ND500 Vertical Oscillator

Customer Product Manual
Part 1070946A
Issued 8/06

For parts and technical support, call the Finishing Customer Support Center at (800) 433-9319.

This document is subject to change without notice.
Check http://emanuals.nordson.com/finishing for the latest version.

NORDSON CORPORATION • AMHERST, OHIO • USA

Table of Contents

Safety **1**
- Qualified Personnel 1
- Intended Use 1
- Regulations and Approvals 1
- Personal Safety 1
- Fire Safety 2
- Grounding 2
- Action in the Event of a Malfunction 2
- Disposal 2

Description **3**
- Features 3
- Dimensions 4

Installation **5**
- Floor Mounting 5
- Positioner Mounting 5
- Electrical Connections 5

Operation **6**
- Startup 6
- Stroke Adjustment 6
- Speed Adjustment 7

Maintenance **7**
- Speed Variator/Gear Reducer 7
- Every Day 7
- After the First 80 Hours of Service 7
- Every Six Months 7

Troubleshooting **8**

Repair **9**
- Gun Carriage Roller Repair 9
- Motor Replacement 10
- Speed Variator/Gear Reducer Replacement . . . 11

Parts **12**
- Oscillator Parts 12

Contact Us

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.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

ND500 Oscillator

Safety

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.

Grounding inside and around the booth openings must comply with NFPA requirements for Class II, Division 1 or 2 Hazardous Locations. Refer to 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.

Description

See Figure 1. The ND500 vertical oscillator is designed to provide consistent spray gun motion in a high-volume finishing system. It uses a heavy-duty 460 Vac motor and gear reducer and can accommodate up to 5 powder spray guns.

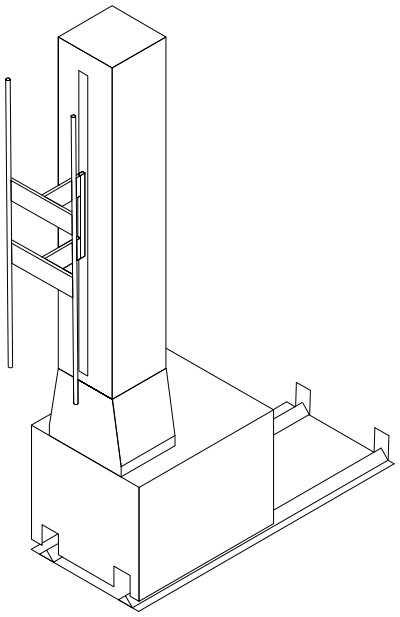

Figure 1 Vertical Oscillator

Features

- Available with casters and tracks for manual positioning, or with a fixed base only for mounting on a positioner
- Dual vertical gun bar carrier for flexible spray device mounting
- Adjustable stroke length (100–500 mm)
- Adjustable speed (19–100 strokes per minute)
- Smooth turn-around
- Low maintenance

Dimensions

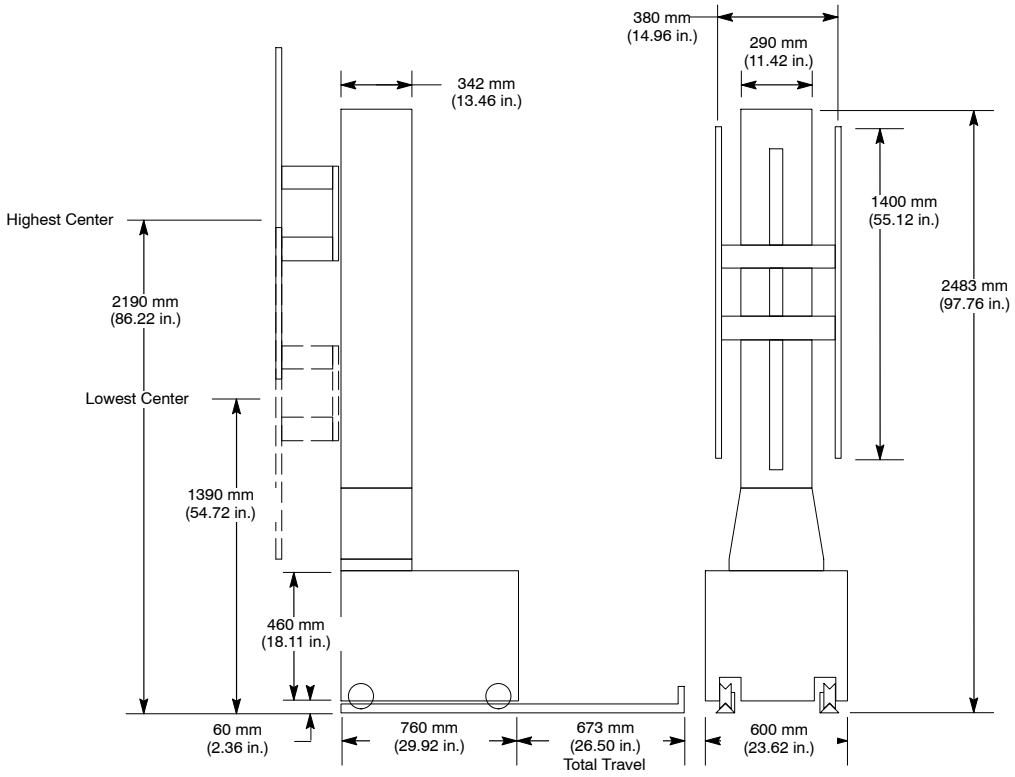

Figure 2 Oscillator Dimensions

Installation

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

WARNING: Oscillators used in liquid coating applications must have an EXE (explosion proof) motor. The motor gland, wiring, and plug must meet local electrical regulations for a Class 1, Zone 1 environment.

WARNING: The motor must be connected to a starter with appropriate overload protection.

NOTE: Install the oscillator in a location where the motor will receive an unrestricted supply of cool air.

Floor Mounting

1. See Figure 3. Set the oscillator and base (5) in place outside the booth gun slots (1). Do not secure it to the floor at this time.

NOTE: Keep the gun bars as short as possible to reduce gun vibration and oscillator wear.

2. Install the gun bars (4) on the gun carriage (6).
3. Install the spray devices (3) on the gun bars.
4. Adjust the oscillator and base so that the gun bars are centered in the gun slots and perpendicular to the booth wall (2). Adjust the distance of the base from the booth so that the guns can be moved in and out of the booth as required.
5. Anchor the base to the floor.

Positioner Mounting

1. Set the oscillator on the positioner carriage and secure it in place.

NOTE: Keep the gun bars as short as possible to reduce gun vibration and oscillator wear.

2. Install the gun bars (4) on the gun carriage (6).
3. Install the spray devices (3) on the gun bars.
4. Adjust the positioner so that the gun bars are centered in the gun slots and perpendicular to the booth wall. Adjust the distance of the positioner from the booth so that the guns can be moved in and out of the booth as required.
5. Anchor the positioner to the floor.

Electrical Connections

Connect the oscillator to a motor starter that matches the specifications on the motor ID plate.

NOTE: The motor starter should be wired so that if power is interrupted, the start button must be pressed to restart the oscillator.

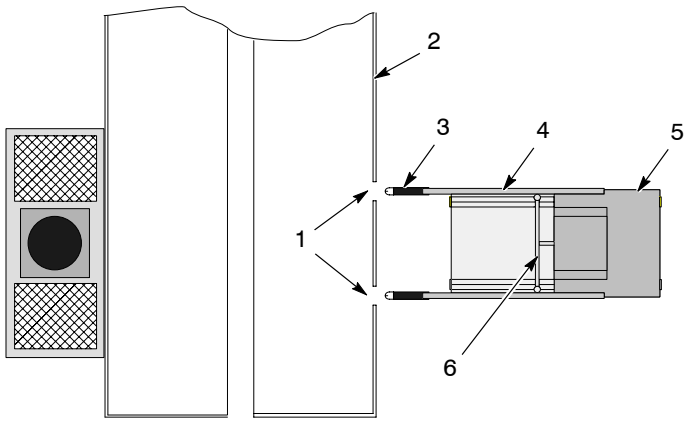

Figure 3 Oscillator Installation (Top View)

1. Gun slots
2. Booth wall
3. Spray device
4. Gun bar
5. Oscillator and base
6. Gun carriage

Operation

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

Startup

1. **Initial Startup Only:** See Figure 4. If present, remove the plastic oil filler plug from the speed variator/gear reducer. Puncture the plastic shroud (if present) and install the supplied breather plug.

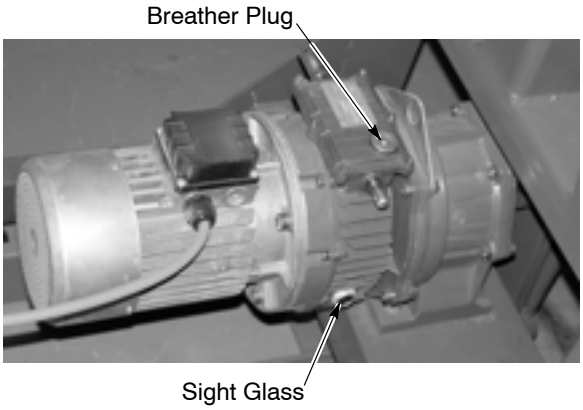

Figure 4 Breather Plug Installation

2. Check the oil level in the sight glass. When the oscillator is stopped, the oil level should be at the center of the sight glass. Add oil if necessary.
3. Set the stroke to the desired setting. Refer to *Stroke Adjustment*.
4. Press the motor starter button to start the oscillator.
5. Set the speed to the desired setting. Refer to *Speed Adjustment*.

Stroke Adjustment

WARNING: Disconnect and lock out electrical power to the oscillator before performing this procedure.

CAUTION: Make sure that the stroke length will not cause the gun carrier or gun bars to collide with other equipment or gun slot top or bottom.

The stroke length is determined by the position of the connecting rod on the crank arm.

1. Turn off and lock out power to the oscillator.
2. Remove the base cover.
3. See Figure 5. With a 19-mm socket wrench, rotate the stroke adjust screw to move the connecting arm to the desired position on the crank arm.
   - For a shorter stroke, move the crank arm toward the gear reducer.
   - For a longer stroke, move the crank arm away from the gear reducer.
4. Turn on the oscillator to check the stroke length.
5. Install the base cover.

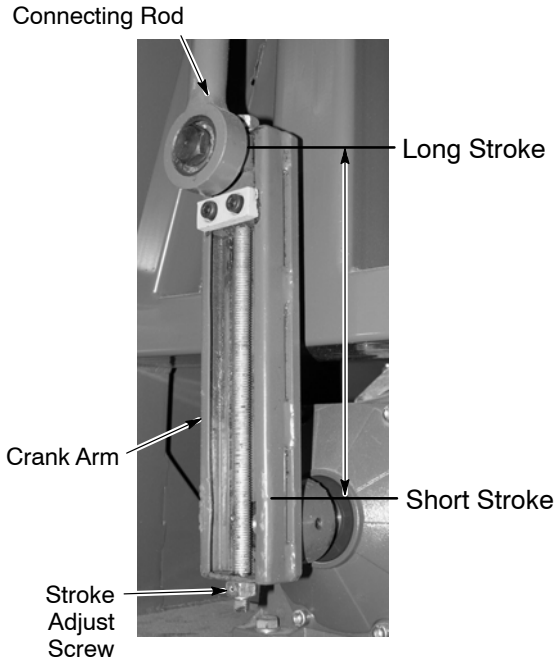

Figure 5 Stroke Adjustment

Speed Adjustment

CAUTION: Adjust the speed only while the oscillator is operating. Turning the speed control knob with the oscillator turned off may damage the oscillator.

See Figure 6. While the oscillator is operating, turn the speed control handle on the side of the oscillator:

- To decrease the speed, turn the knob clockwise.
- To increase the speed, turn the knob counterclockwise.

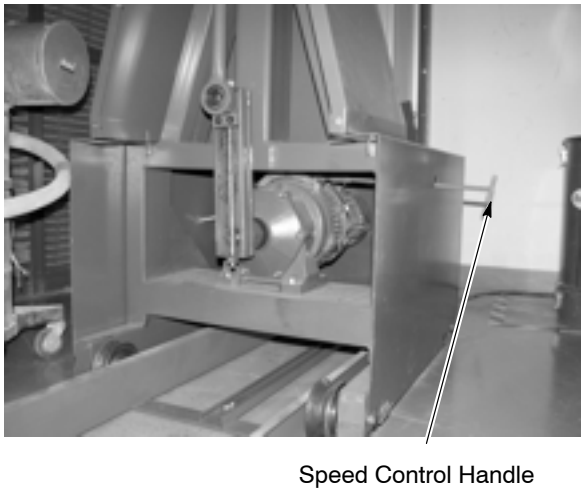

Figure 6 Speed Adjustment

Maintenance

Speed Variator/Gear Reducer

The speed variator/gear reducer is sealed and normally does not require lubrication. With the oscillator stopped the oil level should be at the center of the sight glass. If the level falls below this remove the breather plug and add oil.

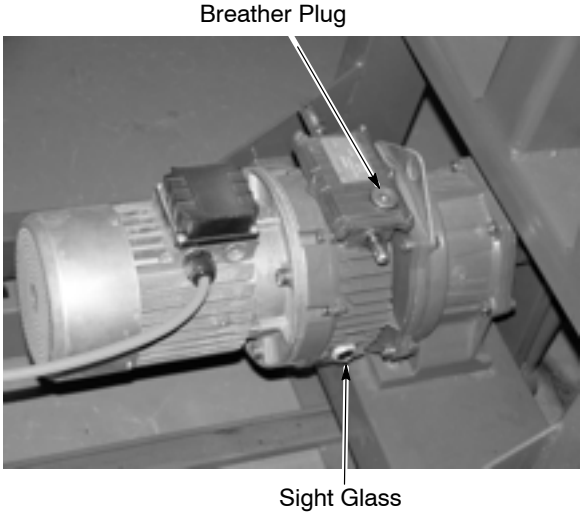

Figure 7 Gear Reducer/Variator Maintenance

Every Day

- Check the gun bars, clamps, and carriage. Tighten as necessary.
- Clean any oversprayed paint from the oscillator cabinet.
- Inspect the gun carriage slot seals for damage. Replace as necessary.
- While the oscillator is operating, check for excessive vibration or noise. Correct any problems.

After the First 80 Hours of Service

- Adjust the carriage rollers.
- Check all nuts and bolts for tightness.

Every Six Months

- Adjust the carriage rollers.
- Check all nuts and bolts for tightness.
- Inspect for worn or damaged parts. Replace parts as necessary.
- Inspect the motor brush seals. Replace as necessary.

Recommended Lubricants

Speed Variator/Gear Reducer

Supplier	Lubricant
IP	IP DEXRON FLUID
AGIP	A.T.F DEXRON
BP	BP AUTRAN DX
CHEVRON	A.T.F DEXRON
ESSO	A.T.F DEXRON
FINA	A.T.F DEXRON
MOBIL	A.T.F 220
SHELL	A.T.F DEXRON
ELF	MATIC G2

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.

Problem	Possible Cause	Corrective Action
1. No motion when start button is pressed (starter contactor does not energize)	No power supply	Check the power supply, continuity, and fuses.
	Faulty starter push button	Replace the starter push button.
	Faulty starter contactor	Replace the starter contactor.
2. No motion when start button is pressed (starter contactor is energized)	Motor starter overload protection or short circuit protection tripped	Check and reset the overload. If it reoccurs, check for a motor fault or an obstruction.
	Gun carriage or gear reducer obstruction	Check for freedom of movement and identify the fault area. Repair as necessary. **NOTE:** When guns are installed on the carriage, it typically requires the weight of one or two people to move it.
	Crank arm or connecting rod linkage broken	Check the linkage and repair or replace as necessary.
	Too many spray devices on the gun carriage	Reduce the number of spray devices on the gun carriage.
3. Erratic motion	Loose gun carriage	Adjust the carriage rollers. The rollers must contact the center column but turn freely.
	Loose crank arm or connecting rod	Tighten the crank arm and connecting rod.
	Faulty gear reducer	Replace the gear reducer.
	Faulty bearings	Check the bearings and replace them as necessary.
4. No speed control	Faulty gear reducer	Replace the gear reducer.
5. Excessive noise	Loose crank arm or connecting rod	Tighten the crank arm and connecting rod.
	Loose gun carriage rollers	Adjust the carriage rollers. The rollers must contact the center column but turn freely.
6. Gun bounce	Gun bars are too long	Shorten and tighten the gun bars.
	Speed too fast	Reduce the oscillator speed.

Repair

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

Gun Carriage Roller Repair

WARNING: Turn off power and support the gun carriage before performing this procedure.

To repair the rollers, use the roller repair kits listed in the parts lists. These kits contain the parts required to repair all eight rollers.

NOTE: It is recommended that you remove the carriage and repair all eight rollers at the same time. The roller locations should be adjusted and tested with no load.

1. Turn off and lock out power to the oscillator.
2. Remove the slot, top, and base covers to expose the gun carriage.
3. Remove the spray guns and gun bars from the gun carriage.
4. Remove the dual vertical gun bar carrier from the carriage.

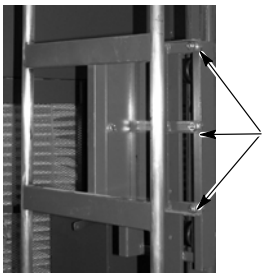

Figure 8 Removing Mounting Bar Bracket

5. Prop up the gun carriage with 2 x 4 beams.
6. Disconnect the connecting arm from the carriage by removing the special bolt from the center of the connecting rod bearings.

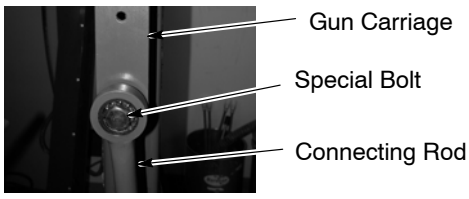

Figure 9 Disconnect Connecting Rod from Carriage

7. Lift the carriage up and off the oscillator column.

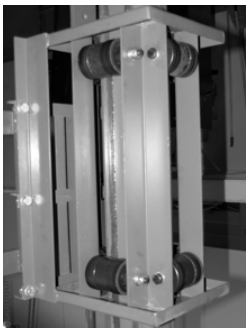

Figure 10 Gun Carriage and Rollers

8. See Figure 11. Remove the nuts and washers and roller bolts, then remove the roller assembly from the carriage.

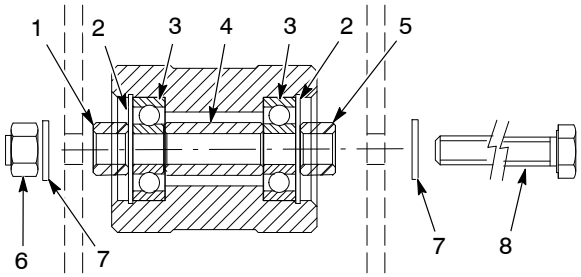

Figure 11 Roller Assembly

1. Short spacer
2. Retaining ring
3. Bearing
4. Long spacer
5. Short spacers
6. Nut
7. Washers
8. Bolt

9. Disassemble the roller, replace parts as needed, then re-assemble the roller.

NOTE: There are two sizes of short spacers: 14.5 mm and 24.5 mm. The 14.5 mm spacers are used on the front and rear rollers; the 24.5 mm spacers on the side rollers.

10. Install the new rollers on the carriage. Hand tighten the nuts, then turn them $^1/_2$ turn to hold the rollers in place.
11. Install the gun carriage on the column and prop it up with 2 x 4 beams.

12. Make sure the gun carriage is centered to the column.
13. While holding the front and left-side rollers against the column, move the rear and right-side rollers up against the column and tighten their fasteners to 62 N•m (46 ft-lb). Adjust and tighten the front and left-side rollers next. Side to side play should be no more than 0.1 mm (0.004 in.).
14. Remove the gun carriage supports. Make sure the carriage moves smoothly and all rollers contact the column equally.
15. Support the gun carriage and connect the connecting rod to the carriage with the special bolt.
16. Install the vertical mounting bars and brackets.
17. Install the oscillator covers, gun mounting bars and spray guns.
18. Return the oscillator to service. Check the rollers after 40 hours of operation and adjust them if necessary.

Motor Replacement

WARNING: Turn off and lock out electrical power to the oscillator. Support the gun carriage to prevent unwanted movement while you are removing the motor.

1. Turn off and lock out power to the oscillator.
2. Remove all exterior covers to expose the gun carriage, motor, and gear reducer.
3. Prop up the gun carriage with 2 x 4 beams.
4. See Figure 12. Remove the junction box cover. Tag and disconnect the wiring from the motor.
5. While supporting the motor from the bottom, remove the bolts securing the motor flange to the gear reducer flange. Save the bolts for reuse.
6. Carefully pull the motor away from the gear reducer. Use wedges or a puller if necessary.
7. Carefully mate the new motor to the gear reducer, making sure the motor shaft and key fit into the gear reducer coupling. Secure the motor to the gear reducer.
8. Route the power cable into the new motor junction box through a liquid-tight strain relief, then wire the cable to the appropriate terminals in the junction box.
9. Remove the 2 x 4 beams from under the carriage, install the covers, and return the oscillator to service.

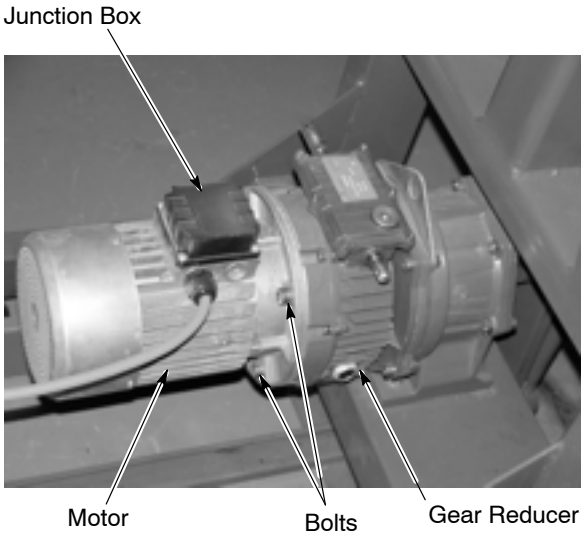

Figure 12 Motor Replacement

Speed Variator/Gear Reducer Replacement

WARNING: Turn off power and support the gun carriage before performing this procedure. When the connecting arm is disconnected, the gun carriage will not be supported.

1. Remove the motor as described in the *Motor Replacement* procedure.
2. See Figure 13. Remove the special bolt to disconnect the connecting rod from the crank arm.
3. Perform these steps to make sure the new gear reducer will be installed in the same location as the old one:
   - Measure the distance between the back of the crank arm and the front of the gear reducer.
   - Mark the location of the gear reducer on the oscillator frame.
4. Loosen the set screw in the crank arm coupling and slide it off the gear reducer shaft.
5. Remove the gear reducer from the oscillator frame.
6. Secure the new gear reducer to the oscillator frame. Make sure it is in the same location you marked in step 3.
7. Install the crank arm on the gear reducer shaft. Make sure the crank arm is the same distance from the gear reducer as you measured in step 3, then tighten the set screw.
8. Connect the connecting rod to the crank arm.
9. Install the motor and covers and return the oscillator to service as described in the *Motor Replacement* procedure.

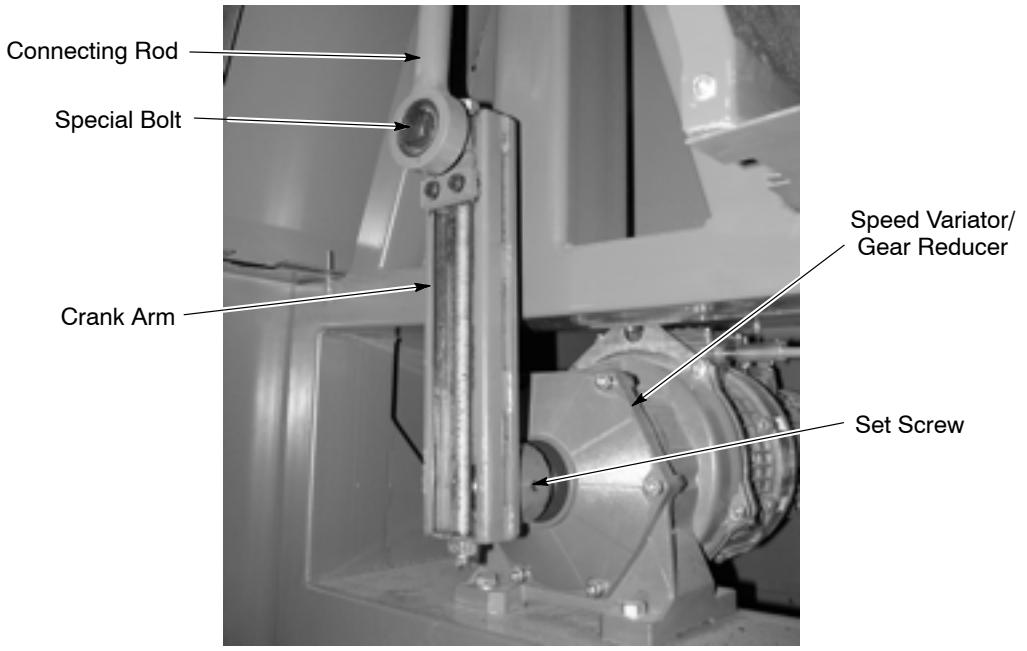

Figure 13 Speed Variator/Gear Reducer Replacement

Parts

To order parts contact your local Nordson representative.

Oscillator Parts

See Figure 14.

Item	Part	Description	Quantity	Note
—	780436	OSCILLATOR, heavy duty, 500, 460 Volt, TEFC, with wheels and track	1	
—	—	OSCILLATOR, heavy duty, 500, 460 Volt, TEFC, without wheels and track	1	
—	778181	OSCILLATOR, heavy duty, 500, 380 Volt, TEFC, without wheels and track	1	
1	7404169	• KIT, carriage rollers	1	A
2	7404170	• KIT, carriage spacers	1	B
3	7404171	• KIT, carriage bearings	1	C
4	7404089	• SCREW, special, spacer	2	
5	777518	• SPEED VARIATOR/Gear Reducer	1	
	777510	• MOTOR/Variator/Gear Reducer, 380V, 50 Hz	1	D
6	777561	• MOTOR, TEFC, 1.1 kW, 460V, 60 Hz	1	
7	779075	• HANDLE, aluminum, black, 120 mm	1	

NOTE A: Roller kit contains eight rollers.

B: Spacer kit contains eight long spacers, eight 14.5 mm short spacers (front and rear rollers), and eight 24.5 mm short spacers (side rollers).

C: Bearings kit contains 16 roller bearings.

D: Use with 778181 Oscillator.

NS: Not Shown

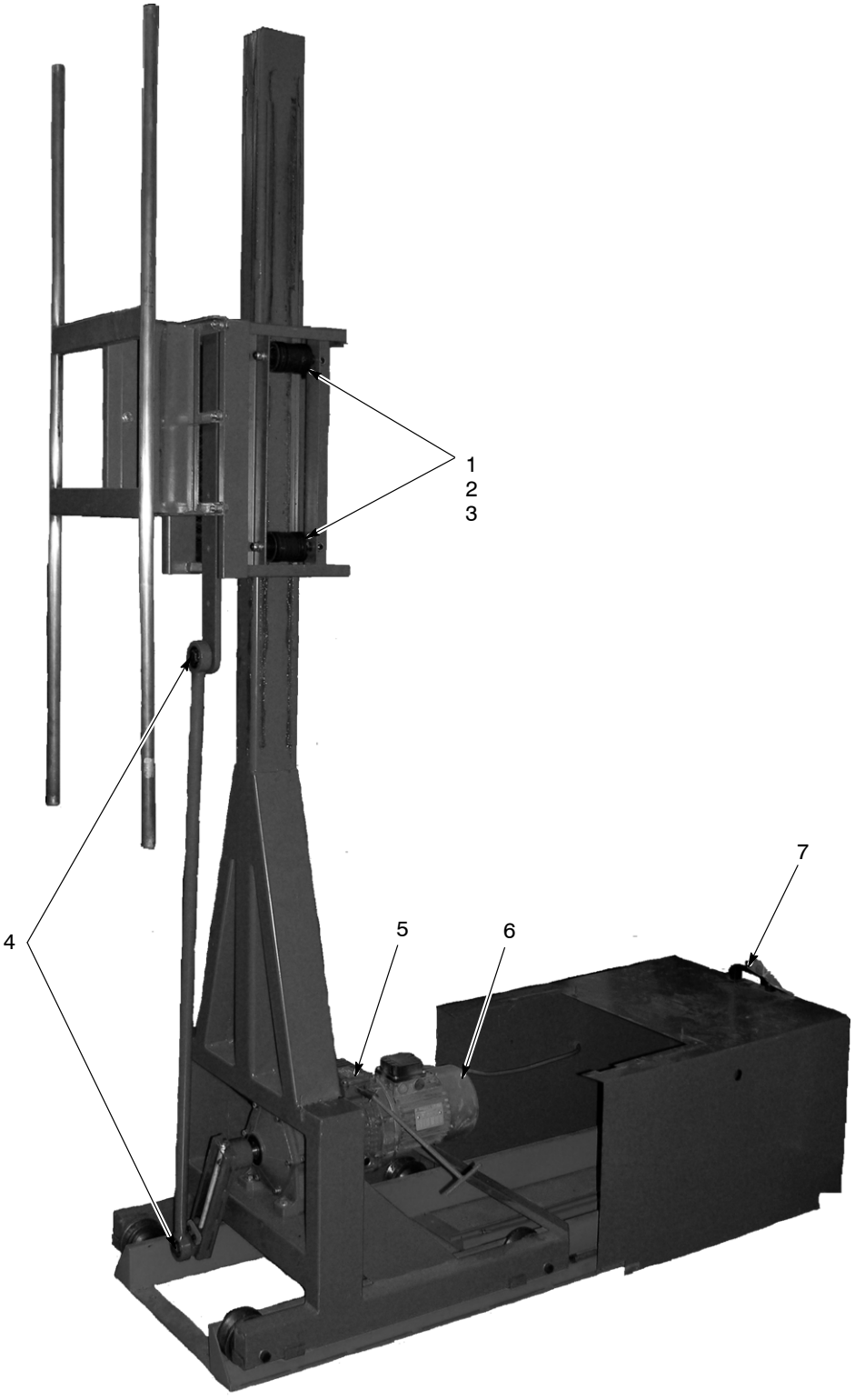

Figure 14 Oscillator Parts (Shown with Covers Removed)