

# **Powder Bell**

Customer Product Manual  
Part 229 843A



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*Section 1*

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***Safety***

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# Section 1

## Safety

---

### 1. Introduction

---

This section contains general safety instructions for using your Nordson equipment. Task- and equipment-specific warnings are included in other sections of this manual where appropriate. Note all warnings and follow all instructions carefully. Failure to do so may result in personal injury, death, or property damage.

To use this equipment safely,

- read and become familiar with the general safety instructions provided in this section of the manual before installing, operating, maintaining, or repairing this equipment.
- read and carefully follow the instructions given throughout this manual for performing specific tasks and working with specific equipment.
- store this manual within easy reach of personnel installing, operating, maintaining, or repairing this equipment.
- follow all applicable safety procedures required by your company, industry standards, and government or other regulatory agencies. Refer to the National Fire Protection Association (NFPA) standard 33 and to federal, state, regulatory agency, and local codes for rules and regulations covering installation and operation of powder spray systems.
- obtain and read Material Safety Data Sheets (MSDS) for all materials used.

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### 2. Safety Symbols

---

Become familiar with the safety symbols presented in this section. These symbols will alert you to safety hazards and conditions that may result in personal injury, death, or property and equipment damage.



**WARNING:** Failure to observe this warning may result in personal injury, death, or equipment damage.

**2. Safety Symbols** (contd.)

---



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



**WARNING:** Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage.



**WARNING:** Risk of explosion or fire. Fire, open flames, and smoking prohibited.



**WARNING:** Wear protective clothing, safety goggles, and approved respiratory protection. Failure to observe may result in serious injury.



**WARNING:** System or material pressurized. Relieve pressure. Failure to observe this warning may result in serious injury or death.



**CAUTION:** Failure to observe may result in equipment damage.

**3. Qualified Personnel**

---

“Qualified personnel” is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance, and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations, and have been trained to safely install, operate, maintain, and repair the equipment. It is the responsibility of the company operating the equipment to see that its personnel meet these requirements.

---

## 4. *Intended Use*

---



**WARNING:** Use of this equipment in ways other than described in this manual may result in personal injury, death, or property and equipment damage. Use this equipment only as described in this manual.

Nordson Corporation cannot be responsible for injuries or damages resulting from nonstandard, unintended applications of its equipment. This equipment is designed and intended only for the purpose described in this manual. Uses not described in this manual are considered unintended uses and may result in serious personal injury, death, or property damage. Unintended uses may result from taking the following actions:

- making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine Nordson replacement parts
- failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards
- using materials or auxiliary equipment that are inappropriate or incompatible with your Nordson equipment
- allowing unqualified personnel to perform any task

---

## 5. *Installation*

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Read the installation section of all system component manuals before installing your equipment. A thorough understanding of system components and their requirements will help you install the system safely and efficiently.

- Allow only qualified personnel to install Nordson and auxiliary equipment.
- Use only approved equipment. Using unapproved equipment in an approved system may void agency approvals.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Follow all instructions for installing components and accessories.
- Install all electrical, pneumatic, gas, and hydraulic connections to local code.

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**5. Installation** (contd.)

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- Install locking, manual, shutoff valves in the air supply lines to the system. This allows you to relieve air pressure and lock out the pneumatic system before undertaking maintenance and repairs.
- Install a locking disconnect switch or breaker in the service line ahead of any electrical equipment.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- Ground all electrically conductive equipment within 10 feet (3 meters) of the spray area. Ungrounded conductive equipment can store a static charge which could ignite a fire or cause an explosion if a hot spark is discharged.
- Route electrical wiring, electrostatic cables, and air hoses and tubing along a protected path. Make sure they will not be damaged by moving equipment. Do not bend electrostatic cables around a radius of less than 6 in. (152 mm).
- Install safety interlocks and approved, fast-acting fire detection systems. These shut down the spray system if the booth exhaust fan fails, a fire is detected, or other emergency situation develops.
- Make sure the spray area floor is conductive to ground and that the operator's platform is grounded.
- Use only designated lifting points or lugs to lift and move heavy equipment. Always balance and block loads when lifting to prevent shifting. Lifting devices must be inspected, certified, and rated for a greater weight than the equipment being lifted.
- Protect components from damage, wear, and harsh environmental conditions.
- Allow ample room for maintenance, material supply container drop-off and loading, panel accessibility, and cover removal.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.

---

## 6. Operation

---

Only qualified personnel, physically capable of operating the equipment and with no impairments to their judgement or reaction times, should operate this equipment.

Read all component manuals before operating a powder spray system. A thorough understanding of all components and their operation will help you operate the system safely and efficiently.

- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.
- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks or locked-out electrical disconnects or pneumatic valves.
- Know where EMERGENCY STOP buttons, shutoff valves, and fire extinguishers are located. Make sure they work. If a component malfunctions, shut down and lock out the equipment immediately.
- Before operating, make sure all conductive equipment in the spray area is connected to a true earth ground.
- Never operate equipment with a known malfunction or leak.
- Do not attempt to operate electrical equipment if standing water is present.
- Never touch exposed electrical connections on equipment while the power is ON.
- Do not operate the equipment at pressures higher than the rated maximum working pressure of any component in the system.
- Know the pinch points, temperatures, and pressures for all equipment that you are working with. Recognize potential hazards associated with these and exercise appropriate caution.
- Wear shoes with conductive soles, such as leather, or use grounding straps to maintain a connection to ground when working with or around electrostatic equipment.

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**6. Operation** (contd.)

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- Do not wear or carry metallic objects (jewelry or tools) while working with or around electrostatic equipment. Ungrounded metal can store a static charge and cause harmful shocks.
- Maintain skin-to-metal contact between your hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If wearing gloves, cut away the palm or fingers.
- Keep parts of the body or loose clothing away from moving equipment or parts. Remove personal jewelry and cover or tie back long hair.
- Wear National Institute of Occupational Safety and Health (NIOSH) approved respirators, safety glasses or goggles, and gloves, and while handling powder containers, filling hoppers, operating spray equipment, and performing maintenance or cleaning tasks. Avoid getting powder coatings on your skin.
- Never point manual guns at yourself or other persons.
- Do not smoke in the spray area. A lit cigarette could ignite a fire or cause an explosion.
- If you notice electrical arcing in a spray area, shut down the system immediately. An arc can cause a fire or explosion.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments to powder spray guns.
- Shut off moving equipment before taking measurements or inspecting workpieces.
- Wash exposed skin frequently with soap and water, especially before eating or drinking. Do not use solvents to remove coating materials from your skin.
- Do not use high-pressure compressed air to blow powder off your skin or clothes. High-pressure compressed air can be injected under the skin and cause serious injury or death. Treat all high-pressure fittings and hoses as if they could leak and cause injury.

---

## **7. Less-Obvious Dangers**

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Operators should also be aware of less-obvious dangers in the workplace that often cannot be completely eliminated:

- exposed surfaces on the equipment which may be hot or have sharp edges and cannot be practically safeguarded
- electrical equipment which may remain energized for a period of time after the equipment has been shut off
- vapors and materials which may cause allergic reactions or other health problems
- automatic hydraulic, pneumatic, or mechanical equipment or parts that may move without warning
- unguarded, moving mechanical assemblies

---

## **8. Action in the Event of a System or Component Malfunction**

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Do not operate a system that contains malfunctioning components. If a component malfunctions, turn the system OFF immediately.

- Disconnect and lock out electrical power. Close and lock out hydraulic and pneumatic shutoff valves and relieve pressures.
- Allow only qualified personnel to make repairs. Repair or replace the malfunctioning component.

---

## **9. Maintenance and Repair**

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Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks.

- Always wear appropriate protective devices and use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in your equipment manuals.
- Do not service or adjust any equipment unless another person trained in first aid and CPR is present.
- Use only genuine Nordson replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.

**9. Maintenance and Repair**  
(contd.)

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- Disconnect, lock out, and tag electrical power at a disconnect or breaker in the service line ahead of electrical equipment before servicing.
- Do not attempt to service electrical equipment if there is standing water present. Do not service electrical equipment in a high-humidity environment.
- Use tools with insulated handles when working with electrical equipment.
- Do not attempt to service a moving piece of equipment. Shut off the equipment and lock out power. Secure equipment to prevent uncontrolled movement.
- Relieve air pressures before servicing equipment. Follow the specific instructions in this manual.
- Make sure that the room where you are working is sufficiently ventilated.
- If a “power on” test is required, perform the test carefully and then shut off and lock out power as soon as the test is over.
- Connect all disconnected equipment ground cables and wires after servicing the equipment. Ground all conductive equipment.
- Service lines connected to panel disconnect switches may still be energized unless they are disconnected. Make sure the power is off before servicing. Wait 5 minutes for capacitors to discharge after shutting off the electrical power.
- Turn off the electrostatic power supply and ground the gun electrode before adjusting or cleaning.
- Keep high-voltage connection points clean and insulated with dielectric grease or oil.
- Check all ground connections periodically with a standard ohmmeter. Resistance to ground must not exceed one megohm. If arcing occurs, shut down the system immediately.

---

## 9. Maintenance and Repair

(contd.)

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- Check interlock systems periodically to ensure their effectiveness.



**WARNING:** Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program.

- Do not store flammable materials in the spray area or room. Keep containers of flammable materials far enough away from spray booths to prevent their inclusion in a booth fire. If a fire or explosion occurs, flammable materials in the area will increase the chances and the extent of personal injuries and property damage.
- Practice good housekeeping procedures. Do not allow dust or powder coatings to accumulate in the spray area or booth or on electrical equipment. Read this information carefully and follow instructions.

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## 10. Disposal

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Dispose of equipment and materials used in operation and cleaning according to your local regulations.



*Section 2*

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***Description***

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## Section 2

# Description

### 1. Introduction

The Nordson Powder Bell is a motor-driven, rotating, electrostatic powder applicator. It is designed to apply decorative and protective finishes and is compatible with all commercially available organic powder coating materials.

The rotating nozzle of the powder bell provides uniform distribution of the powder pattern. Adjustable operating functions allow the powder bell to be tailored to specific situations.

### Terms

Table 2-1 defines common terms used throughout this manual.

Table 2-1 Terms and Definitions

Term	Definition
Flow Rate Air	Regulated air supplied to the powder pump. Controls the delivery rate of powder to the powder bell.
Atomizing Air	Regulated air supplied to the powder pump. Dilutes and smooths the delivery of the powder to the powder bell.
Shaping Air	Regulated air supplied to the front of the powder bell. Controls the size of the powder pattern.
Diffuser Air	Regulated air supplied to the main body of the powder bell. Prevents powder build-up on the powder bell but can also be used with shaping air to provide additional control of the powder pattern.
Nozzle Air	Regulated air supplied to the recessed area behind the nozzle. Prevents powder build-up behind the nozzle.
Bearing Air	Regulated air supplied to the internal chamber of the main body. Flows past the bearing seals reducing frictional drag on the spindle, prevents residual powder from entering the chamber, and prevents the powder supply from entering the chamber.
Powder Bell Cup	Consists of the nozzle and the deflector. Powder flows through the gap created between the nozzle and powder bell cup's deflector. Their combined shape creates the initial powder pattern.
Charging Voltage or Electrostatic Voltage	Measured in kilovolts (kV). Imparts an electrostatic charge to the powder as it leaves the nozzle.

**2. System Configuration**

A typical powder bell system consists of the components shown in Figure 2-1. In a large multiple powder bell system, the individual controllers may be replaced by custom-built control panels.

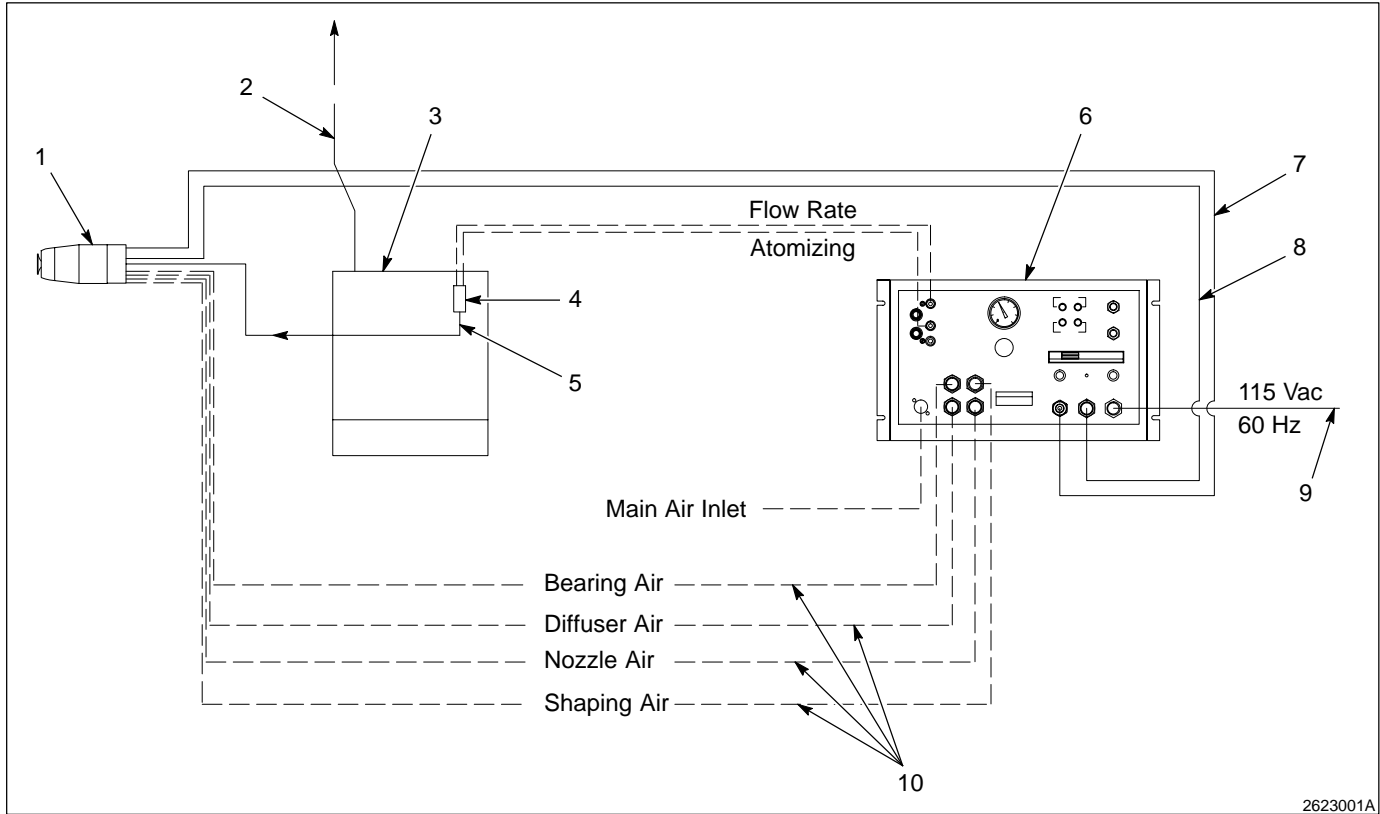


Fig. 2-1 Powder bell system components

- |                                    |                           |                     |
|------------------------------------|---------------------------|---------------------|
| 1. Powder bell (rotary applicator) | 5. Powder feed tube       | 8. Motor cable      |
| 2. Vent to booth                   | 6. Controller (back view) | 9. Input power      |
| 3. Feed hopper                     | 7. Multiplier cable       | 10. Pneumatic lines |
| 4. Feed pump                       |                           |                     |

**3. Specifications**

Specifications for the powder bell system are as follows:

**Dimensions**

See Figure 2-2.

**Weight**

- |                               |                 |
|-------------------------------|-----------------|
| Weight (powder bell)          | 4.4 kg (9.6 lb) |
| Weight (powder bell mt assy.) | 2.1 kg (4.7 lb) |

<b>Pressure</b>	Flow rate air	0.7–4.1 bar (10–60 psi)
	Atomizing air	0.3–1.0 bar (5–15 psi)
	Bearing air	1.0–1.4 bar (15–20 psi)
	Shaping air	0.1–1.4 bar (1–20 psi)
	Diffuser air	0.1–1.4 bar (1–20 psi)
	Nozzle air	0.1–1.4 bar (1–20 psi)
<b>Powder Delivery</b>	Operating range	1–7.5 gr/sec (8–60 lb/hr)
<b>Rotating Speed</b>	Operating range	750–1500 rpm
<b>Charging Voltage</b>	Operating range	30–100 kV

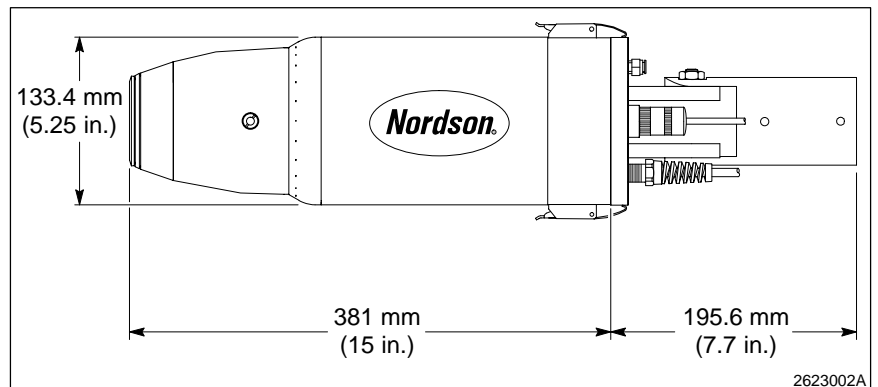


Fig. 2-2 Powder bell dimensions



*Section 3*

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# ***Installation***

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## Section 3 Installation



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

### 1. Introduction

This section provides instructions for installation of the mounting assemblies, powder feed tube, pneumatic connections, and electronic connections.

### 2. Mounting Assemblies

See Figure 3-1. The system may be mounted to a tube or a bar mount assembly.

Both mounting assemblies include pneumatic fittings for all powder bell air functions, 2 electrical control cables (multiplier power and motor power), and the fitting for the powder feed tube.

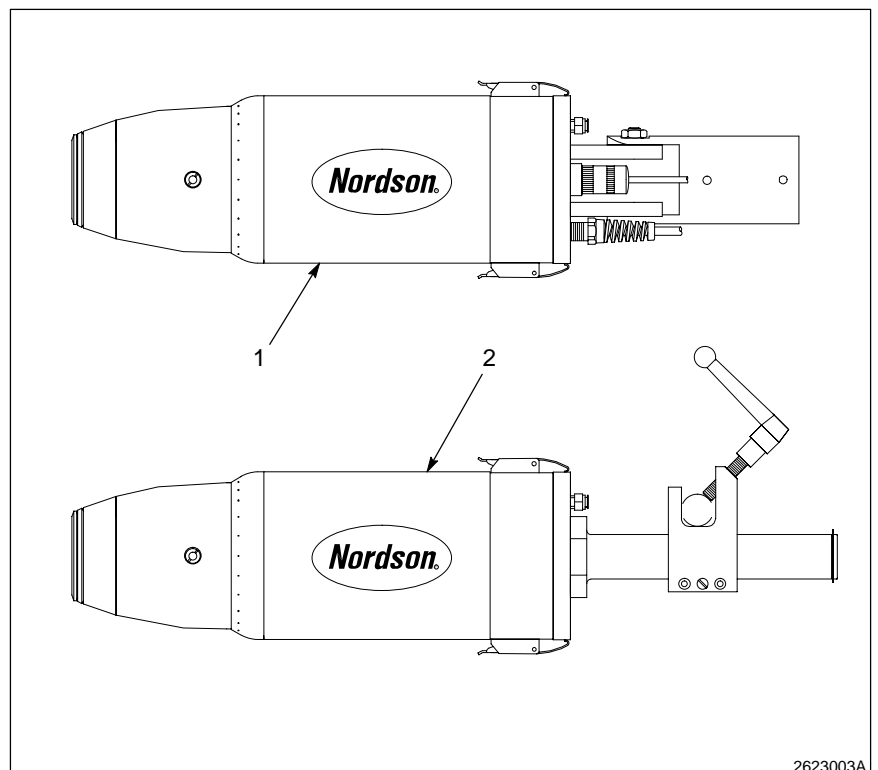


Fig. 3-1 Mounting assemblies

1. Tube mount

2. Bar mount

### **Tube Mount Assembly**

See Figure 3-1. The assembly fits over the end of a 48.5 mm (1.91 in.) outside diameter (OD) aluminum or steel tube. It is usually used for permanent installations because it is more rigid. The pneumatic, electronic, and powder lines can be routed directly through the tube, resulting in a less cluttered installation.

1. Attach the assembly to the 48.5 mm (1.91 in.) OD tube by tightening the 2 set screws.

**NOTE:** Make sure that the tube is properly supported and of adequate strength to support the powder bell. The tube should be positioned to allow proper distance between the powder bell and the object to be coated (usually 203–305 mm (8–12 in.)).

2. If desired, route the pneumatic, electrical, and powder lines through the tube.

### **Bar Mount Assembly**

See Figure 3-1. This assembly (2) has an adjustable clamping bolt for attachment to a round or square, 25.4 mm (1 in.) maximum, bar. It is usually used for temporary or lab installations, which may require frequent installation, removal, or repositioning. It can also be used for permanent installations.

Attach the assembly to the intended bar, a maximum of 2.54 cm (1 in.) diameter or square, by tightening the handle attached to the threaded bolt.

**NOTE:** See Figure 3-2. Make sure that the bar is properly supported and of adequate strength to support the powder bell. The bar should be positioned to allow proper distance between the powder bell and the object to be coated (usually 20–30 cm (8–12 in.)). The assembly can be adjusted 57 mm (2.25 in.) fore and aft, independent of the mounting bar.

**Bar Mount Assembly** (contd)

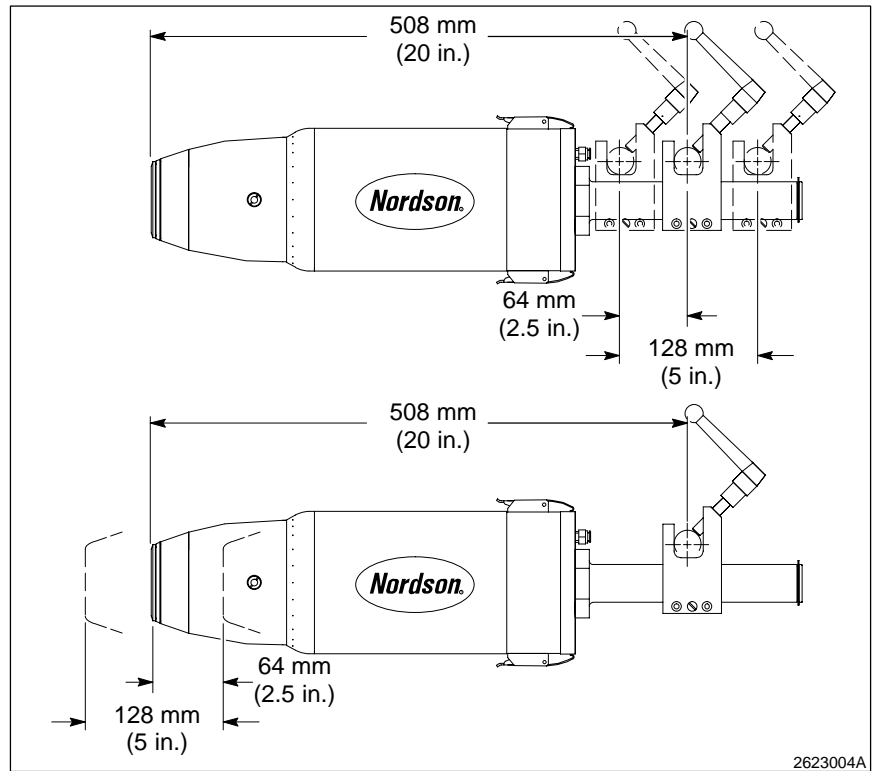


Fig. 3-2 Adjustment range

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### 3. Powder Feed Tube

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Attach the powder feed tube to the supplied connector. The connector accepts a feed tubing from 9.5–13 mm ( $3/8$ – $1/2$  in.) ID. Typical is 11 mm ( $7/16$  in.) ID.

---

### 4. Pneumatic Connections

---

Attach the 4 pneumatic tubes ( $3/8$  in. OD plastic) to the appropriate fittings (shaping, bearing, nozzle, and diffuser air) on the rear of the mount.

If a different type of tubing is desired, the supplied fittings can be removed and replaced with any fitting having a  $1/8$  NPT thread.

---

### 5. Electronic Connections

---

The powder bell power and multiplier cables are supplied connected to the powder bell mount.



**CAUTION:** Equipment damage may occur if the control unit is connected to a line voltage other than that stated on the ID plate.

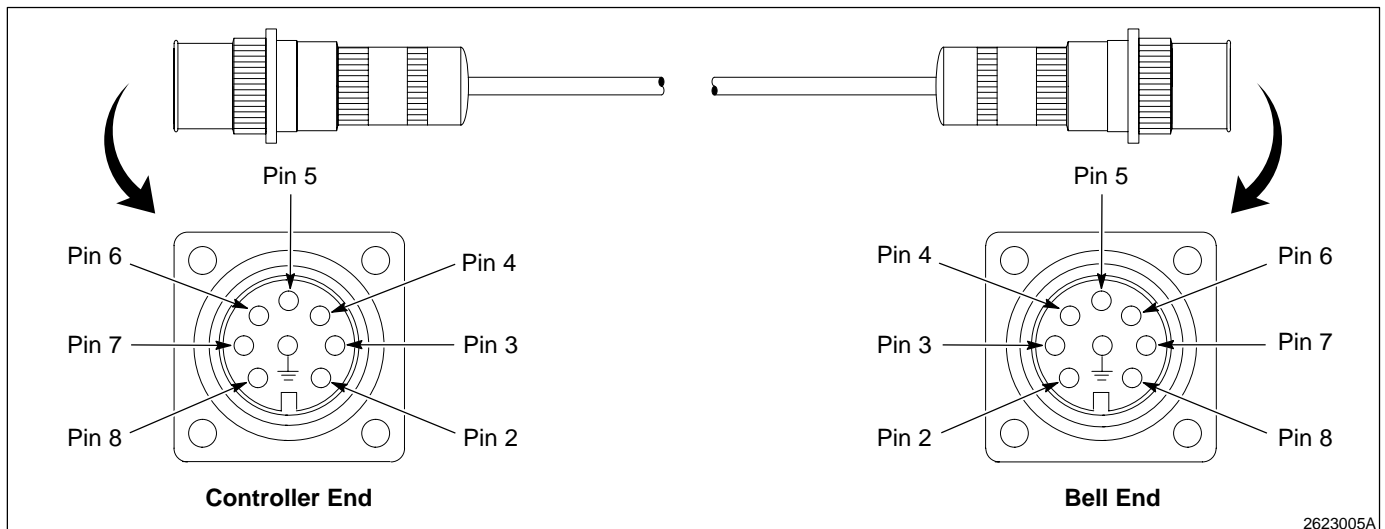


**WARNING:** Do not skip step 1. Failure to install the locking disconnect switch or breaker may result in a severe shock during installation or repair.

1. Install a locking disconnect switch or breaker in the service line ahead of the equipment so power can be shut off during installation or repair.
2. Make sure that the input voltage is 120 Vac  $\pm$  10%, single phase, 50/60 Hertz.
3. [See Figure 3-3](#). Attach the free end of the powder bell power cable to the bell motor output receptacle on the controller. If a custom control panel is used, it may have a receptacle that is compatible with the motor cable. If different terminations are required, connect the wires of the cable according to [Figure 3-5](#) and refer to [Table 3-1](#).

**5. Electronic Connections**

(contd.)



2623005A

Fig. 3-3 Powder bell power cable

Table 3-1 Power (Motor Output) Cable Connections

Pin	Wire Color	Type
1	green	ground
2	black	motor (negative)
3	red	motor (positive)
4	yellow	not used
5	white	encoder signal
6	blue	not used
7	brown	not used
8	—	shield drain

**NOTE:** The orange wire in the cable is not used and not connected. Make sure the position of the keys align with Figure 3-3.

## 5. Electronic Connections

(contd.)



**WARNING:** All electrically conductive equipment in the spray area must be grounded. Ungrounded or poorly grounded equipment can store an electrostatic charge which can give personnel a severe shock or arc and cause a fire or explosion.

4. Connect the ground strap furnished with the control unit to the ground stud.
5. Secure the clamp to an earth ground.
6. See Figure 3-4. Attach the free end of the multiplier cable to the multiplier output receptacle on the controller. If a custom control panel is used, it may have a receptacle that is compatible with the motor cable. If different terminations are required, connect the wires of the cable according to Figure 3-5 and refer to Tables 3-2 and 3-3.

Table 3-2 Multiplier Cable Connections—Controller End of Cable

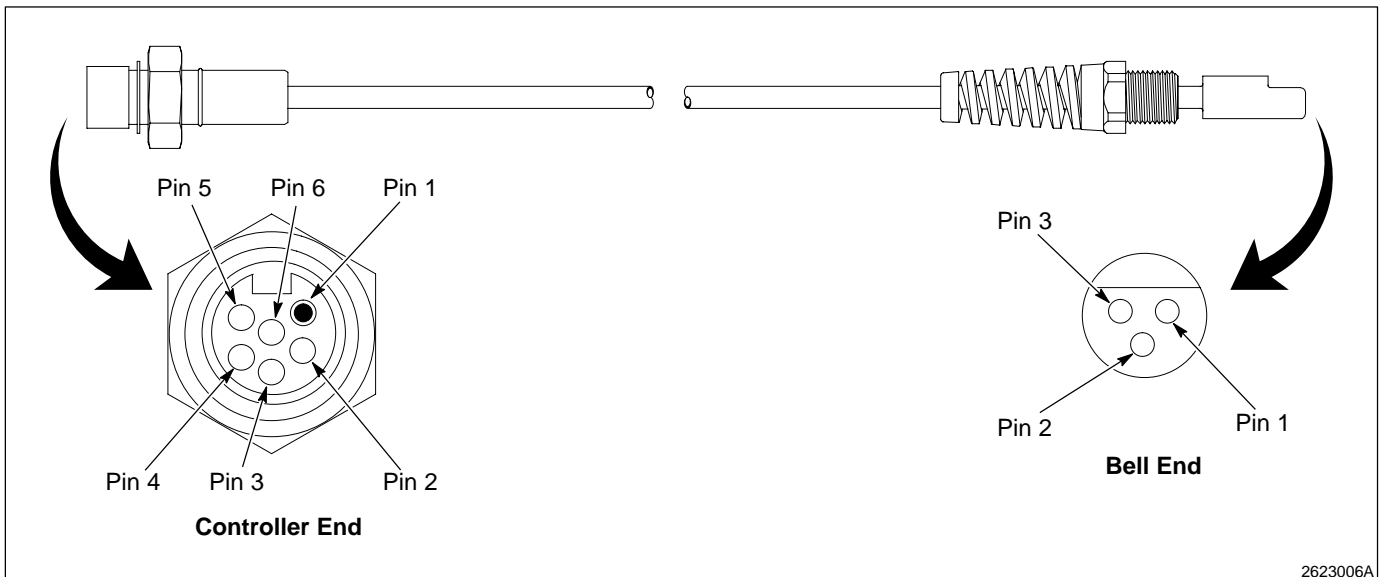
Pin	Wire Color	Type
1	—	not used
2	black	multiplier (negative)
3	red	multiplier (positive); +21 Vdc
4	white	feedback voltage; +5 Vdc
5	—	jumper to pin 6
6	—	jumper to pin 5

Table 3-3 Multiplier Cable Connections—Powder Bell End of Cable

Pin	Wire Color	Type
1	red	multiplier (positive); +21 Vdc
2	white	feedback voltage
3	black	multiplier (negative); +5 Vdc

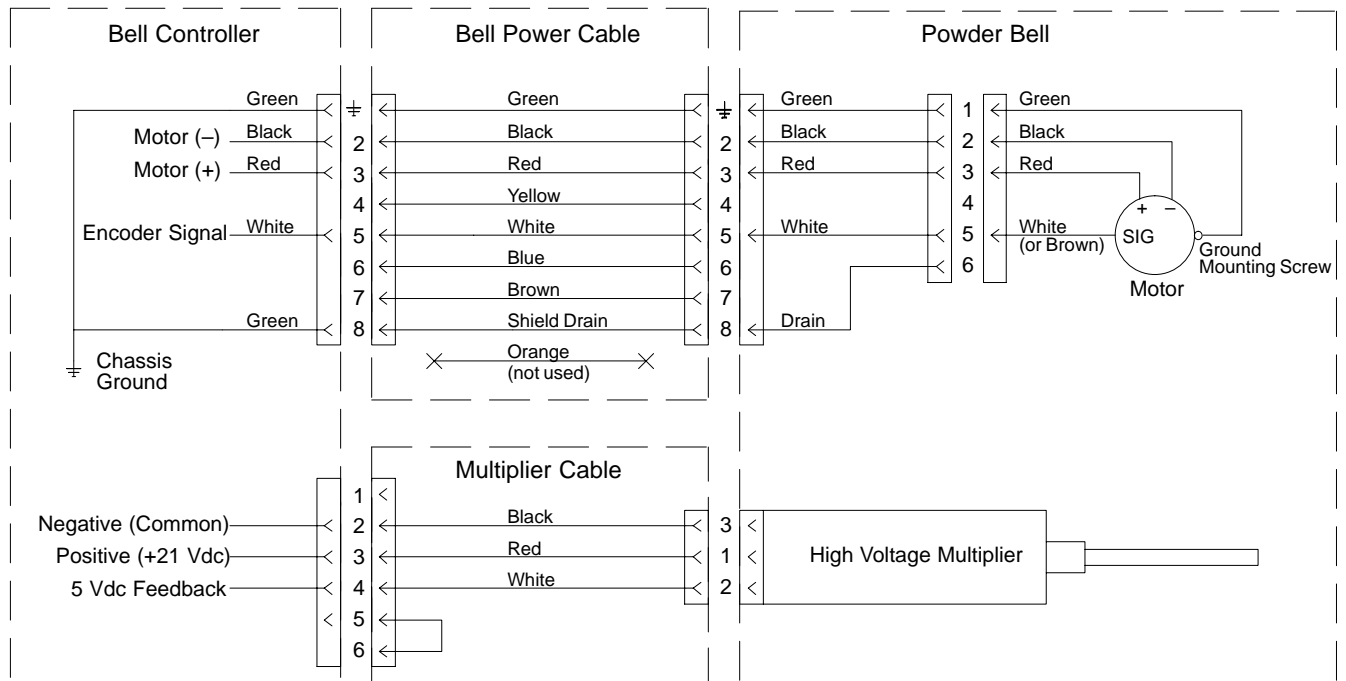
5. Electronic Connections

(contd.)



2623006A

Fig. 3-4 Powder bell multiplier cable



2623007A

Fig. 3-5 Powder bell system electrical diagram



*Section 4*

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# ***Operation***

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## Section 4 Operation



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

---

### 1. Introduction

---

This section contains general instructions for operating the powder bell. The air pressures given are initial settings. These settings may be adjusted for special applications.

When operating the powder bell, make sure the supply air is clean and dry, with 99.99% of 0.1 micron contaminants removed.

---

### 2. Daily or Shift Start-up

---

For daily or shift start-up, perform the following steps:

1. Make sure that bearing, shaping, diffuser, and nozzle air are properly adjusted.

**NOTE:** Bearing air should be kept at  $1 \pm 0.2$  bar ( $15 \pm 3$  psi). If it falls below 0.7 bar (10 psi), an internal interlock switch stops the powder bell rotation.

2. Make sure that motor and kV power to the powder bell are both off, and that the bell motor is not rotating.
3. [See Figure 4-1](#). Press and hold the spindle lock button (2).
4. Thread the bell cup (1) onto the spindle, turning the bell cup clockwise while facing the front of the powder bell.
5. Tighten the bell cup finger tight. Do not over tighten.
6. Apply motor power to the powder bell and check that proper rotation speed is indicated.

---

## 2. Daily or Shift Start-up

(contd.)

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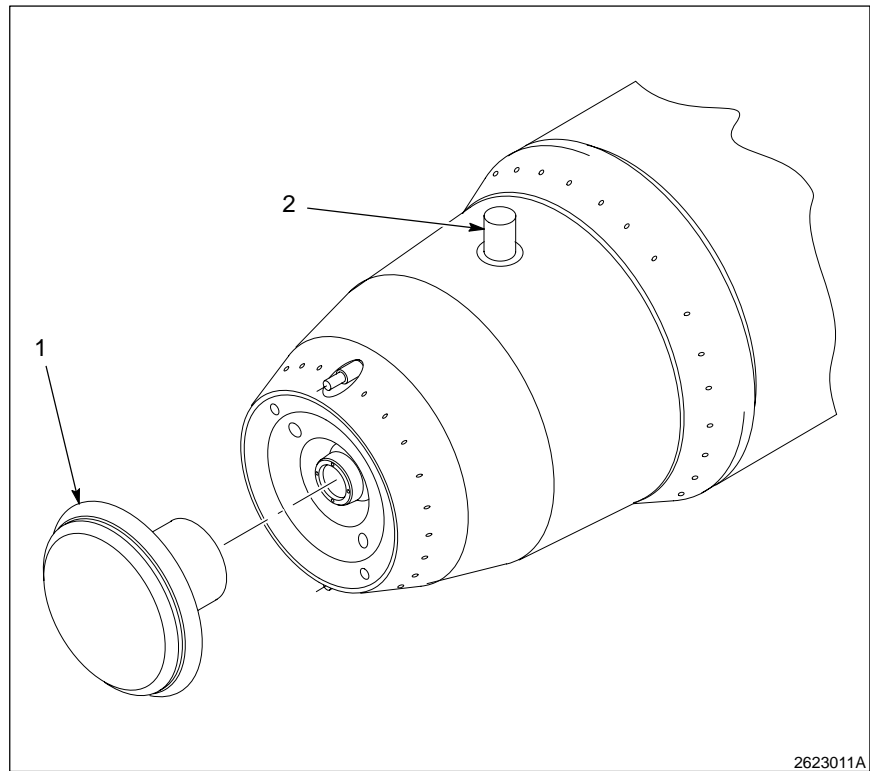


Fig. 4-1 Powder bell

1. Bell cup

2. Spindle lock button

---

## 3. Daily or End of Shift Shutdown

---

For daily or end of shift shutdown, perform the following actions:

1. Turn off the motor power to the powder bell.
2. Turn off the kV power to the powder bell.
3. Leave on the air pressures to the powder bell to prevent powder infiltration while cleaning.
4. See Figure 4-1. Remove and clean the bell cup (1). Refer to the *Maintenance* section for procedures.



**CAUTION:** Do not use compressed air on the external surface of the powder bell. Only a vacuum or wiping cloth should be used. Internal damage can result if powder is forced into the powder bell from compressed air.

5. Clean the bell exterior of any powder build-up.

*Section 5*

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# ***Maintenance***

---



## 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.

---

### 1. Introduction

---

This section provides instructions for maintaining the powder bell. To keep the powder bell operating at maximum efficiency, follow these instructions carefully.

---

### 2. Daily/Per Shift/As Necessary

---

The bell cup requires cleaning on a daily, per shift, or as necessary basis.

Perform bell cup cleaning as follows:

1. Press and hold the spindle lock button.
2. See Figure 5-1. Remove the bell cup (2) by rotating the bell cup counterclockwise while facing the front of the powder bell.



**CAUTION:** To prevent damage, remove the diffuser disk before cleaning the bell cup.

3. Remove the diffuser disk (1) from the bell cup (2). Check the diffuser disk for damage. Replace if necessary.

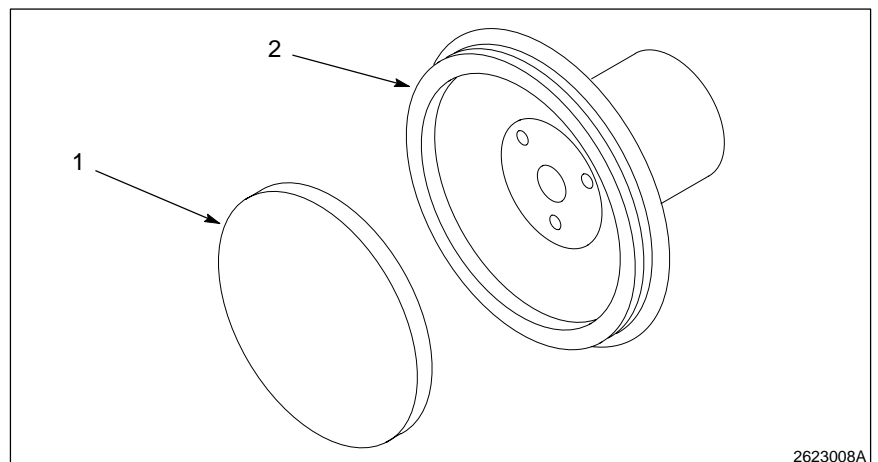


Fig. 5-1 Diffuser disk removal

1. Diffuser disk

2. Bell cup

---

## 2. Daily/Per Shift/As Necessary (contd.)

---



**WARNING:** Be sure to use an OSHA approved safety blow-off air gun. Failure to follow this warning may result in powder build-up, sparking, and injury to personnel.

4. If powder build-up is light and soft, remove the powder by carefully using a compressed air gun.



**WARNING:** Wear protective clothing, safety goggles, and approved respiratory protection. Failure to follow this warning may result in serious injury.



5. If powder build-up is impact fusion, soak the bell cup in warm, de-ionized water.
6. Dry off the bell cup thoroughly. Use compressed air to fully remove any moisture from the interior holes and passages in the bell cup.
7. Install the diffuser disk on the bell cup.
8. Install the bell cup to the powder bell.

---

## 3. Powder Bell Cleaning

---

Perform powder bell cleaning as follows:

1. Remove the bell cup from the powder bell.



**CAUTION:** Do not use a compressed air gun to blow off the powder bell. This can force powder into the unit and cause damage.

2. Clean the main body of the powder bell by wiping with a clean, soft, dry, lint-free cloth, or by the use of a vacuum with a soft brush attachment.

# ***Troubleshooting***

---



# 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.

## 1. Introduction

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.

Problem		Page
1.	Low transfer efficiency	6-1
2.	Low film build	6-2
3.	Bell cup speed low or irregular	6-2
4.	Bell cup does not rotate	6-2

## 2. Troubleshooting Chart

Problem	Possible Cause	Corrective Action
1. Low transfer efficiency	Poor ground	Refer to <i>Procedures, Ground Check</i> in this section.
	kV set point too low	Check and adjust if necessary.
	Charging malfunction	Refer to <i>Procedures, Electrostatic Charging Diagnosis</i> in this section.
	Flow rate air too low	Check and adjust if necessary.
	Atomizing air too high	Check and adjust if necessary.

**2. Troubleshooting Chart**

(contd.)

Problem	Possible Cause	Corrective Action
<b>2. Low film build</b>	Poor ground  kV set point too low  Charging malfunction  Flow rate air too low  Atomizing air too high	Refer to <i>Procedures, Ground Check</i> in this section.  Check and adjust if necessary.  Refer to <i>Procedures, Electrostatic Charging Diagnosis</i> in this section.  Check and adjust if necessary.  Check and adjust if necessary.
<b>3. Bell cup speed low or irregular</b>	RPM set point too low  Speed controller out of calibration  Bearing air pressure too low  Low output from motor circuit board  Bearings dirty or worn  Seals dirty or worn	Check and adjust if necessary according to the <i>Repair</i> section in the controller manual.  Refer to the <i>Repair</i> section in the controller manual for the procedures.  Check and adjust if necessary.  Refer to <i>Procedures, Motor Power Diagnosis</i> in this section.  Check and replace if necessary.  Check and replace if necessary.
<b>4. Bell cup does not rotate</b>	RPM set point too low  Speed controller out of calibration  Spindle lock pin not released  Bearing air pressure too low  Blown fuse on motor circuit board  Blown motor power fuse  Motor defective  Bearings dirty or worn  Seals dirty or worn	Check and adjust if necessary according to the <i>Repair</i> section in the controller manual.  Refer to the <i>Repair</i> section in the controller manual for procedures.  Check and correct if necessary.  Check and adjust if necessary.  Refer to <i>Procedures, Motor Power Diagnosis</i> in this section.  Check and replace if necessary.  Check and replace if necessary.  Check and replace if necessary.  Check and replace if necessary.

---

### 3. Procedures

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The following paragraphs provide ground check, electrostatic charging diagnosis, and motor power diagnosis procedures for the powder bell.

#### Ground Check

The object to be coated must be properly grounded to ensure safety and effective coating. To determine this, the electrical resistance between the part and ground must be measured. This can only be done by using a high voltage meg-ohmmeter. Do not use standard volt-ohmmeters because they do not reliably measure high resistance.



**WARNING:** Follow carefully the instructions supplied with the meg-ohmmeter. These units typically operate at 500–1000 Volts. Failure to adhere to this warning may result in electrical shock.

1. Attach the black (–) meter lead to a reliable ground point. Make sure that this ground attachment point is clean and free of paint or powder build up.

Good grounds:       conveyor rail; booth wall  
Poor grounds:       booth grating

2. Attach the red (+) meter probe to the part being checked.

**NOTE:** The probe must touch bare metal on the part. If the part has been E-coated or previously painted, scratch a small spot where the probe can touch bare metal.

3. Check the resistance. The resistance between the part and the ground must be 2 meg-ohms or less.
4. If the resistance is higher than 2 meg-ohms, try to locate the problem area by first measuring the resistance from the part to the carrier, and then from the carrier to the ground point.

## **Electrostatic Charging Diagnosis**

The powder bell has an internal high voltage multiplier which generates the electrostatic charging voltage, also known as E-stats or kV. The multiplier receives an input of 6–21 Vdc and multiplies it to an output of 30–100 kV. If a problem with the charging voltage is suspected, it can be isolated to the powder bell, the cable, or the power supply.

**NOTE:** To measure kilovolts, use the Nordson Electrostatic Analyzer Kit. This is the only meter that properly measures kilovolts on Nordson equipment. Any other type or brand of kilovolt meter loads down the charging circuit excessively and gives a false reading.

### **Electrode Tips**

1. Measure kV at the individual electrode tips (one at a time). With the kV set point at maximum, each electrode tip should measure approximately 70–74 kV.

**NOTE:** The reading will be less than 100 kV due to corona discharge from the unmeasured electrode tip. If one tip were removed, the reading on the remaining tip would be approximately 100 kV.

2. If one electrode tip measures significantly lower than the other, it may be broken, loose, or not screwed completely into the electrode holder. Replace the tip if necessary.
3. If both electrode tips measure the same but do not measure 70–74 kV, the problem may either be inside the powder bell or involve the voltage supply to the powder bell.

### **Multiplier Cable**

1. See [Figure 6-1](#) and refer to [Table 6-1](#). Remove the powder bell from its mount and measure the voltage at the multiplier cable connector (1). With the kV set point at maximum, the voltage across pins 1 and 3 should measure approximately 21 Vdc.
  - a. If the cable voltage measures 21 Vdc, the cable and power supply are correct and the problem is the powder bell.
  - b. If the cable voltage does not measure 21 Vdc, the problem is either the cable or the power supply. Go to step 9b.
2. See [Figure 7-2](#). Remove the electrode ring from the powder bell.
3. Check that the conductive O-ring is in place and that the 2 electrode tips are making contact with the O-ring. Replace if in doubt.

**Multiplier Cable** (contd.)

4. Set the kV set point at maximum. Measure kV at the end of the multiplier resistor where it protrudes from the front of the powder bell. The reading should be approximately 100 kV. If the voltage reading is not  $100 \pm 5$  kV, remove the multiplier from the powder bell according to *Powder Bell Disassembly* in the *Repair* section.

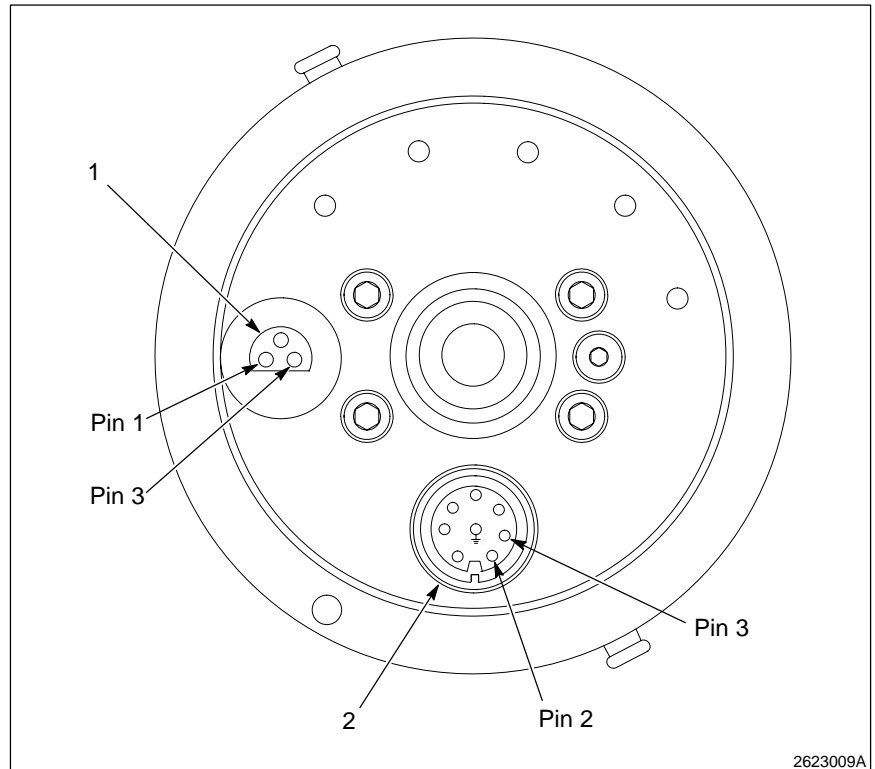


Fig. 6-1 Powder bell mount end view

1. Multiplier cable connector
2. Motor power cable connector

Table 6-1 Powder Bell End Connections

Cable	Pin	Type
Multiplier	1	+21 Vdc
	3	ground
Motor power	2	negative
	3	+27.5 Vdc

**Multiplier Cable** (contd.)

5. Remove the multiplier resistor from the multiplier and measure the electrical resistance of the resistor using a high voltage meg-ohmmeter. The resistance should be 161–187 meg-ohms.
6. Replace the resistor if defective or damaged. Be sure to use sufficient dielectric grease where the resistor spring enters the multiplier well.
7. Retest the multiplier. Replace if necessary.
8. [See Figure 3-5](#). Check for proper voltage input to the multiplier cable. With the kV set point at maximum, voltage across pins 2 and 3 at the controller end of the cable should measure 21 Vdc.
9. If the connector has been removed from the controller end of the cable, check for 21 Vdc across the connection points for the black wire (multiplier negative) and the red wire (multiplier positive).
  - a. If the voltage measures 21 Vdc at the controller end of the cable, but not at the powder bell end of the cable, the cable is defective. Replace the cable.
  - b. If the voltage does not measure 21 Vdc at the controller end of the cable, the problem is in the power supply circuit.
10. Check the wiring connector on the kV control circuit board. Make sure all wires are securely fastened.

**NOTE:** The kV control circuit board has an orange wiring connector. Do not confuse it with the motor control circuit board which is similar in appearance but has a black wiring connector. For part number verifications, refer to *Accessories* in the *Parts* section.

11. Check the fuse on the kV control circuit board. Replace if necessary using a 1 amp fast-acting fuse. For part number verifications, refer to *Accessories* in the *Parts* section
12. [See Figure 6-2](#). Check that the correct voltages are present at the kV control circuit board.

**Motor Power Diagnosis**

Perform motor power diagnosis as follows:

1. On the powder bell controller front panel, place the speed controller into manual mode and 100% output.
2. Verify that the bell cup is rotating at approximately 1565 rpm. Use a strobe tachometer if available.

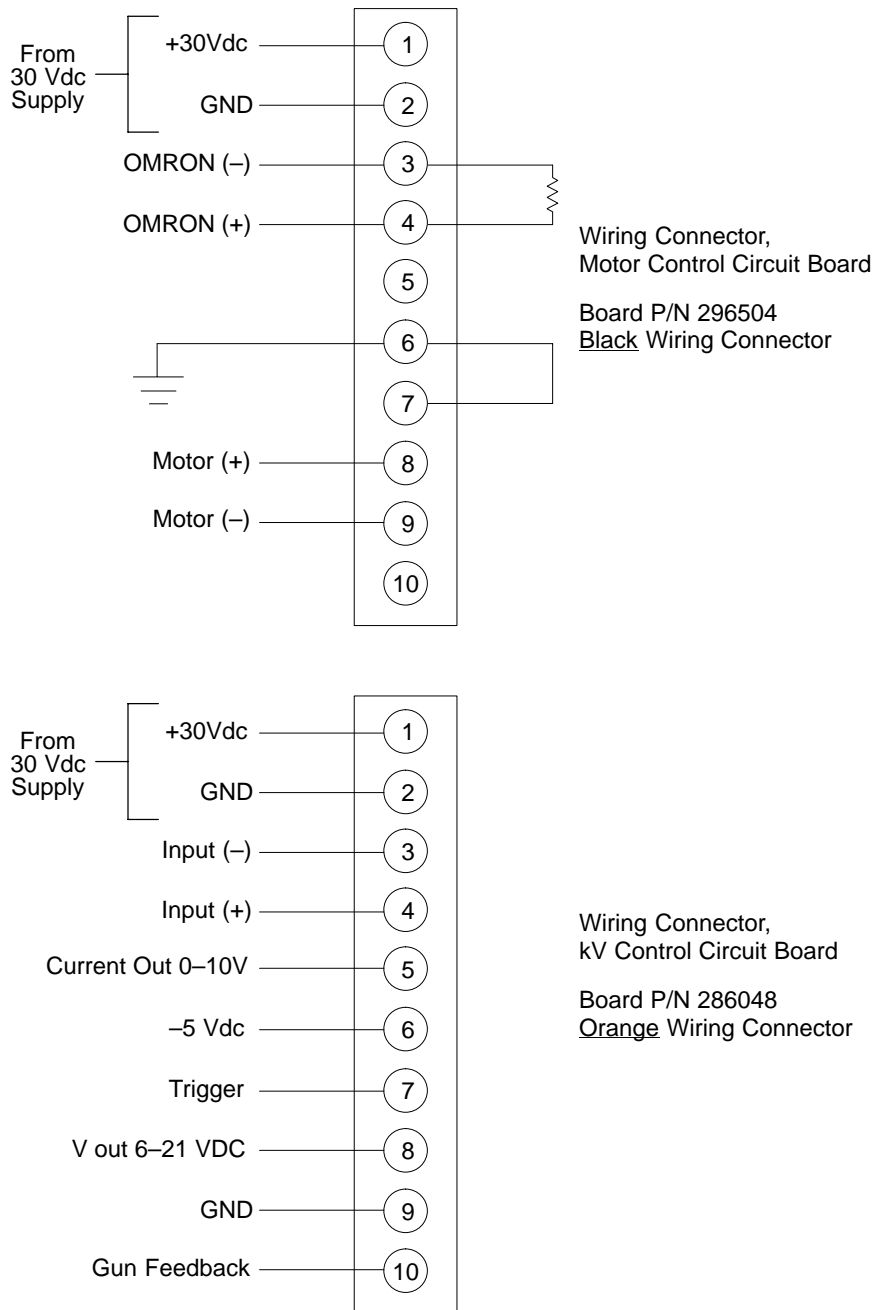


Fig. 6-2 kV control circuit board wiring

2623010A

**Motor Power Diagnosis** (contd)

3. Remove the powder bell from its mount.
4. [See Figure 6-1](#). With the speed controller still in manual mode and 100% output, measure the voltage at the powder bell end of the motor power cable. The voltage across pins 2 and 3 should measure approximately 27.5 Vdc.
  - a. If the proper voltage is measured, the cable and the motor power circuit are correct.
  - b. If the proper voltage is not measured, the problem is in the cable or the motor power circuit. Go to step 8.
5. Connect the powder bell to the bell tester. Mount and test for proper rotation. If the powder bell does not rotate properly, refer to the troubleshooting chart problem *Bell cup does not rotate*.
6. Check the motor power cable connector at the rear of the powder bell for damaged pins.
7. Check the connector inside the powder bell between the motor cable and the motor power cable for proper contact and damaged or loose wires.
8. Check for proper voltage input to the motor power cable. With the speed controller in manual mode and 100% output, voltage across pins 2 and 3 (black wire and red wire) at the controller end of the cable should measure approximately 27.5 Vdc.
  - a. If the voltage measures 27.5 Vdc at the controller end of the cable but not at the powder bell end of the cable, the cable is defective. Replace the cable.
  - b. If the voltage does not measure 27.5 Vdc at the controller end of the cable, the problem is in the motor power supply circuit.
9. Check the edge connector on the motor control circuit board. Make sure all wires are securely fastened.
10. Check the fuse on the motor control circuit board. Replace if necessary using a 1 amp fast-acting fuse (for a part number, refer to *Accessories* in the *Parts* section).
11. [See Figure 6-2](#). Check that proper voltages are present at the motor control circuit board.

*Section 7*

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***Repair***

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## 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.

### 1. Powder Bell Disassembly

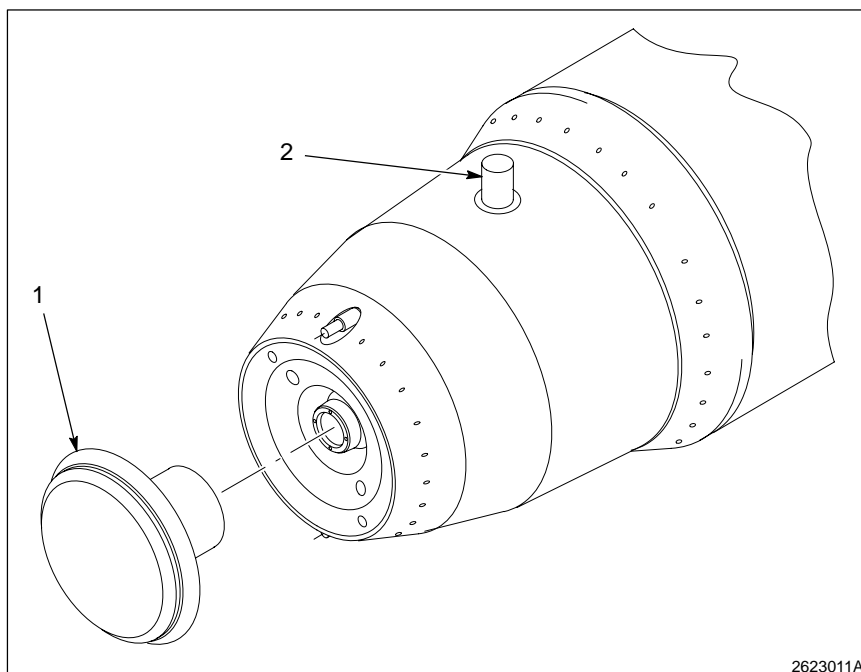


**WARNING:** Turn off the electrostatic voltage and ground the gun electrode before performing the following tasks. Failure to observe this warning could result in a shock.

**NOTE:** The powder bell tool kit is required for repairs.

Perform powder bell disassembly as follows:

1. See Figure 7-1. Remove the bell cup (1) by pressing in the spindle lock button (2) and turning the bell cup counterclockwise.



2623011A

Fig. 7-1 Powder bell

1. Bell cup

2. Spindle lock button

**1. Powder Bell Disassembly**  
(contd.)

2. See Figure 7-2. Insert the spanner wrench (1) into the alignment holes (2) on the electrode ring nut (3).
3. Turn the spanner wrench (1) counter-clockwise and remove the electrode ring nut (3).

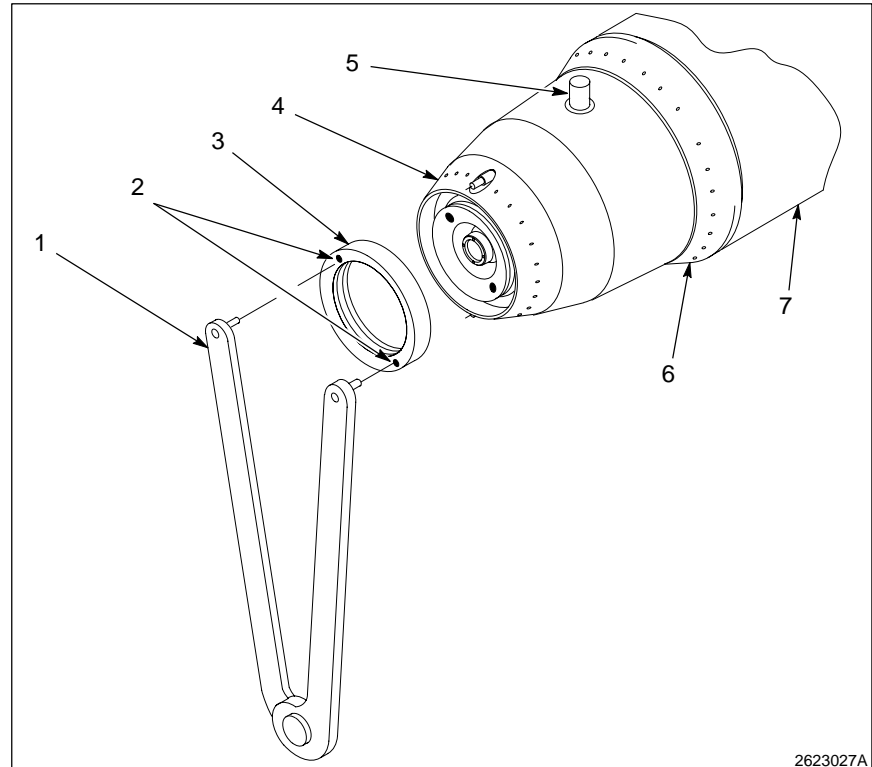


Fig. 7-2 Electrode ring and ring nut removal

- |                       |                        |
|-----------------------|------------------------|
| 1. Spanner wrench     | 5. Spindle lock button |
| 2. Alignment holes    | 6. Diffuser ring       |
| 3. Electrode ring nut | 7. Outer shell         |
| 4. Electrode ring     |                        |

4. Remove the electrode ring (4).
5. Use the grip pad from the powder bell tool kit to loosen and remove the diffuser ring (6). Turn counterclockwise.
6. Remove the outer shell (7). Press the spindle lock button (5) for clearance.
7. [See Figure 7-3](#). Remove the 4 screws (4) that secure the motor cable.
8. Disconnect and remove the motor cable (2).
9. Disconnect the 4 air hoses (1) at the base end of the powder bell.

**1. Powder Bell Disassembly**  
(contd.)

10. Slide the powder hose (3) off the powder tube fitting at the base end of the powder bell, leaving the opposite (nose) end connected.
11. See Figure 7-4. Remove the 2 socket head screws (1) that secure the rear body and remove the rear body.

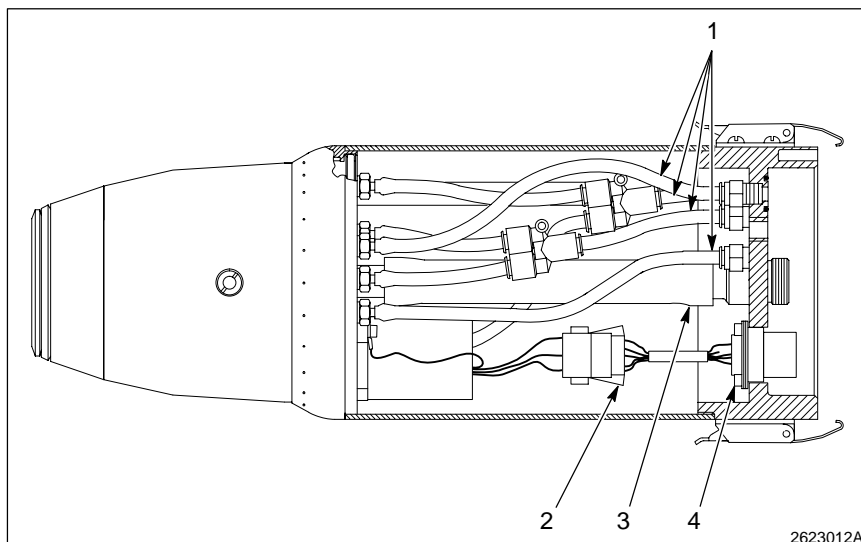


Fig. 7-3 Motor electrical plug and 4 air supply hoses

- |                |                |
|----------------|----------------|
| 1. Air hose    | 3. Powder hose |
| 2. Motor cable | 4. Screw       |

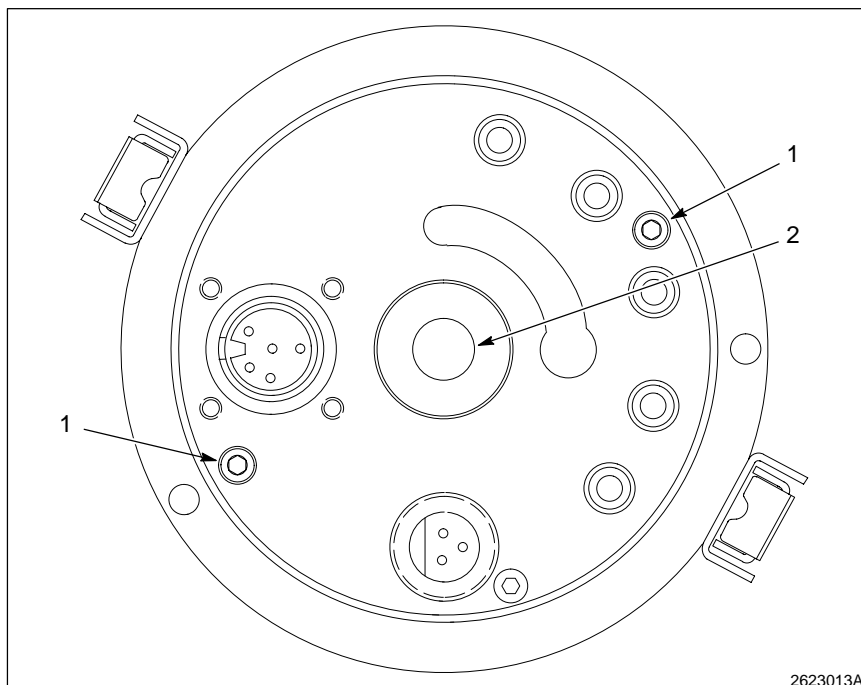


Fig. 7-4 Rear body

- |                      |                        |
|----------------------|------------------------|
| 1. Socket head screw | 2. Powder tube fitting |
|----------------------|------------------------|

## 1. Powder Bell Disassembly (contd.)

12. See Figure 7-5. Remove the multiplier (4) with a twisting motion.
13. Remove the 2 support rods (3).
14. Remove the 2 motor retaining screws (1) and ground lug.
15. Remove the motor (5) with a twisting motion.
16. Use the spanner wrench to loosen and remove the powder tube fitting (2).

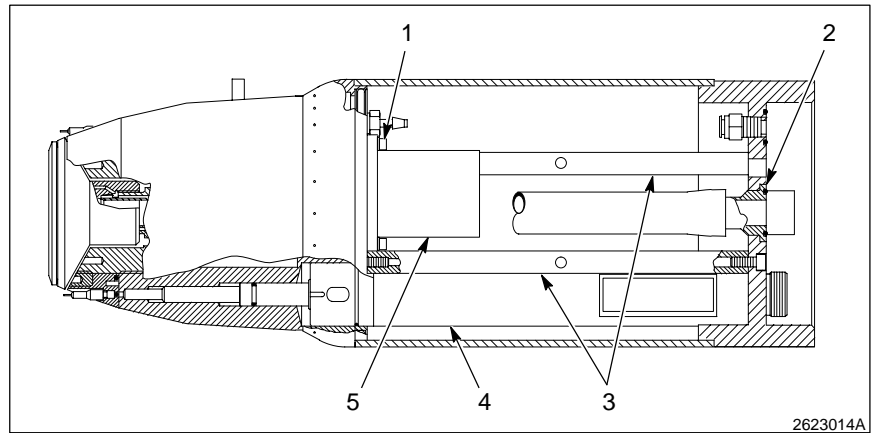


Fig. 7-5 Rear body disassembly

- |                          |               |
|--------------------------|---------------|
| 1. Motor retaining screw | 4. Multiplier |
| 2. Powder tube fitting   | 5. Motor      |
| 3. Support rod           |               |

## 2. Rear Bearing Disassembly

Perform rear bearing disassembly as follows:

1. Complete *Powder Bell Disassembly*.
2. See Figures 7-6. Press down on the spindle lock button. Use the bearing nut wrench (4) to remove the rear bearing nut (3).



**CAUTION:** Do not force the bearing with tools. Use finger pressure only. Bearings are easily damaged.

3. Push, with finger pressure, the spindle from the rear toward the front of the powder bell.
4. Move the rear bearing from left to right to loosen and remove.

## 2. Rear Bearing Disassembly (contd.)

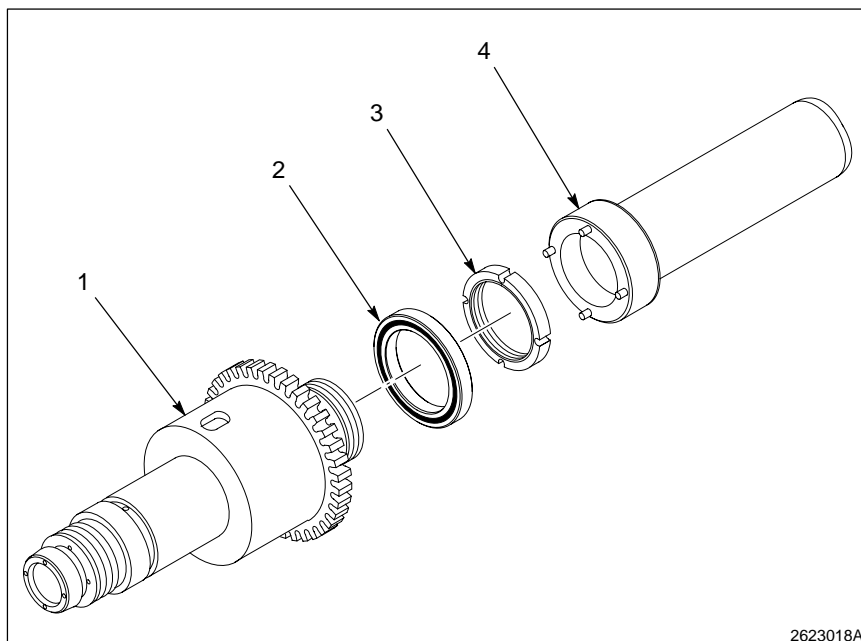


Fig. 7-6 Rear bearing disassembly

- |                 |                       |
|-----------------|-----------------------|
| 1. Spindle      | 3. Rear bearing nut   |
| 2. Rear bearing | 4. Bearing nut wrench |

## 3. Front Bearing Disassembly

Perform front bearing disassembly as follows:

1. Complete *Powder Bell Disassembly* and *Rear Bearing Disassembly*.
2. Using the spanner wrench, remove the front bearing retainer from the bell housing.



**CAUTION:** Make sure the rear bearing retainer nut has been removed or damage to the front bearing will result.

3. See Figure 7-7. Extend the puller tool (1) and align the heads of the 2 extended screws (2) with the 2 keyhole slots (3) in the front bearing holder.
4. Engage the screw heads into the keyhole slots with a clockwise turn.
5. Use a smooth continuous motion to pull or push the lever over the center, which will pull the front bearing holder out of the housing.
6. Make sure that the spindle lock button is not engaged.

### 3. Front Bearing Disassembly (contd.)



**CAUTION:** Handle the spindle and gear with care. The gear teeth are plastic and are easily damaged.

7. See Figure 7-6. If the spindle (1) did not come out of the housing with the front bearing holder, carefully remove it.
8. Remove the rear bearing (2) and rear bearing nut (3).
9. See Figure 7-8. Use the bearing nut wrench (1) to remove the front seal (2) from the front bearing holder (4).
10. Remove the front bearing (3) from the front bearing holder (4). Push from the back side using fingers. Apply equal pressure to both sides. Do not force.

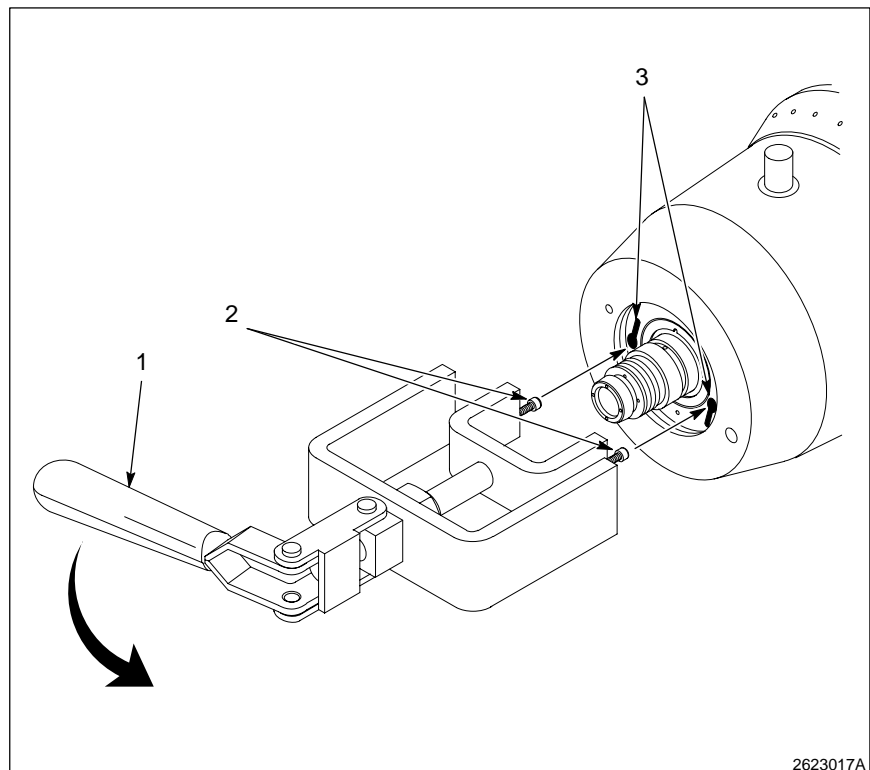


Fig. 7-7 Front bearing holder removal

- |                |                 |
|----------------|-----------------|
| 1. Puller tool | 3. Keyhole slot |
| 2. Screw head  |                 |

### 3. Front Bearing Disassembly (contd.)

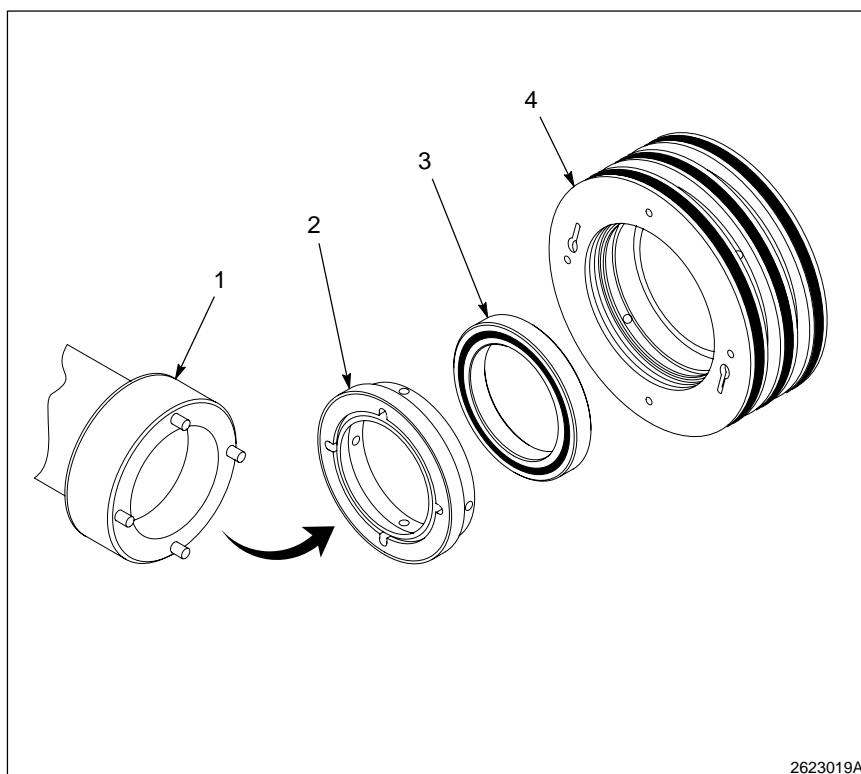


Fig. 7-8 Front bearing holder disassembly

- |                       |                         |
|-----------------------|-------------------------|
| 1. Bearing nut wrench | 3. Front bearing        |
| 2. Front seal         | 4. Front bearing holder |

### 4. Spindle Disassembly



**CAUTION:** Handle the spindle and gear with care. The gear teeth are plastic and are easily damaged.

1. See Figure 7-9. Remove the gear (1) from the spindle by removing the 2 retaining screws (2).
2. Remove the rear seal (3) only if necessary. If the seal is removed, replace the seal with a new one.

#### 4. Spindle Disassembly

(contd.)

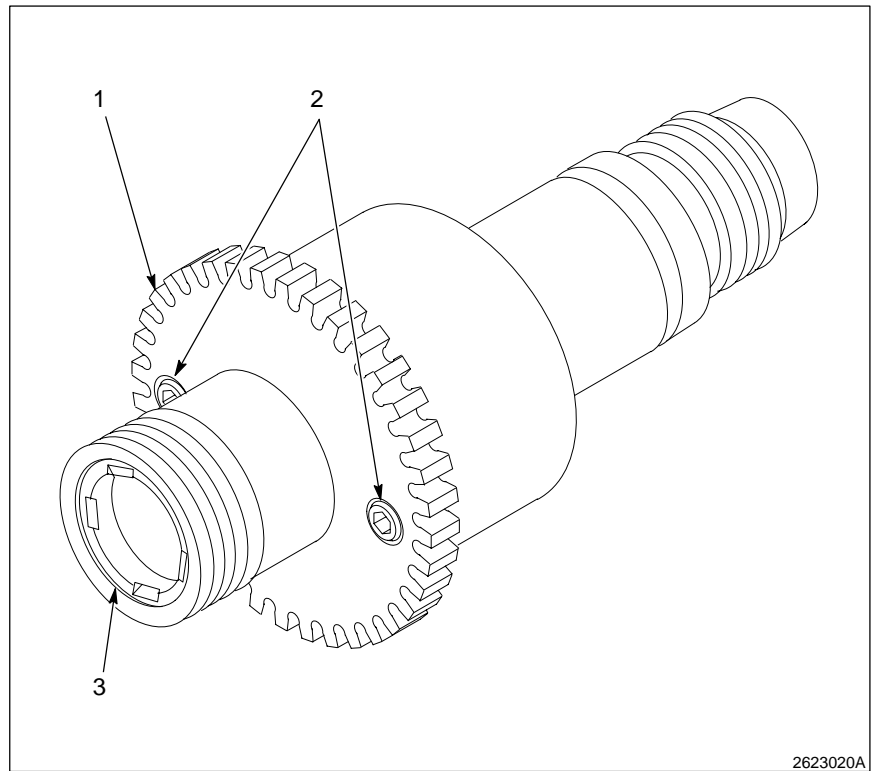


Fig. 7-9 Spindle assembly

- 1. Gear
- 2. Screw
- 3. Rear seal

#### 5. Spindle Assembly

1. Make sure all surfaces are clean.
2. See Figure 7-9. Install a new rear seal (3) if necessary.
  - a. Make sure the seal points forward, toward the inside of the spindle.
  - b. Center the rear seal with the powder tube fitting to make sure the alignment is correct.



**CAUTION:** Do not over torque the gear retaining screws. The threads may become stripped or the spindle may crack.

3. Attach the gear (1) onto the spindle with the counter-sink facing out. Torque in equal intervals the 2 screws (2).

## 6. Rear Bearing Assembly

Assemble the rear bearing as follows:

1. Insert the rear bearing (finger pressure only) into the rear of the bell housing.
2. Make sure the rear bearing is level and properly seated.
3. Insert the spindle into the nose end of the powder bell until several spindle threads are exposed.
4. See Figure 7-6. Insert the rear bearing nut (3) with the raised shoulder against the bearing. If shoulders are present on both sides, the orientation does not matter.



**CAUTION:** Do not over-tighten the nut. The threads may become stripped or the spindle may crack.

5. Press the spindle lock button and use the bearing nut wrench to tighten.

## 7. Front Bearing Assembly

**NOTE:** Check all O-rings for damage and replace if necessary.

1. Make sure all surfaces are clean.
2. Turn the powder bell over.
3. See Figure 7-8. Install, using fingers, the front bearing (3) into the front bearing holder (4).
4. Install the front seal (2) into the front bearing holder (4) using the bearing nut wrench (1). Make sure the seal points forward, facing outward from the front bearing holder.



**CAUTION:** Do not over torque the bearing holder assembly. The threads may become stripped or the front seal may be damaged.

5. Carefully place the bearing holder assembly into the front of the powder bell. A few threads should be showing. Make sure the seal is facing outward, toward the front of the powder bell.
6. Install the bearing retainer nut, tightening by hand until the bearing holder is fully seated. Finish tightening with the spanner wrench.

## 8. Powder Bell Assembly

---



**WARNING:** Turn off the electrostatic voltage and ground the gun electrode before performing the following tasks. Failure to observe this warning could result in a shock.

**NOTE:** Check all O-rings for damage and replace if necessary.

1. Make sure all surfaces are clean.
2. Insert the powder tube fitting and tighten using the spanner wrench until it bottoms out.
3. Check that the spindle turns freely and has 0.010–0.20 inches of end play.



**CAUTION:** Use care to avoid spindle gear damage.

4. [See Figure 7-5](#). Carefully insert the motor (5) with its attached gear while turning the spindle so that the gears mesh. The spindle should turn freely when the motor is fully seated.
5. [See Figure 7-10](#). If the gear (1) was removed from the motor:
  - a. Make sure the motor adapter (2) and O-ring are attached to the motor (3).
  - b. Attach the gear (1) to the motor shaft at a distance of 38.1 mm (1.50 in.) from the edge of the motor adapter.
6. [See Figure 7-5](#). Attach the ground lug and the 2 motor retaining screws (1). After tightening the screws, make sure the spindle can turn freely.
7. Install the 2 support rods (3).
8. Install the multiplier (4). The square block of the multiplier should be parallel to the mounting rod.
9. Install the rear body with 2 socket head screws. Align the multiplier hole and the 2 holes to the mounting rods.
10. [See Figure 7-11](#). If the motor cable has been removed, install it with the key (1) pointing toward the outside of the powder bell.

**8. Powder Bell Assembly**  
(contd.)

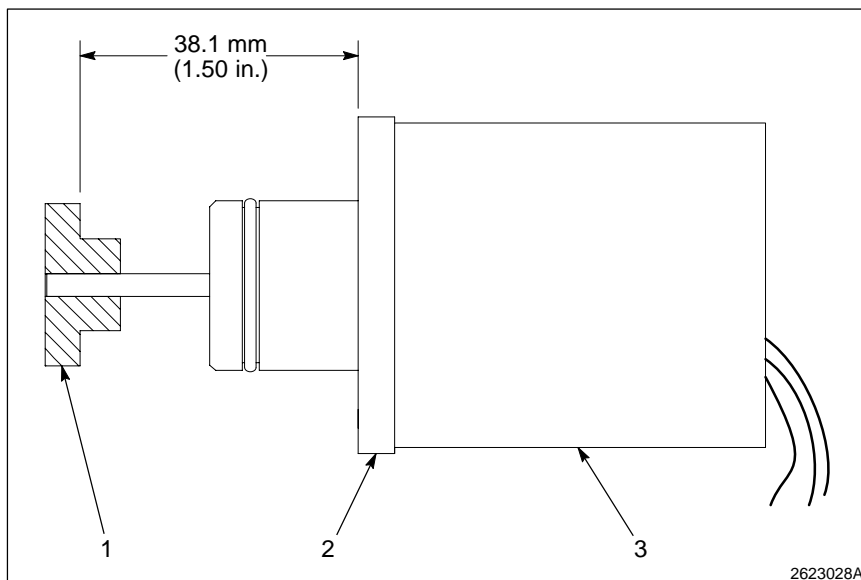


Fig. 7-10 Gear alignment

- 1. Gear
- 2. Motor adapter
- 3. Motor

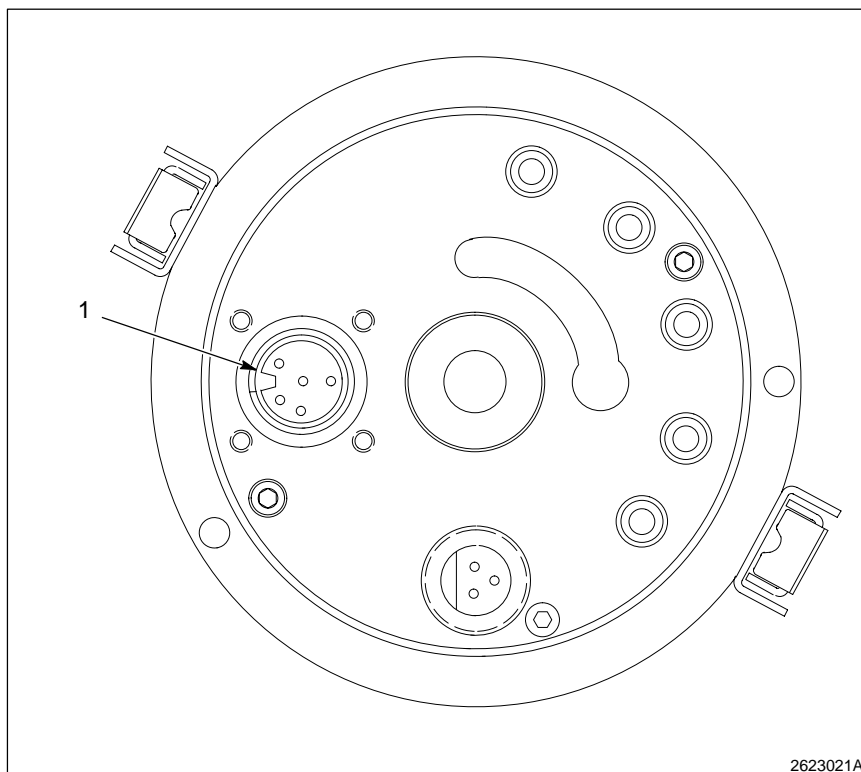


Fig. 7-11 Motor cable orientation

- 1. Key alignment

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**8. Powder Bell Assembly**

(contd.)

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11. See Figure 7-3. Install the powder hose (3) to the powder tube fitting.
12. Connect the 4 air hoses (1). Work from the inside out.
13. See Figure 7-2. Slide the outer shell (7) onto the bell assembly. Press the spindle lock button (5) for clearance.
14. Screw the diffuser ring (6) onto the bell assembly until snug. The outer shell should not move. Use the grip pad from the powder bell tool kit for a secure hand hold.
15. Install, finger tight, the electrode ring (4) and electrode ring nut (3).
16. Rotate the electrode ring (4) so that the electrodes are in the proper orientation. Use the spanner wrench (1) to tighten the electrode ring nut (3).
17. Press the spindle lock button and install the bell cup.

*Section 8*

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***Parts***

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## Section 8

# Parts

### 1. 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 six-digit 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
—	000 000	Assembly	1	
1	000 000	• Subassembly	2	A
2	000 000	• • 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.

**2. Powder Bell**

See Figure 8-1.

Item	Part	Description	Quantity	Note
—	236 732	Bell assembly, powder	1	
1	296 530	• Bell cup assembly	1	
2	235 983	• Nut, electrode ring	1	
3	235 984	• Ring, electrode	1	
4	132 748	• Contact, cable (electrode tip)	2	
5	236 762	• O-ring, -151, conductive	1	
6	287 699	• O-ring, -143, 2 <sup>7</sup> / <sub>16</sub> x 2 <sup>5</sup> / <sub>8</sub>	1	
7	235 988	• Ring, diffuser	1	
8	296 371	• Module, bell drive	1	A
9	296 421	• O-ring, -247	1	
10	146 009	• Multiplier, 100 kV	1	
11	235 925	• Tubing, isoprene, <sup>7</sup> / <sub>16</sub> ID	1 ft	
12	287 405	• Shell	1	
13	900 730	• Tubing, <sup>1</sup> / <sub>4</sub> ft polyurethane	3 ft	
14	972 672	• Fitting, union WYE, <sup>1</sup> / <sub>4</sub> in.	2	
15	303 986	• Rod, support	2	
16	981 202	• • Screw, <sup>1</sup> / <sub>4</sub> -20 x 1 in. long, socket set, cup point	2	
17	972 716	• Male connector, <sup>1</sup> / <sub>4</sub> T x <sup>1</sup> / <sub>8</sub> NPT	4	
18	287 420	• Body, rear	1	
19	981 164	• Screw, #10-32 x <sup>3</sup> / <sub>4</sub> in. long, socket head	2	
20	230 651	• Latch	2	
21	981 066	• Screw, #8-32 x <sup>1</sup> / <sub>4</sub> in. long round head, ss	4	
22	940 140	• O-ring, <sup>1</sup> / <sub>2</sub> x <sup>5</sup> / <sub>8</sub> x <sup>1</sup> / <sub>16</sub>	5	
23	236 751	• Fitting, powder tube, <sup>1</sup> / <sub>2</sub> in.	1	
24	940 180	• O-ring, <sup>3</sup> / <sub>4</sub> x <sup>7</sup> / <sub>8</sub>	1	
25	982 923	• Screw, M3 x 8, round head	1	
26	986 120	• Retaining ring, <sup>7</sup> / <sub>8</sub>	1	B
27	981 258	• Screw, #6-32 UNC x <sup>5</sup> / <sub>16</sub> in. fillister head	4	
28	973 402	• Plug, <sup>1</sup> / <sub>8</sub> NPT	1	
29	236 765	• Cable, motor	1	

NOTE A: Refer to the *Bell Drive Module* section.

B: Used on powder bells with a serial number of 01020 and higher.

2. Powder Bell (contd.)

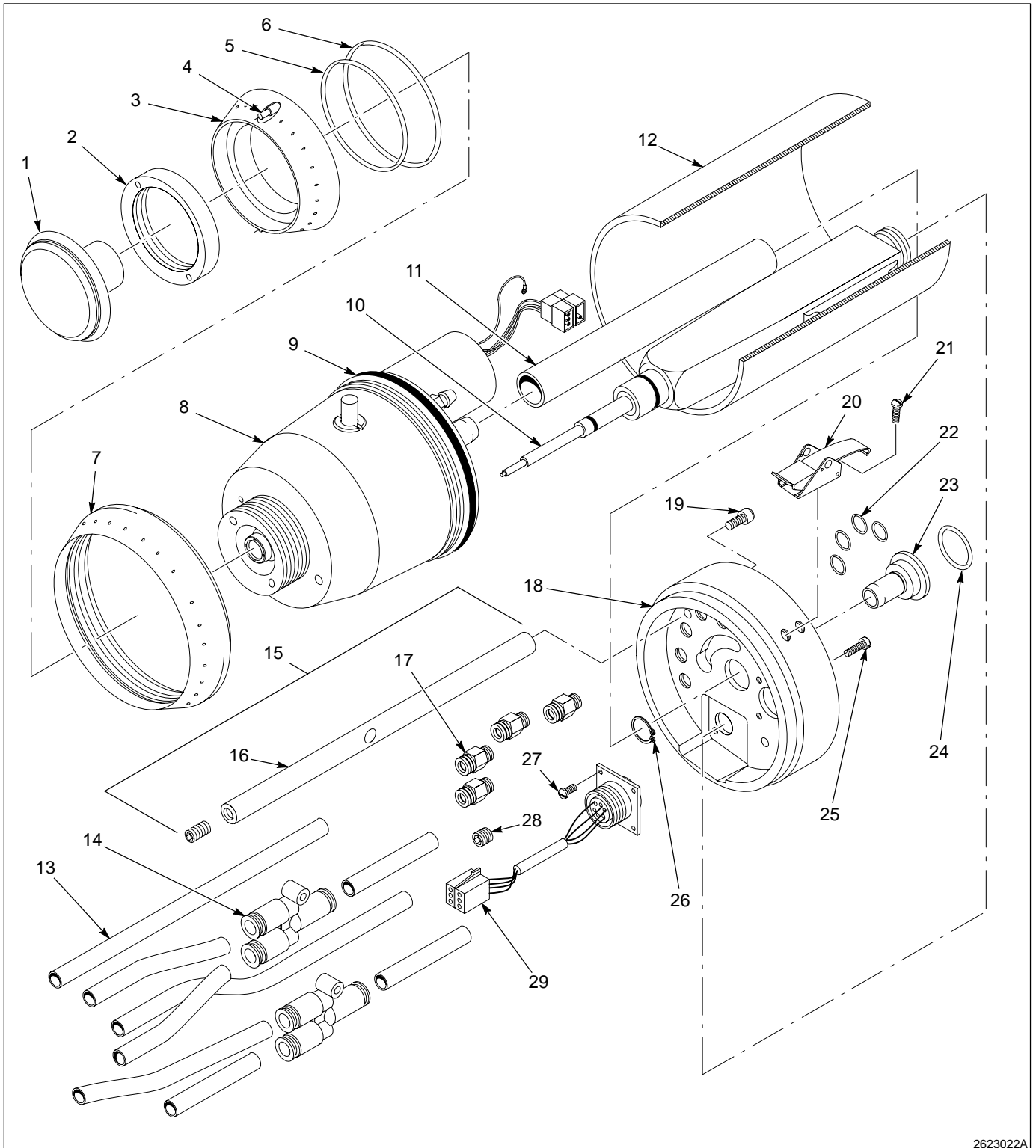


Fig. 8-1 Powder bell (side view)

2623022A

**3. Bell Drive Module**

See Figure 8-2.

Item	Part	Description	Quantity	Note
—	296 371	Module, bell drive	1	
1	287 431	• Bushing, spindle lock	1	
2	940 104	• O-ring, 0.25 x 0.38 x 0.60 diameter	1	
3	287 580	• Retaining, ring	1	
4	287 432	• Button, spindle lock	1	
5	236 761	• Spring, compression, 0.36 x 1 in. long	1	
6	239 764	• Housing, bell	1	
7	236 757	• Gear, 40 tooth, 48 pitch	1	
8	236 802	• O-ring, $1^3/16$ x $1^5/16$ x $1/16$	1	
9	981 389	• Screw, #4-40 UNC shcs x $1/4$ in. long	3	
10	235 987	• Adapter, motor	1	
11	236 752	• Motor, 28 Vdc brushless	1	
12	981 880	• Screw, #8-32 UNC fillister head x $5/8$ in. long	2	
13	239 861	• Wire, ground	1	
14	981 073	• Screw, #8-32 UNC fillister head x $3/8$ in. long	1	
15	239 766	• Retainer, rear bearing	1	
16	239 770	• Nut, rear bearing	1	
17	235 996	• Fitting, barbed, $1/4$ x $1/8$ NPT	6	
18	239 771	• Seal, rear	1	
19	303 599	• Gear, 100 tooth	1	
20	296 380	• • Screw, #3-48 UNC shcs x $1/4$ in. long	2	
21	239 763	• Spindle	1	
22	236 760	• O-ring, $2^1/8$ x $2^1/4$ x $1/16$	3	
23	239 761	• Holder, front bearing	1	
24	239 768	• Bearing, ball	2	
25	303 598	• Seal, front	1	
26	235 982	• Retainer, front bearing	1	

3. Bell Drive Module (contd.)

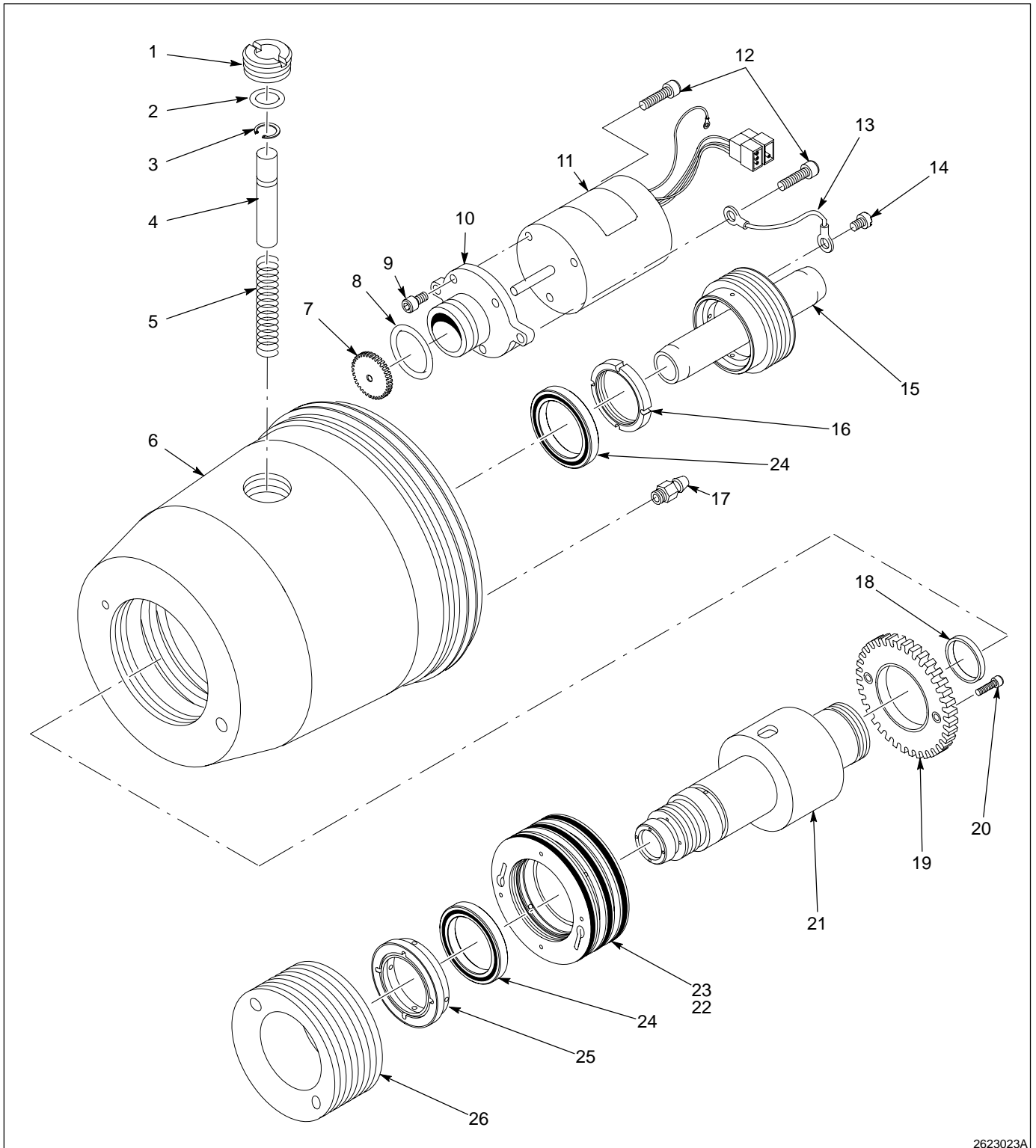


Fig. 8-2 Bell drive module

**4. Tube Mount Assembly**

See Figure 8-3.

Item	Part	Description	Quantity	Note
—	236 958	Plate mount assembly, tube	1	
1	287 421	• Mounting, Powder Bell	1	
2	236 900	• Clevis, bell mount	2	
3	981 563	• Screw, $\frac{3}{8}$ -16 x 1 in. flat head socket	2	
4	984158	• Nut, $\frac{3}{8}$ -16 hex jam	2	
5	236 901	• Tube mount	1	
6	981 228	• Screw, $\frac{1}{4}$ -20 x $\frac{1}{4}$ socket set	2	
7	239 801	• Cable, motor	1	
8	981 023	• Screw, #6-32 UNC x $\frac{5}{8}$ in. long filister head	4	
9	236 881	• Cable, multiplier	1	
10	986 120	• Ring, retaining, external, $\frac{7}{8}$ in.	1	
11	287 939	• Fitting, powder, $\frac{1}{2}$ in. tube	1	
12	981 220	• Screw, $\frac{1}{4}$ -28 UNF x 1 in. long shcs	4	
13	973 402	• Plug, $\frac{1}{8}$ NPT	1	
14	286 630	• Keeper, latch	2	
15	981 834	• Screw, #8-32 x $\frac{1}{2}$ in. long, flat head socket	2	
16	972 716	• Connector, $\frac{1}{4}$ tube x $\frac{1}{8}$ NPT smc	4	
17	296 389	• Screw, shoulder, $\frac{5}{16}$ x 1	1	

**4. Tube Mount Assembly**  
(contd.)

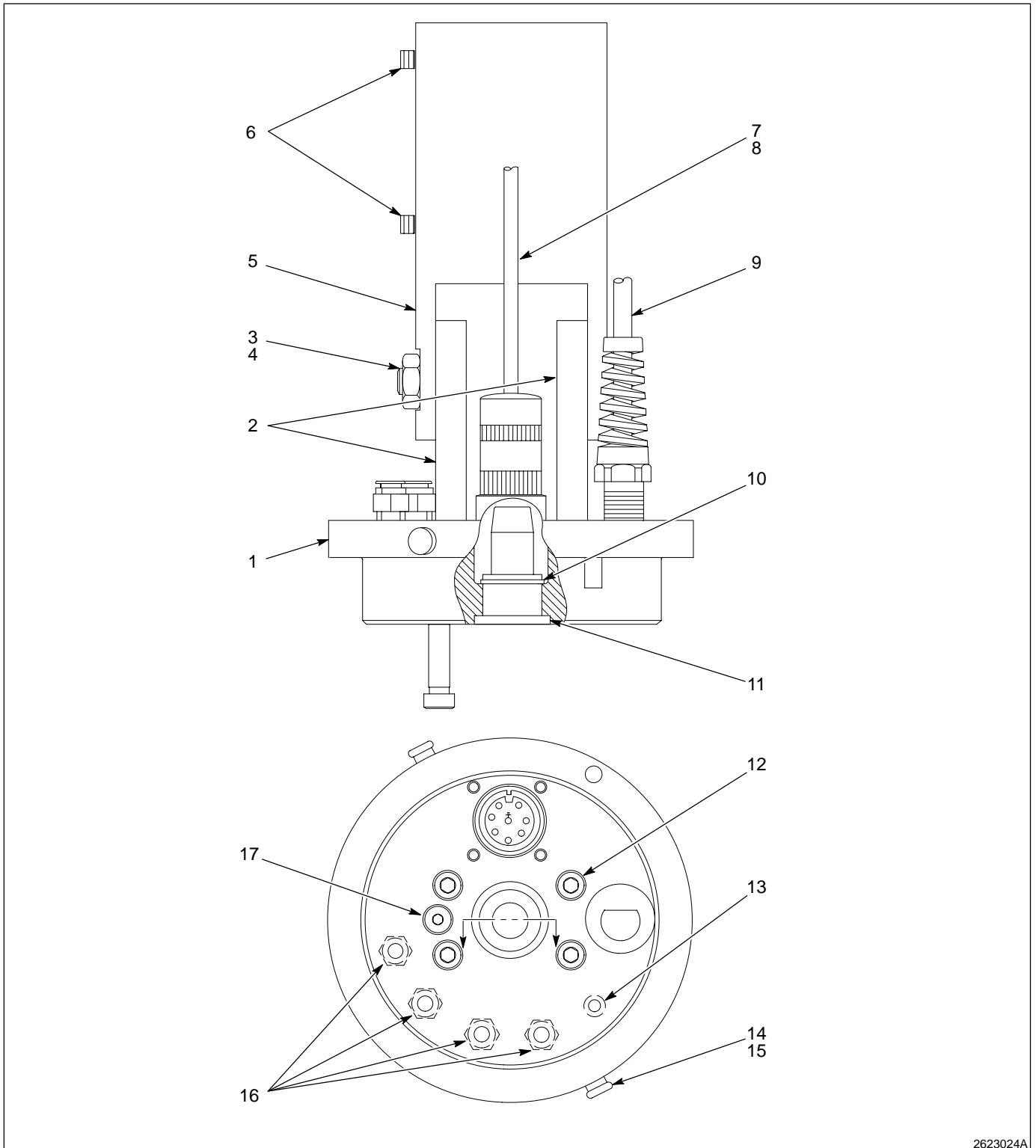


Fig. 8-3 Tube mount assembly

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**5. Bar Mount Assembly**

See Figure 8-4.

Item	Part	Description	Quantity	Note
—	236 879	Mount assembly, bar	1	
1	287 421	• Mounting, Powder Bell	1	
2	287 970	• Support, vertical	1	
3	239 801	• Cable, motor	1	
4	981 023	• Screw, #6-32 UNC x $\frac{5}{8}$ in. long fillister head	4	
5	287 969	• Support, horizontal	1	
6	249 074	• Handle, adjustable	1	
7	237 856	• Retaining ring, external, 1 $\frac{3}{8}$	1	
8	981 510	• Screw, #10-24 x 1 in. long, socket head	2	
9	981 765	• Screw, set, $\frac{5}{16}$ x $\frac{7}{8}$ x 0.75, cup	1	
10	236 881	• Cable, multiplier	1	
11	981 220	• Screw, $\frac{1}{4}$ -28 UNF x 1 in. long shcs	4	
12	236 883	• Nut, $\frac{1}{4}$ -28 Allen	4	
13	986 120	• Ring, retaining, external, $\frac{7}{8}$ in.	1	
14	287 939	• Fitting, Powder Bell	1	
15	973 402	• Plug, $\frac{1}{8}$ NPT	1	
16	286 630	• Keeper, latch	2	
17	981 834	• Screw, #8-32 x $\frac{1}{2}$ in. long, flat head socket	1	
18	972 716	• Connector, male, $\frac{1}{4}$ in. smc	4	
19	296 389	• Screw, shoulder, $\frac{5}{16}$ x 1	1	

**5. Bar Mount Assembly**  
(contd.)

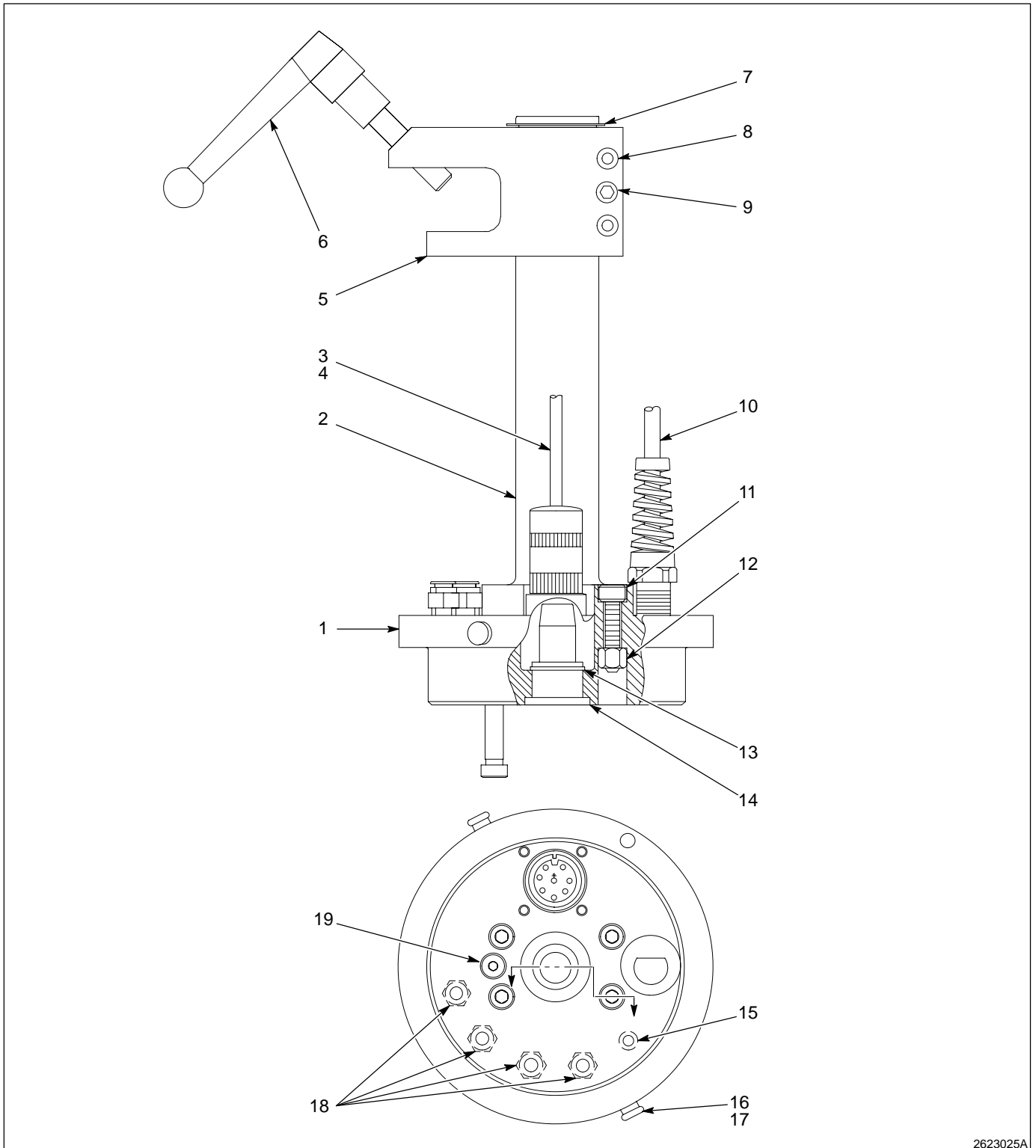


Fig. 8-4 Bar mount assembly

2623025A

**6. Powder Bell Tool Kit**

See Figure 8-5.

Item	Part	Description	Quantity	Note
—	303 594	Kit, Powder Bell repair tools	1	
1	296 438	• Puller	1	
2	239 804	• Tool, bearing nut	1	
3	236 803	• Extension	1	
4	303 595	• Spanner wrench	1	
NS	303 596	• Grip cloth	1	
NS	303 597	• Tool case	1	

NS: Not Shown

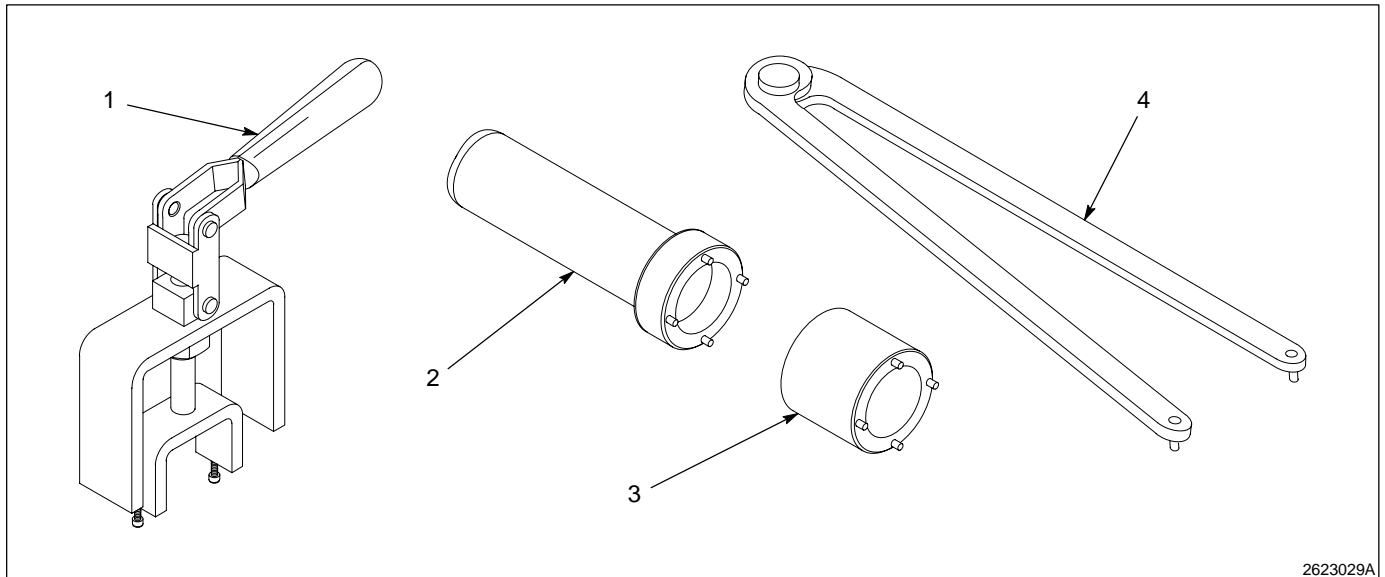


Fig. 8-5 Powder bell tools

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**7. Accessories**

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Part	Description	Quantity	Note
172 872	Nordson meg-ohm meter	1	
185 807	Nordson electrostatic analyzer kit	1	
286 048	KV circuit board	1	
296 504	Motor control circuit board	1	
939 098	1 amp fast acting fuse	AR	

AR: As Required

