Motor Controller

Customer Product Manual
Part 331 153A

NORDSON CORPORATION ● AMHERST, OHIO ● USA

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Notice

Trademarks

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Motor Controller

1. 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.

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.
- While operating manual electrostatic spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- 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.

- Ground all conductive equipment in the spray area. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- 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.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- 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.

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.

2. Description

The Nordson motor controller is designed for use with the Nordson mini powder bell. Local operation or PLC connections for remote control are available.

Controls and Indicators

See Figure 1 and refer to Table 1 for controls and indicators on the front panel of the controller.

See Figure 2 for controls and indicators on the back panel of the controller. The back panel contains a pin description (1), fuse (2), power connector (3), and I/O connector (4). Refer to Table 2 for a detailed pin description of the I/O connector.

Table 1 Controller Front Panel

Item	Component	Indicator Light	Description
1	RUN/STOP Switch	Yes (green)	Starts or stops the motor when local mode is selected.
2	RPM Display	No	Displays voltage, current, or rpm. Default is to rpm.
3	Up or Down Arrow Keys	No	Increases or decreases rpm. Must be pressed simultaneously with the set key to change the rpm.
4	SET Key	Yes (yellow)	Increases or decreases rpm. Must be pressed simultaneously with the up or down arrow key to change the rpm.
5	Current Key (mA)	Yes (red)	Shows the current feedback on the display. Indicator only illuminates if the current goes above the allowable range.
6	Voltage Key (V)	No	Shows the output voltage going to the motor on the display.
7	LOCAL Indicator Light	Yes (yellow)	Illuminates when local mode is selected.
8	MAIN POWER Indicator Light	Yes (green)	Illuminates when power is on.

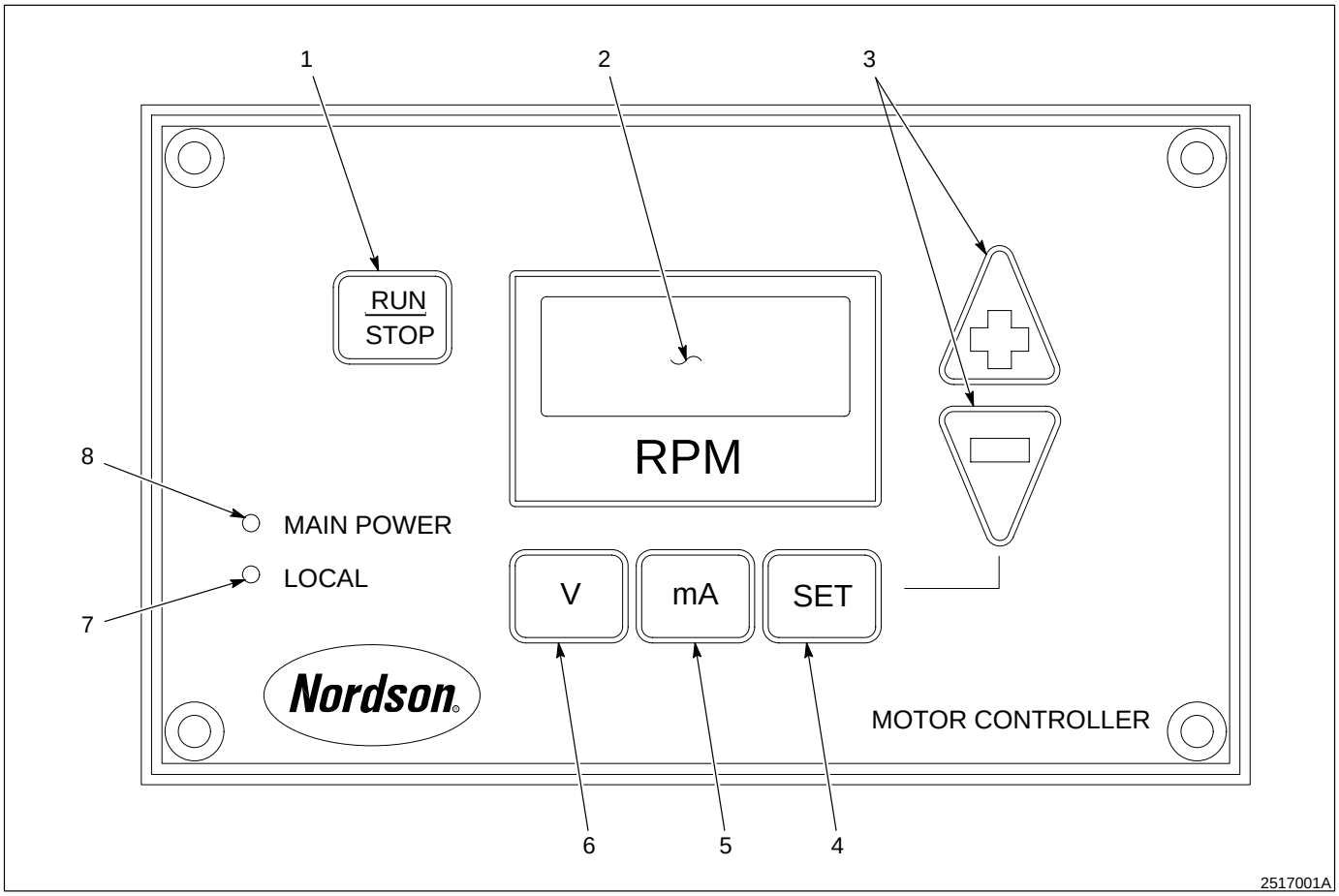

Fig. 1 Controller Front Panel

Controls and Indicators *(contd)*

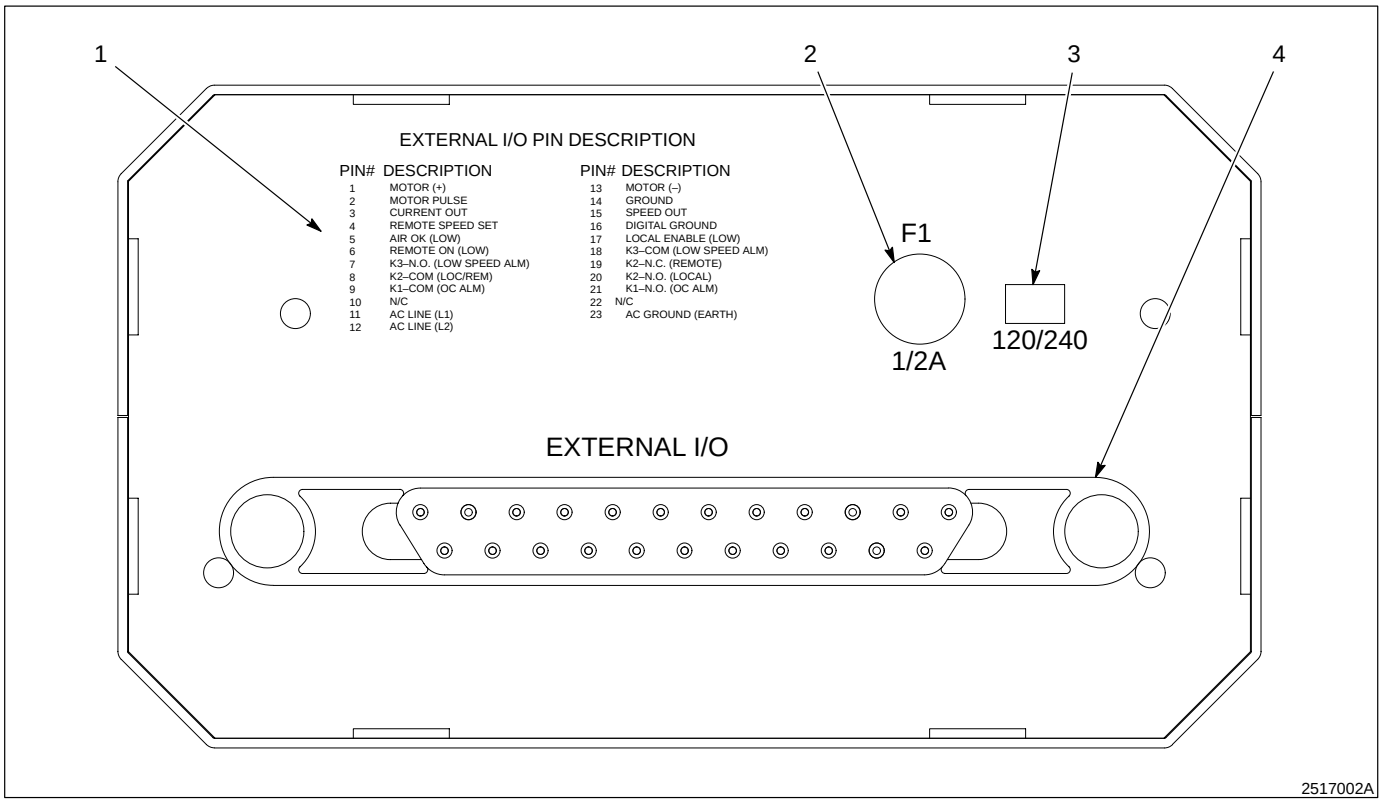

Fig. 2 Motor Controller Back Panel

1. Pin description
2. Fuse
3. Power connector
4. I/O connector

Table 2 Back Panel Connector Pin Descriptions

Pin No.	Description	Type of Signal
1	MOTOR (+)	0–35 VDC output to motor
2	MOTOR PULSE	Feedback output from the motor
3	CURRENT OUT	0–10 V out which represents 0–250 mA. Reference to pin 14
4	REMOTE SPEED SET	0–10 V or 4–20 mA Input referenced to pin 14

Pin No.	Description	Type of Signal
5	AIR OK (LOW)	Bearing air Input to controller Open collector Relay contact TTL logic (5 V) Reference to pin 16 NOTE: If used with a motor only, pins 5 and 16 must be jumpered for the controller to work. CAUTION: If the motor controller is used with the powder mini bell, pins 5 and 16 cannot be jumpered or serious damage to the mini bell will occur.
6	REMOTE ON (LOW)	Input to controller Open collector Relay contact TTL logic (5 V) Reference to pin 16
7	K3-N.O. (LOW SPEED ALARM)	Relay contact output
8	K2-COM (LOCAL/REMOTE)	Relay common
9	K1-COM (OC ALARM)	Relay common
10	N/C	
11	AC LINE (L1)	120/240 VAC
12	AC LINE (L2)	120/240 VAC
13	MOTOR (–)	Negative lead to motor
14	GROUND	Analog ground
15	SPEED OUT	0–10 V out represents 750–2100 RPM Reference to pin 14
16	DIGITAL GROUND	Used by pins 5, 6, and 17
17	LOCAL ENABLE (LOW)	Allows motor controller to be controlled locally Reference to pin 16.
18	K3-COM (LOW SPEED ALARM)	Relay common
19	K2-N.C. (REMOTE)	Relay contact output
20	K2-N.O. (LOCAL)	Relay contact output
21	K1-N.O. (OC ALARM)	Relay contact output
22	N/C	
23	AC GROUND (EARTH)	Main ground to motor controller

Specifications

Input voltage	120/240 VAC @ 60 Hz
(The input voltage is variable on the rear panel.)	
Motor output voltage (closed loop)	0–35 VDC, $^1/_2$ A DC max
Motor feedback input	Hall effect
PLC input control	0–10 V; 4–20 mA
(PLC input control is from the inside of the motor controller; factory default is 0–10 V.)	
Over current	0–250 mA
Factory setting	150 mA
Relay contacts rated	120 VAC; 1 A
RPM output	750–2100 $\pm$ 5%
Low speed (factory setting)	$\pm$ 200 (rpm of set point)
Display (backlit LCD)	7 segment; 4 digit

3. Installation

The motor controller requires the cabling of the connector. Refer to your system requirements.

Mounting

The motor controller is not shipped with a mounting kit or hardware. Contact your Nordson representative for mounting requirements.

Electrical Connections

Two modes of operation are user selectable. They are local and remote.

LOCAL MODE (NO PLC)

To place the motor controller in local mode:

1. Make sure that power is turned off.
2. Refer to Table 2. Place a jumper between pins 17 and 16 on the back panel connector of the motor controller.
3. Connect the motor controller positive (+) output pin to the positive (+) lead of the motor.
4. Connect the motor controller negative (–) output pin to the negative (–) lead of the motor.

5. Connect pin 2 (the motor pulse) to the motor feedback lead.

6. If the alarm functions are desired, make connections according to the connection diagram.

7. Make sure the voltage to the motor controller is 120/240 V.

8. Route/connect the powder bell and power wires to the EXTERNAL I/O connector on the back panel of the motor controller.

9. Turn on power to the system. Make sure the main power indicator light on the front of the motor controller is on.

10. Press the run/stop key on the front panel of the motor controller to turn on the motor. Make sure the local and run/stop indicator lights are on.

11. If desired, simultaneously press the set key and the up/down (+/–) arrow keys to set rpm. Make sure the set key indicator light is on.

NOTE: The motor runs to the indicated rpm setpoint.

12. Press the run/stop key on the front panel of the motor controller to turn off the motor.

REMOTE MODE (PLC)

The system is factory installed for remote mode.

Route/connect the bell and power wires to the EXTERNAL I/O connector on the back panel of the motor controller.

4. Operation

The system is operated in a local or remote mode.

Local Mode (no PLC)

To operate the system in local mode:

1. Turn on power to the system. Make sure the main power indicator on the front panel of the motor controller is on.
2. If desired, simultaneously press the set key and the up/down (+/–) arrow keys to set rpm. Make sure the set key indicator light is on.
3. Press the run/start key on the front panel of the motor controller

NOTE: The motor runs to the indicated rpm setpoint.

4. Use the voltage (V) and current (mA) keys to view these settings.
5. Refer to the appropriate manuals for spraying directions.

Remote Mode (PLC)

NOTE: The system is factory installed for remote mode. The run/stop key is disabled in remote mode. To stop the motor, system power must be turned off or set through the PLC.

To operate the system in remote mode:

1. Turn on power to the system. Make sure the main power indicator on the front panel of the motor controller is on.
2. Use the voltage (V) and current (mA) keys to view these settings.
3. To set the rpm, the motor controller rpm must be set through the PLC program.
4. Refer to the appropriate manuals for spraying directions.

Shutdown

To shutdown the motor controller, turn off power to the system.

Indicator Lights

If any indicator light does not go on or the red indicator for the current (mA) is on, refer to the *Troubleshooting Charts* in the *Troubleshooting* section.

5. Maintenance

No maintenance is required on the motor controller.

6. Troubleshooting

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

Introduction

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

Troubleshooting Charts

Some problems presented in this section may originate with components in the system and not with the controller. If the corrective actions described do not solve the problem, refer to the appropriate system manuals for further suggestions.

Problem	Possible Cause	Corrective Action
1. Main power indicator does not light	Fuse blown	Check the fuse on the rear panel of the motor controller. Change if blown. Refer to the *Parts* section.
2. Motor does not run	Power not applied to unit	Check to insure the power select switch on the rear of the motor controller is set correctly. Make sure that power to the system, including the motor controller, is connected.
	Air connection incorrect	Check the motor controller configuration. If air is used, check connection points. If air is not used, refer to Table 2.
	Motor is binding	Check the motor controller configuration. Check if the red LED for mA on the front panel of the controller is on. If the red LED is on, check motor for binding issues. Refer to the Nordson *Powder Mini Bell* manual.
3. Local indicator is not on. This is for a system without a PLC connection.	Incorrect jumpers for local mode	Install a jumper from pins 17 to 16 on the connector on the rear panel of the motor controller.

7. Repair

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

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

The motor controller has a fuse, connector, and bezel that can be replaced. Refer to *Parts* for additional information. If the motor controller requires further repair, replace the motor controller.

Motor Controller Replacement

To replace the motor controller:

1. Disconnect the power and I/O connectors.
2. Remove the corner screws if the unit is mounted to a fixture or cabinet.
3. Remove the motor controller.
4. Insert the new controller and secure.
5. Perform the *Installation* section.

8. Parts

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.

Spare Parts

This chart lists the recommended spare parts.

Part	Description	Quantity
329 679	Controller, motor, powder bell	1
329 980	Fuse, $^1/_2$ amp, 250 V, (312) littleamp	1
329 684	Cable assembly, motor contro	1
329 684	Connector, amp, metrimate 23 position	1
288 814	Bezel, manual control, sure coat	1