pulse valve timer panel. If you do not hear a pulse each time an LED lights, the solenoid valve or the pulse valve connected to that LED may be clogged or failed. Check the wiring to the solenoid valve before opening the solenoid box and replacing the solenoid valve.
	Powder level in after filter waste hopper too high	Empty the waste hopper.
8. System shuts down or will not start	Flame detector system sees a flame or spark, or is malfunctioning	Check the inside of the enclosure and after filter; the detector head aim; and the workpiece and conveyor grounds.
		Follow the troubleshooting procedures in the flame detector system manual.
	Final filters clogged	Locate the source of powder leakage and correct the problem. Refer to problem 6.
	Final filter pressure switch failed	Replace the pressure switch.
	Safety duct gate not fully open	Make sure that the safety duct gate limit switch is engaged. The gate opens when the SYSTEM START button is pressed. The SYSTEM READY indicator lights when the gate is fully opened.
	Air dryer not operating, or interlock not activated	Start the air dryer. Follow the troubleshooting procedures in the dryer manual. Check the interlock circuit.
	Fuse(s) blown	Check the fuses in the system control panel. Replace the blown fuse(s). If the fuses continue to blow, fix the electrical problem.
	Electrical failure	Trace the circuits and correct the problem.

Continued...

Problem	Possible Cause	Corrective Action
9. Powder escaping from enclosure openings	Cartridge filters clogged, exhaust fan draw insufficient to retain powder within enclosure	If the differential pressure gauge shows more than 6-in. wc, refer to problem 7.
	Cross drafts interfering with exhaust fan draw	Check for cross drafts at all enclosure openings. Eliminate or divert drafts.
	Workpieces entering booth are too hot	Cool the workpieces before moving them into the booth. The workpiece temperature should not exceed 49 °C (120 °F).
	Powder spray gun output exceeds booth containment capability	Reduce the powder flow and/or the number of the spray guns.
	Booth openings too large	Close or decrease the size of the openings.
	Workpieces too large for booth	Contact your Nordson Corporation representative.
	Fan rotation backward	Reverse the rotation of the motor. Refer to the *Reversing Motor Direction* procedure in this section.
	Air leaks in ducts, duct extensions, or duct seals	Inspect duct joints, extensions, and seals for air leaks. Repair and seal all leaks.

Alarm Messages

Use the following chart to identify and correct system alarms.

Identifying Alarm Messages

During the color change process, status messages are displayed in the message text area of the **Color Change Control** menu. Only the messages listed in the following chart indicate system alarms and require operator intervention.

Alarm Message	Possible Cause	Corrective Action
GUN BLOW-OFF CYCLE INTERRUPTED	LOCKOUT keyswitch is in the LOCKED position	Turn the LOCKOUT keyswitch to the NORMAL position.
	After filter fan is not on	Turn on the after filter fan by either • touching the **SYSTEM Start** button on the **Auto Menu**, or • touching the **EXHAUSTER Start** button on the **Spray Booth** menu.
	In/out gun positioners are not in fully extended position	Refer to **GUN MOVER BLOW-OFF CYCLE INTERRUPTED** fault message.
	Gun Blow-Off Mode set to **MANUAL** operating mode	Go to the **Auto Menu** and touch the **Gun Blow-Off Mode** button to set the mode to **AUTO**.
OSCILLATOR NOT AT BLOW-OFF POSITION	Oscillator stop position not detected by stroke position proximity switch	Turn the LOCKOUT keyswitch to the LOCKED position and observe the position of the proximity sensor on the oscillator crank arm. **NOTE:** The LED on the sensor will light when the sensor detects the crank arm. Make sure that the sensor detects the crank arm at the bottom of the oscillator stroke.
GUN MOVER BLOW-OFF CYCLE INTERRUPTED	Oscillator stop position not detected by stroke position proximity switch	Turn the LOCKOUT keyswitch to the LOCKED position and adjust the position of the proximity sensor on the oscillator crank arm. **NOTE:** The LED on the sensor will light when the sensor detects the crank arm. Make sure that the sensor detects the crank arm at the bottom of the oscillator stroke.
GUN MOVER NOT AT EXTEND POSITION	In/out gun positioner proximity switch out of adjustment	Adjust the proximity switch position. Refer to the in/out gun positioner manual for the location of the proximity switch.
	Insufficient air pressure	Increase the air pressure to the in/out gun positioner.

Continued...

Alarm Message	Possible Cause	Corrective Action
GUN MOVER NOT AT RETRACT POSITION	In/out gun positioner proximity switch out of adjustment	Adjust the proximity switch position. Refer to the in/out gun positioner manual for the location of the proximity switch.
	Insufficient air pressure	Increase the air pressure to the in/out gun positioner.
LANCE NOT AT PURGE LIMIT POSITION	**Lance/Purge Mode** is set to **MANUAL**	On the **Auto Menu**, touch the **Lance/Purge Mode** button to set the mode to **AUTO**.
	Insufficient air pressure	Increase the air pressure to the lance assembly.

Clearing Alarms

When an alarm occurs, touch the **Alarm** button at the upper right corner of the screen. The **Alarm Display** menu appears, displaying a history of all previous and current system alarms.

To acknowledge the alarm and resume system operation, touch the **Alarm Ack** button in the upper right corner of the **Alarm Display** menu. The time, date, and alarm message will be stored in the **Alarm Display** menu history. After you clear the alarm, you may perform the necessary corrective actions.

Reversing Motor Direction

Improperly connecting the exhaust fan motor starter will cause it to rotate in the wrong direction. If the exhaust fan is rotating in the wrong direction, air will not be drawn through the recovery system and the sprayed powder will not be contained within the enclosure. Use the following procedure to check and correct fan rotation.

1. Turn on power at the powder feed center, system, and exhauster (if applicable) control panels.
2. Start and immediately stop the after filter fan motor.
3. While the fan is coasting to a stop, observe the direction of fan rotation. The fan should rotate in the direction indicated by the yellow arrow on the fan drive housing. If the rotation is backward, go to the next step.

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

4. Shut off power at the disconnect switch on the system and after filter control panels. Open the after filter control panel door and reverse any two wires (L1, L2, or L3) connected to the live side of the fan motor circuit breaker (CB305). Close the panel door.
5. Turn the disconnect switches to the on position. Start the fan and check the rotation direction.

Section 7
Repair

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

Introduction

This section covers basic repair procedures for the Sure Clean powder coating system. Repair procedures for other system components can be found in their own manuals.

Cartridge Filter Replacement

Use the following procedures to replace the cartridge filters in the after filter.

NOTE: Two people are required to replace the cartridge filters. One person removes the cartridge filter mounting hardware. The other person removes the old filters and holds the new filters up against the mounting plate.

Removing the Cartridge Filter

See Figure 7-1.

1. Shut down the powder coating system. Refer to *Shutdown* in the *Operation* section for instructions. Shut off and lock out system electrical power.
2. **Systems with Explosion Suppression Systems Only:** Disable the explosion suppression system. Refer to your explosion suppression system manual for more information.

Removing the Cartridge Filter *(contd)*

3. Open the access doors in the blowdown and cartridge filter sections (1, 2).
4. Pull up on the T-handle on the draw rod (8) to hold the cartridge filter (10) against the mounting plate (7).
5. Remove the nut (3), lock washer (4), flat washer (5), and mounting bracket (6) from the draw rod. Save these parts for reuse.
6. Carefully lower the cartridge filter away from the mounting plate and out of the after filter. The centering bracket (9) and draw rod will stay in the cartridge filter.
7. Unscrew the draw rod and remove the draw rod and centering bracket from the old cartridge filter.

Installing the Cartridge Filter

See Figure 7-1.

1. Thoroughly clean the sealing surface on the underside of the mounting plate (7). A dirty surface will prevent the cartridge filter gasket from sealing properly and allow powder to leak into the fan section.
2. Remove the new cartridge filter (10) from its carton and inspect it for damage. Do not use damaged cartridge filters.
3. Set the centering bracket (9) into the open end of the new cartridge filter. Slide the draw rod (8) through the centering bracket and screw the draw rod into the bottom of the cartridge filter.
4. Center the cartridge filter under the opening in the mounting plate. Use the draw rod's T-handle to pull up the cartridge filter against the mounting plate.
5. Install the mounting bracket (6) on the draw rod, making sure that the slots in the mounting bracket slip over the T-handle.
6. Install the flat washer (5), lock washer (4), and nut (3) onto the draw rod. Do not tighten the nut at this time.
7. Slip the ends of the mounting bracket into the locating slots around the filter opening in the mounting plate.
8. Tighten the nut until the mounting and centering brackets are touching. This will compress the filter gasket (11) and seal the cartridge against the mounting plate.

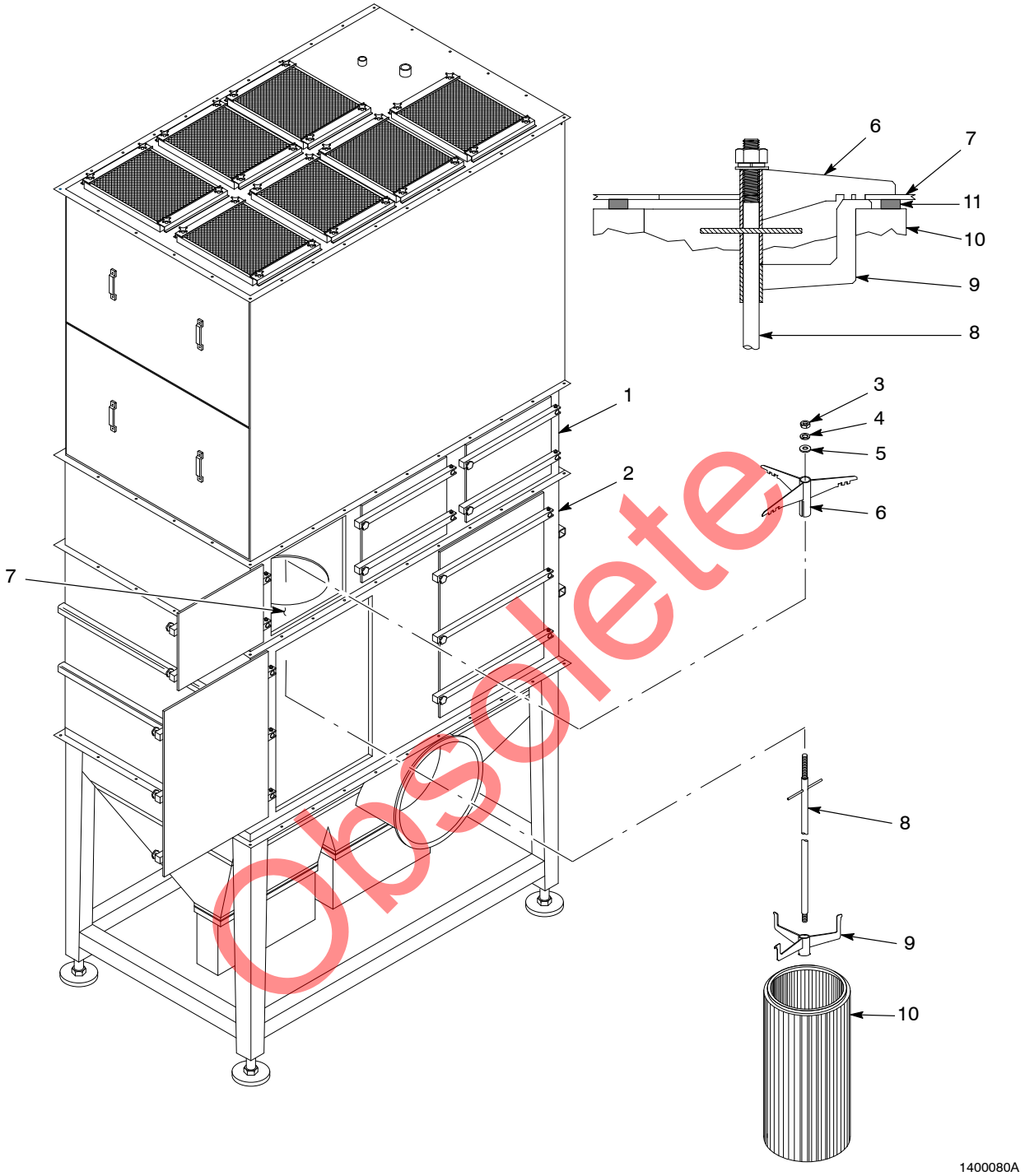

Figure 7-1 Cartridge Filter Replacement

1. Blowdown section
2. Cartridge filter section
3. Hex nut
4. Lock washer
5. Flat washer
6. Mounting bracket
7. Mounting plate
8. Draw rod
9. Centering bracket
10. Cartridge filter
11. Gasket

Seasoning the Cartridge Filters

New cartridge filters must be properly seasoned. If new cartridge filters are not seasoned, their performance and life can be dramatically reduced.

Cartridge filter seasoning is accomplished by introducing virgin powder to the after filter through the AeroDuct. Seasoning requires a minimum of 4.5 kg (10 lb) of virgin powder for each cartridge filter in the after filter.

For example, the standard 11250 cfm system uses 15 cartridge filters, and therefore requires 67.5 kg (150 lb) of virgin powder for the seasoning procedure.

WARNING: Wear protective clothing, safety goggles, and approved respiratory protection whenever handling powder or performing maintenence or cleaning procedures. Follow the personal protection recommendations included on the Material Safety Data Sheets for each powder used.

1. Press the EXHAUSTER START button and turn the PULSE ON DEMAND switch to the ON DEMAND position.
2. Measure the initial average air velocity across the booth part openings using a hand-held velometer.
3. Record the cartridge filter and final filter static pressures displayed on the pressure gauges on the system control panel.
4. Disengage the coupling connecting the vacuum conveyor line to the vacuum transfer pan. Open the vacuum transfer pan and the cyclone access doors.
5. With the floor rotating, gradually dump the virgin powder onto the floor.
6. Note the cartridge filter static pressure displayed on the pressure gauge. If the pressure is less than 3-in. wc, add more powder until the static pressure reaches 3-in. wc.
7. Close the cyclone access doors and vacuum transfer pan. Connect the vacuum conveyor line coupling to the vacuum transfer pan.
8. Record the average air velocity across the booth part openings using a hand-held velometer.
9. Record the cartridge filter and final filter static pressure displayed on the pressure gauge.

Final Filter Replacement

Use the following procedure to replace the final filters in the after filter.

See Figure 7-2.

1. Shut down the powder coating system. Refer to *Shutdown* in the *Operation* section for instructions. Shut off and lock out system electrical power.
2. **Systems with Explosion Suppression Systems Only:** Disable the explosion suppression system. Refer to your explosion suppression system manual for more information.
3. Remove the final filter brackets (2) by removing the clamping knobs (1).
4. Lift the old final filter (3) out of the after filter.
5. Inspect the interior of the fan housing (4). If you see large amounts of powder inside of the housing, powder is leaking through the cartridge filters or mounting plate. Fix the leak before starting the system.
6. Remove the new final filter from its carton and inspect it for damage. Do not use damaged final filters.
7. Set the new final filter into the after filter.
8. Install the final filter brackets and clamping knobs.
9. Tighten the clamping knobs to compress the final filter evenly on all four sides.

Final Filter Replacement *(contd)*

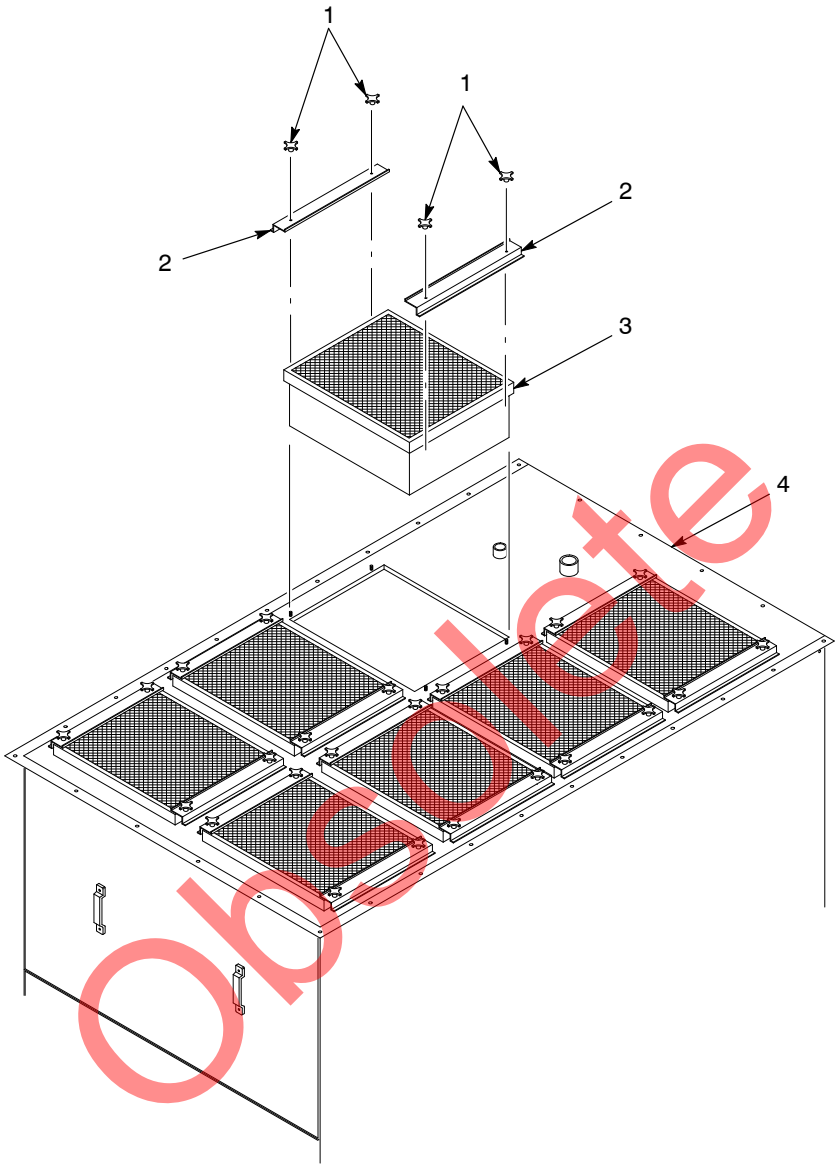

Figure 7-2 Final Filter Replacement

1. Clamping knobs
2. Final filter brackets
3. Final filters
4. Fan housing

Pulse Valve Replacement

Use the following procedure to replace the pulse valves in the after filter.

Preparation

NOTE: Replace the pulse valves one at a time to avoid confusing which air tubing connects to which pulse valve.

1. Shut down the powder coating system. Refer to *Shutdown* in the *Operation* section for instructions.
2. Shut off and lock out system electrical power.
3. **Systems with Explosion Suppression Systems Only:** Disable the explosion suppression system. Refer to your explosion suppression system manual for more information.
4. Open the pulse valve access door.

Removing the Pulse Valve

See Figure 7-3.

1. Disconnect the air tubing from the elbow fitting (3) on top of the pulse valve (4).
2. Unscrew the pulse valve from the nipple (2).
3. Unscrew the elbow fitting and nozzle (5) from the pulse valve. Save the elbow fitting and nozzle for reuse.
4. Clean the threads on the nipple, elbow fitting, and nozzle and wrap 2–3 layers of new PTFE tape around the threads.

Installing the Pulse Valve

See Figure 7-3.

1. Install the elbow fitting and nozzle onto the new pulse valve.
2. Screw the new pulse valve assembly onto the nipple. Make sure that the pulse valve nozzle points straight down into the cartridge filter.
3. Connect the air tubing to the pulse valve elbow fitting.

Installing the Pulse Valve *(contd)*

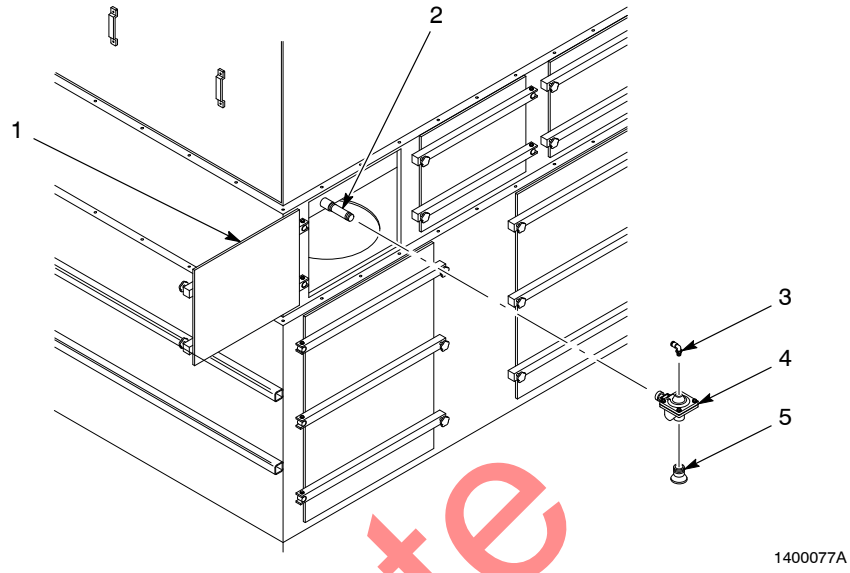

Figure 7-3 Pulse Valve Replacement

1. Access door
2. Nipple
3. Elbow fitting
4. Pulse valve
5. Nozzle

Floor Lifter Replacement

Use the following procedure to replace the floor lifters.

WARNING: Relieve system pressure before performing the following tasks. Failure to observe this warning may result in personal injury.

CAUTION: Lower the floor before performing this procedure. Failure to observe this caution may result in damage to the floor.

See Figure 7-4.

1. Lower the floor by turning the LOCKOUT keyswitch on the system control panel to the NORMAL position.
2. Shut down the powder coating system. Refer to *Shutdown* in the *Operation* section for instructions. Shut off and lock out system electrical power.

3. Remove the floor lifter access plate from the booth base by removing the four screws.
4. Disconnect the 6-mm air tubing from the floor lifter air fitting (6).
5. Remove the cotter pins (1) and clevis pins (2) securing the bellows brackets (4, 7) to the booth base and floor lifter arm (8). Lift the floor lifter bellows (5) away from the booth base and floor lifter arm.
6. Remove the upper and lower bellows brackets by removing the screws (3).
7. Install the upper and lower bellows brackets onto the new floor lifter bellows.
8. Secure the new floor lifter assembly to the booth base and floor lifter arm using the clevis pins and cotter pins.
9. Connect the 6-mm air tubing to the floor lifter air fitting.
10. Secure the floor lifter access plate to the booth base using the four screws.

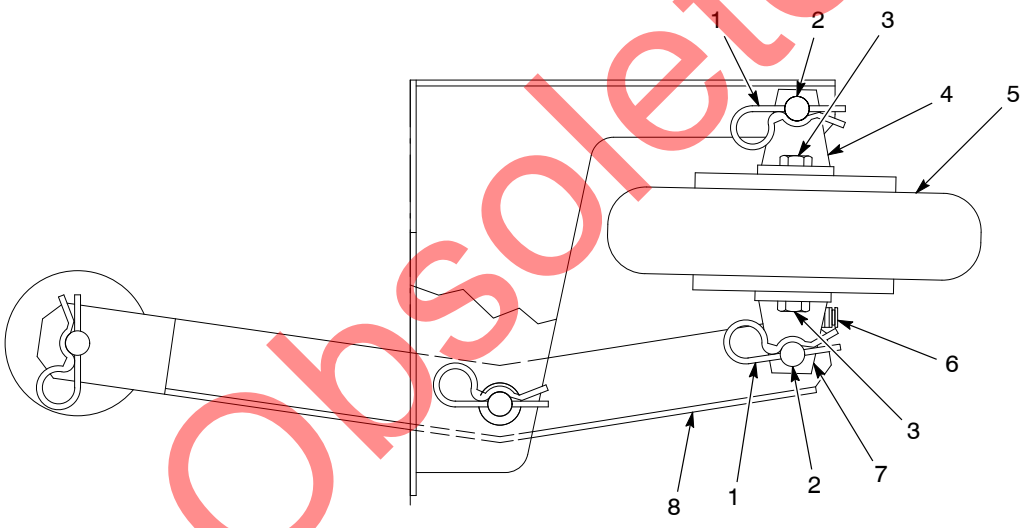

Figure 7-4 Floor Lifter Replacement

1. Cotter pins
2. Clevis pins
3. Screws
4. Upper bellows bracket
5. Bellows
6. 6-mm air fitting
7. Lower bellows bracket
8. Floor lifter arm

Floor Gear Reducer Replacement

Use the following procedure to replace the gear reducer in the center of the booth floor.

CAUTION: Raise the floor before performing this procedure. Failure to observe this caution may result in damage to the floor.

CAUTION: Operators must wear shoe covers when entering the booth. Failure to wear shoe covers will result in damage to the floor surface.

CAUTION: Do not set any tools or parts on the booth floor. Scratches on the floor will reduce the floor's cleanability.

Removing the Gear Reducer

See Figure 7-5.

1. Raise the floor by turning the LOCKOUT keyswitch on the system control panel to the LOCKED position.
2. Shut down the powder coating system. Refer to *Shutdown* in the *Operation* section for instructions. Shut off and lock out system electrical power.
3. Remove the cap (3) by removing the four screws (4). The ball spline (7) will drop against the gear reducer.
4. Remove the four screws (5) around the circumference of the access plate (2). Do not lose the nut pads (6) on the underside of the access plate. Lift the access plate away from the floor.
5. Loosen the set screw (12) securing the gear reducer coupling (11) to the drive shaft (13).
6. Remove the eight bolts (10) securing the gear reducer assembly (8) to the mounting bracket (9). Lift the gear reducer assembly out of the floor.

Installing the Gear Reducer

See Figure 7-5.

1. Set the new gear reducer assembly (8) onto the mounting bracket (9). Secure the gear reducer using the eight screws (10).
2. Couple the gear reducer coupling (11) to the drive shaft (13) and tighten the set screw (12).

3. Set the access plate (2) into its opening in the floor (1). Secure the access plate with the four screws (5) and nut pads (6).
4. Set the cap (3) in place on the access panel. Insert one of the screws (4) into a hole in the cap and adjust the cap until the screw lines up with the appropriate hole in the ball spline (7). Thread the screw into the ball spline, but do not tighten it at this time.
5. Repeat step 4 for each of the other three screws in the cap. When all four screws are in place, tighten them in an alternating pattern.
6. Remove all tools from the booth and check the floor for proper operation.

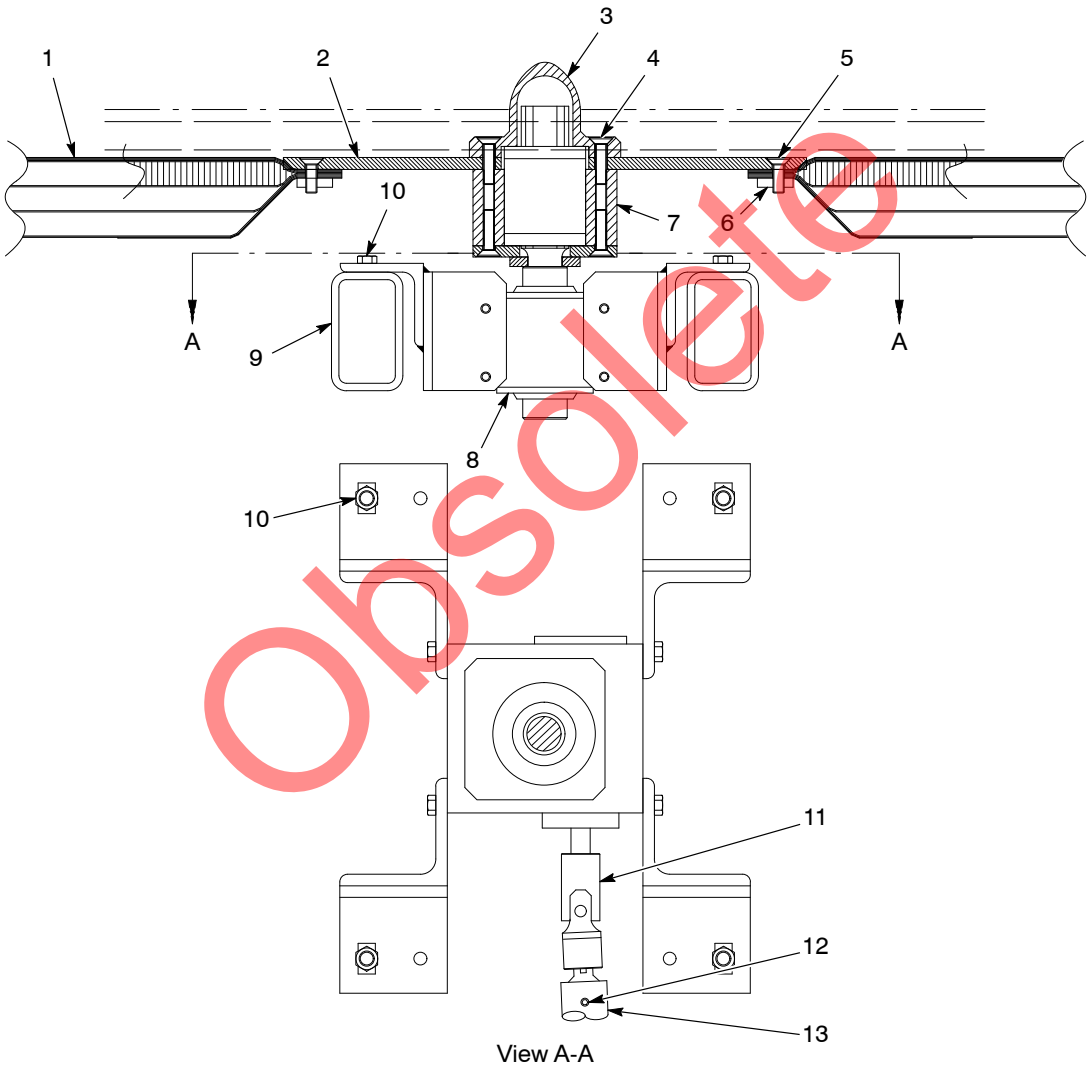

Figure 7-5 Floor Gear Reducer Replacement

1. Booth floor
2. Access plate
3. Cap
4. Screw
5. Screw
6. Nut pad
7. Ball spline
8. Gear reducer
9. Mounting bracket
10. Screws
11. Coupling
12. Set screw
13. Drive shaft

Section 8
Parts

Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

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

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

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

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

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

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

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

After Filter Parts

See Figure 8-1.

Item	Part	Description	Quantity	Note
1	- - - - - -	Bolt, eye, 1.38 ID x $^5/_8$-11 thread x 1.75-in. long	4	
2	156995	Filter, final, 20 x 24 in., internal	7	
3	- - - - - -	Bracket, filter retaining	14	
4	- - - - - -	Nut, hex, flanged, serrated, $^3/_8$-16	110	
5	1008635	Fan, assembly, Chicago Blower, 50 hp	1	
6	1008295	Baffle, plate assembly	1	
7	- - - - - -	Knob, $^3/_8$-16 through hole	24	
8	244721	Pump, powder, transfer 0.75-in outlet	2	
9	- - - - - -	Connector, male, 10-mm tube x $^1/_4$-in. NPT	8	
10	1008128	Fluidizing bed	2	
11	- - - - - -	Connector, male, elbow, 90°, 10-mm tube x $^1/_4$-in. NPT	4	
12	- - - - - -	Nut, hex, $^5/_8$-11, UNC 2B	15	
13	983440	Washer, lock, e, split, $^5/_8$-in, steel, zinc	15	
14	983090	Washer, flat, e, 0.656 x 1.312 x 0.095 in., zinc plated	15	
15	174720	Mount, filter, cartridge, Excel	15	
16	174722	Bracket, filter centering	15	
17	156996	Filter, 36 in., PowderGrid, center mount	15	
18	174723	Rod, filter mount, 36 in., Excel	15	
19	341807	Valve, pilot solenoid, 8	2	
20	174710	Valve, pulse, 1-in. NPT in, 1-in. NPT out	15	
21	165726	Nozzle, cartridge, pulse	15	
22	- - - - - -	Connector, male, elbow, 90°, 6-mm tube x $^1/_4$-in. NPT	4	
23	- - - - - -	Plug, pipe, $^3/_8$-in. NPTM	2	
24	248105	Manifold, air	2	
25	341848	Valve, fluidizing	4	
26	- - - - - -	Pad, leveling	4	
NS	1008803	Gasket, door, compression type	1	
NS: Not Shown				

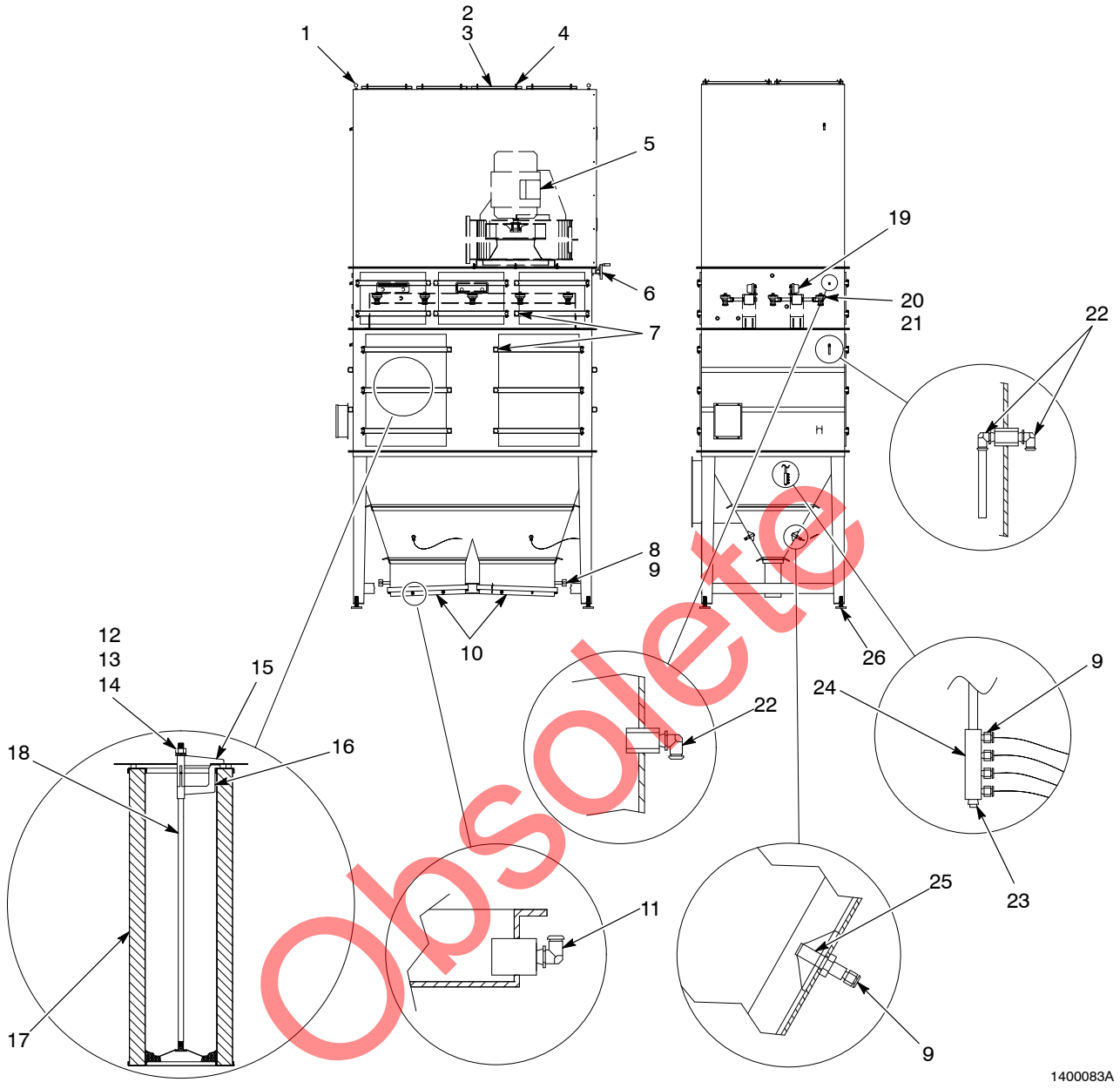

Figure 8-1 After Filter Parts

Gun Blow-Off Parts

See Figure 8-2.

NOTE: One gun blow-off kit, part 1016432, is necessary for each spray gun in the system.

Item	Part	Description	Quantity	Note
—	1016423	Kit, gun blow-off	1	
1	1014482	• Elbow, male, $^{5}/_{16}$-in. tube x $^{1}/_{4}$-in. NPTF, plastic	4	
2	900618	• Tubing, polyurethane, 8-mm OD, blue	AR	
3	1014495	• Screw, thumb, knurled, hand, $^{3}/_{8}$-16 x $1^{1}/_{2}$ in., nylon	4	
4	1014478	• Bracket, nozzle positioning, gun blow-off	2	
5	1014480	• Reducer, tube to tube stem, $^{5}/_{16}$–$^{3}/_{8}$ in.	4	
6	1014494	• Tee, male swivel, $^{3}/_{8}$-in. tube x $^{1}/_{4}$-in. NPTF, plastic	2	
7	1014477	• Nozzle, flat spray, $^{1}/_{4}$-in. NPT, plastic	4	
8	1014479	• Nut, channel, $^{3}/_{8}$-16, UNC 2B	4	
9	1022415	• Nut, hex, machined, #10-32, isoplast	4	
10	1022416	• Washer, friction, 0.25 ID x 1.00-in. OD	4	A
11	1022417	• Screw, pan head, 10-32 x 0.75 in., isoplast	4	

NOTE A: The friction washer, part 1022416, must be adhered to the back of the nozzle, part 1014477, before the nozzle is secured to the nozzle positioning bracket.

AR: As Required

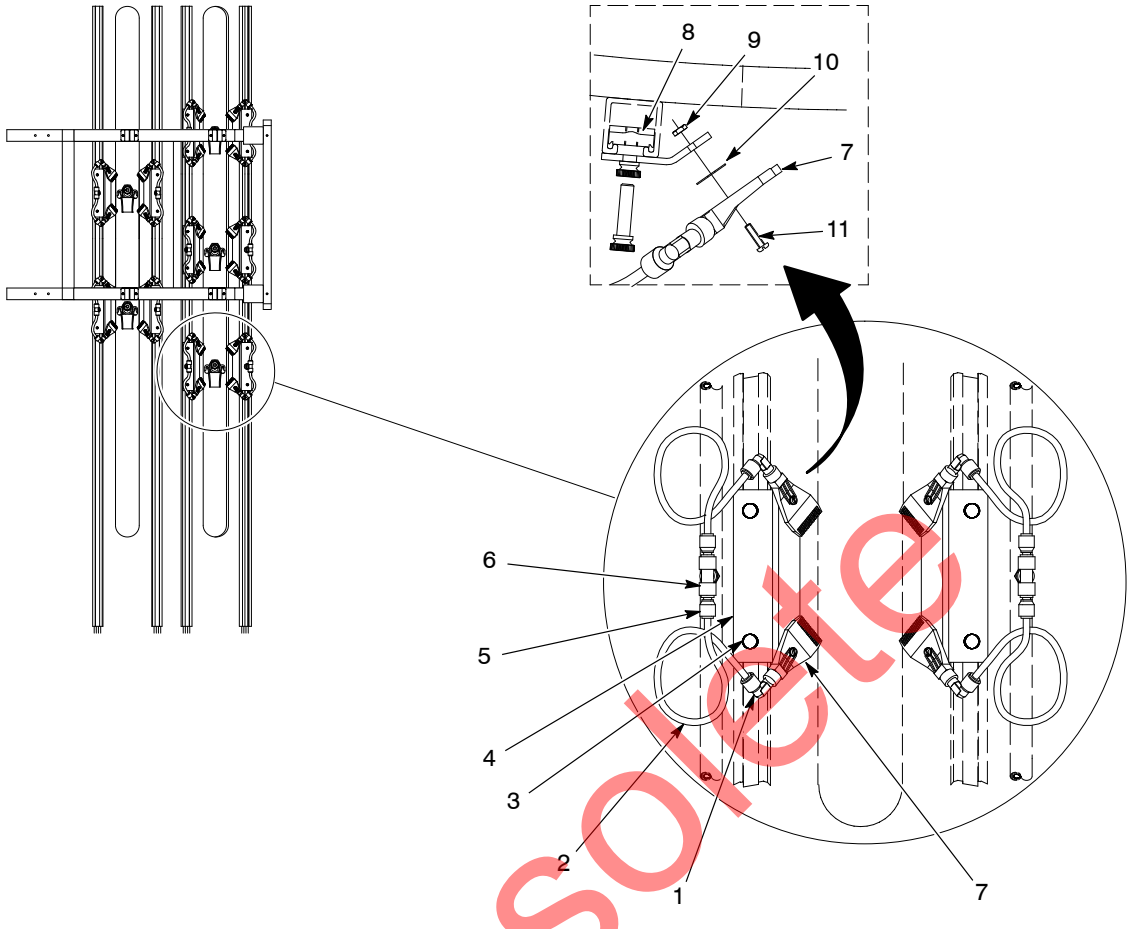

Figure 8-2 Gun Blow-Off Parts

Canopy and Base Parts

Use the following list to order common replacement parts for the booth canopy and base.

Part	Description	Note
1008309	Panel, lexan, roof	
1016862	Spring, air, hub, floor assembly	
1016194	Reducer, with base, hub, floor assembly	
1014481	Valve, remote, air operated, 1-in. NPT	
1016344	Pistol, blowgun, 72 in.	
1016340	• Gun, spray, trigger, 36 in.	
1016341	• Wand, extension, 36 in.	
1016199	Universal joint, hub, floor assembly	
1016209	Pin, hub, floor assembly	

Miscellaneous Parts

Use the following list to order miscellaneous parts for the system.

Part	Description	Note
1013284	Sponge, cleaning, 2 in., vacuum transfer, one dozen	
1013179	Filter, Sure Max	
1018784	Cyclone cleaning media, 50-lb drum	