Temperature Controller

Customer Product Manual
Part 303 833A

NORDSON CORPORATION • AMHERST, OHIO • USA

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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Notice

Trademarks

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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 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 him this card.
- Tell him 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 in the spray area. 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 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.

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.

2. Description

The temperature controller is part of the Nordson temperature control systems. The controller is used in CanNeck II, and CoilLube systems to keep material temperature in dispensing devices constant. The controller can also be used on other systems to get the same results.

The closed-loop system receives input information from thermocouples and controls power to the dispensing device heating elements. See Figure 1. The front panel includes an ACTUAL and SET POINT display, LEDs and control keys.

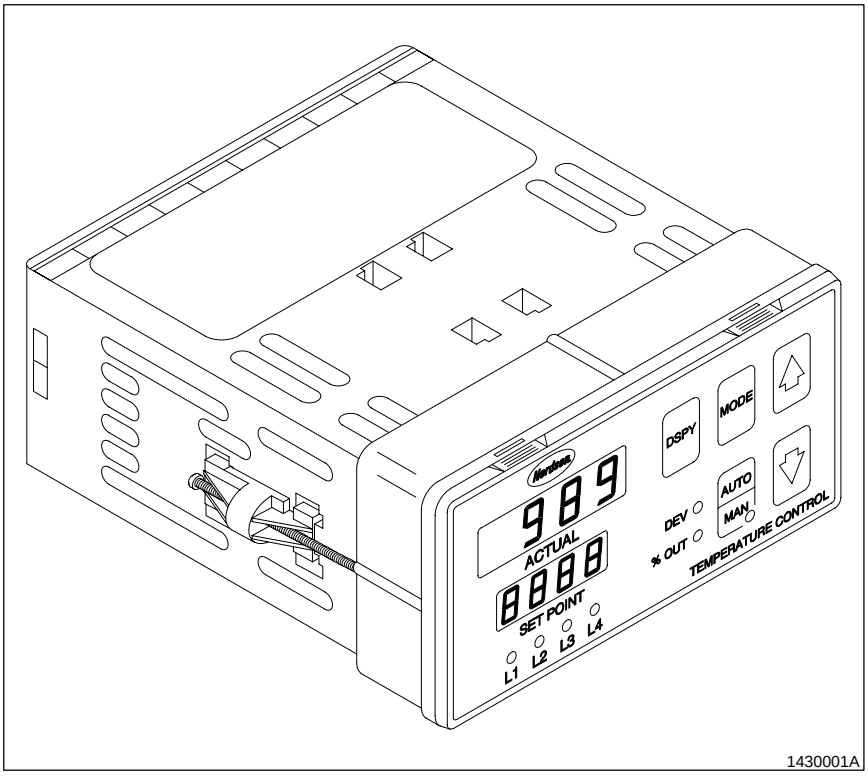

Fig. 1 Temperature Controller

3. Specifications

This section provides specification information for the Nordson temperature controller.

Power requirements	100 to 240 Vac + 10%/-15%, 50/60 Hz, 100 to 240 Vac nominal, 85 to 264 Vac actual
Fuse	Internal, 2 A 250 Vac slo-blo type, time lag
Operating environment	0 to 65 °C (32 to 149 °F) 0 to 99% relative humidity
Input options	Software programmable, thermocouple sensor J, K, and RTD sensors, platinum or nickel
Outputs	Dual switched Vdc, opto-isolated, zero cross switching
Control mode	Single channel unit, one input sensor controlling four outputs
Dimensions	Overall depth: 120 mm (4.74 in.) Bezel: 55 mm H x 102 mm W x 17.3 mm D (2.18 in. H x 4.03 in. W x 0.68 in. D) Case: 44 mm H x 89 mm W x 103 mm D (1.75 in. H x 3.50 in. W x 4.06 in. D)
Weight	396.9 g (14 oz)
Front panel	1/8 DIN mount, NEMA 4x front panel
Temperature stability	+/- 0.1°C/°C (0.2°F/°F)
Sample/Update Rates	1 input: 10 Hz 2 inputs: 5 Hz Retransmit: 1 Hz Remote set point: 1 Hz PID: 1 Hz Outputs: 10 Hz Display: 2 Hz
Terminals	#6 compression universal head screws
Resolution	Inputs: 16 bits Outputs: 12 bits
Memory	Data retention upon power loss
Calibration accuracy and sensor conformity	+/- 0.1% of span, + LSD, 540°C (77°F) minimum
Agency approvals	UL, CSA, CE

4. Installation

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

Installation requires access to the back of the control cabinet panel door. Install the temperature controller into the control cabinet, next to the existing system control displays.

1. See Figure 2. Cut a 92 x 45 mm (3.62 x 1.77 in.) panel cutout (8) into the controller cabinet.

NOTE: Space panel cutouts at least 42.2 mm (1.66 in.) apart.

2. Press the release tabs (1), to remove the controller from the case.

NOTE: To prevent installing the temperature controller upside down, make sure that the terminals are oriented as shown in Figure 3.

3. Loosen the mounting bracket screws to remove the mounting bracket (6).

4. Remove the mounting collar (5).

5. Slide the case into the panel cutout. Make certain the bezel gasket (3) is properly seated, and not twisted.

6. Slide the mounting collar (5) over the back of the case.

7. Install the mounting brackets (6) to the case as illustrated.

NOTE: Maximum panel thickness is 9.65 mm (0.38 in.).

8. Place the mounting brackets into the side mounting slots (7). The screw heads must point toward the back of the controller.

9. Push the mounting brackets back and slide them sideways to secure the brackets to the case.

NOTE: Overtightening the screws will distort the case and make it difficult to remove or replace the controller.

10. Make sure the case is seated properly. Tighten the screws firmly against the mounting collar (5) to secure the temperature controller.

NOTE: To ensure a NEMA 4x seal, leave no space between the bezel (2) and the cabinet panel.

11. Slide the controller into the case until the release tabs (1) snap.

NOTE: Make sure the bezel gasket (3) is seated properly.

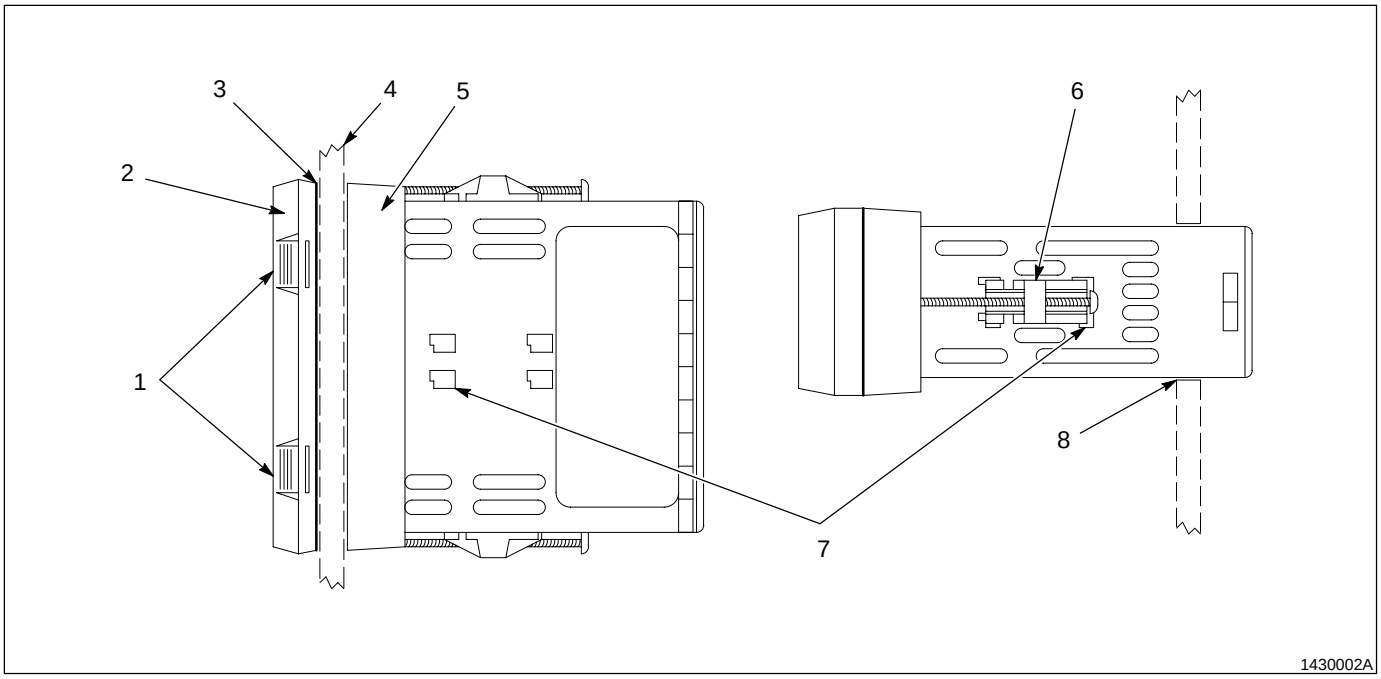

Fig. 2 Mounting the Temperature Controller

1. Release tabs
2. Bezel
3. Bezel gasket
4. Panel
5. Mounting collar
6. Mounting bracket
7. Mounting slots
8. Panel cutout

Electrical Connections

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

WARNING: To avoid potential electric shock, use National Electric Code (NEC) safety practices when wiring and connecting the temperature controller to power sources, existing thermocouples or peripheral devices. Failure to do so could result in injury or death.

Connections to the hard wired case terminals are achieved by sliding contacts on the temperature controller circuit board.

Power Input

The wiring terminals are number coded. Refer to Table 1 for a detailed description of the rear panel wiring terminals.

If existing thermocouple wiring requires extension, make certain that the wires are of the same alloy.

NOTE: Each 1 Ω of lead wire resistance can cause a +2 °C (+35.6 °F) error.

NOTE: For CE compliance, terminal 11 must be connected to true earth ground.

1. Route the power input wires to the back of the temperature controller case.

2. See Figure 3. Loosen the compression universal head screws on power input L1 (1), and L2 (2).

3. Insert wires, and tighten head screws.

NOTE: The head screws accept 20–40 gauge wire, and should be tightened to 5 in.-lb.

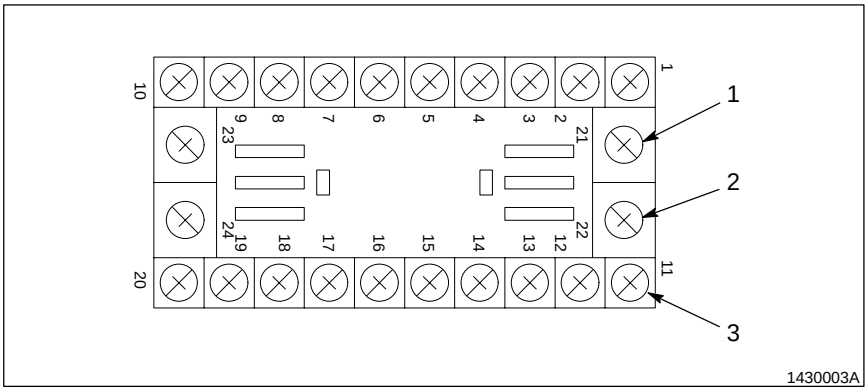

Fig. 3 Power Wiring

1. Power input L1
2. Power input L2
3. Earth ground

Table 1 lists the rear panel wiring connections, including terminal description and channel assignment.

Table 1 Rear Panel Wiring Connections

Terminal	Description	Channel
1	N.O./N.C	OUT # 3 electromechanical contacts 5 A from A or B
2	COM.	OUT # 3 electromechanical contacts 5 A from A or B
3	Not used	
4	Not used	
5	Not used	
6	Not used	Out #4
7	Not used	Out #4
8	S1, mV-, mA-	Sensor Input
9	S2, V=, T.C.+	Sensor Input
10	S3, mV+, mA+, V-, T.C.-	Sensor Input
11	EARTH GND	Earth Ground
12	DC+	OUT # 1, solid state
13	DC-	OUT # 1, solid state
14	COM	OUT # 1, solid state
15	N.O.	OUT # 2, solid state relay 0.5 A
16	COM	OUT # 2, solid state relay 0.5 A
17	Not used	OUT # 2, solid state relay 0.5 A
18	Not used	
19	Not used	
20	Not used	
21	L1	Input Power
22	L2	Input Power
23	DC+	Event switch (input)
24	DC-	Event switch (input)

DIP Switch Adjustment

Wiring options vary with model number and DIP switch settings. Check the terminal designation stickers on either side of the controller.

Adjust DIP switch settings according to the wiring connection for RTD input devices.

J- and K-Type Thermocouples

1. See Figure 4. Loosen the compression universal head screw, and connect positive wire to terminal 9.

2. Loosen the compression universal head screw, and connect negative wire to terminal 10.

3. Tighten the head screws.

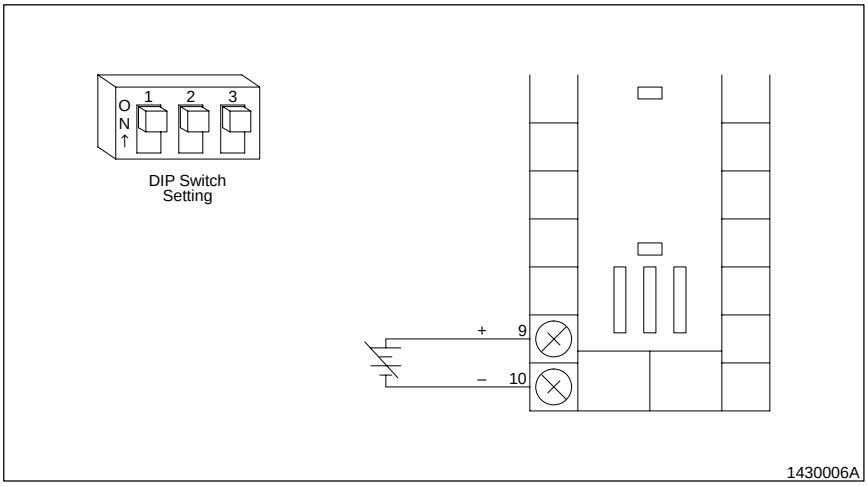

Fig. 4 J- and K Type Thermocouple Connections and DIP Switch Settings

2-Wire RTD Thermocouple

1. See Figure 5. Loosen the terminal 8 compression universal head screw and connect the S1 wire.

2. Loosen the terminal 9 compression universal head screw and connect the S2 wire.

3. Tighten the head screws.

NOTE: Terminal 9 and 10 are bridged.

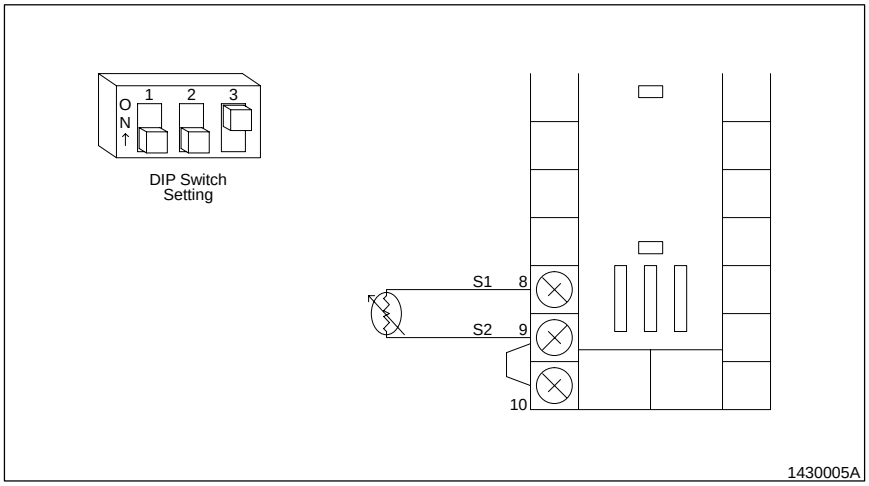

Fig. 5 2-Wire RTD Type Thermocouple Connections and DIP Switch Settings

5. Operation

Operation procedures for the temperature controller are limited to temperature set point changes. The temperature controller is configured by Nordson to fit your particular application.

Front Panel Controls

See Figure 6. Use the front panel control keys to change temperature and system settings. Based on your specific system configuration, some functions may not be accessible.

NOTE: The temperature controller is equipped with non-volatile memory, retaining data during power outages.

Table 2 lists the front panel control key functions. Items 1 through 10 correspond to the call outs in Figure 6.

Table 2 Front Panel Control Keys

Item	Function	Description
1	ACTUAL	The upper display indicates the actual process value, prompt parameter value or error code.
2	DSPY	The display key enters the display loop. Press at any time to return to this loop.
3	MODE	The mode key enters new data and steps to next prompt in current menu.
4	Up Arrow Key	Increases value or changes value in the upper display (except for set point changes in the lower display). Hold key down to increase value rapidly. New data take effect in five seconds or when mode key or display key is pressed.
5	Down Arrow Key	Decreases value or changes value in upper display (except for set point changes in the lower display). Hold key down to decrease value rapidly. New data take effect in five seconds or when mode key or display key is pressed.
6	AUTO/MAN	Not used.
7	DEV	When LED is lit, lower display shows current deviation from set point.
8	%OUT	When LED is lit, the lower display shows the current percent output.
9	L1, L2, L3, L4	Active output indicator diodes.
10	SET POINT	The lower display indicates the set point, deviation, percent power, temperature unit, and menu prompt name or alarm code.

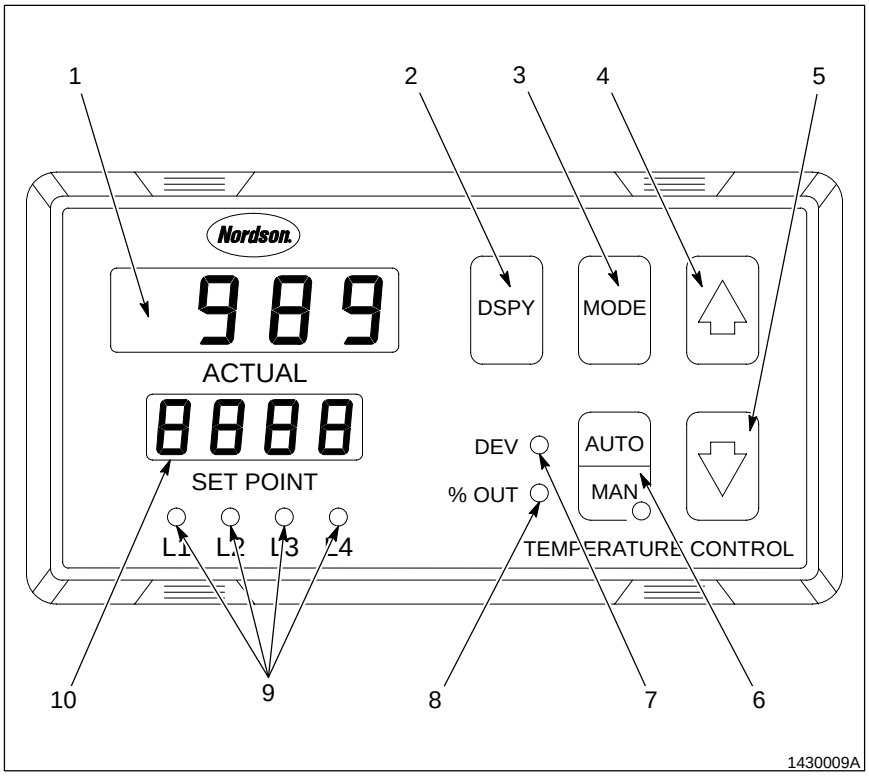

Fig. 6 Front Panel Control Keys

Setpoint and Actual

The SET POINT temperature display is green. The ACTUAL temperature display is red.

Press the arrow keys on the control panel to set the desired temperature in the lower SET POINT display. The displayed SET POINT temperature changes in one-degree intervals.

If the temperature is below the SET POINT, the unit will power the heat elements inside the dispensing device, until the set temperature is reached. The temperature controller automatically maintains the SET POINT level.

Temperature Units

The temperature displays in either Fahrenheit (°F) or Celsius (°C). To change settings, perform the following steps:

1. Press and hold the up- and down arrow keys simultaneously for three seconds to enter the input menu.

SEt appears in the SET UP display; InPt appears in the ACTUAL display.

2. Press an arrow key until GLbL appears in the ACTUAL display.

NOTE: Global (GLBL) is the only input menu option used.

If no key is pressed for 60 seconds, the temperature controller returns to standard run mode.

3. Press the MODE key.

The upper ACTUAL display shows °C or °F.

4. Press an arrow key to switch between °C and °F.

5. Press DSPY to store the new temperature units, and to return to standard run mode.

The SET POINT display now shows the actual set point temperature.

6. Press DSPY to toggle between the actual set point temperature and the temperature units.

Setup Menu Lockout

To prevent unauthorized changes to the temperature controller, the setup menu can be turned off with a lockout DIP switch.

1. Remove power.

2. Press on the tabs and remove the controller.

3. Use an insulated screwdriver to change the DIP switch 2 setting.

NOTE: Lockout DIP switch 1 is not connected.

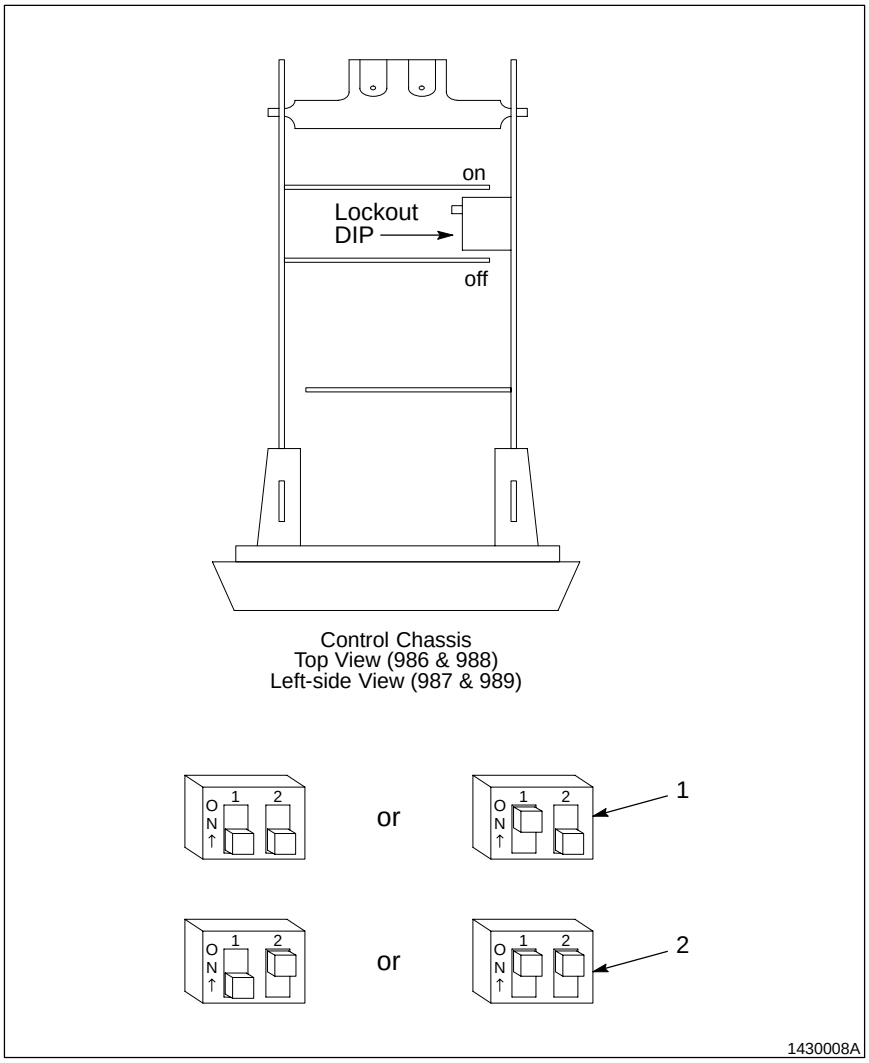

Fig. 7 Temperature Controller Lockout DIP Switch

1. Lockout DIP switch 2 OFF
2. Lockout DIP switch 2 ON

6. 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.

Temperature Controller

NOTE: The following parts list provides ordering information for the temperature controller. If you need assistance in ordering, contact your Nordson Corporation representative.

Item	Part	Description	Quantity	Note
1	272 711	Controller, temperature	1	
2	- - - - - -	• Bracket, mounting, adjustable	2	
3	- - - - - -	• Collar, mounting	1	
4	- - - - - -	• Gasket, bezel	1	

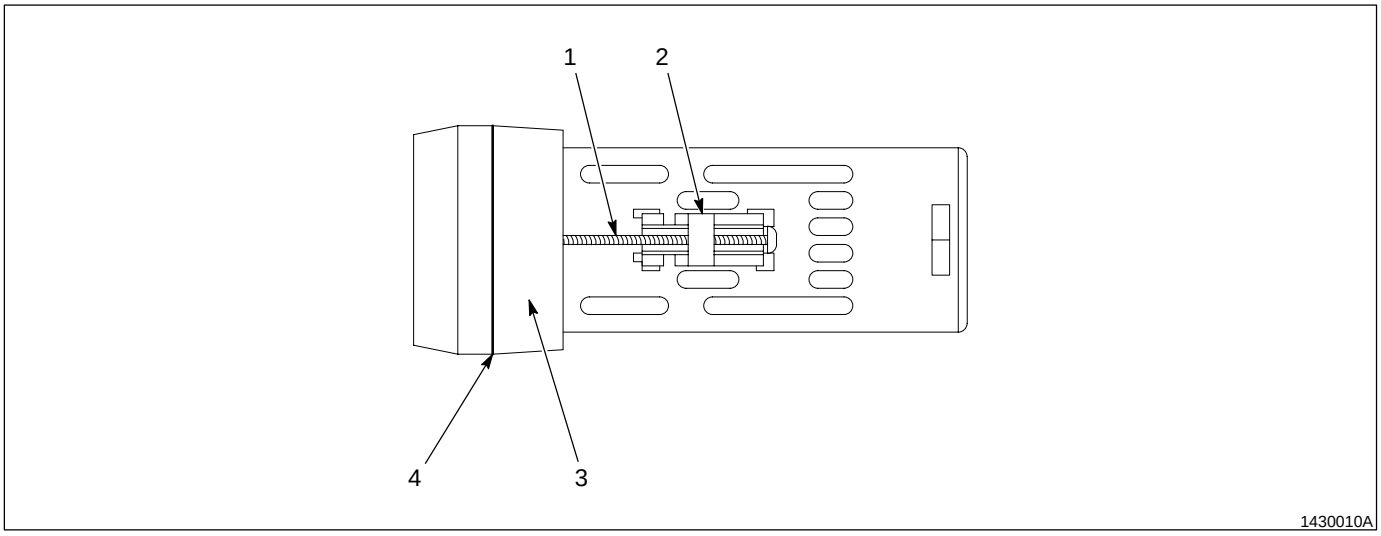

Fig. 8 Temperature Controller