Global Oscillator

Customer Product Manual
Part 1106313–04

Issued 4/18

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

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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.

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Change Record

Revision	Date	Change
02	2/12	Revise Adjusting the stroke procedure. Update part number for Oscillator without VFD, 200 Vac, 60 Hz.
03	4/12	Description corrections for Oscillators Configured with VFD (page 39). Corrected part number for Oscillator, 200 Vac, 60 Hz (1600637). Corrected parameter settings (page 11).
04	9/17	Upper level parts obsolete.

Global 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 Safety Data Sheets (SDS) 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 SDS 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. Vertical oscillators are designed to move spray guns up and down in a smooth, repetitious pattern for thorough coverage of parts being coated. The oscillators can support up to 80 kg (176 ib) or about16 automatic spray guns. Oscillators are available with a Variable Frequency Drive (VFD) to control the stroke speed.

Oscillators are typically mounted to either the floor or a horizontal in/out positioner, which moves the oscillator on- and off-line. Refer to Table 1 for component descriptions.

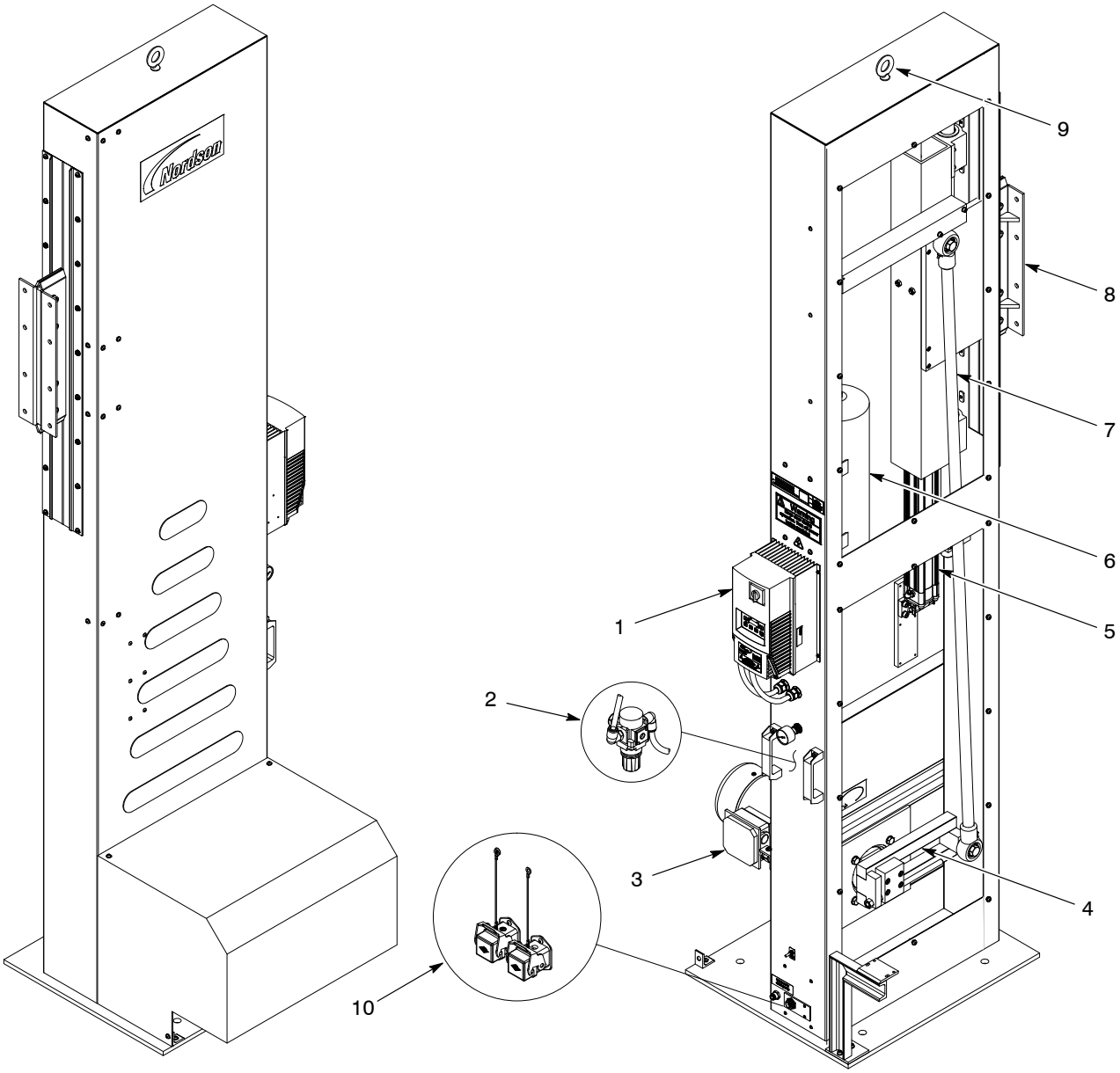


Figure 1 Major Components

Table 1 Component Descriptions

Item	Component	Function
1	VFD	Controls the stroke speed
2	Internal Air Regulator	Controls supply air to the accumulator and air cylinder
3	Gear Motor	Rotates the torque arm to move the gun carriage
4	Adjustable Torque Arm	Moves the gun carriage and is used to adjust the stroke length between 100–450 mm (4–18 in.)
5	Air Cylinder	Counter balances the gun carriage during oscillator operation
6	Accumulator	Stores air to operate the air cylinder
7	Connecting Rod	Connects the gun carriage to the torque arm
8	Gun Carriage	Mounting point for the gun mounts and guns
9	Eye Bolt	Lift point for moving the oscillator
10	Sensor and Motor Connectors	Connections for the sensor and motor cables from the system controller; Only on models without a VFD that use proximity sensor
—	Proximity Sensor	Installed on models that do not use a VFD; Sends signal to the controller to indicate that the gun carriage has reached the lower limit of travel

Installation

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

Read and understand the following procedures before installing the oscillator in a system. Contact a local Nordson representative regarding these procedures if necessary.

Installation consists of the following tasks:

- Remove the oscillator from the shipping container
- Mount the oscillator
- Install the gun mount and guns
- Electrical connections

Remove the Oscillator from the Shipping Container

WARNING: Only use approved and tested lifting equipment that can lift at least 270 Kg (600 lb) or more. Lifting straps, ropes, or chains used with the lifting equipment must also be capable of supporting at least 270 Kg (600 lb) or more. Failure to observe this warning could result in death, injury, or property damage, injury, or death.

1. Remove the top, cross supports, and all of the sides on the shipping container.
2. See Figure 2. Attach lifting equipment to the eye bolt (6). Carefully lift the oscillator upright and off of the shipping container.
3. Stand the oscillator upright onto the floor or onto the in/out positioner.
4. Remove the screws (2) and lock washers (1) securing the covers (3, 4) and gear motor cover (5).

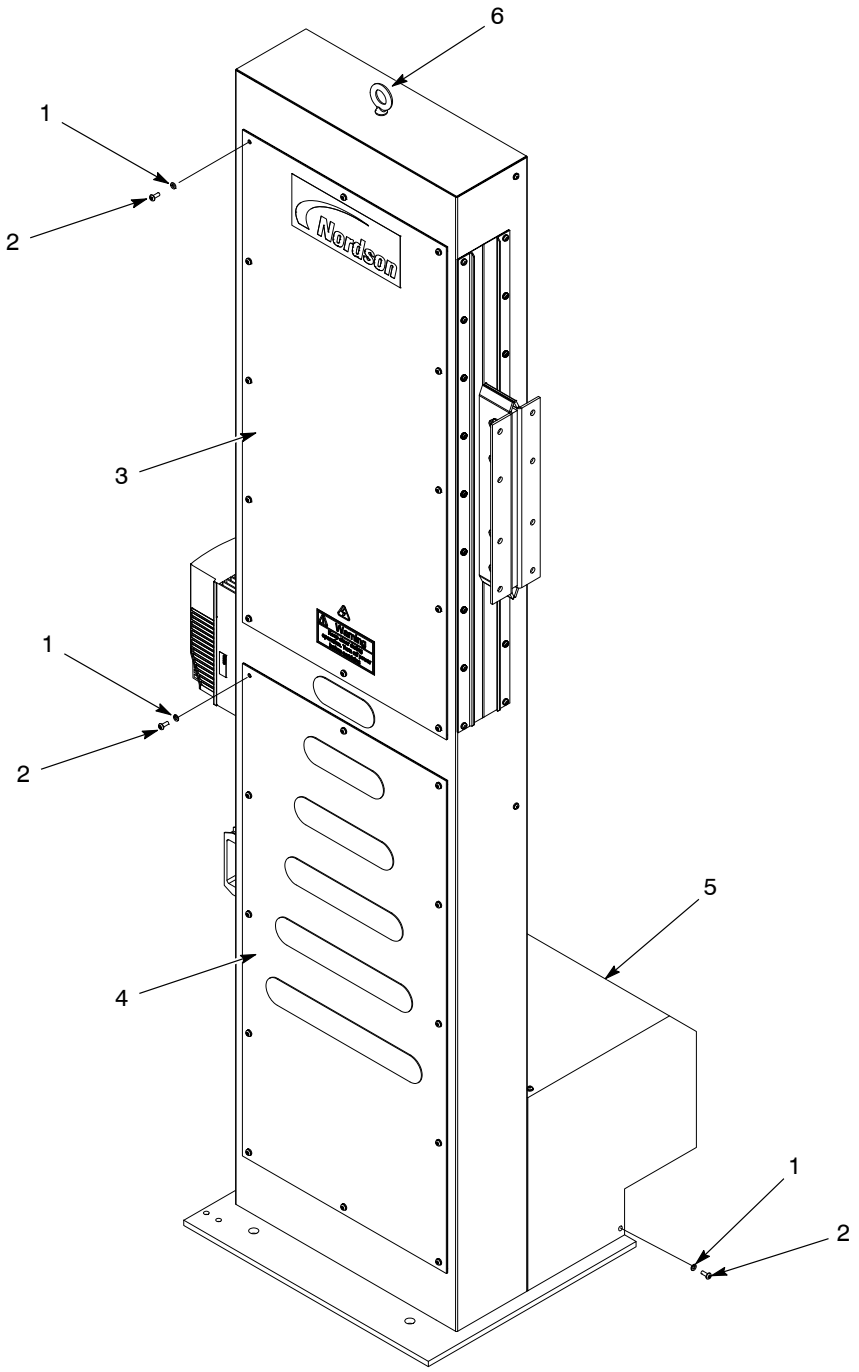


Figure 2 Removing the Covers

Mount the Oscillator

CAUTION: The oscillator is designed for use with a Nordson in/out positioner. If using another type of in/out positioner, make sure that it can support at least 340 Kg (750 lb) or more.

The oscillator is typically installed onto manual or automatic in/out positioners, a fixed stand, or bolted to the floor. A Nordson in/out positioner ships with fasteners included in a hardware kit for oscillator installations. Other fasteners may be required if using another type of in/out positioner.

NOTE: Using an in/out positioner — The payload capacity of the oscillator is 80 kg (176 lb); about 16 automatic guns with hoses, cables and mounting hardware. If the payload meets or exceeds 60 kg (132 lb), about 12 guns or more, it may be necessary to install the counterweight kit. This kit is used as a counter balance to prevent the rear wheels of the in/out positioner from unloading. Refer to the *Kits* section to order a counterweight kit.

1. **IN/OUT POSITIONERS ONLY**: Perform the following:
   a. Set the oscillator onto the in/out positioner and secure it to the in/out positioner carriage.
   b. See Figure 3. Install the counterweights (4) to the oscillator using the screw and (6) and lock washers (5). Tighten the screw securely.
2. If mounting the reciprocator to the floor or a fixed stand, use the existing four mounting holes (8). If necessary, drill new holes into the base or floor. Use properly sized fasteners to secure the reciprocator.

CAUTION: The rubber plug on the pressure vent must be removed to prevent over pressurizing the drive assembly.

3. Remove the rubber plug (1) from the pressure vent (2).
4. Install the cable bracket (15) to the oscillator base (9) using the screws (13) and lock washers (14). Tighten the screws securely.

Electrical Connections

WARNING: Connect the oscillator power cable to a disconnect or other device that will allow power to be locked out for service. Failure to observe this warning may result in personal injury or death.

NOTE: Check the gear motor ID plate to ensure that the correct voltage is being supplied to the gear motor.

Grounding

See Figure 3. Ground the oscillator using the grounding post (6) to a true earth ground. Test the ground and make sure it meets local code requirements.

ATEX MOTOR ONLY: If the oscillator has an ATEX motor, make sure that the gear motor ground wire is attached to the ground post (7).

1. **Oscillators Without VFD:** Perform the following:
   a. See Figure 3. Connect the motor cable from the system controller to the connector (10).
   b. Connect the proximity sensor cable from the system controller to the connector (11). If necessary, see Figure 23 for a wiring diagram.
2. **Oscillators With VFD:** Connect a motor cable to the connector (16).

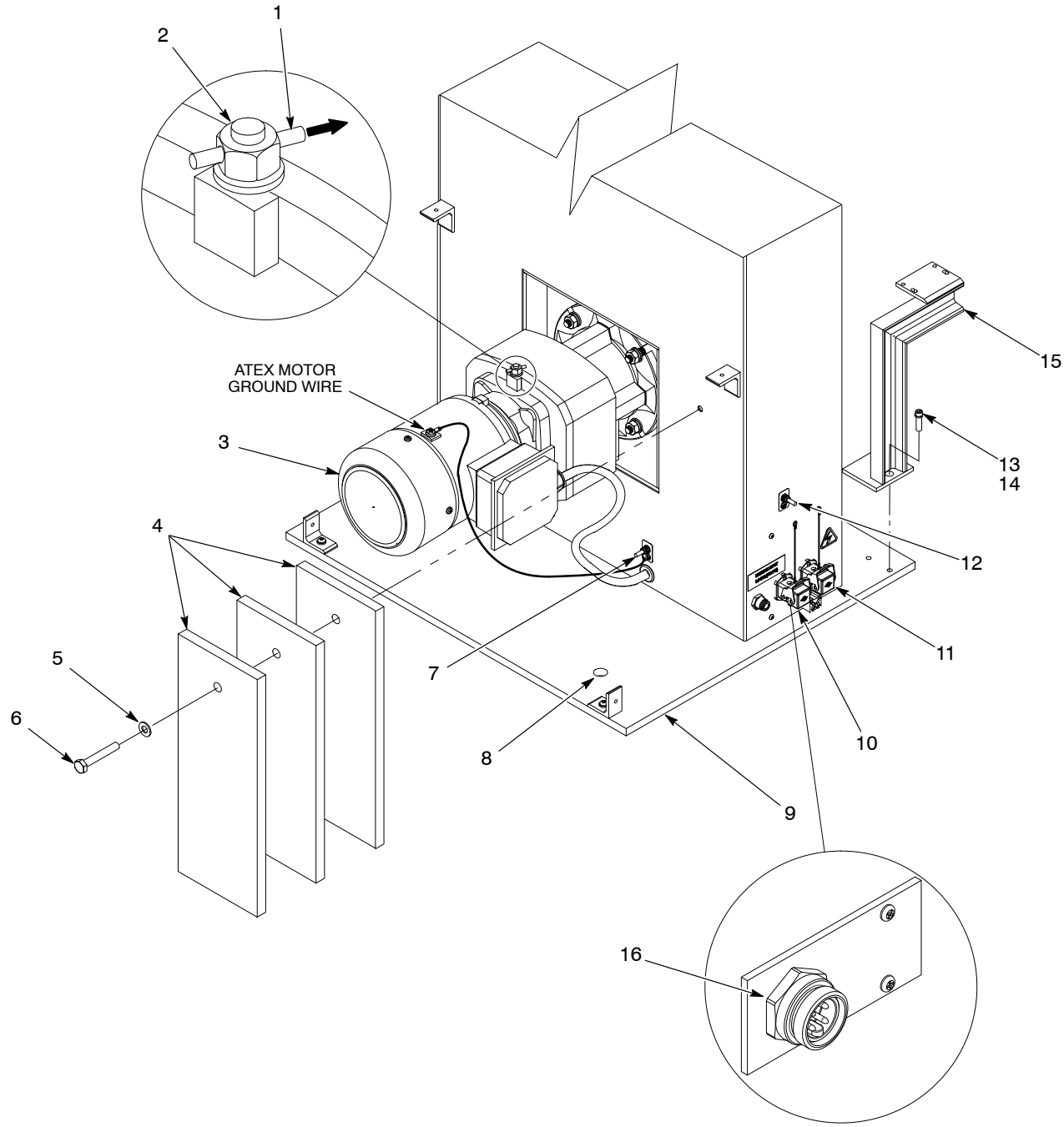


Figure 3 Installation

Set the Parameters for VFD Configurations

Table 2 lists the Nordson-specific parameter settings along with parameters that are specific to the supply voltage.

NOTE: Before putting the oscillator into service, verify that the voltage-specific parameters settings are correct.

Review the following before verifying the VFD parameters:

- The RUN and RF buttons on the VFD keypad are inactive.
- Power to the oscillator can be locked out by turning the VFD power switch to OFF.
- The oscillator can immediately start when power is applied to the VFD. Warn personnel in the area to stand away from the oscillator before turning the VFD power switch to ON.
- The oscillator can be stopped at any time using the STOP button.
- The oscillator cannot be restarted from the VFD keypad. Cycle power to the VFD to restart the oscillator.
- The VFD displays cycles/minute of the oscillator stroke. The speed range is 9.5–40 cpm. Use the up and down arrow buttons to change the speed.

See Figure 4 and refer to Table 2. Use the following procedure to set or change the VFD parameters.

1. Turn the VFD power switch (1) to ON. If the oscillator starts to operate, press **STOP** on the keypad (2).
2. Press **M** on the keypad (2) to access the parameters.
3. If **PASS** then **0000** appears on the display (3). Press the up or down arrow keys to enter password **225**. Press **M** to accept the password.

   OR

   If **Pnnn** appears, press the up or down arrow keys to select a parameter number.
4. To change a parameter setting:
   a. Press **M**. The current parameter setting appears.
   b. Press either the up or down arrow buttons until the desired setting appears on the display.
   c. Touch **M** to save the parameter setting and exit.

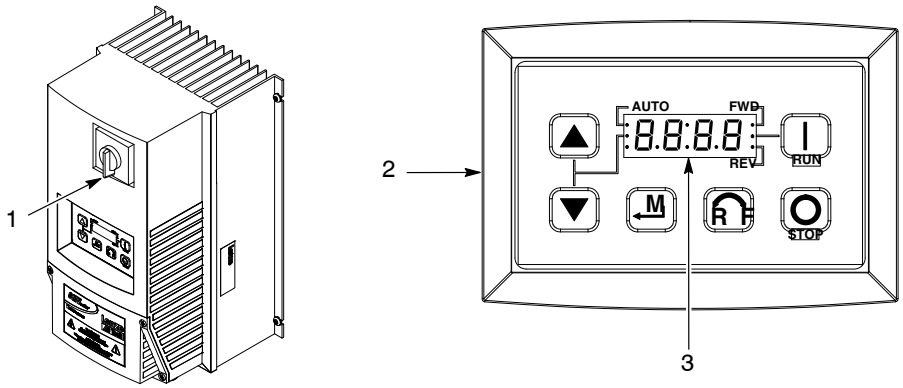


Figure 4 Setting VFD Parameters

Table 2 Nordson-Specific and Voltage-Specific Parameter Settings

Nordson Settings (A)					
Parameter	**Setting**				
P100: Start Control Source: Terminal Strip	1	1	1	1	1
P102: Minimum Frequency (B)	20	20	20	20	20
P103: Maximum Frequency (B)	90.0	90.0	90.0	90.0	90.0
P104: Acceleration Time	3.0	3.0	3.0	3.0	3.0
P105: Deceleration Time	3.0	3.0	3.0	3.0	3.0
P110: Start Method: Start on Power-Up	1	1	1	1	1
P177: Speed Units: RPM Display (C)	1	1	1	1	1
P178: Scale Factor for P177	0.44	0.44	0.44	0.44	0.44
Settings Specific to Supply Voltage					
Supply Voltage (Vac)	200–208	230 (D)	380–415	460	575
Oscillator Part Number	Obsolete	Obsolete	Obsolete	Obsolete	Obsolete
Parameter	**Setting**				
P107: Line Volts Select (E)	0	1	0	1	1
P302: Motor Voltage	208	208	400	460	575
P303: Motor Current	4.0	4.0	2.1	1.8	1.5
P304: Motor Frequency	60	60	50	60	60
P305: Motor Speed	1650	1650	1650	1650	1650

(A) The Nordson settings must be re-entered if replacing a VFD that shipped with the oscillator.

(B) The minimum and maximum frequency settings limit the oscillator stroke between 10–40 cpm.

(C) This value Represents cpm.

(D) The gear motor junction box must be configured for low voltage.

(E) Voltage supplied to the VFD determines the setting:

0—if the input voltage is 200–208 or 380–415 Vac

1—if the input voltage is 230, 460, or 575 Vac

NOTE: If necessary to reset all parameters to the VFD factory default settings, go to Parameter 199:
Enter “3” if the voltage supply is 60 Hz
Enter “4” if the voltage supply is 50 Hz
All parameters listed in Table 2 must be re-entered after a factory default reset.

Set the Parameters for a Remote VFD

Make sure that the following parameters are set on the remote VFD before operating the oscillator:

Parameter	Setting
Motor-Specific	Must match the data on the motor identification plate
Minimum Output Frequency (A)	20 Hz
Maximum Output Frequency (A)	90 Hz
Acceleration	3.0 sec
Deceleration	3.0 sec or as needed
(A) The minimum and maximum frequency settings limit the oscillator stroke between 10–40 cpm.	

Set the Cycle Rate

See Figure 5. A cycle is one full up and down stroke. The cycle rate range is 9–40 $^{cycles}/_{min.}$ and is adjusted by varying the VFD frequency output. Use the following equation to determine the desired frequency:

$$Rate\ (^{cycles}/_{min.}) \times 2.2 = Frequency\ (Hz)$$

For example, the frequency output for the desired rate of 20 $^{cycles}/_{min.}$ is:

$$20 \times 2.2 = 44\ Hz$$

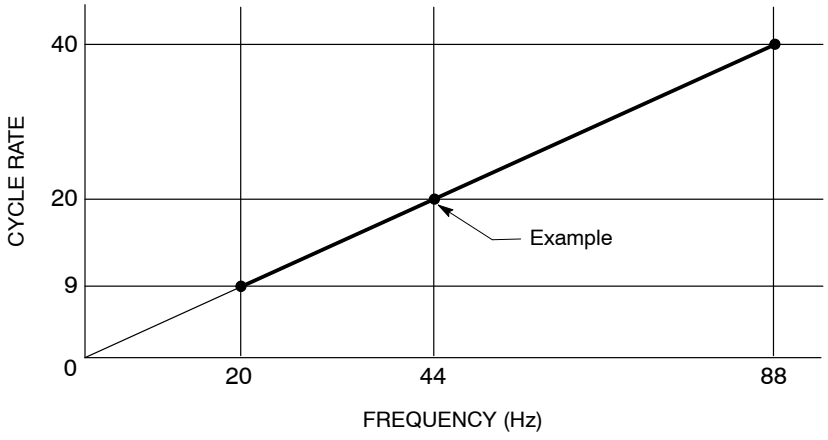


Figure 5 Frequency-to-Cycle Rate

Maximum Carriage Speed

See Figure 6. The maximum allowable carriage speed is 100 $^{ft}/_{min}$. The maximum speed occurs at the midpoint of an up or down stroke and is a function of stroke length and cycle rate. At stroke lengths greater than 9.5 in., the cycle rate is limited by the maximum carriage speed as shown.

Use the following equation to determine the maximum cycle rate:

$$382/stroke = Max.\ Rate\ (^{cycles}/_{min.})$$

For example, given a known stroke of 12 in., the maximum cycle rate is:

382/12 = 31.8 cycles/min.

NOTE: Refer to the *Adjusting the Stroke* section to adjust the stroke.

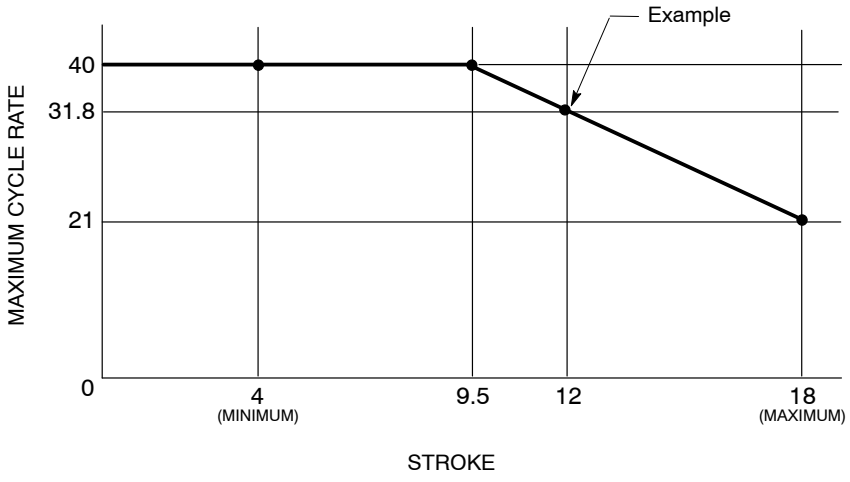


Figure 6 Maximum Carriage Speed

Install the Gun Mount and Guns

See Figure 7. The maximum oscillator payload is 80Kg (176 lb) at a distance of 610 mm (24 in.) from the mounting flange.

1. Install the spray guns onto the desired gun mount.
2. Install the gun mount onto the gun carriage (2) using the appropriate hardware.
3. Make sure that the gun mount does not interfere with the operation of the oscillator (1).

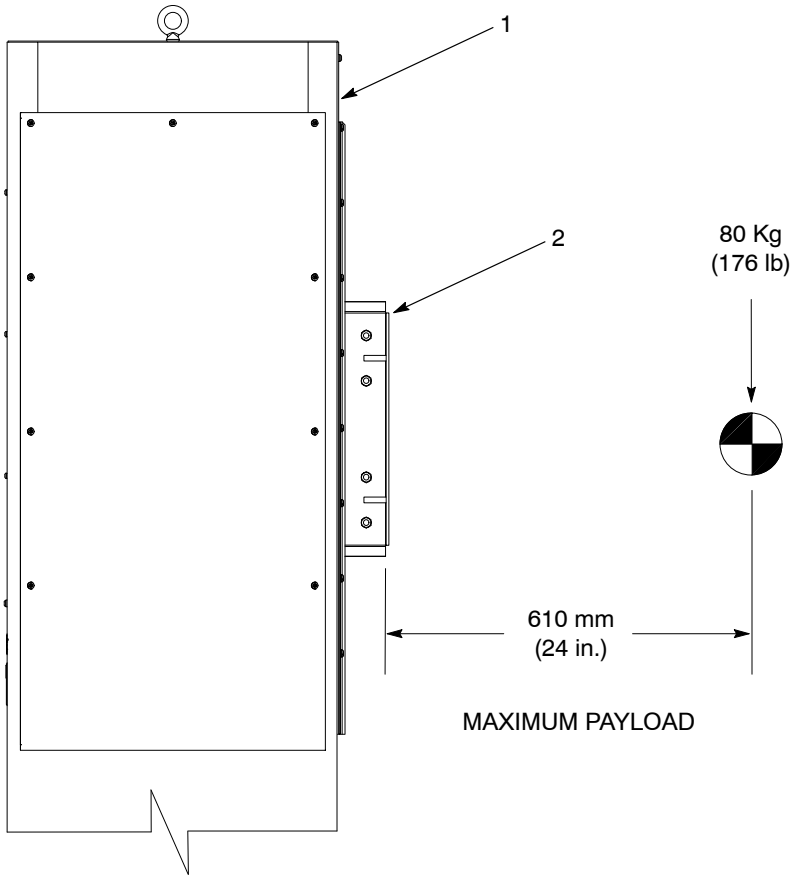


Figure 7 Installing the Gun Mount and Guns

Connect Supply Air to the Air Connection Port

1. See Figure 8. Connect an 8-mm supply air line (6) to the air fitting (5) on the oscillator (7).
2. Perform the *Adjust the Air Pressure* procedure to balance the load of the guns and the mounting hardware.

Adjust the Air Pressure

The air pressure must be adjusted to balance the guns and mounting hardware (load) that are mounted to the gun carriage. The air pressure operating requirements follows:

Air Pressure Operating Requirements
1.4 bar (20 psi)[A] to 5.8 bar (85 psi)[B]
A: Without guns or mounting hardware B: Maximum capacity of 80 Kg (176 lb)

Perform the following:

1. Disconnect and lock out power to the oscillator.
2. Make sure that the hoses and cables are connected to the guns.
3. Remove the screws (3) and lock washers (2) securing the lower access panel (1) to the oscillator (7).
4. Using the air pressure regulator (4), start at 1.4 bar (20 psi) and slowly increase the air pressure until the connecting rod can be manually pulled into the horizontal position and remain there.
5. Manually move the load slightly up, then down. If necessary, adjust the air pressure until the required force to move the load up and down is about the same in both directions.
6. Install the lower access panel (1) using the lock washers (2) and screws (3). Tighten the screws securely.

Install Panels and Covers

See Figure 2. Make sure that all covers and panels are installed and secured using the lock washers and screws.

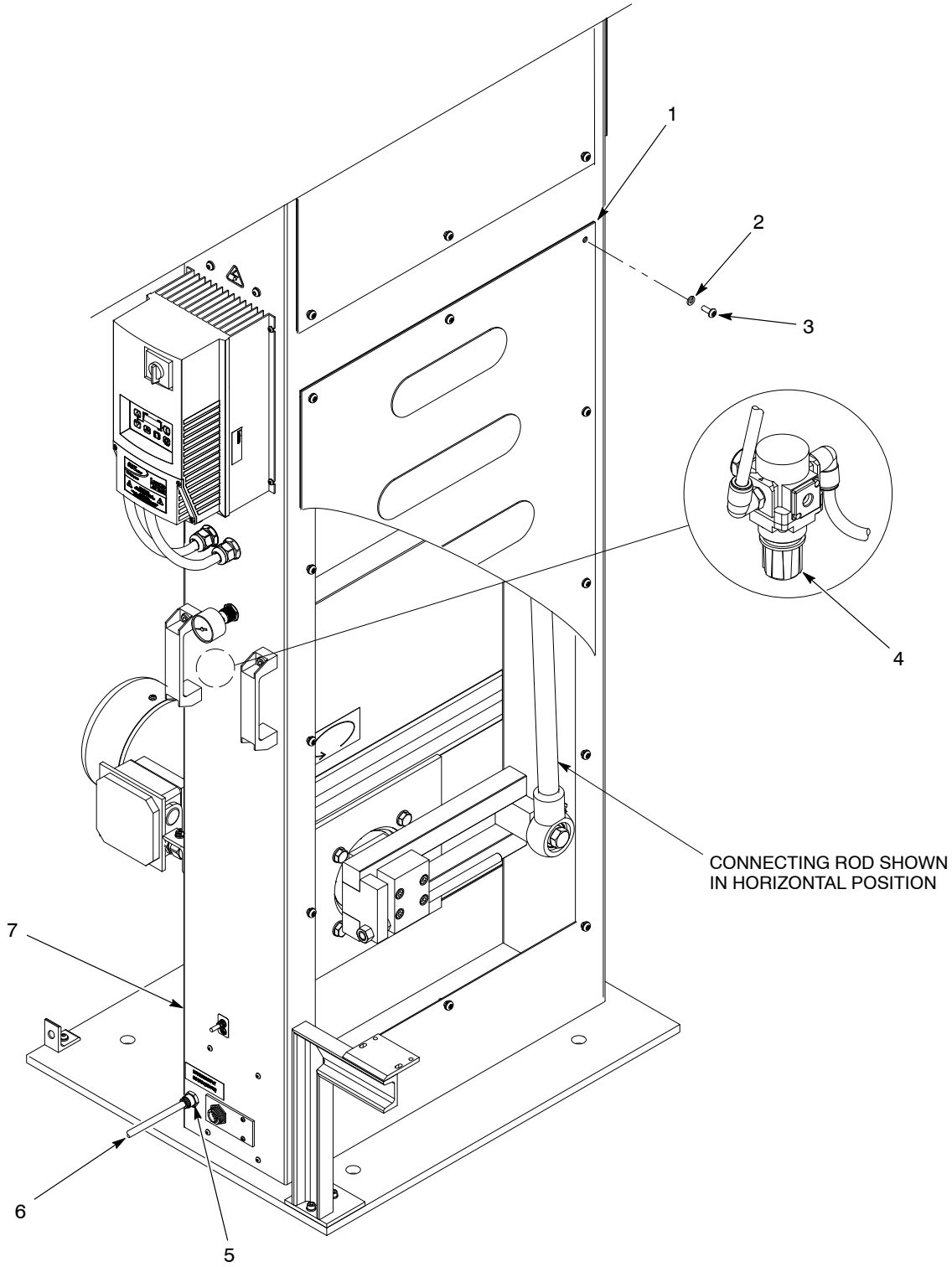


Figure 8 Supply Air Connection

Operation

Operation is dependent upon the application requirements. Refer to the System Documentation manual that shipped with the system for operating procedures.

WARNING: Failure to observe the following could result in property damage, injury, or death:

- Before starting the oscillator, make sure nothing interferes with the gun mount or spray guns.
- The oscillator could immediately start when power is applied to the VFD. Warn personnel in the area to stand away from the oscillator before turning the VFD power switch to ON.
- Never open the access panels while the oscillator is operating.

Adjusting the Stroke

See Figure 9. Perform the following to adjust the stroke:

1. Lock out power to the oscillator.
2. If the load has not been balanced, perform the *Adjust the Air Pressure* procedure.
3. **Oscillators With VFD**: Remove the screws (4) and lock washers (5) securing the bottom access panel (6).

   Oscillators Without VFD: Remove the screws (2, 4) and lock washers (3, 5) securing the top and bottom access panels (1, 6).
4. Perform the following to adjust the stroke:
   a. Loosen the torque arm support block screws (10).
   b. Turn the adjustment nut (12) clockwise to increase or counterclockwise to decrease the distance between the center lines of the torque arm support (9) and the connecting rod end (11). The stroke equals this distance multiplied by 2.
   c. Tighten the torque arm screws (10) to 26 N•m (19 ft-lb).
5. **Oscillators Without VFD:** With the gun carriage at the bottom stroke, loosen the screws (8) and readjust the sensor target (7) as shown. Tighten the screws securely.
6. Install any access panels (1, 6) that were removed using the lock washers (3, 5) and screws (2, 4). Tighten the screws securely.

CAUTION: After performing this procedure, the cycle rate may need to be adjusted to prevent the carriage from over-speeding. The maximum carriage speed is 100 fpm.

7. If necessary, adjust the cycle rate. Refer to the *Maximum Carriage Speed* section for the procedures.

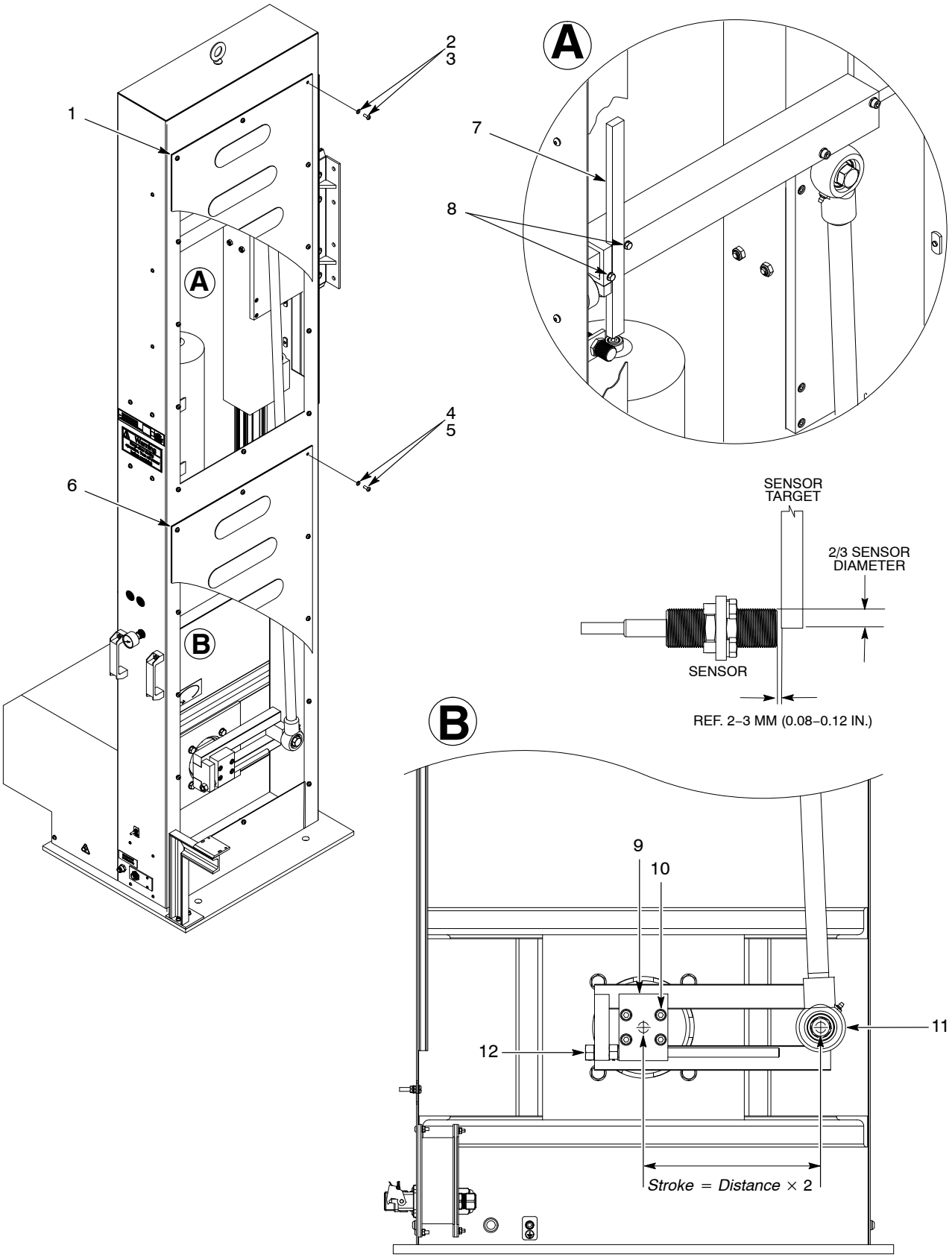


Figure 9 Changing the Stroke

Maintenance

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

WARNING: Disconnect equipment from the line voltage before servicing the equipment. Failure to observe this warning may result in a severe shock.

Refer to Table 3 and Figure 10.

Table 3 Maintenance Schedule

Description	Item	Frequency	Procedure
General Cleaning	—	Weekly	Clean the interior of the oscillator. **NOTE:** If the oscillator is located in an inherently dirty environment or if the overspray build up is excessive, consider installing a pressurizing unit. Oscillators with built-in pressurizing units are available. Contact your Nordson representative for more information.
Gun Carriage Guide Rod and Bearings	1, 2	Weekly	Wipe overspray off the guide rod and lubricate it with a light coat of 3-IN-ONE® oil or ISO Grade 22–32 machine oil.
		Monthly	Inspect the guide rod wear. Grooves indicate that the bearings and guide rod must be replaced.
Crank Arm Rod Ends	3, 4	Monthly	Make sure that the screws are tight. Torque value: 120–135 N•m (90–100 ft-lb).
Torque Arm Support Block Screws	5	Monthly	Make sure that the screws are tight. Torque value: 26 N•m (19 ft-lb)
Motor	6	Monthly	Clean the grille over the fan on the rear of the motor. Make sure that it is clear of any dirt buildup.
		First 500 hours/five weeks of operation	Check the motor current draw and compare the reading to the value on the motor identification plate. Actual draw should be 50–70% of the value shown on the identification plate.
Air Cylinder	7	Monthly	Disconnect power. With the air on, listen for air leaks. Repair or replace leaking components.
Gearbox	8	10,000 hours or 2 years	Replace the gear oil.

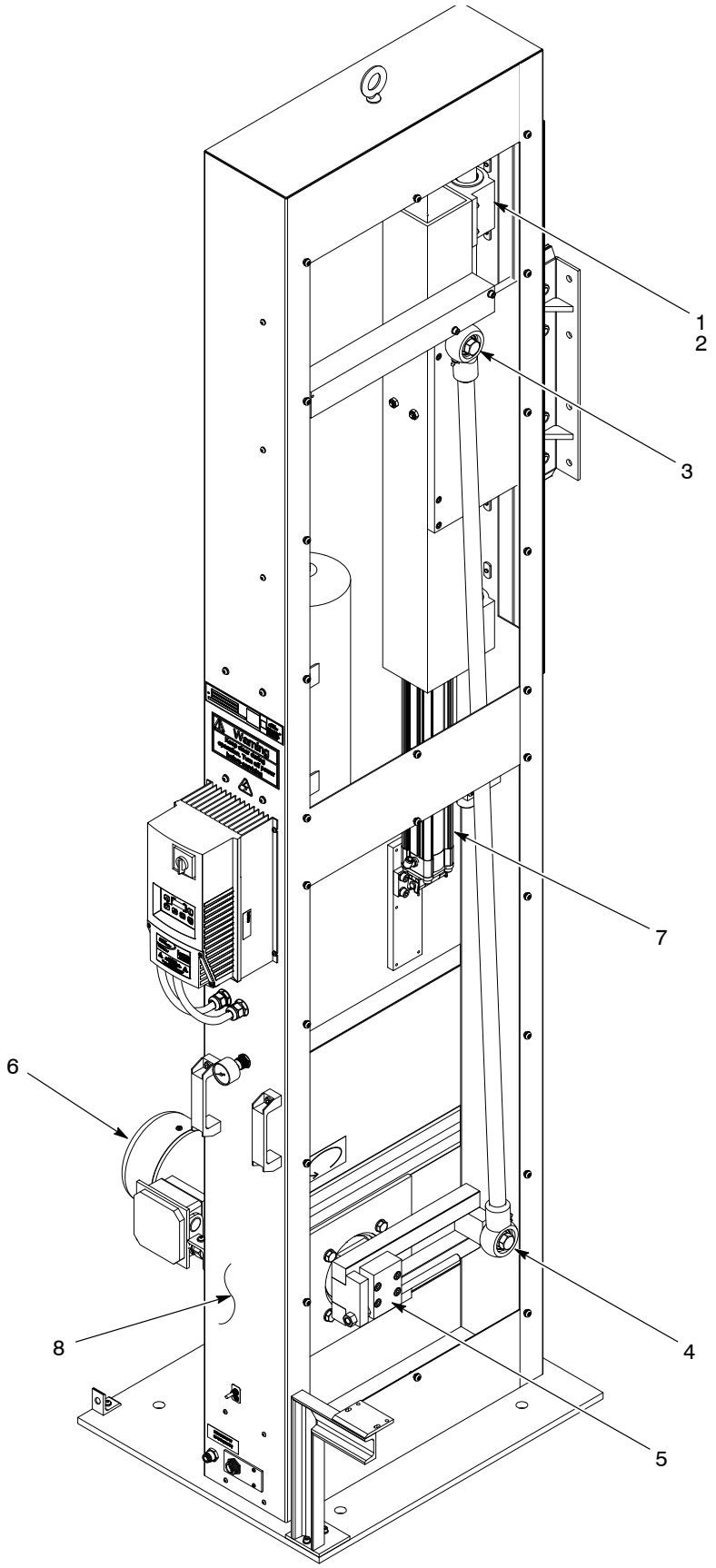


Figure 10 Maintenance Points

Troubleshooting

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

These troubleshooting procedures cover only the most common problems. If you cannot solve a problem with the information given here, contact your local Nordson representative for help.

Problem	Possible Cause	Corrective Action
1. Excessive vibration	Worn gun carriage guide rod or bearings.	Check for excessive guide rod wear. Replace the guide rod and bearings if necessary.
	Worn gearbox.	Check for excessive noise, heat, current draw. Replace gearbox if necessary.
	Worn air cylinder.	Check for air leaks, looseness, and binding. Replace the air cylinder if necessary.
	Loose torque arm support block screws.	Check the screws and tighten if necessary. Torque value: 26 N•m (19 ft-lb)
2. Oscillator will not start	Motor does not start.	Check all electrical connections leading to the motor. Verify that the proper line voltage is supplied to the motor. Check all motor circuit breakers. Check motor rotation. The motor should be free from obstructions.
	Excessive load.	Check the load. Reduce the load if it exceeds the oscillator limits.
	Insufficient or no air pressure.	Adjust air pressure.
	VFD parameters incorrectly set.	Refer to Table 2 on page 11. Set VFD parameters to factory defaults and re-enter Nordson parameters.
	Jumper wire incorrectly installed or not installed at VFD terminals.	Refer to Figure 13, item 11 on page 24. Verify jumper installation, or install jumper as shown.
3. Cannot change speed with VFD keys	VFD parameters incorrectly set.	Refer to Table 2 on page 11. Set VFD parameters to factory defaults and re-enter Nordson parameters.
4. VFD does not display Cycles Per Minute	VFD parameters incorrectly set.	Refer to Table 2 on page 11. Set VFD parameters to factory defaults and re-enter Nordson parameters.
5. VFD indicates fault F_HF (high DC bus voltage	Compressed air pressure set incorrectly.	Adjust pressure as described on page 15.
	VFD parameters incorrectly set.	Refer to Table 2 on page 11. Set VFD parameters to factory defaults and re-enter Nordson parameters.

Repair

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

Remove the Panels and Gear Motor Cover

1. See Figure 11. Remove the screws (2) and lock washers (1) from the applicable panel (3, 4) or gear motor cover (5) to gain access to an oscillator part.
2. When repairs are complete, install the applicable cover using the lock washers and screws. Tighten the screws securely.

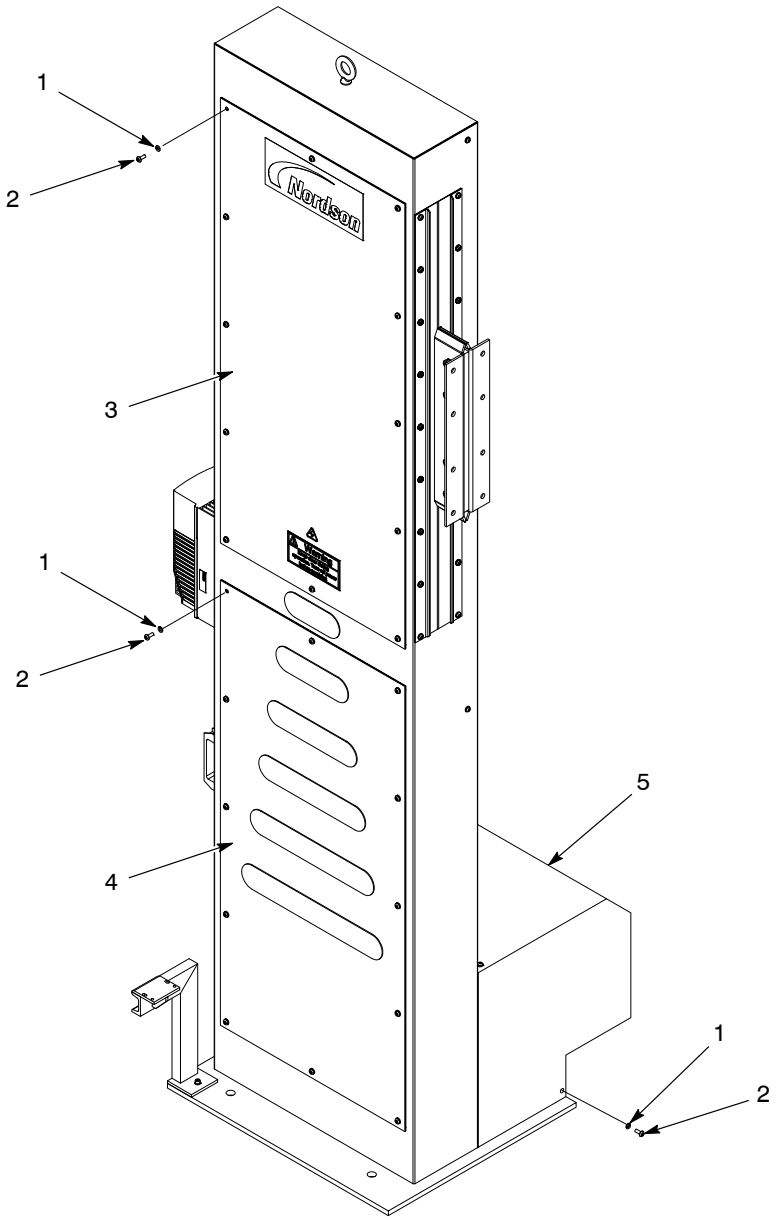


Figure 11 Removing the Covers

Replace the Rollers

Have the Wheel Guide Kit on hand before performing this procedure. Refer to the *Parts* section for ordering information.

1. Relieve the air pressure to the oscillator.
2. See Figure 12. Make sure that the gun carriage (10) is in the down stroke position.
3. Remove the screws (6) and lock washers (7) securing the roller block (8) to the stabilizer bar (1).
4. Remove the button flange screw (5) securing the wheel (4), bearing (3), and axle (2) to the roller block (8). Only discard the wheel and bearing.
5. Install the new wheel (4), new bearing (3), and axle (2) to the roller block (8) using the button flange screw (5). Tighten the screws securely.
6. Install the roller block (8) to the stabilizer bar (1) using the lock washers (7) and screws (6). Tighten the screws securely.

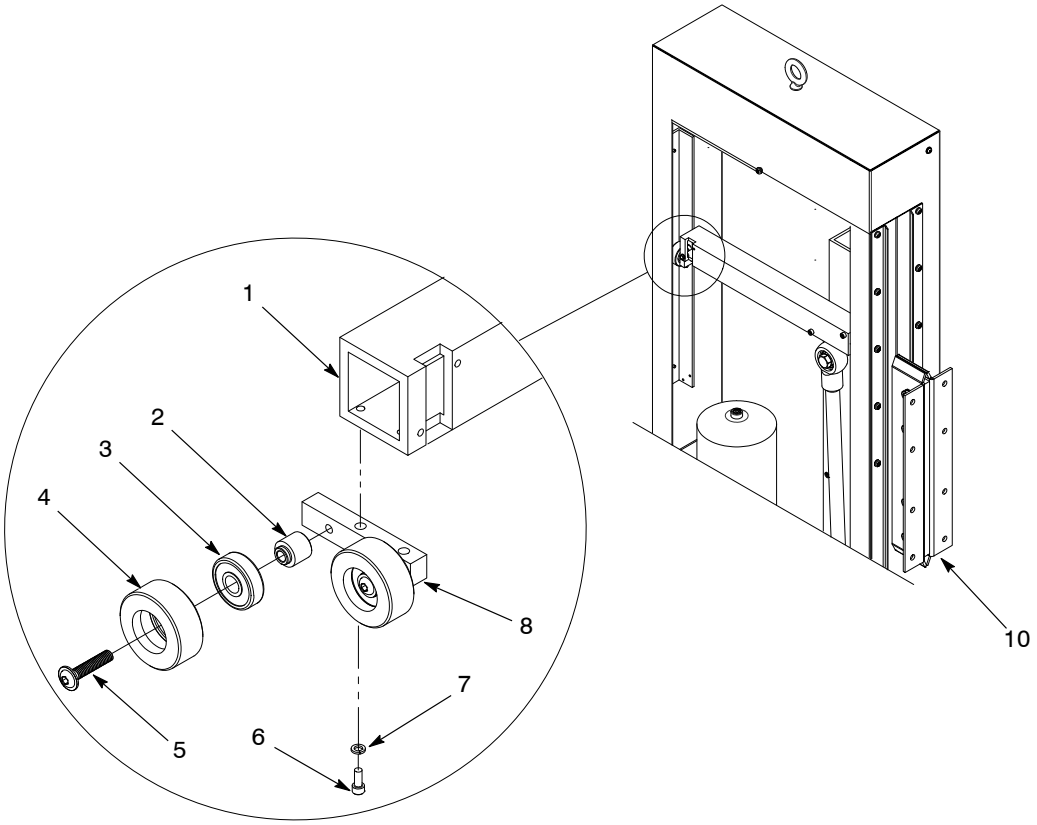


Figure 12 Typical Roller Assembly *(VFD configuration shown)*

Replace the VFD

WARNING: Disconnect and lock out power to the oscillator before performing repairs. Make sure that the VFD power switch is OFF.

1. Remove the screws (8) securing the cover (7) to the VFD (1).
2. Loosen the strain reliefs (10). Disconnect the gear motor cable wires (6) and the supply power cable wires (5) from the terminal board (9).
3. Remove the screws (4) and lock washers (3) securing the VFD (1) to the oscillator (2).
4. Install the new VFD (1) to the oscillator (2) using the lock washers (3) and screws (4). Tighten the screws securely.
5. Insert the motor cable and power supply cable through the strain reliefs (10). Connect the gear motor cable wires (6) and power supply cable wires (5) to the terminal board (9) as shown.
6. Obtain a 50-mm (2-in.) length of 18 AWG wire. Strip 6 mm (0.25 in.) of insulation from each end of the wire to create a jumper wire.
7. Connect the jumper wire (11) between terminals 1 and 4 as shown.
8. Install the cover (7) using the screws (8). Tighten the screws securely.
9. Refer to the *Set the Parameters for VFD Configurations* in the *Installation* section to reset the parameters.

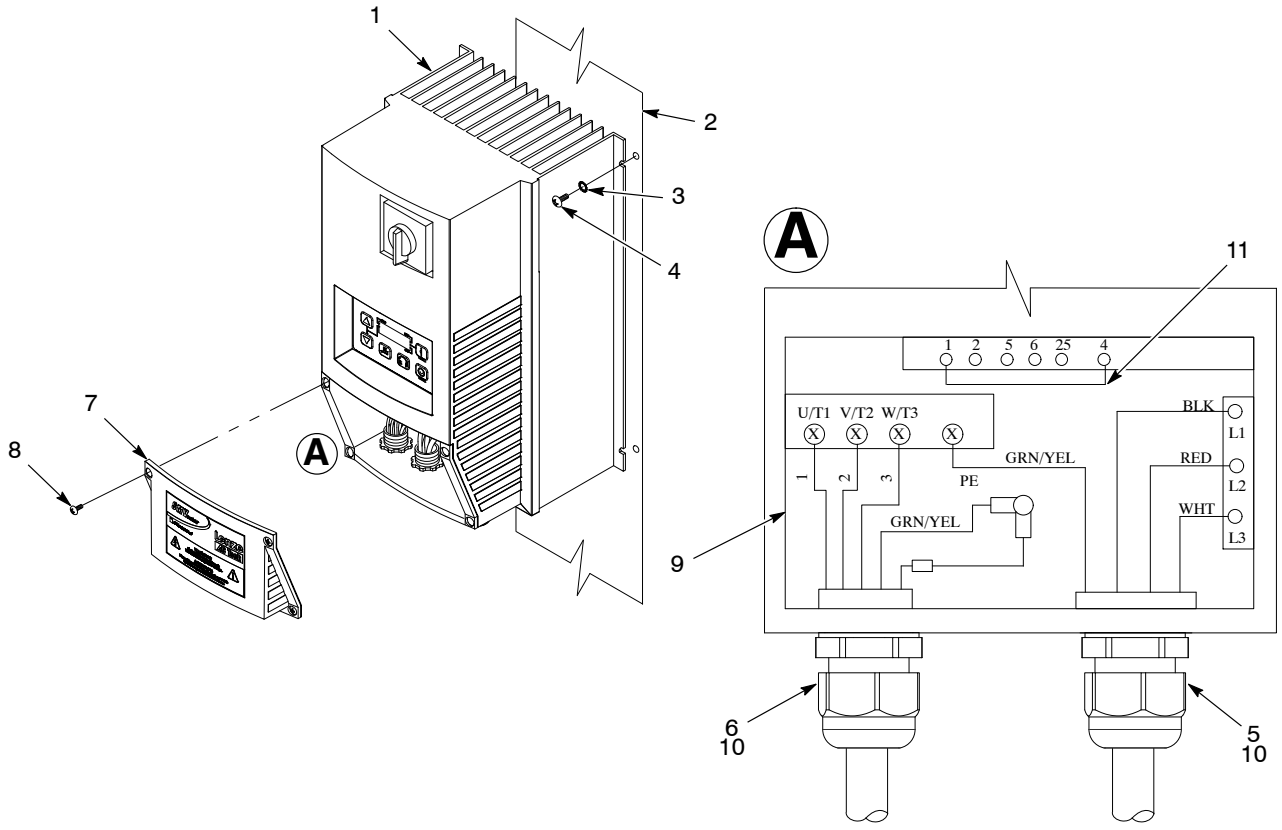


Figure 13 Replacing the VFD

Replace the Gear Motor

CAUTION: The gear motor is heavy. An assistant is required to safely remove the gear motor from the oscillator.

1. See Figure 14. Move the gun carriage (1) to the top stroke position. Use a block (2) as shown to secure the gun carriage (1).
2. Disconnect power and relieve the air pressure.
3. Perform the following:
   a. Remove the screws (5) and lock washers (6) securing the cover (7) to the junction box (4).
   b. Make note of the orientation of the terminal jumper connectors in the junction box. Make sure that the terminal jumper connectors on the new gear motor are configured the same way.
   c. Remove the cable strain relief (8) and keep it for use on the new gear motor.
   d. Disconnect the cable wires in the junction box (4). Carefully pull the cable (9) out of the junction box.
4. Remove the screws (18) securing the torque arm (17) to the shaft block (15). Lift the torque arm off and swing it to the side.
5. Remove the nuts (13), lock washers (12), and washers (11) securing the gear motor (3) to the mounting studs (16). Remove the gear motor from the oscillator.
6. Loosen the screw (14) on the shaft block (15). Remove the shaft block from the gear motor (3).

NOTE: Check the lengths of new and old shaft keys (10). If the new shaft key is longer than the old shaft key, either shorten it or use the old shaft key.

7. Install the shaft key (10) onto the new gear motor (3).
8. Install the shaft block (15) onto the gear motor (3) until it bottoms. Tighten the screw (12) to 26 N•m (19 ft-lb).
9. Perform the following:
   a. Install the gear motor (3) onto the mounting studs (16) using the washers (11), lock washers (12), and nuts (13). Tighten the nuts to 50 N•m (37 ft-lb).
   b. Rotate the gear motor shaft to align the screw hole pattern on the shaft block (15) to the screw hole pattern on the torque arm (17).
   c. Connect the torque arm (17) to the shaft block (15) using the screws (18). Tighten the screws to 26 N•m (19 ft-lb).

NOTE: Make sure that the terminal jumper connectors in the junction box on the new gear motor are configured the same way as the old gear motor.

10. Perform the following:
    a. Remove the screws (5) and washers (6) securing the cover (7) to the junction box (4). Install the strain relief (8) from the old gear motor.
    b. Insert the cable (9) into the cable strain relief (8). Connect the cable wires to the junction box (4). Refer to the *Wiring Diagram* section if necessary.
    c. Tighten the cable strain relief (8).
    d. Install the cover (7) to the junction box (4) using the screws (5) and lock washers (6). Tighten the screws securely.

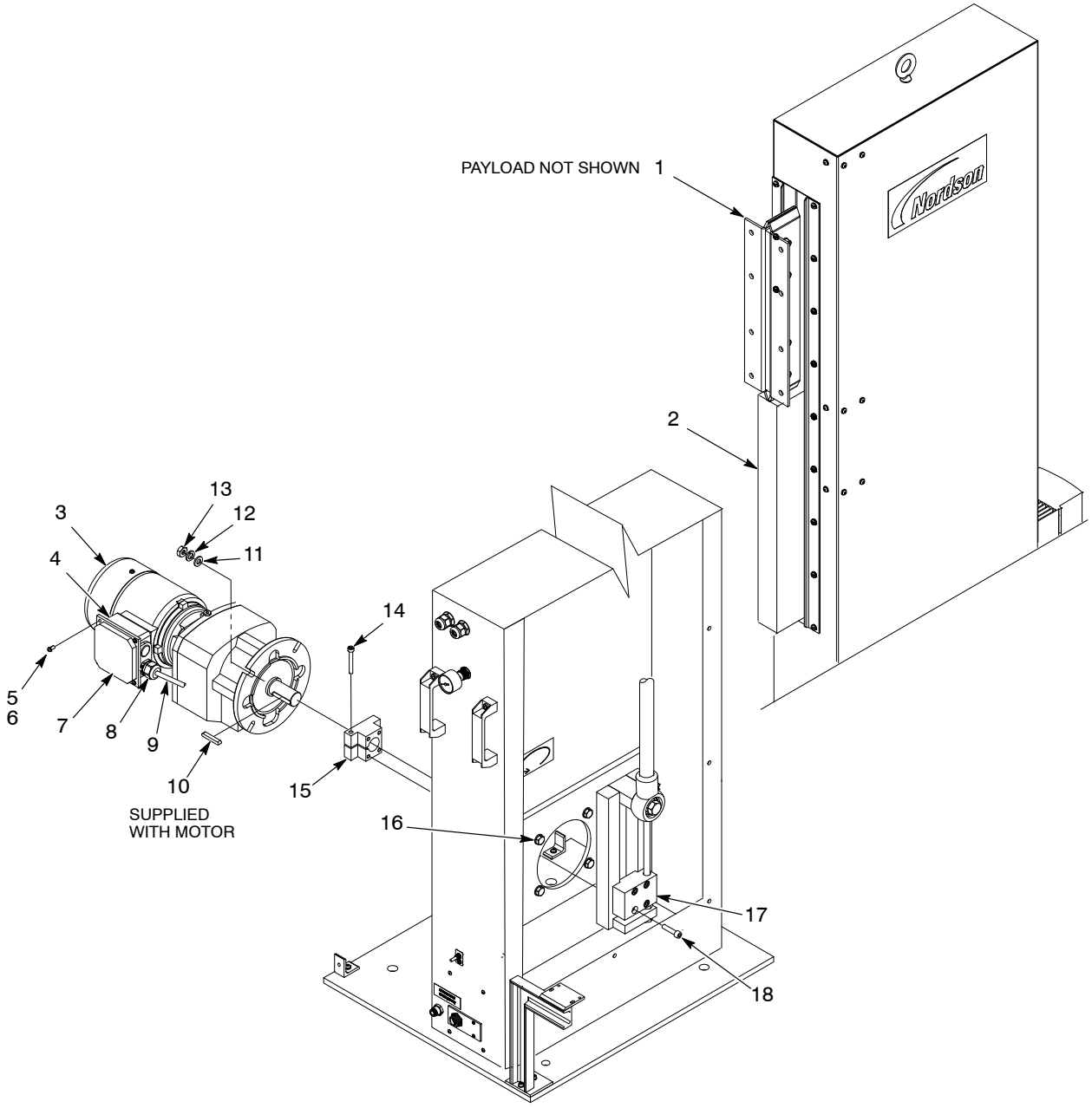


Figure 14 Replacing the Gear Motor

Replace the Bearings

Use the following procedure to replace the bearings. Read the following before performing these procedures:

- Remove the payload form the gun carriage.
- Have the Bearing Kit on hand. Refer to the *Parts* section for ordering information.
- An assistant is required to safely remove the bearing assembly from the oscillator.
- A block is required to secure the gun carriage in the top stroke position. Make sure that the block can support the weight of the gun carriage.

Remove the Air Cylinder

1. See Figure 15. Remove the guns and mounting hardware from the carriage mounting bracket (1).
2. Move the gun carriage (1) to the top stroke position. Use a block (2) as shown to secure the gun carriage (1).
3. Relieve the air pressure to the oscillator.
4. Disconnect the air line (3) from the air cylinder fitting (4).
5. Remove the clips (6) and pin (7) securing the air cylinder (5) the bracket (8). Remove the air cylinder from the bearing assembly mounting tube (9).

NOTE: The gun carriage needs to be guided down because it will drop down under its own weight.

6. Move the gun carriage (1) to the bottom stroke position by carefully removing the block (2).
7. Remove the bearing assembly from the oscillator. Refer to the *Remove the Bearing Assembly* section.

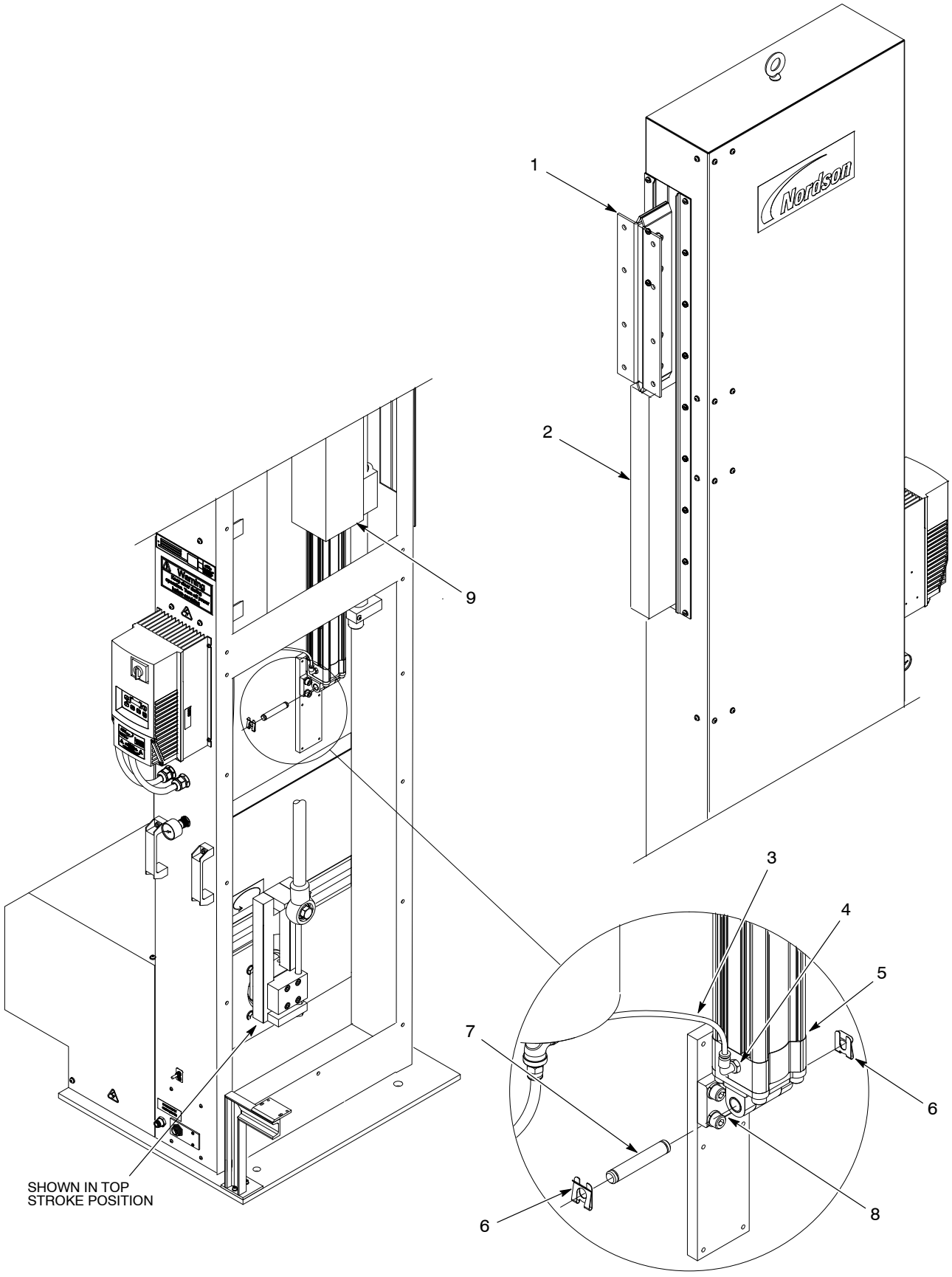


Figure 15 Removing the Air Cylinder

Remove the Bearing Assembly

1. See Figure 16. Remove the screws (3) and lock washers (4) securing the stabilizer bar (5) to the bearing mount tube (8). Remove the stabilizer bar.

CAUTION: Be careful when removing the screw in the next step. The gun carriage will slide down about 25.4 mm (1 in.) until the bearings contact the support blocks.

2. Remove the screw (6) securing the connecting rod (7) to the bearing mount tube (8). Swing the connecting rod to the left and away from the bearing mount tube.
3. Remove the screws (2) securing the gun plate assembly (1) to the bearing mount tube (8). Remove the gun plate assembly.
4. Have an assistant support the bearing assembly. Remove the screws (9) and lock washers (10) securing the bearing assembly to the oscillator (11). Remove the bearing assembly from the oscillator (11) through the bottom opening.
5. Replace the bearings. Refer to the *Replace the Bearings* section.

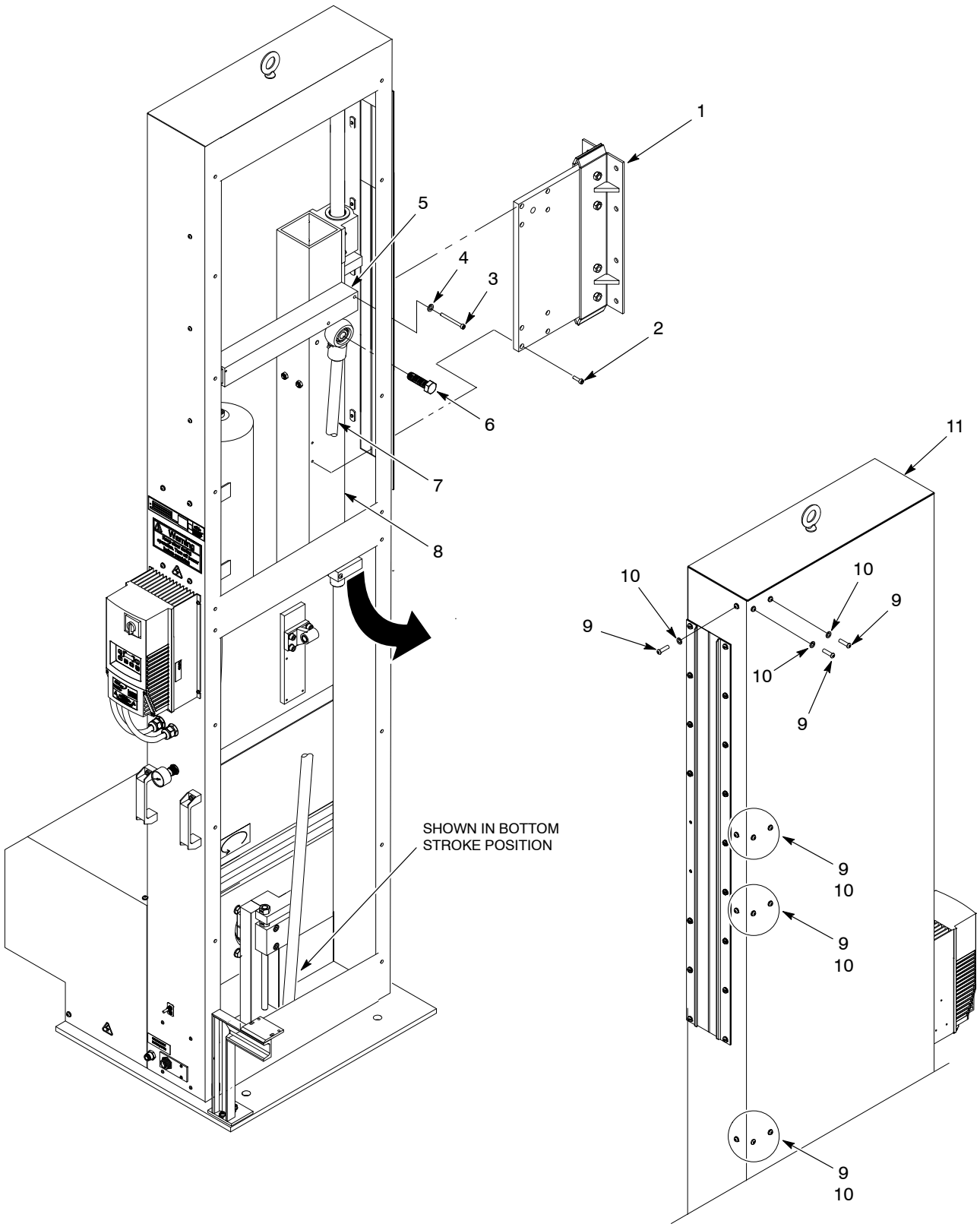


Figure 16 Removing the Bearing Assembly

Replace the Shaft and Bearings

1. See Figure 17. Loosen the screws (2) securing the two end shaft supports (1A, 1D). Remove the two end shaft supports.
2. Remove the screws (6) and lock washers (5) securing the bearings (4A, 4B) to the bearing mounting tube (8). Remove the bearings from the shaft (7).
3. Remove the last two shaft supports (1B, 1C) from the shaft (7).

CAUTION: New bearings are lubricated and assembled with wipers and seals. Use extreme care to avoid contaminating the interior of the bearings.

4. Install the new bearings (4A, 4B) onto the new bearing mounting tube (8) using the lock washers (5) and screws (6). Do not tighten the screws at this time.
5. Perform the following:
   a. Insert the 20° chamfered end of the shaft (7) through the top bearing (4A).
   b. From the 20° chamfered end of the shaft (7), slide two shaft supports (1B, 1C) onto the shaft (7).
   c. Insert the shaft through the bottom bearing (4B). Tighten the bearing screws (6) to 6 N•m (4.4 ft-lb).
6. Secure the shaft supports:

   NOTE: Make sure that all spacing and orientation is correct for each shaft support.

   a. Position the top end support (1A) at the dimension as shown. Tighten the screw (2) securely.
   b. Position the remaining shaft supports (1B, 1C, 1D,) to the dimensions as shown. Tighten the screws (2) securely.
7. Install the bearing assembly onto the oscillator. Refer to the *Install the Bearing Assembly* section.

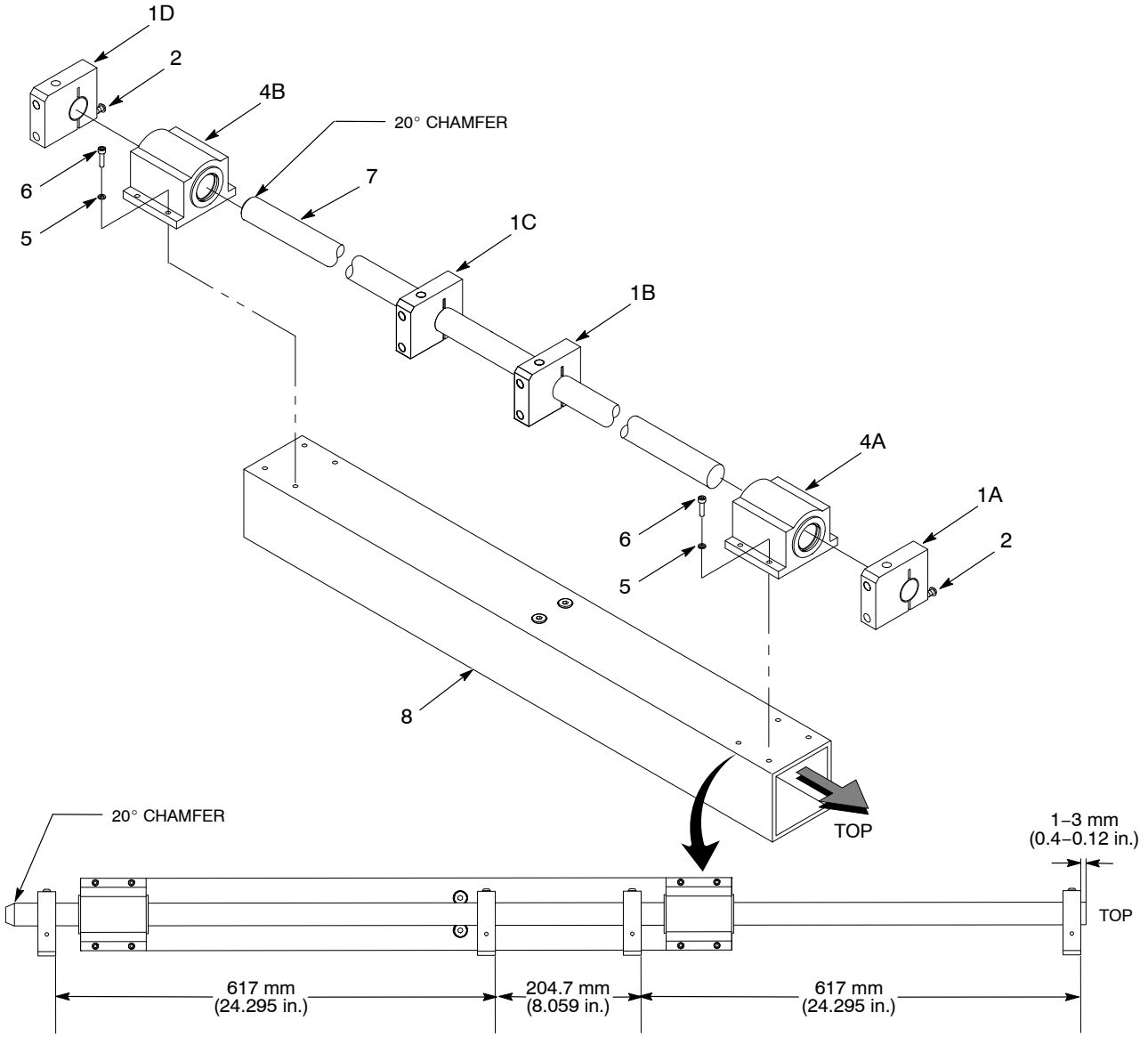


Figure 17 Replacing the Bearings

Install the Bearing Assembly

1. See Figure 18. Have an assistant position the bearing assembly onto the oscillator (11). Secure the bearing assembly to the oscillator using the lock washers (10) and screws (9). Tighten the screws securely.
2. Install the gun carriage (1) to the mounting tube (8) using the screws. Tighten the screws securely.
3. Apply grease to the threads of the screw (6). Install the connecting rod (7) to the mounting tube (8) using the screw. Tighten the screw to 90–100 ft-lb. (120–135 N•m).
4. Install the stabilizer bar (5) to the bearing mount tube (8) using the lock washers (4) and screws (3). Tighten the screws securely.
5. Install the air cylinder. Refer to the *Install the Air Cylinder* section.

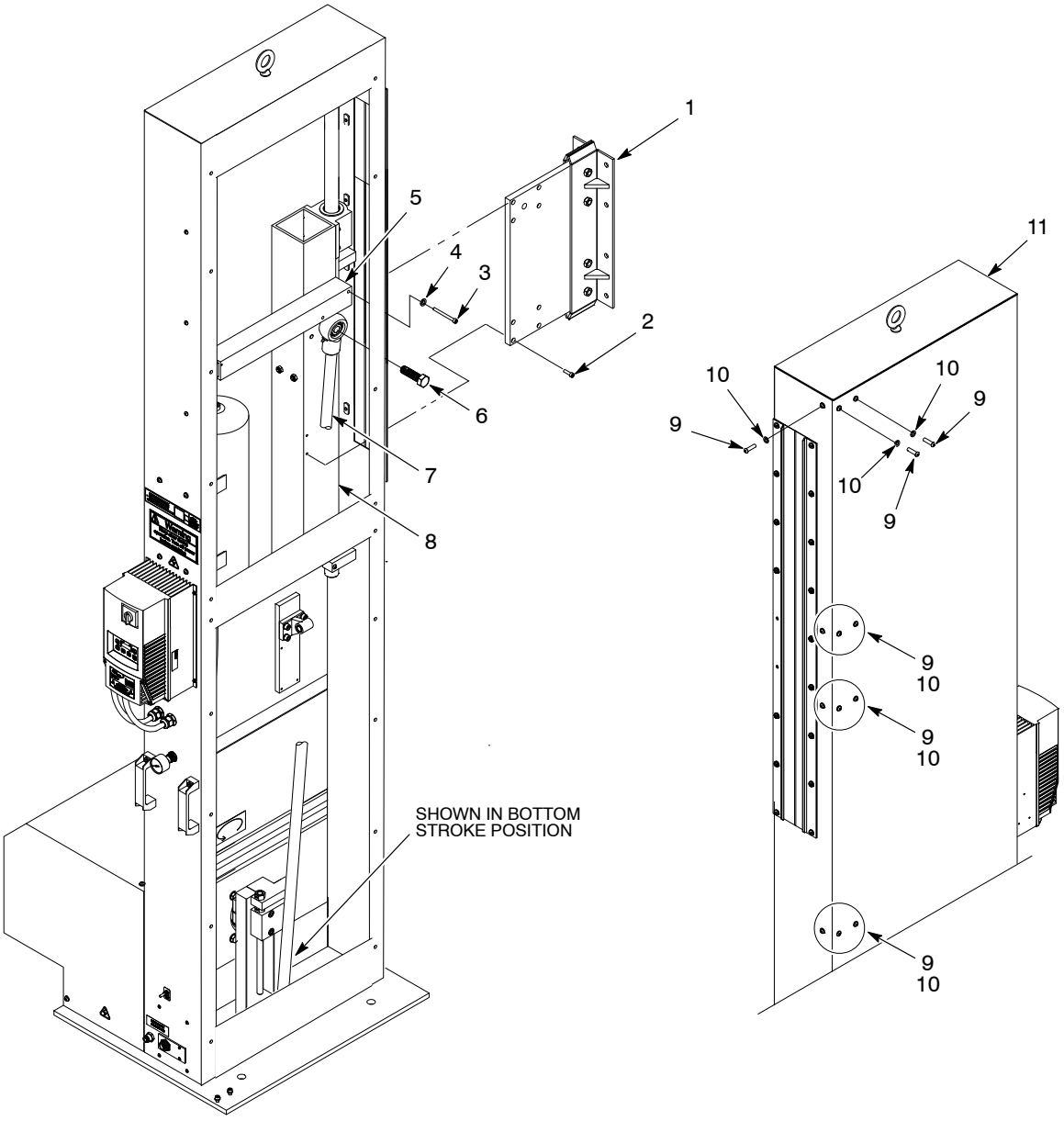


Figure 18 Installing the Bearing Assembly

Install the Air Cylinder

1. See Figure 19. Move the gun carriage (1) to the top stroke position. Use a block (2) as shown to secure the gun carriage (1).
2. Install the air cylinder into the bearing assembly mounting tube (9). Secure the air cylinder using the pin (7) and clips (6).
3. Connect the air line (3) to the air cylinder fitting (4).

NOTE: The gun carriage needs to be guided down because it will drop down under its own weight.

4. Move the gun carriage (1) to the bottom stroke position by carefully removing the block (2). The gun carriage should drift downward.
5. Install the gun mount to the gun carriage (1) mounting bracket.

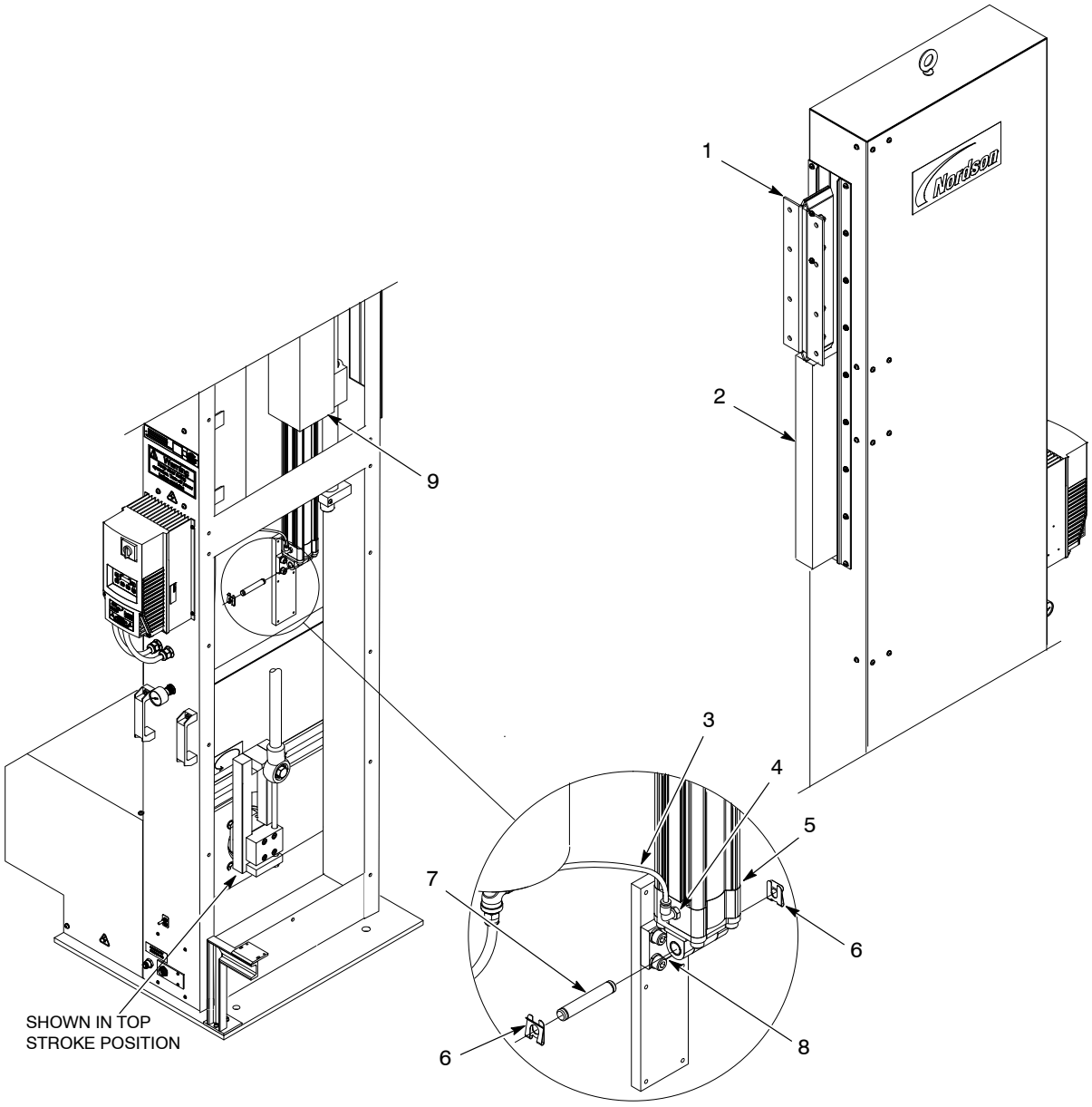


Figure 19 Installing the Air Cylinder

Replace the Air Cylinder

1. See Figure 19. Move the gun carriage (1) to the top stroke position. Use a block (2) as shown to secure the gun carriage (1).
2. Relieve the air pressure to the oscillator.
3. See Figure 20. Disconnect the air line (3) from the air cylinder fitting (4).
4. Remove the clips (6) and pin (7) securing the air cylinder (5) the bracket (8). Remove the air cylinder from the bearing assembly mounting tube (9).
5. Perform the following:
   a. Remove the fitting (4), breather vent (10), washer (11), support plate (12), and lock nut (13) from the old air cylinder.
   b. Install these parts onto the new air cylinder. Tighten the lock nut until it contacts the plate, then back it off ½ turn.
6. Install the new air cylinder (5) into the bearing assembly mounting tube (9). Secure the air cylinder using the pin (7) and clips (6).
7. Connect the air line (3) to the air cylinder fitting (4).

NOTE: The gun carriage needs to be guided down because it will drop down under its own weight.

8. See Figure 19. Move the gun carriage (1) to the bottom stroke position by carefully removing the block (2). The gun carriage should drift downward.

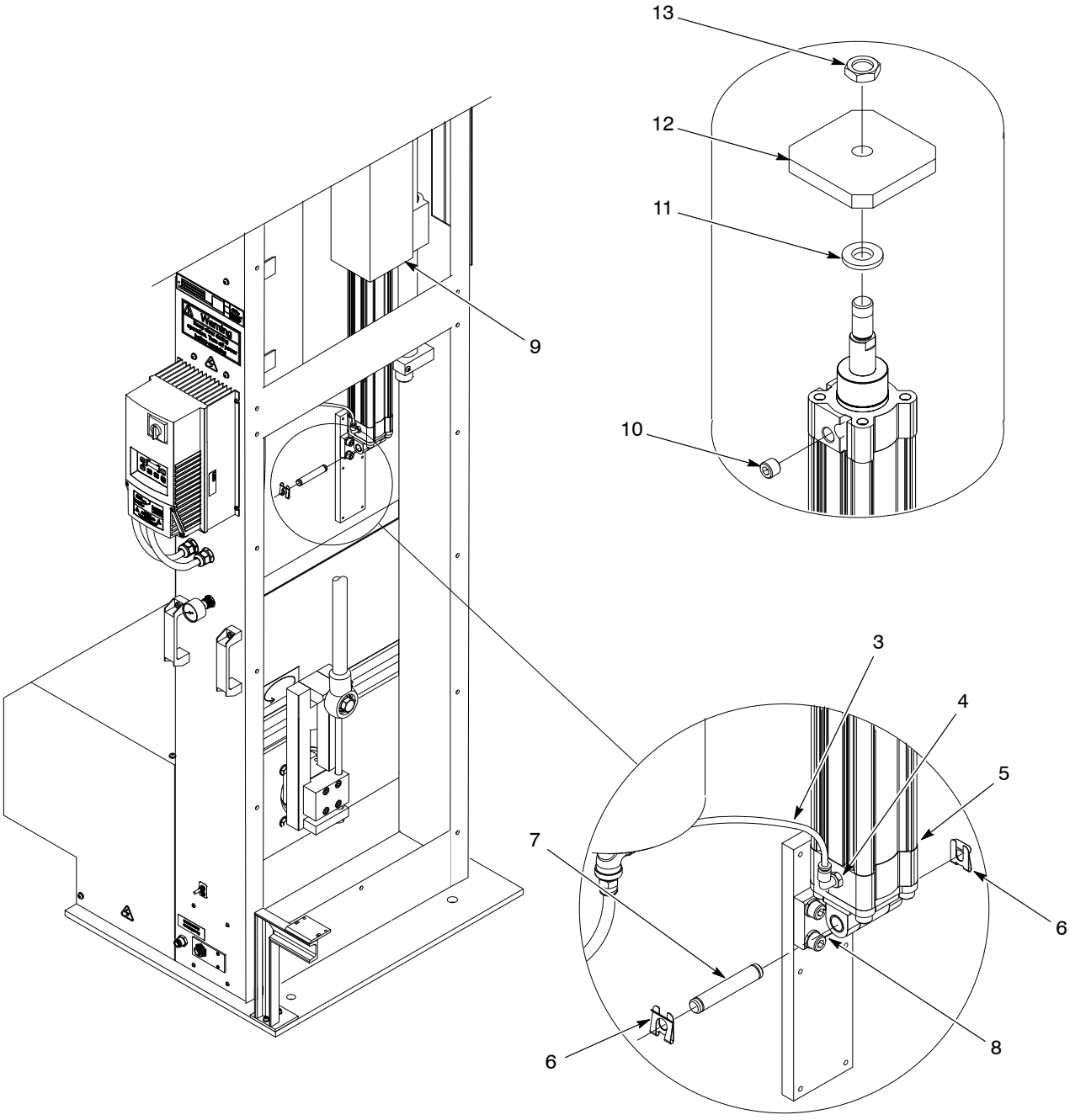
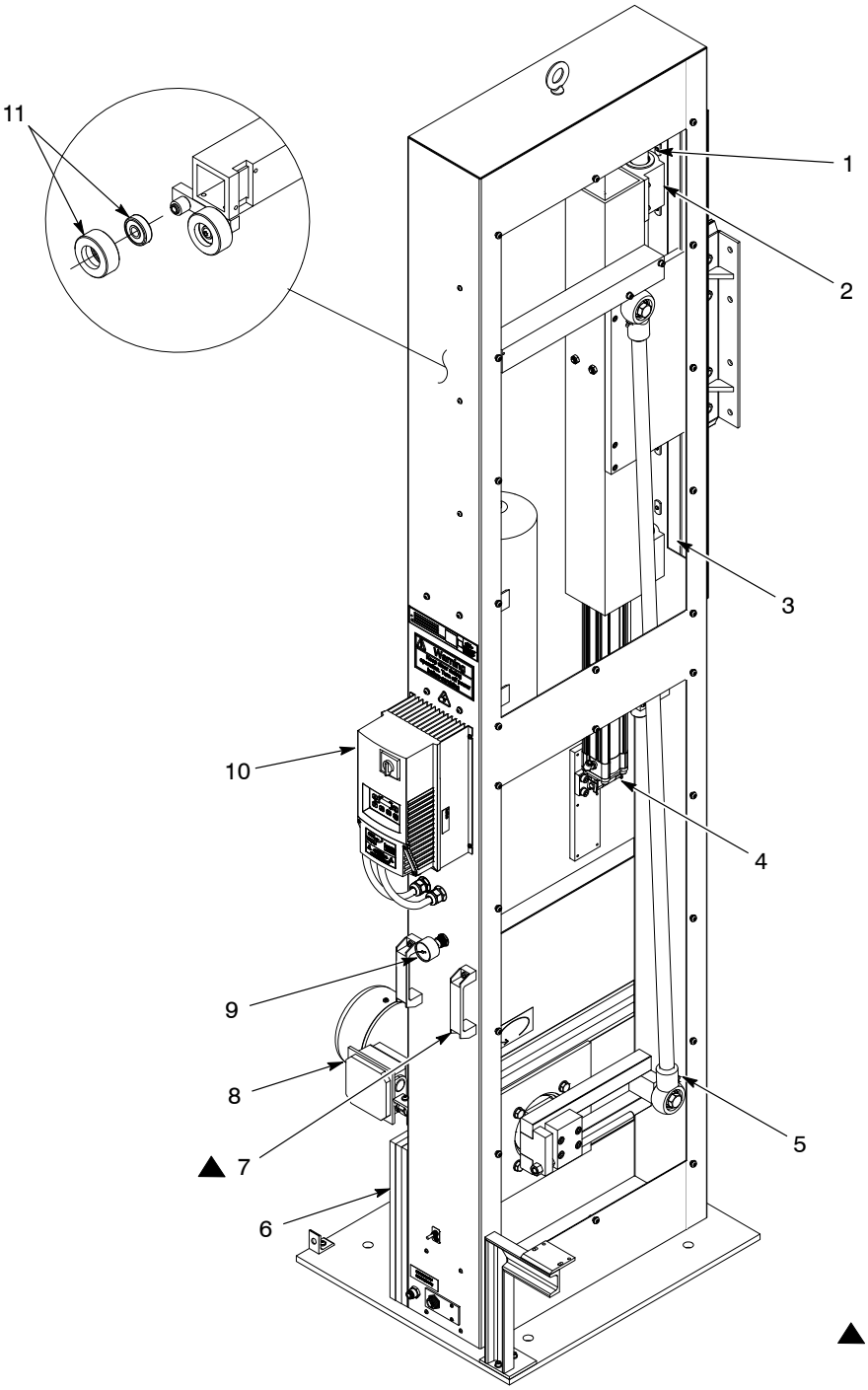


Figure 20 Installing the Air Cylinder

Parts

To order parts, call the Nordson Industrial Coating Customer Service Center at (800) 433−9319 or contact your local Nordson representative.

Parts listed in this manual are used on all oscillator models. For parts not listed in this manual, contact your Nordson representative or the Nordson Industrial Coating Customer Service Center.



▲ If using a manual In/Out mover, order the Handle Kit for moving the oscillator.

Figure 21 Parts

Oscillator Assemblies

The following Oscillators are available.

Part	Description
Oscillators Configured With VFD	
Obsolete	OSCILLATOR, 380–415 Vac, 50/60 Hz, VFD
Obsolete	OSCILLATOR, 380–415 Vac, 50/60 Hz, VFD, ATEX
Obsolete	OSCILLATOR, 460 Vac, 50/60 Hz, VFD
Obsolete	OSCILLATOR, 200–230 Vac, 50/60 Hz, VFD
Obsolete	OSCILLATOR, 575/600 Vac, 50/60 Hz, VFD
Oscillators Configured Without VFD	
Obsolete	OSCILLATOR, 230/380–415 Vac, 50 Hz
Obsolete	OSCILLATOR, 230/380–415 Vac, 50 Hz, ATEX
Obsolete	OSCILLATOR, 230/460 Vac, 60 Hz
Obsolete	OSCILLATOR, 208 Vac, 60 Hz
Obsolete	OSCILLATOR, 575/600 Vac, 60 Hz
Obsolete	OSCILLATOR, 200 Vac, 60 Hz

Gear Motors

See Figure 21 and the following parts list

Item	Part	Description
8	1108515	GEAR MOTOR, 400 V–50 Hz, 30-mm diameter shaft
	1108517	GEAR MOTOR, 400 V–50 Hz, ATEX, 30-mm diameter shaft
	1108516	GEAR MOTOR, 230/460 V–60 Hz, 30-mm diameter shaft
	1108518	GEAR MOTOR, 208 V–60 Hz, 30-mm diameter shaft
	1108519	GEAR MOTOR, 575 V–60 Hz, 30-mm diameter shaft

Inverters

See Figure 21 and the following parts list

Item	Part	Description
10	1106722	INVERTER DRIVE, 1 hp, disconnect, 200/240 V
	1106723	INVERTER DRIVE, 1 hp, disconnect, 400/480 V
	1106724	INVERTER DRIVE, 1 hp, disconnect, 480/600 V

Sensors

Item	Part	Description
Not Shown	1098898	SENSOR, inductive, proximity, 3-wire, NO, NPN, 18-mm
	1108645	SENSOR, inductive, proximity, 3-wire, NO, PNP, 18-mm

Kits

See Figure 21 and the following parts list

Item	Part	Description
1	1107805	KIT, SHAFT, gun carriage
2	1107804	KIT, BEARING, linear, 1.25 diameter, with seals
3	1107801	KIT, FLAP SEAL, oscillator
4	1107802	KIT, AIR CYLINDER, 500-mm stroke, 50 mm diameter
5	1108812	KIT, ROD END
6	1600187	KIT, COUNTERWEIGHT, 33.9 Kg, GBL oscillator
7	1104658	KIT, HANDLE, In/Out mover
9	1107803	KIT, REGULATOR, with gage, 0–100 psi, 1/8 NPT
11	1108811	KIT, GUIDE WHEEL

Cables – Oscillator without VFD

Part	Description	Note
7751168	CABLE, CF, oscillator sensor, 7 meter	A, C
1600024	CABLE, CF, oscillator sensor, single end, 7 meter	A, C, F
1601826	CABLE, CF, oscillator sensor, 17 meter	A, D
1102301	CABLE, CG7, 4 core assembly, UL, 7 meter	B, C
1600028	CABLE, CG, 4 core assembly, single end, UL, 7 meter	B, C, F
1102302	CABLE, CG17, 4 core assembly, CE, 17 meter	B, D, E
1600026	CABLE, CG, 4 core assembly, single end, CE, 17 meter	B, D, E, F

NOTE A: Use this cable for sensors.

B: Use this cable for 3-phase motors.

C: Use this cable with oscillators that have a control box located near or close to the mover.

D: Use this cable with oscillators that have a control box remotely located a long distance from the mover.

E: Not for use in North America.

F: This cable has a “flying lead” connector for termination at a remote control box.

Cables – Oscillator with VFD

Part	Description	Note
1600023	CABLE, power, 4 core, 20 meter, single end	B, C
1601820	CABLE, power, 4 core, 7 meter, single end	A, C
1601825	CABLE, power, 4 core, 20 meter	B

NOTE A: Use this cable with oscillators that have a control box located near or close to the mover.

B: Use this cable with oscillators that have a control box remotely located a long distance from the mover.

C: This cable has a “flying lead” connector for termination at a remote control box.

Specifications

Refer to Table 4.

Table 4 Specifications

Hardware Specifications	
Power Supply	Refer to the part number descriptions in the *Oscillator Assemblies* section.
Motor	See motor identification plate
Enclosure	TEFC, IP55
Weight	210 kg (463 lb) without guns or mounting hardware
Operating Specifications	
Gun Speed Velocity Range	Minimum: 9 cycles per minute (up and down) @ 20 Hz Maximum: 40 cycles per minute (up and down) @ 88 Hz
Stroke Center Line from Base	1920 mm (75.6 in.) (Without in/out positioner)
Stroke Length Adjustment	100–450 mm (4–18 in.)
Maximum Payload	80 kg (176 lb) @ 610 mm (24 in.) from gun mounting flange
Ambient Operating Temperature Range	5–50 °C (41–122 °F)
Dimensions	With VFD: 2667.7 mm H x 843.3 mm W x 737.5 mm D (105 in. H x 33.2 in. W x 28 in. D) Without VFD: 2667.7 mm H x 703 mm W x 737.5 mm D (105 in. H x 27.6 in. W x 28 in. D)
Recommended Gear Reducer Oil	Mineral oil with an EP additive (DIN51517, Type CLP, ISO viscosity, Grade EP220 (AGMA 5EP)
Compressed Air Requirements	
Supply Pressure	Minimum: 5.8 bar (85 psi) Maximum: 10.3 bar (150 psi)
Air Consumption	Negligible

Wiring Diagrams

See Figures 22 and 23.

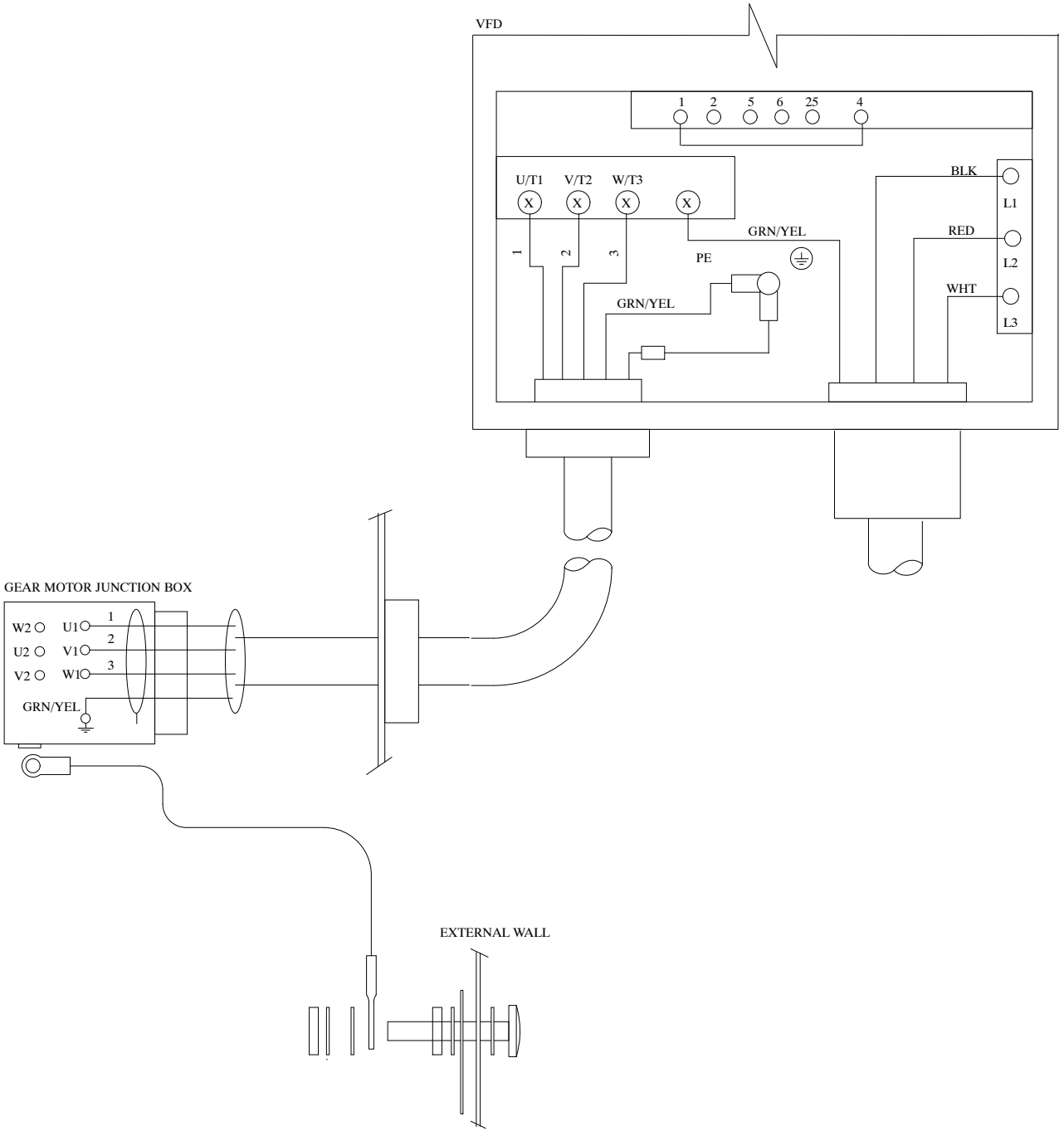


Figure 22 Wiring Diagram for VFD Oscillators

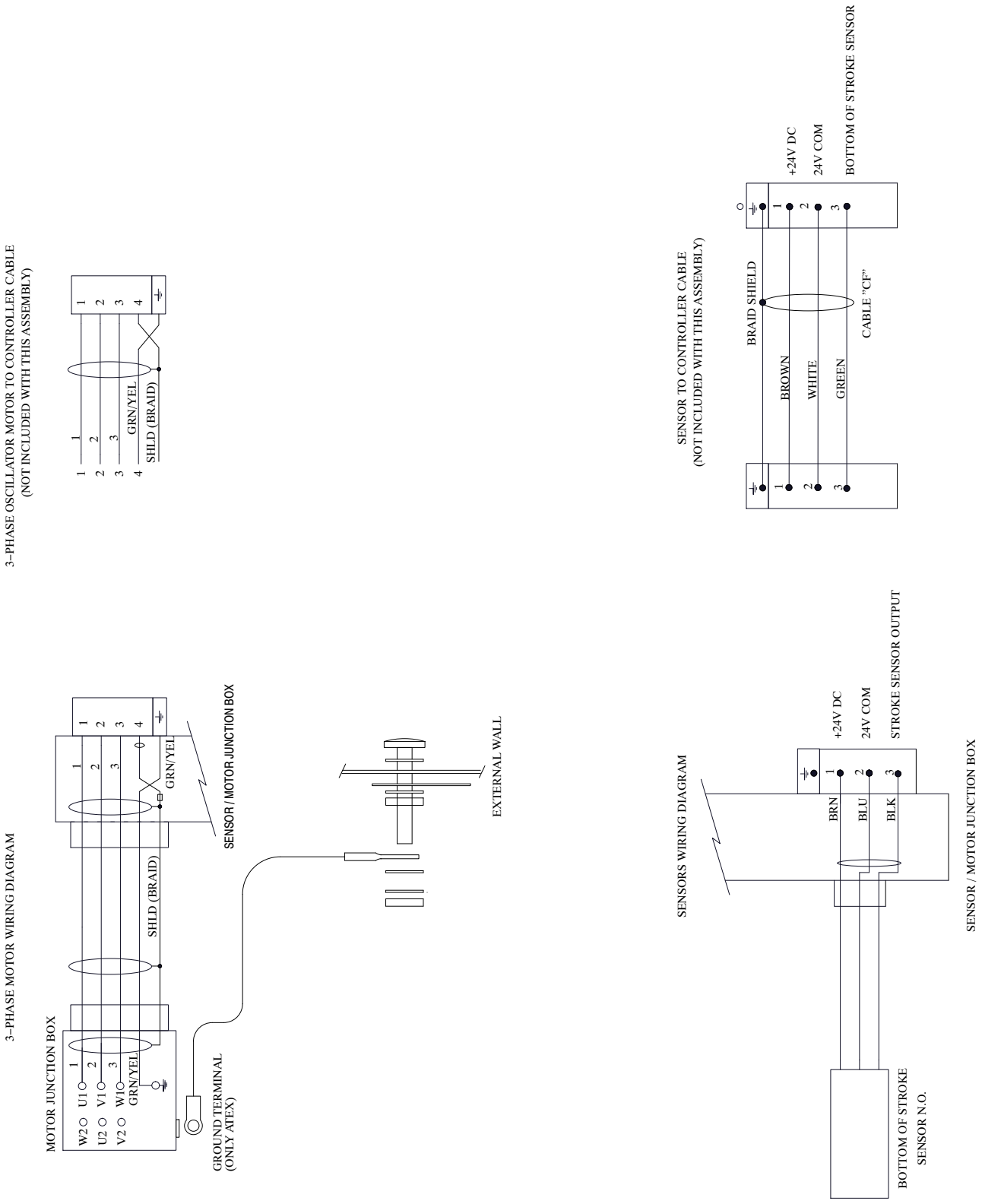


Figure 23 Wiring Diagram for Oscillators without VFD