Ink-Dot Controller

Customer Product Manual

Document Number 106605-03
Issued 7/22

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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NORDSON CORPORATION • AMHERST, OHIO • USA

Table of Contents

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

Change Record

Revision	Date	Change
01	1/97	Initial Release.
02	9/03	Added Declaration of Conformity.
03	7/22	Added UKCA certification.

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 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 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 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.
    - Make sure the spray area is adequately ventilated.
    - 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.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury
- Show them this card
- Tell them what kind of material you were spraying

MEDICAL ALERT—AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue’s resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. 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.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS for guidance.
- Do not disconnect live electrical circuits when 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.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

Element	Symbol	Prefix
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check your material MSDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

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 system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

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

Safety Labels

Table 1 contains the text of the safety labels on this equipment. The safety labels are provided to help you operate and maintain your equipment safely.

See Figure 1 for the location of the safety labels.

Table 1 Safety Labels

Item	Part	Warning Symbol	Description
1	242867		**WARNING:** Risk of electrical shock. Failure to observe may result in personal injury, death, or equipment damage.
2	230172		**WARNING:** This enclosure is not certified for hazardous environments. 140 °F (80 °C) MAX AMBIENT TEMP.
3	248316		**WARNING:** Disconnect main power supply before removing this panel.

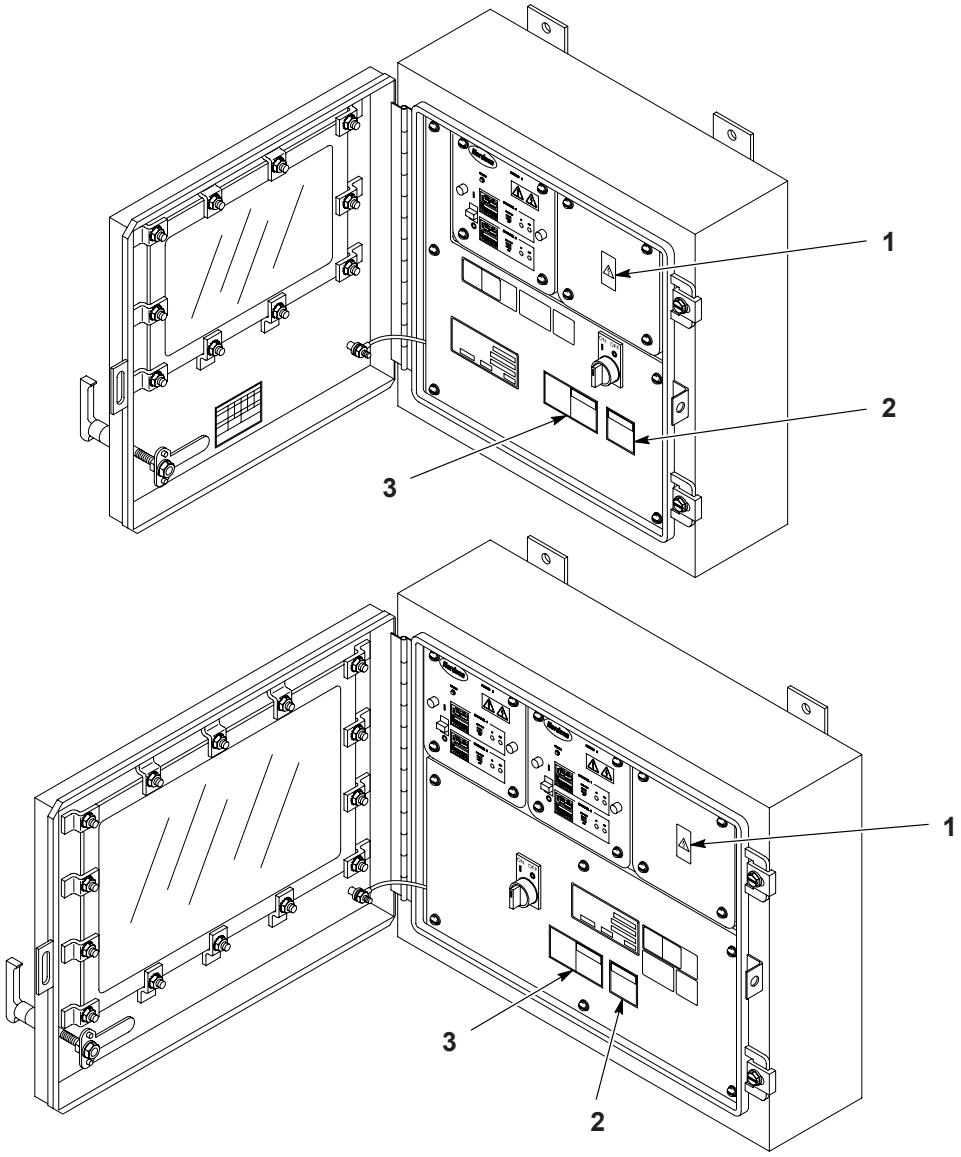


Figure 1 Safety Label Locations

Description

See Figure 2. The Nordson Ink-Dot controller is a timing device that controls operation of the guns in an Ink-Dot system. The controller is available in the three versions illustrated.

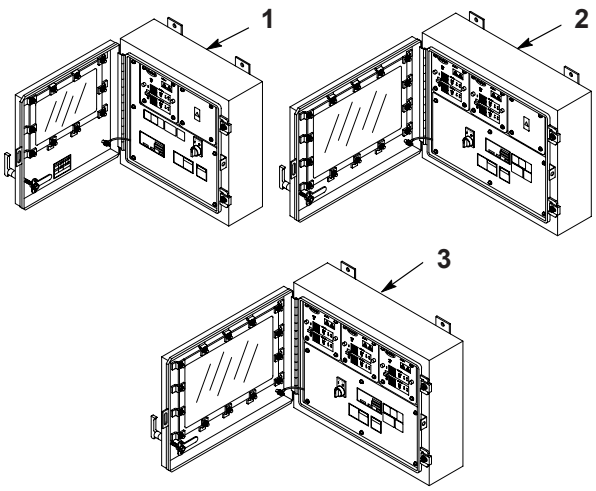


Figure 2 Ink-Dot Controllers

Controller Component

See Figure 3 and refer to Table 2 for an illustration and description of the major components of the Ink-Dot controller. Figure 3 illustrates the Series I and Series II controllers.

Table 2 Controller Components

Item	Description
1	Enclosure
2	Controller power switch
3	OUT light — Amber, pulses when you press the TEST switch or when gun fires in the RUN mode
4	IN light — Green, lights when a trigger signal is present
5	RUN/OFF/TEST switch RUN — Enables the channel to respond to the driver's inputs OFF — Disables the channel TEST — Checks the quality of the ink dot
6	Input connector (gun 1)
7	Input connector (gun 2)
8	Power connector
9	Fuses
10	Output connector (gun 2)
11	Gun head dip switch
12	Output connector (gun 1)
13	Series II dip switch settings
14	Driver power switch
15	Power indicator

Controller Components (contd)

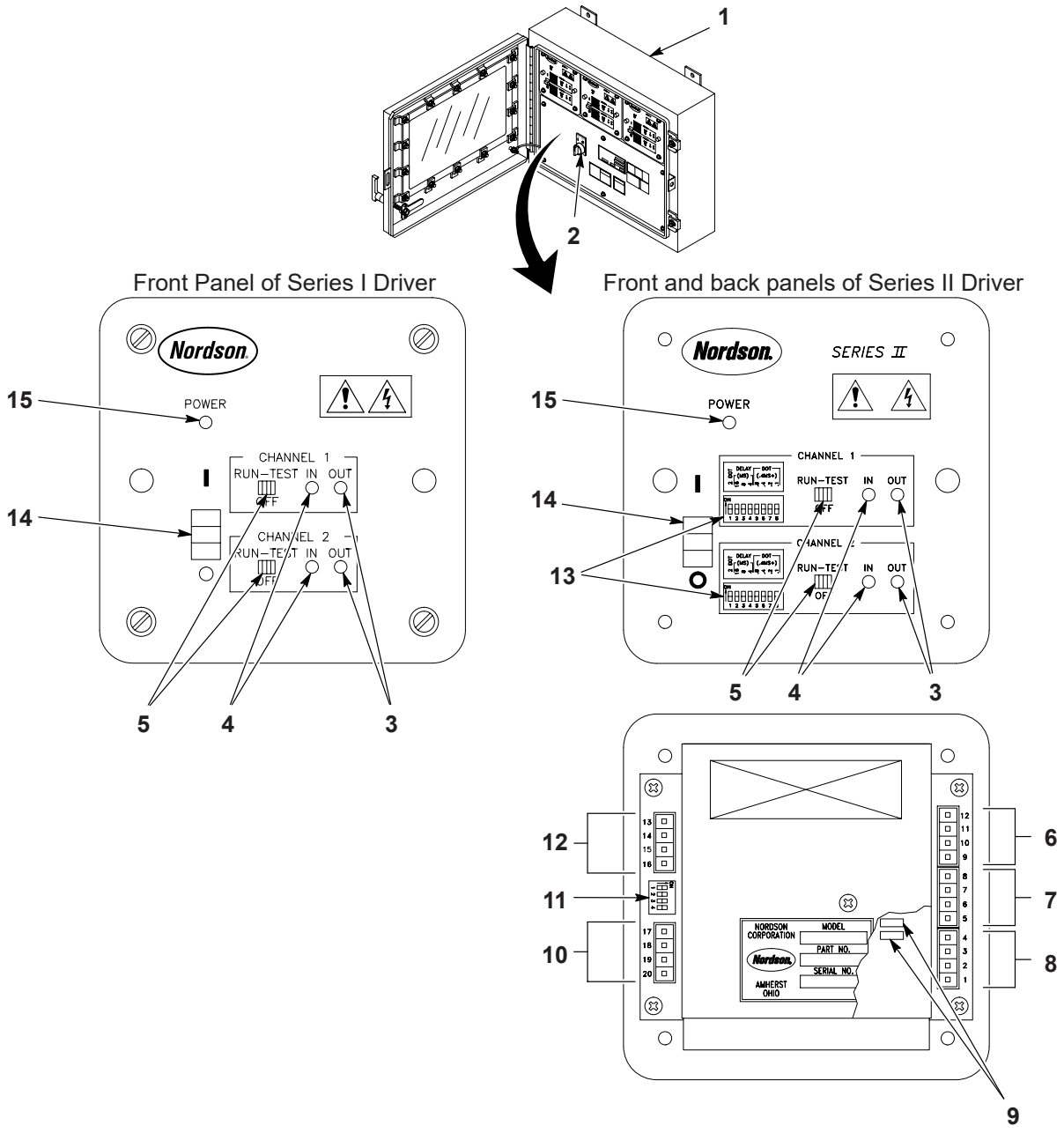


Figure 3 Controller Components

1. Enclosure
2. Controller power switch
3. OUT light
4. IN light
5. RUN/OFF/TEST switch
6. Input connector (gun 1)
7. Input connector (gun 2)
8. Power connector
9. Fuses
10. Output connector (gun 2)
11. Gun head dip switch
12. Output connector (gun 1)
13. Series II dip switch settings
14. Power switch
15. Power indicator

Theory of Operation

See Figure 4. Ink from the reservoir (8) flows through the gun manifold (6) and into the Ink-Dot spray gun (7). The driver (2) responds to input signals from the proximity sensor (5). When a can (4) is in line with the proximity sensor, the driver signals the Ink-Dot spray gun to apply a dot onto the can.

The driver's signal duration is factory set for 1 msec (±0.1 msec), depending on the spray gun adjustment; this corresponds to a spray duration of about 1−4 msec. Toggling the driver RUN/OFF/TEST switch to TEST, enables the spray gun to spray test dots.

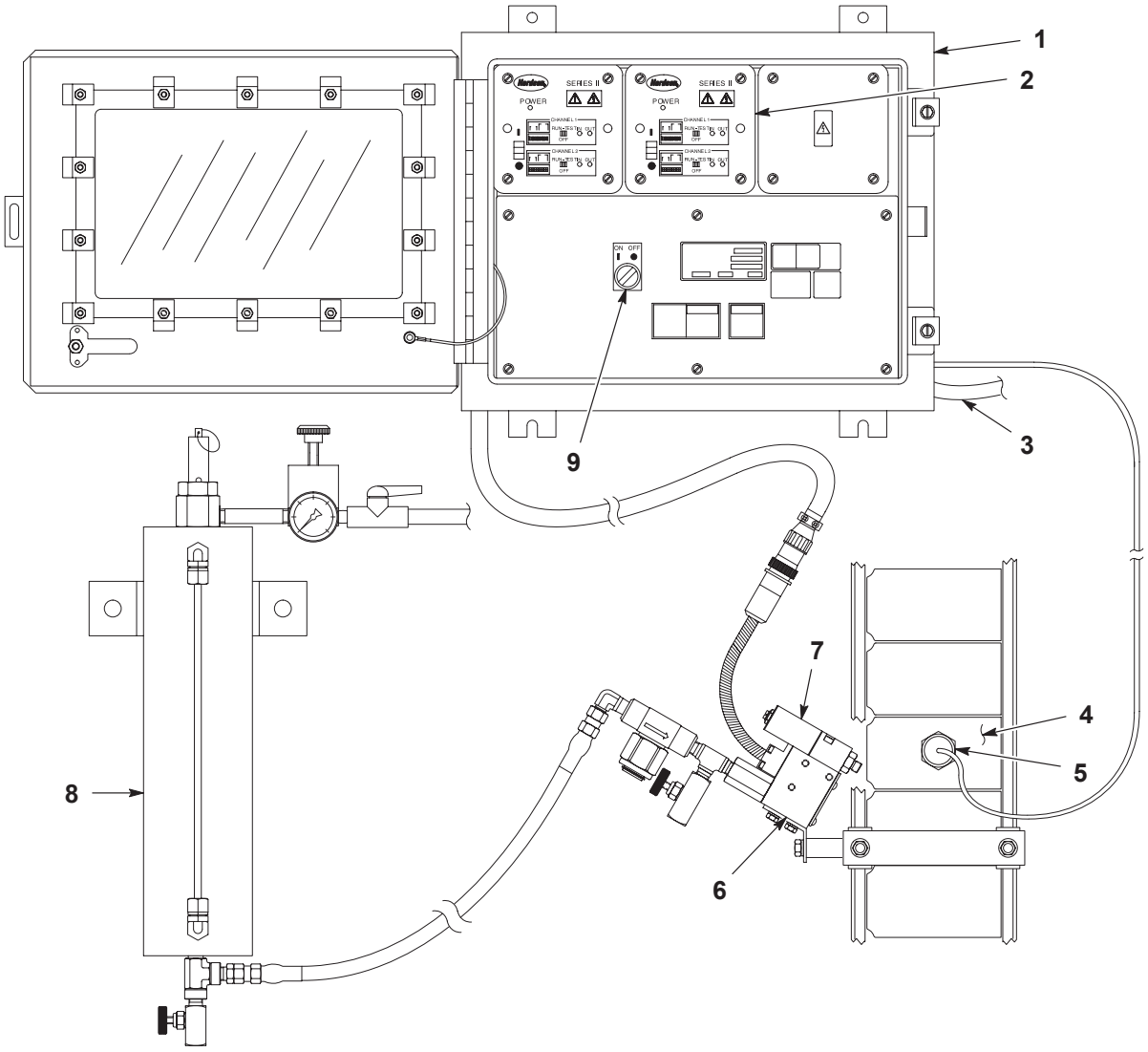


Figure 4 System Operation

1. Ink-Dot controller
2. Driver
3. Input voltage cable
4. Can
5. Proximity sensor
6. Gun manifold
7. Ink-Dot gun
8. Reservoir
9. Controller power switch

Installation

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

Guidelines

Install the Ink-Dot controller away from electrical noises. Some examples of electrical noises are

- transformers
- motors
- high-voltage lines
- large power switches
- welders

You must connect the enclosure, conduit, and cable shields to an earth ground.

Use shielded cable for each signal line.

Keep the signal and power wiring as short as possible. Wire lengths can be up to 30.5 m (100 ft).

Route the power wires through grounded conduit. Avoid routing the signal wiring in the same conduit with the power wires.

Power wires from the controller to the spray gun must be

- twisted-pair
- rated for at least 600 volts
- at least 18 or 20 AWG

Mounting

Mount the controller in an area

- free from excessive vibration and moisture
- close to the Ink-Dot spray gun

Refer to *Specifications* for dimensions.

Electrical

NOTE: Controllers are factory wired and fused for the 230–240 Vac operation

See Figure 5 for input wire connections and the AC INPUT HOOKUP label. See Figure 6, 7, 8, 9, and 10 for wiring diagrams of each controller.

1. See Figure 11. Remove the screws (7), washers (8), and cover panel (9) from the enclosure (1).
2. To select the desired input voltage, change the position of the jumpers at PS1-PS5 on the terminal block. See Figure 5 or refer to the AC INPUT HOOKUP label on the inside of the enclosure door for voltage selections.
3. Refer to Table 3. Make sure that fuse holder F3 has the correct fuse for the desired operating voltage. Fuses are supplied with the controller.

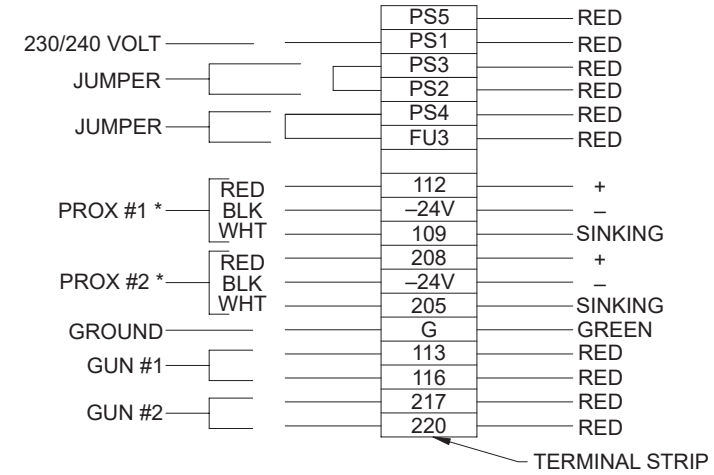
Table 3 Fuses

Operating Voltage	Fuse
100 V and 120 V	0.800 amp, T, 250 V, 5 x 20 mm
200 V, 215 V, 230 V, and 240 V	0.400 amp, SLO-BLO, 250 V, 5 x 20 mm

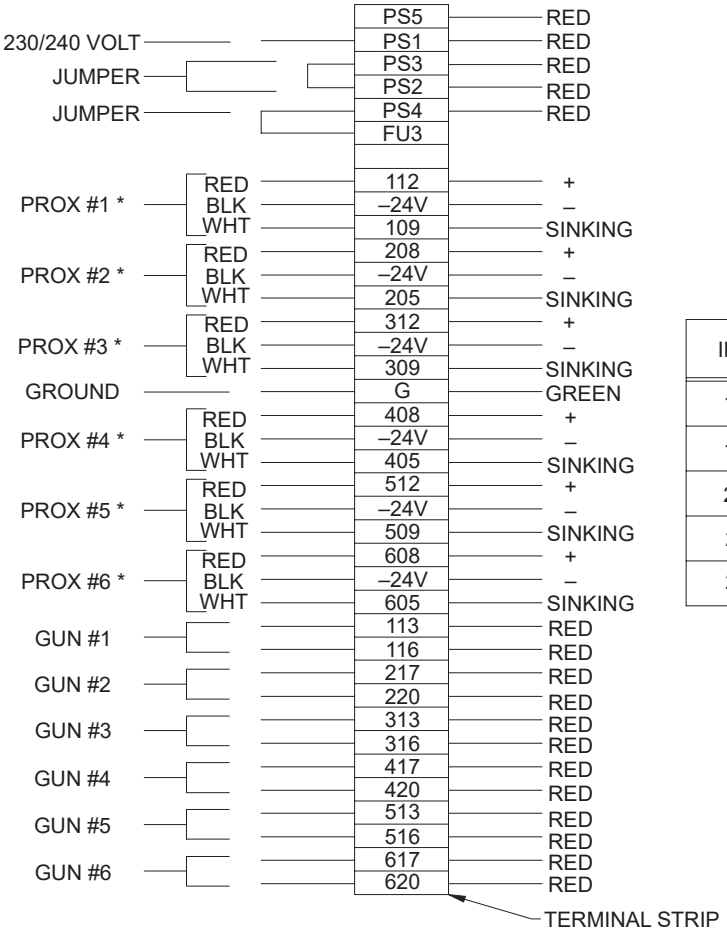
NOTE: This enclosure complies with NEMA 12 (IP54) standards. To maintain the enclosure's NEMA 12 (IP54) integrity, use a sealed strain relief for the wires.

4. Select a location to route the electrical wires into the enclosure. Drill a hole through the enclosure.
5. Install a sealed strain relief in the hole. Route the power, spray gun, and proximity sensor wires through the sealed strain relief.
6. Connect the input power wires:
   - L1 to fuse block F1
   - L2 to fuse block F2
7. Use the wiring diagram for your controller to connect the gun output and proximity sensor wires to the terminal strip.
8. Connect the input ground wire to PE.

See Figure 11. Use the screws (7) and washers (8) to secure the cover panel (9) to the enclosure (1).



1–2 GUN



3–4 GUN and 5–6 GUN

INPUT	JUMPER	WIRE SW1	WIRE SW2	FUSE FU3
100V	1–3, 2–4	FU3–5	1	3/4 amp
120V	1–3, 2–4	FU3–4	1	3/4 amp
215V	2–3	FU3–5	1	3/4 amp
230V	2–3	FU3–4	1	3/4 amp
240V	2–3	FU3–4	1	3/4 amp

1. AC INPUT HOOKUP DIAGRAM
THE ABOVE TABLE IS FOR A POWER-ONE POWER SUPPLY, MODEL: HB24–1.2A+.

* COLORS SHOWN FOR PROXIMITY SENSOR LEADS ARE FOR A SENCON SENSOR. COLORS MAY VARY IF ANOTHER SENSOR IS USED

Figure 5 Wire Connections and AC Input Hookup

NOTE: Refer to *Parts* for an additional sensor part number

Operation

Refer to the Ink-Dot System Operator's Card for operating procedures.

Troubleshooting

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

WARNING: Thiscontroller produces a high-voltage signal that could cause fatal injury to personnel. Be alert when performing electrical checks.

See Figure 6, 7, 8, 9, and 10. These wiring diagrams are provided to aid in troubleshooting.

Problem	Possible Cause	Corrective Action
1. Controller power indicator does not light when ON/OFF switch is ON	Blown fuse	Replace fuses F1, F2, or F3.
	Bad bulb	Replace the bulb.
	Defective power switch	Replace the power switch.
2. Driver power indicator does not light when switch is ON	Faulty driver	Check for 110−240 Vac between terminals L1 and L2. If voltage is present, replace the driver.
3. No input signal light	Trigger signal polarity	Check the trigger signal polarity. The voltage must be between 12−18 Vdc. Replace the driver. **NOTE:** The signal light shows the trigger state. The driver does not have to be on.
4. No output indicator light	Bad driver	Perform the following procedure: 1. Turn the controller power switch to ON. 2. Place the RUN/OFF/TEST switch to RUN. 3. Make sure the IN light is on. 4. If OUT light does not come on, replace the driver.
5. No output to solenoid	Bad solenoid	If the OUT light is on but there is no output to the solenoid, check the wiring and solenoid. Replace the solenoid, if necessary.
6. Power to gun is present but ink does not spray	Refer to Problem 5	Refer to Problem 5.

One–Two Gun Wiring Diagram

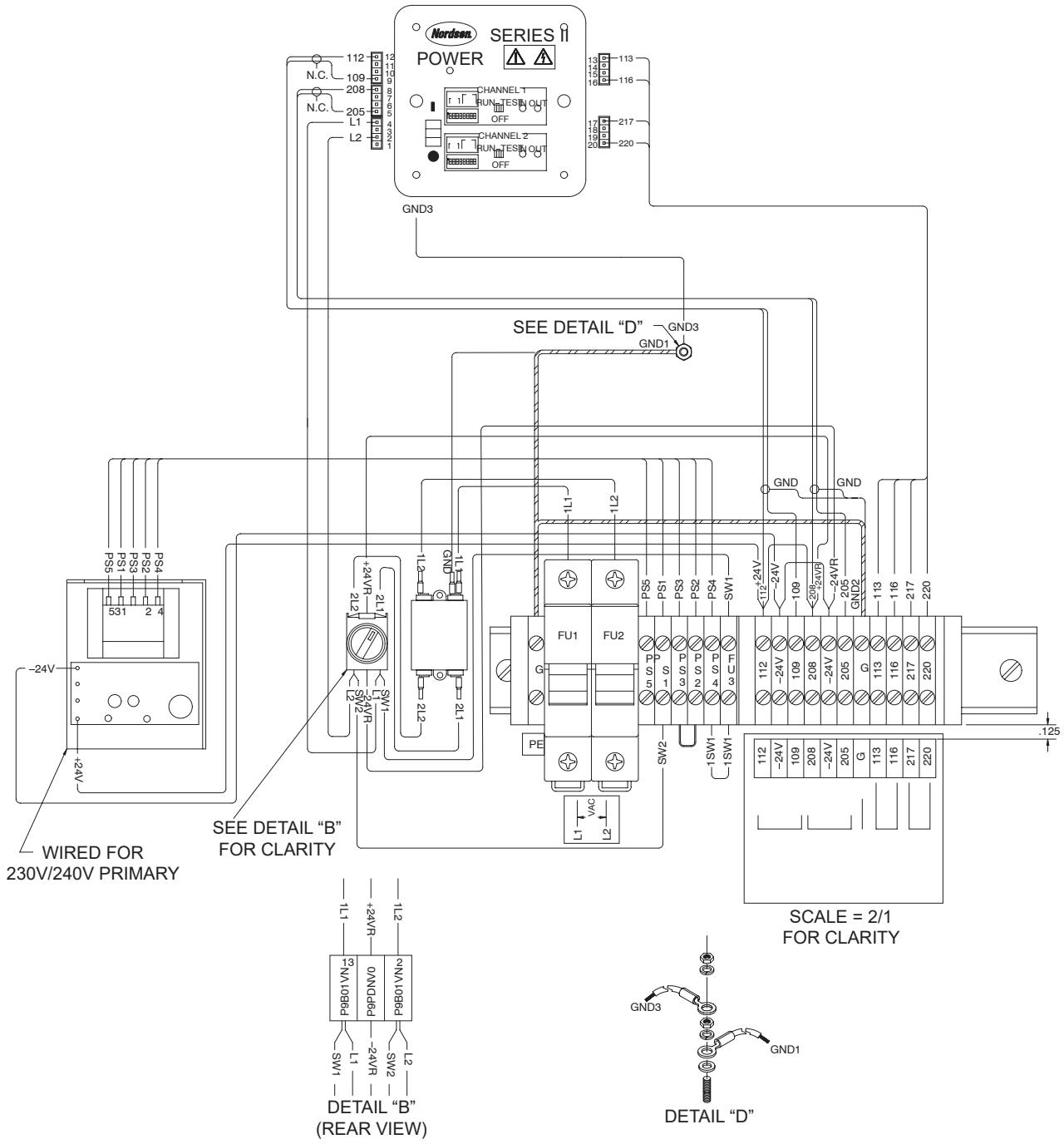


Figure 6 One-Two Gun Wiring Diagram

Three–Four Gun Wiring Diagram

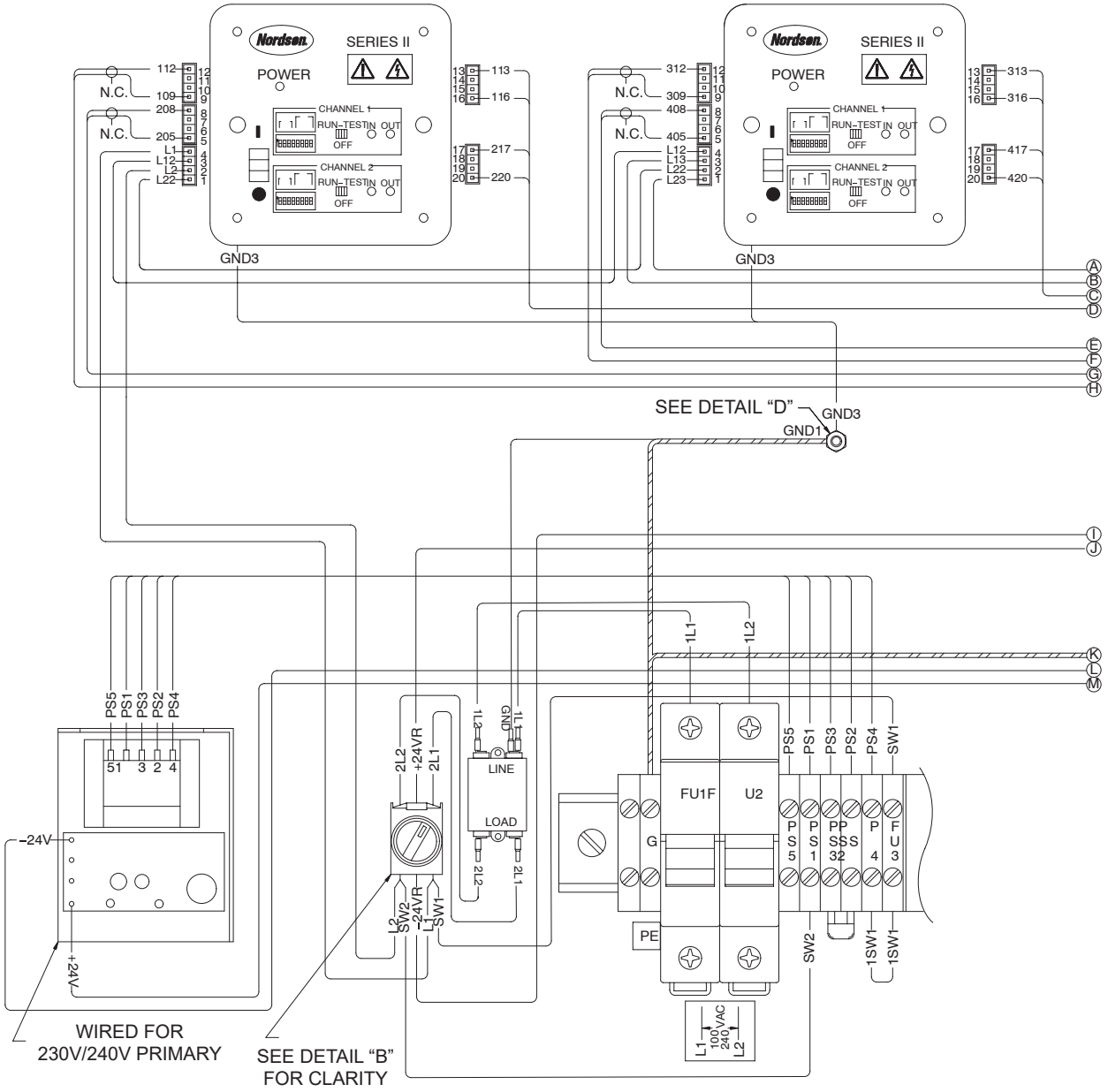


Figure 7 Three-Four Gun Wiring Diagram (Sheet 1 of 2)

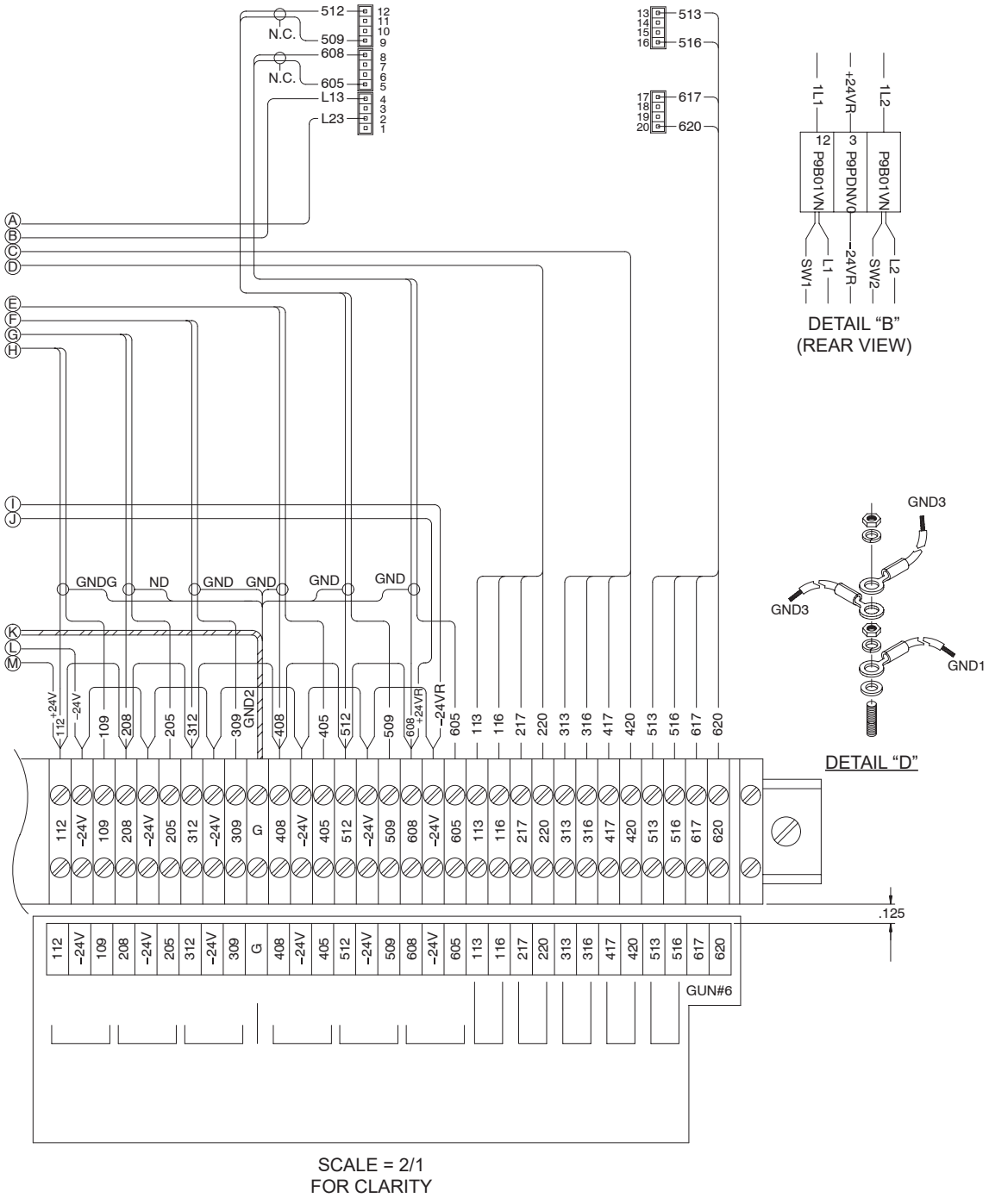


Figure 8 Three-Four Gun Wiring Diagram (Sheet 2 of 2)

Five–Six Gun Wiring Diagram

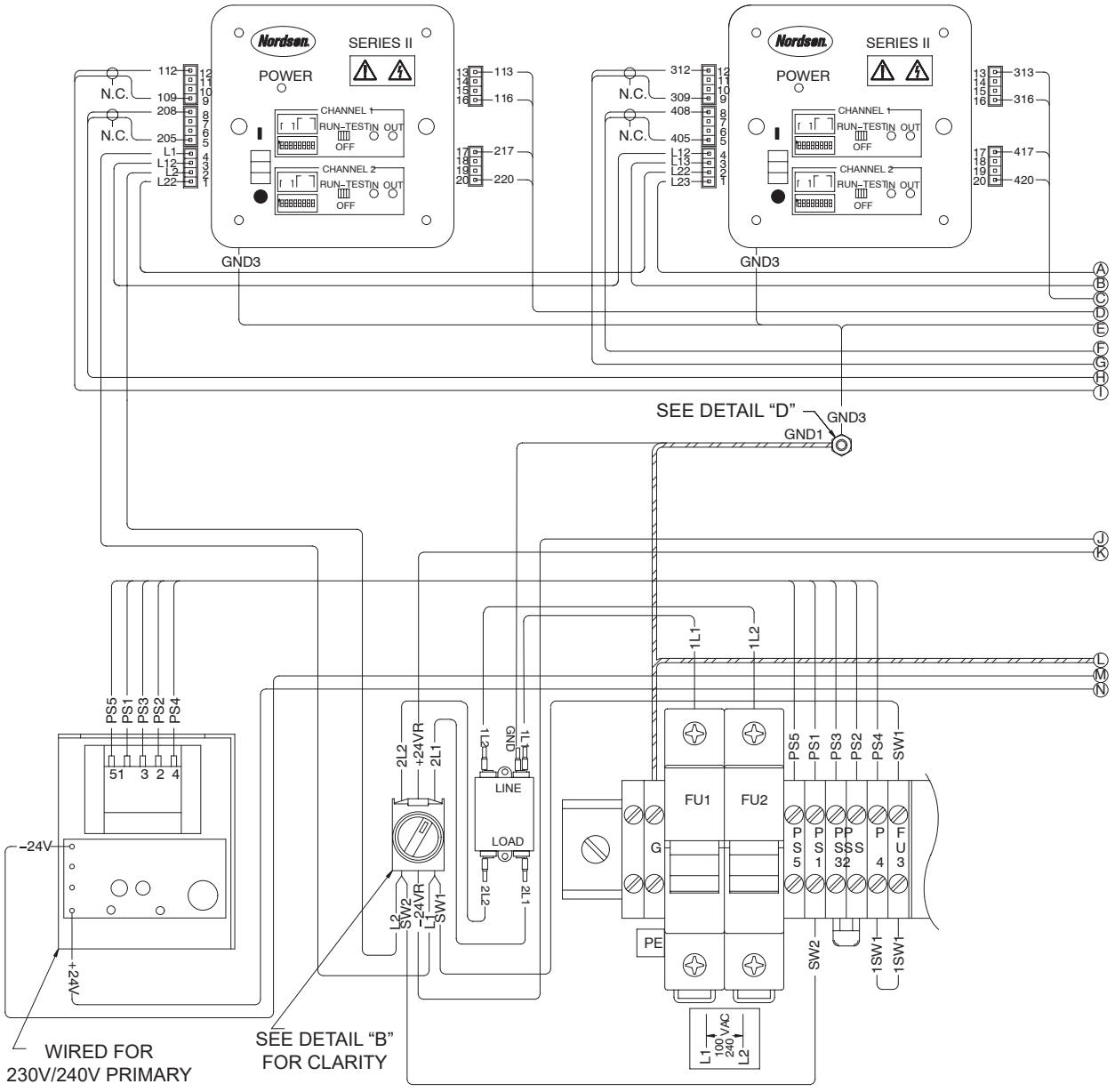


Figure 9 Five-Six Gun Wiring Diagram (Sheet 1 of 2)

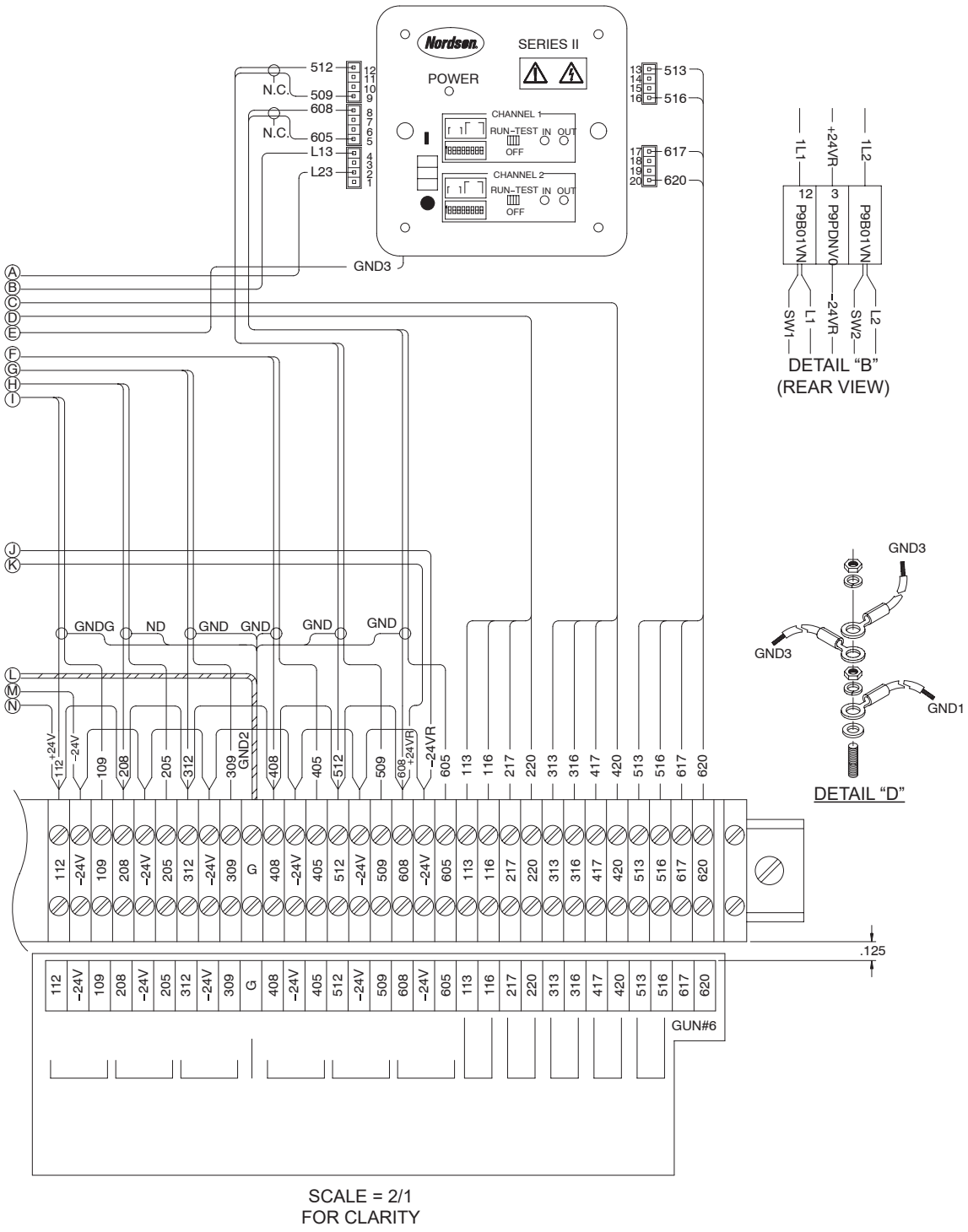


Figure 10 Five-Six Gun Wiring Diagram (Sheet 2 of 2)

Repair

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

Driver Module Replacement

1. See Figure 11. Remove the screws (5) and washers (4) securing the driver module (3) to the enclosure (1).
2. Disconnect the connectors (2) from the driver module.
3. Disconnect the L1 and L2 wires (6) from the driver module.
4. Connect the L1 and L2 wires to the new driver module.
5. Connect the connectors to the new driver module.
6. Use the washers and screws to secure the new driver module to the enclosure. Tighten the screws securely.

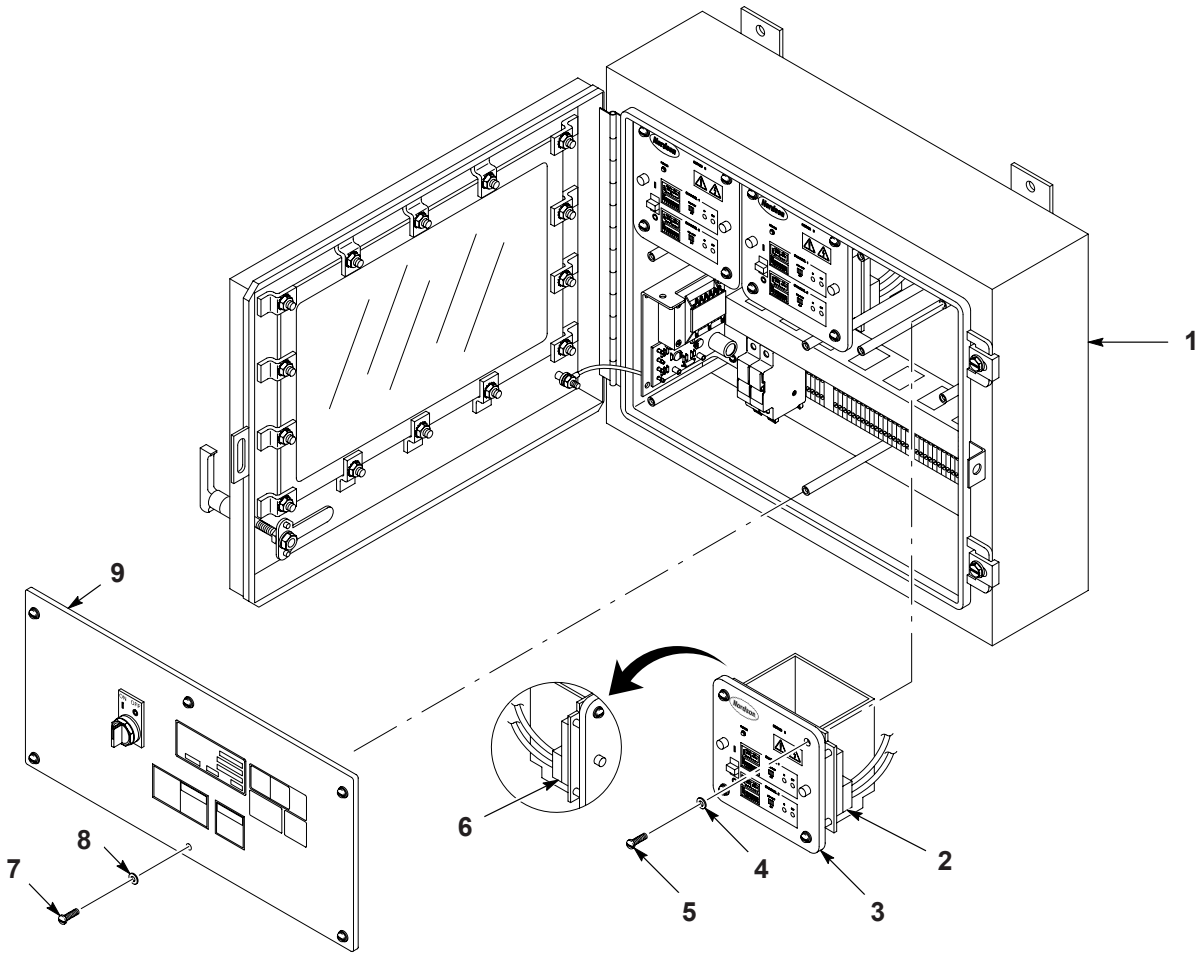
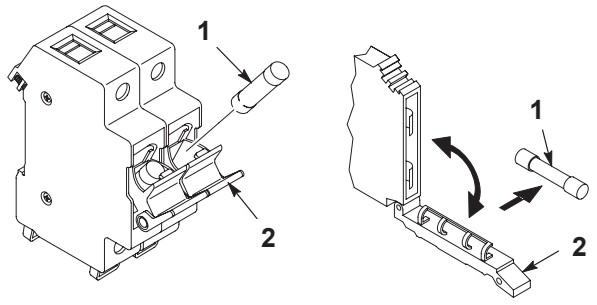


Figure 11 Typical Ink-Dot Controller Repair

1. Enclosure
2. Connectors
3. Driver module
4. Washers
5. Screws
6. L1 and L2 wires
7. Screws
8. Washers
9. Cover panel

Fuse Replacement

1. See Figure 11. Remove the cover panel (9) to access the fuses.
2. See Figure 12. Carefully pull back on the fuse holder door (2). Replace the fuse (1).
3. Push on the fuse holder door (2) to close it.



Fuse 1 and 2 Fuse 3

Figure 12 Fuse Replacement

1. Fuse 2. Fuse holder door

Parts

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

Controller Parts

See Figure 13.

Item	Part	Description	Quantity	Note
—	159925	CONTROL UNIT, 1−2 gun	1	
—	159909	CONTROL UNIT, 3−4 gun	1	
—	159910	CONTROL UNIT, 5−6 gun	1	
—	- - - - - -	• CONTROL UNIT, subassembly	1	
1	167402	• • SWITCH, DPST, panel mount, with 24-volt light	1	
2	939320	• • CONNECTOR ASSEMBLY, plastic, 3-station	2	
3	245321	• DRIVER MODULE, Series II, Ink-Dot gun	AR	
4	159914	• POWER SUPPLY, 24 V	1	
5	159922	• PANEL COVER, 1−2 gun controller	1	
5	159923	• PANEL COVER, 3−4, 5−6 gun controller	AR	
6	939948	• FUSE, 4 amp, gI, 500 V, 10 x 38 mm	2	
7	- - - - - -	• SCREW, round, 8-32 x 0.375 in., zinc	AR	
8	983123	• WASHER, flat, 0.219 x 0.50 x 0.049 in., zinc	AR	
NS	939949	• FUSE, 0.800 amp, T, 250 V, 5 x 20 mm	1	A
NS	939925	• FUSE, 0.400 amp, slo-blo, 250 V, 5 x 20 mm	1	B
NS	333932	• • FILTER, assembly, 120/250 V, 3a	1	

NOTE: A. Fuse F3 for 100 V and 120 V operation.

B. Fuse F3 for 200 V, 215 V, 230 V, and 240 V operation.

AR: As Required

NS: Not Shown

Spare Parts

Part	Description	Note
159917	SENSOR, proximity, ind, Ink-Dot	
333932	FILTER assembly	

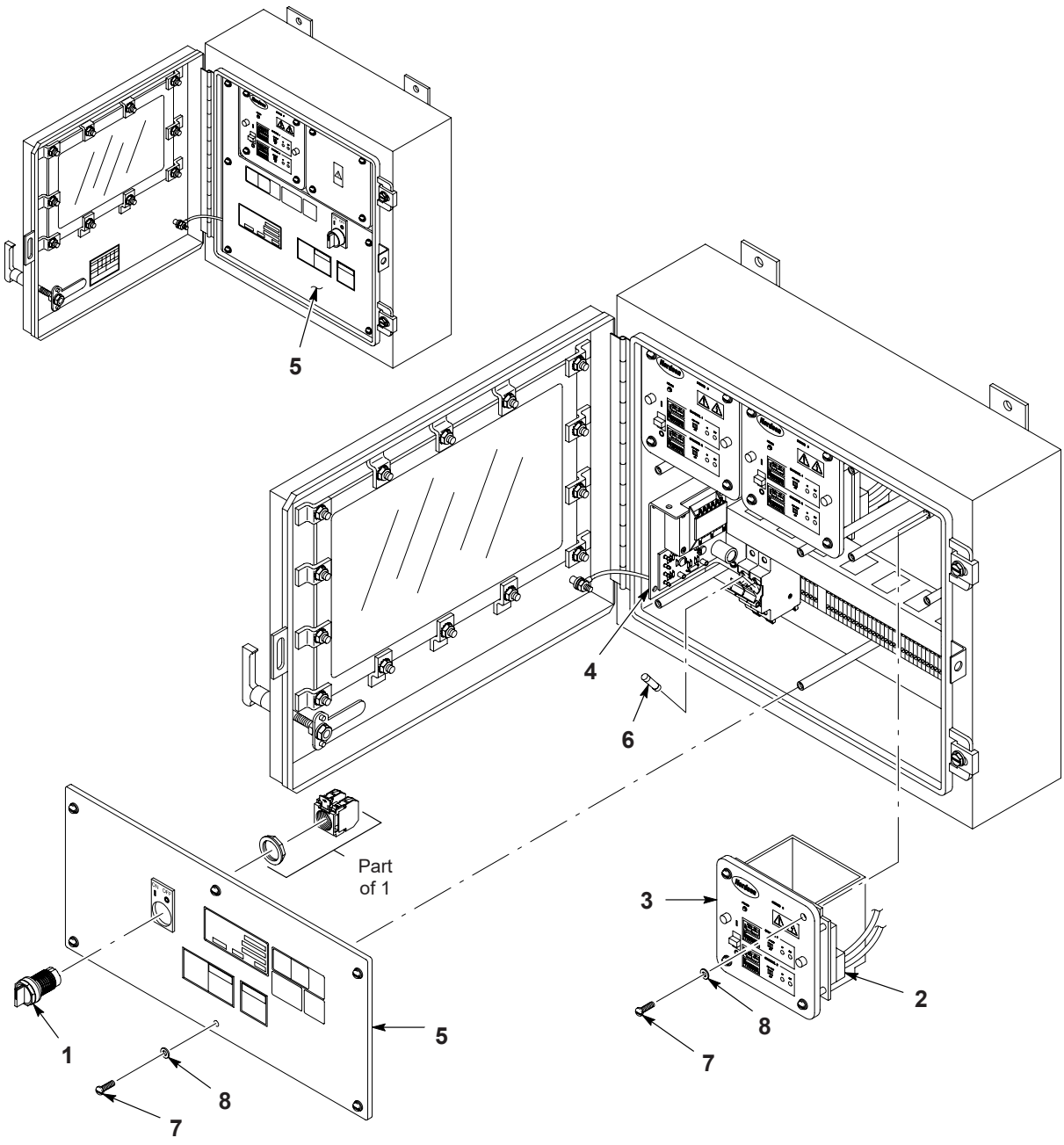


Figure 13 Controller Parts

Specifications

Dimensions	See Figure 14.		
Input Voltage	100−240 Vac		
Output Voltage	Controlled dc signal to gun coil(s) at 1.4 x input voltage		
Current Limit	9.4 amps with jumper		
	4.7 amps without jumper		
Input Trigger	12−24 Vdc signal		
Internal Power Supply Output	24 Vdc, 1.2 amps		
Weight	**Controller**	**Metric (kg)**	**US (lb)**
	One-two gun	16.8	37
	Three-four gun	20.6	45.5
	Five-six gun	21.1	46.5

Dimensions

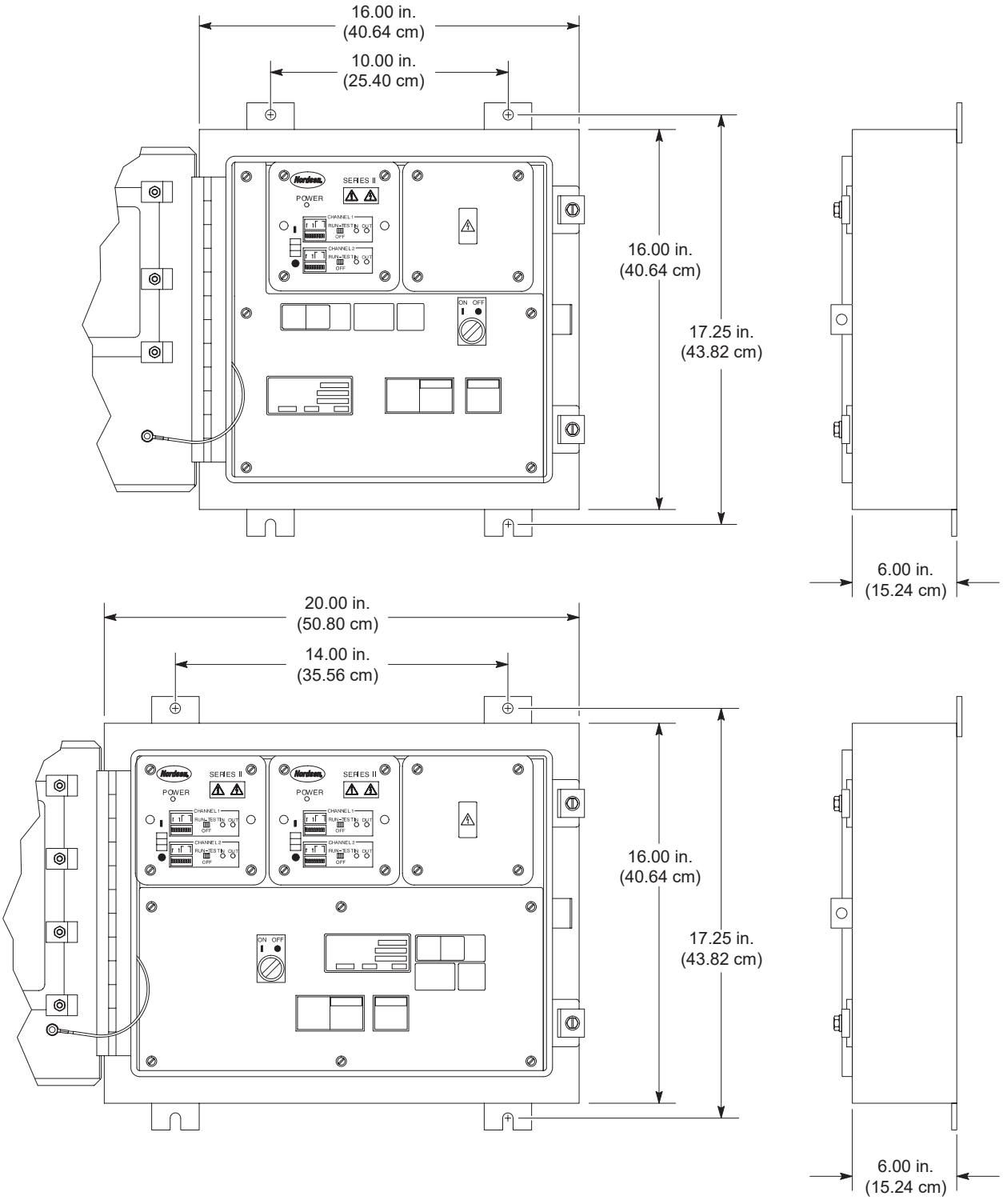


Figure 14 Controller Dimensions

EU DECLARATION of Conformity

Product: Ink-Dot Can Marking System

Models: Ink-Dot

Description: This system consists of a controller, ink reservoir and a non-atomizing applicator. The system is used in the container industry for can line identification. Different colors of ink are used on each line in a manufacturing facility and a dot of ink is applied to the bottom of a can. This process allows the manufacture to identify which line a can was manufactured on.

Applicable Directives:
2006/42/EC - Machinery Directive
2014/30/EU - EMC Directive
2014/35/EU - Low Voltage Directive

Standards Used for Compliance:

EN/ISO12100	EN61000-6-3
EN60204	EN61000-6-2
	EN55011

Principles:
This product has been manufactured according to good engineering practice.
The product specified conforms to the directive and standards described above.

Quality System DNV – ISO9001 Certified

Date: 09DEC21

Jeremy Krone
Supervisor Product Development Engineering
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the EU
Person authorized to compile the relevant technical documentation.
Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich-Hertz-StraBe 42-44
D-40699 Erkrath

UK DECLARATION of Conformity

Product: Ink-Dot Can Marking System

Models: Ink-Dot

Description: This system consists of a controller, ink reservoir and a non-atomizing applicator. The system is used in the container industry for can line identification. Different colors of ink are used on each line in a manufacturing facility and a dot of ink is applied to the bottom of a can. This process allows the manufacture to identify which line a can was manufactured on.

Applicable UK Regulations
Supply Machinery Safety 2008
Electrical Equipment Safety 2016
Electromagnetic Compatibility Regulation 2016

Standards Used for Compliance:

EN/ISO12100	EN61000-6-3
EN60204	EN61000-6-2
	EN55011

Principles:
This product has been manufactured according to good engineering practice.
The product specified conforms to the directive and standards described above.

Quality System DNV – ISO9001 Certified

Date: 09DEC21

Jeremy Krone
Supervisor Product Development Engineering
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the UK
Contact: Technical Support Engineer
Nordson UK Ltd.; Unit 10 Longstone Road
Heald Green; Manchester, M22 5LB.
England

Nordson

Nordson Corporation • Westlake, Ohio