Sure Coat® Rack Mount Master Control

Customer Product Manual
Part 303 838A

NORDSON CORPORATION • AMHERST, OHIO • USA

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Section 1

Safety

Section 1
Safety

1. Introduction

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.

2. 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.

3. 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

4. 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.

5. 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.

6. 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.

7. 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.

8. Disposal

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

Section 2

Description

Section 2
Description

1. Introduction

The Sure Coat rack mount master control system provides pneumatic and electrostatic controls, dc power, and monitoring functions for the Sure Coat powder spray guns and Sure Coat rack mount automatic controllers.

NOTE: Refer to the Sure Coat powder spray guns and Sure Coat rack mount automatic controller manuals for additional information.

2. System Components

The Sure Coat rack mount master control system consists of the components shown in Figure 2-1.

2. System Components
(contd)

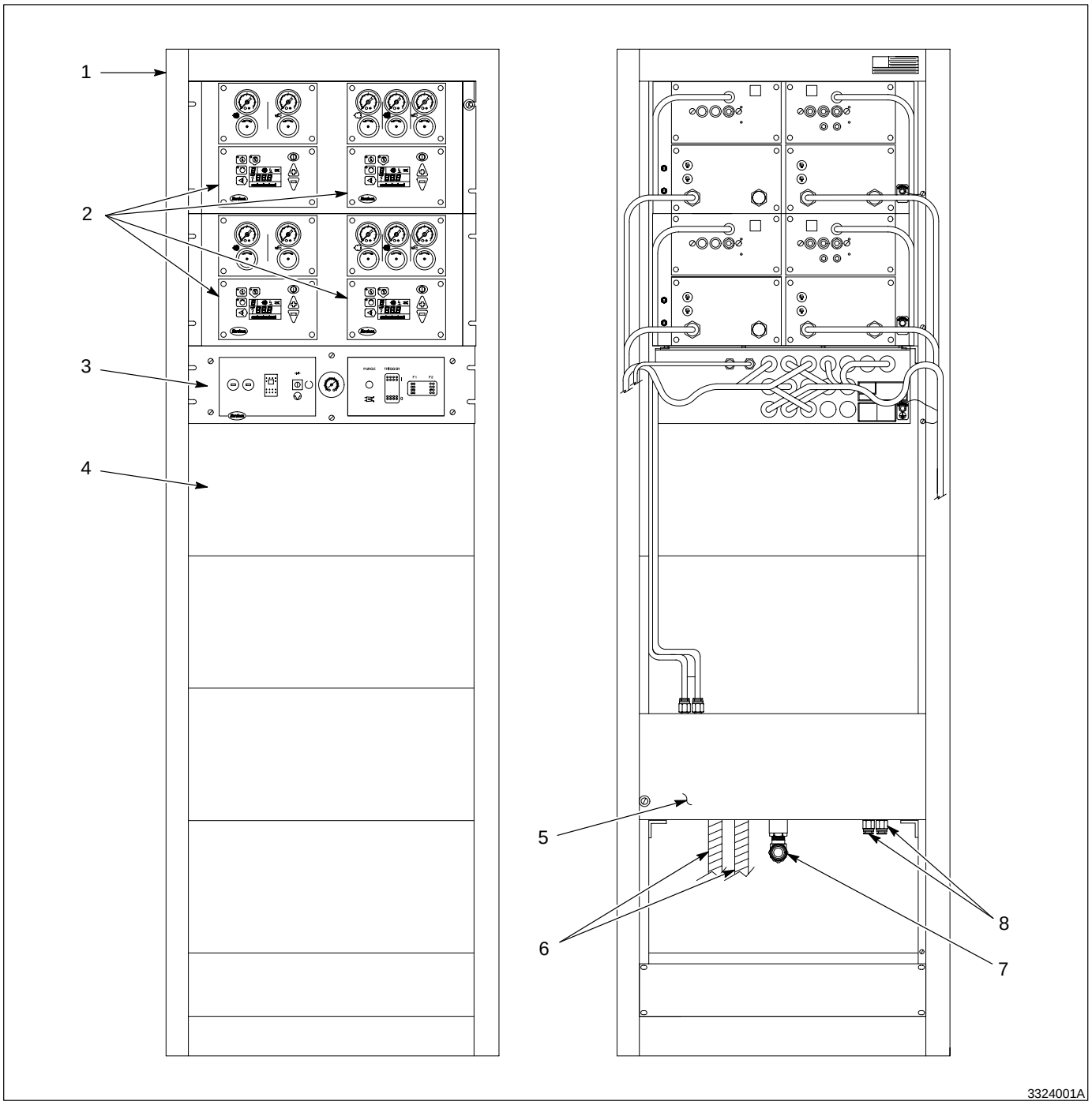

Fig. 2-1 System Components

1. Rack
2. Controllers
3. Master control unit
4. Blank panels
5. Pneumatic module
6. Power and control flex conduit
7. Supply air input
8. Purge fittings

Rack

The standard 19-inch rack contains all of the system components. It has rails with standard EIA spacing for mounting the controllers, master control unit, and pneumatic module. The door on the rear of 19-inch rack provides access to the air and electrical connections.

Controllers

Controllers are available for 2-gauge single or dual systems and 3-gauge single or dual systems. Refer to the controller manual for additional information.

Master Control Unit

The master control unit is the centralized control area. Refer to the following paragraphs for additional information.

Front Panel

See Figure 2-2 and refer to Table 2-1 for component locations and descriptions.

Table 2-1 Front Panel Components

Item	Component	Description
1	Main power switch	Controls distribution of power to a 120- or 240-volt system via a distribution board. Up position — applies power to all controllers in the rack. LED on. Down position — power off.
2	Keyswitch	The system keyswitch has three positions. CONVEYOR BYPASS — provides conveyor bypass; allows the system to run without the conveyor running; used for testing spray patterns and troubleshooting. READY — provides normal operation when the conveyor is operating and the guns are spraying; if the conveyor stops, the guns stop spraying. LOCKOUT — provides a lockout feature with the key removed; prevents the guns from triggering or turning on; allows for maintenance without the possibility of an electrostatic shock or the guns spraying. The ac power is on to the system and can only be turned off at the power main.
3	Main air pressure gauge	Monitors system air pressure to each controller. 6.9–8.6 bar (100–125 psi); regulated down.
4	Purge button option	Controls a pilot air signal that controls a pilot air valve to purge the guns. This feature is used for cleaning guns.
5	Main trigger switch	Allows the operator to send a trigger signal that turns on the gun controllers. All the guns are turned on or off simultaneously. This feature is wired internally to the distribution board.
6	F1/F2 option	This switch is only operational in 3-gauge systems and switches all guns to either Flow 1 or Flow 2. Use Flow 2 for higher pressures.
NS	Rocker switch option	Allows the customer to choose between two flow rate regulators: F1 — lower rate for re-coats F2 — higher rate for a wide variety of applications
NS: Not Shown		

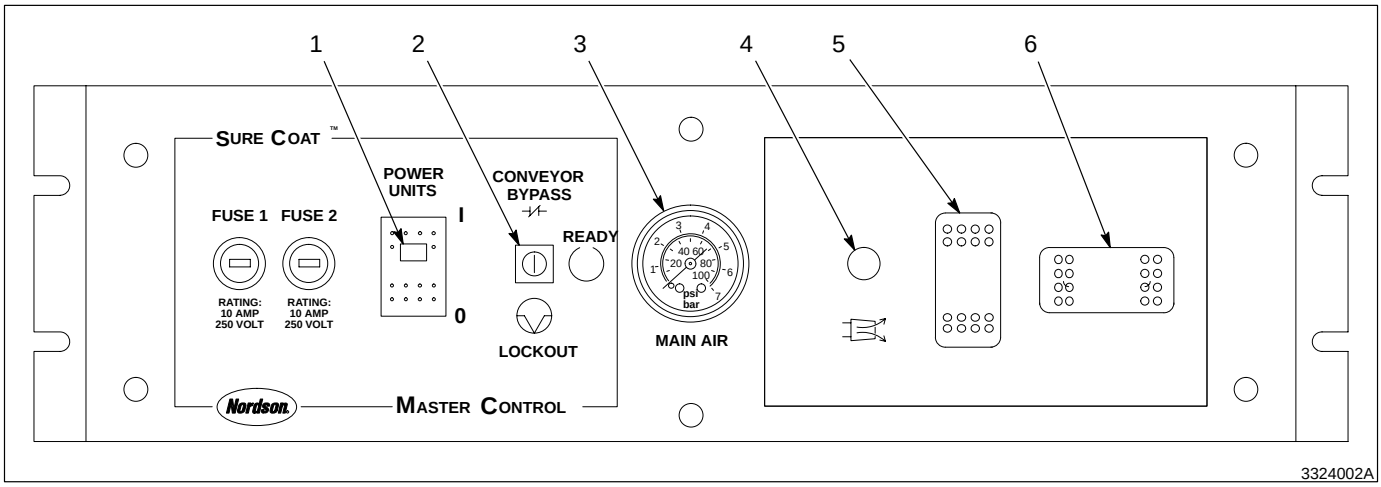

Fig. 2-2 Front Panel Components

Back Panel

See Figure 2-3 and refer to Table 2-2 for component locations and descriptions.

Table 2-2 Back Panel Components

Item	Component	Description
1	AIR IN connector	Connection from the pneumatic module for the supply air input. 0–7 Bar (0–100 psi)
2	PURGE connector	Connection from the pneumatic module for purge air output.
3	Knockouts	Numbered 1–14. These are the hole locations for external wires or cables. If a slot is not used, leave the caps in place to prevent dirt from getting into the system.
4	AUX connector	Auxiliary input connector for the 40-conductor cable for programmable logic control. All external wires that control flow rates and triggering signals come through this knockout.
5	INPUT connector	Standard 5-wire cable connector; wires are black, white, green, red, and orange.
6	Ground lug	Chassis ground.

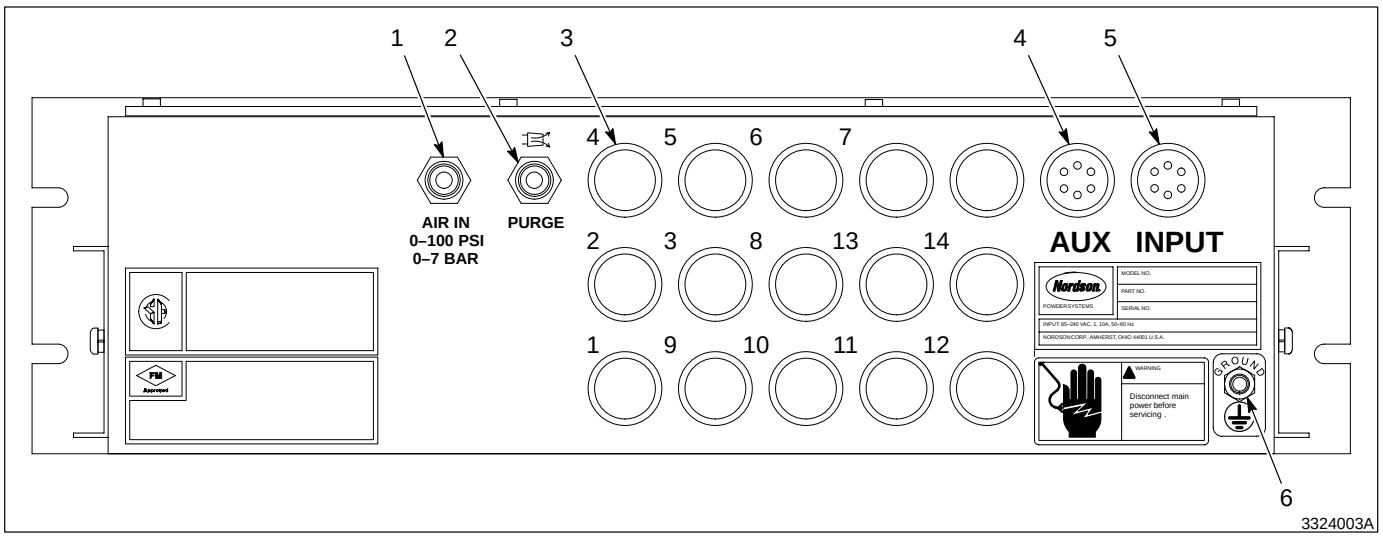

Fig. 2-3 Back Panel Components

Distribution Board

See Figure 2-4. The distribution board (2) has contact blocks for controller power, input power, auxiliary power, and conveyor interlock.

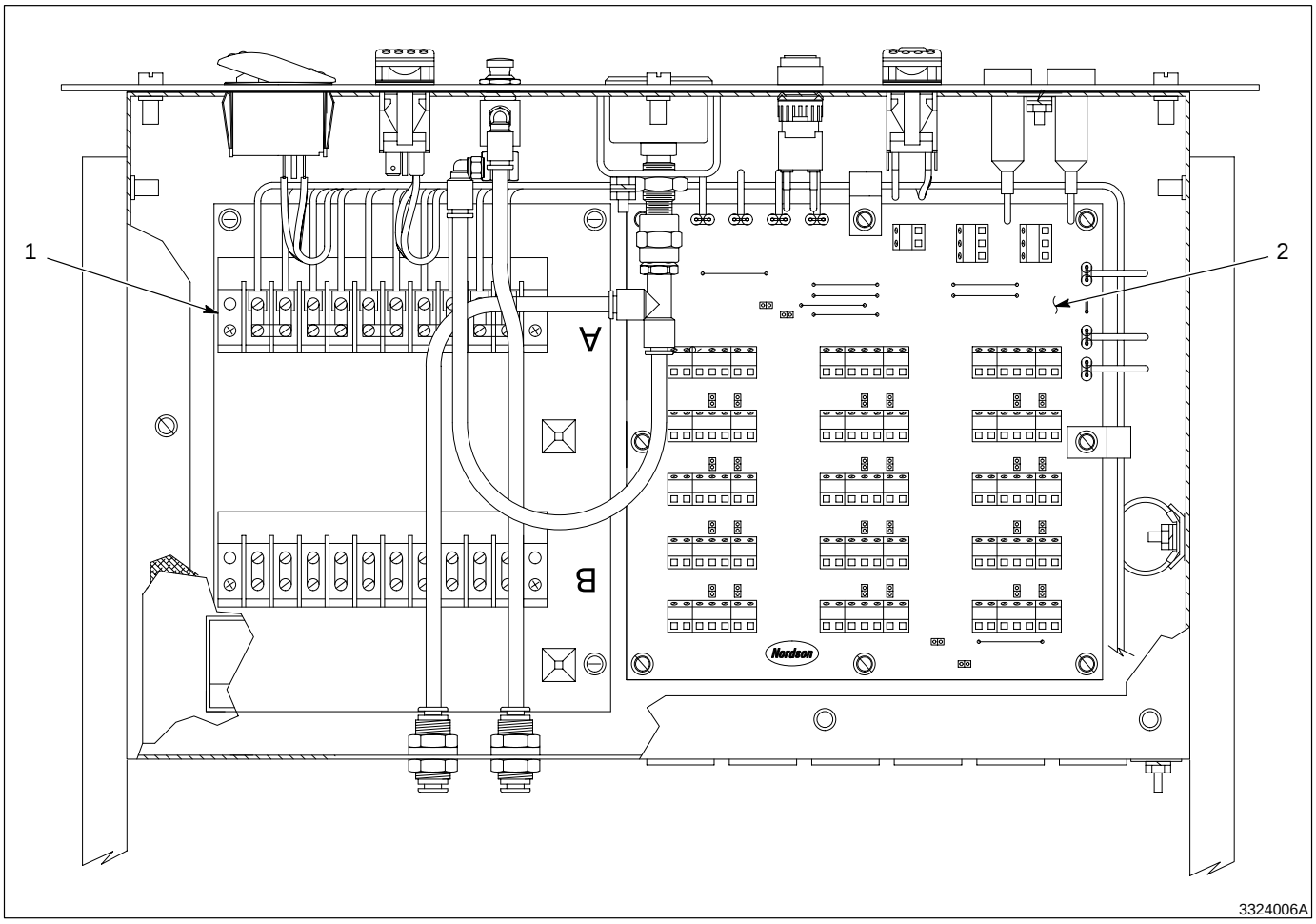

Fig. 2-4 Internal Components

1. Sub-plate
2. Distribution board

See Figure 2-5. There are 14 distribution blocks (9) available for the controllers. Each distribution block has input power (L1), input power (L2), ground (GND), trigger (TRIG) and Flow 1/Flow 2 (A/P) connections. TRIG (6) controls all the gun triggering. A/P (5) controls the Flow 1/Flow 2 option. Wiring for the distribution blocks comes from the 40-conductor cable through the knockouts in the back of the master control unit.

Jumpers are used on the distribution blocks to configure the system. Triggering and/or flow configurations are done by daisy chaining the connections on the distribution blocks. However, only consecutive distribution blocks can be grouped together. The system comes with all jumpers in place so that triggering and flow configurations are the same for all the guns.

Distribution Board *(contd)*

The INPUT distribution block (3) is a screw terminal connector and provides a contact point for input power.

The AUX distribution block (2) is not used.

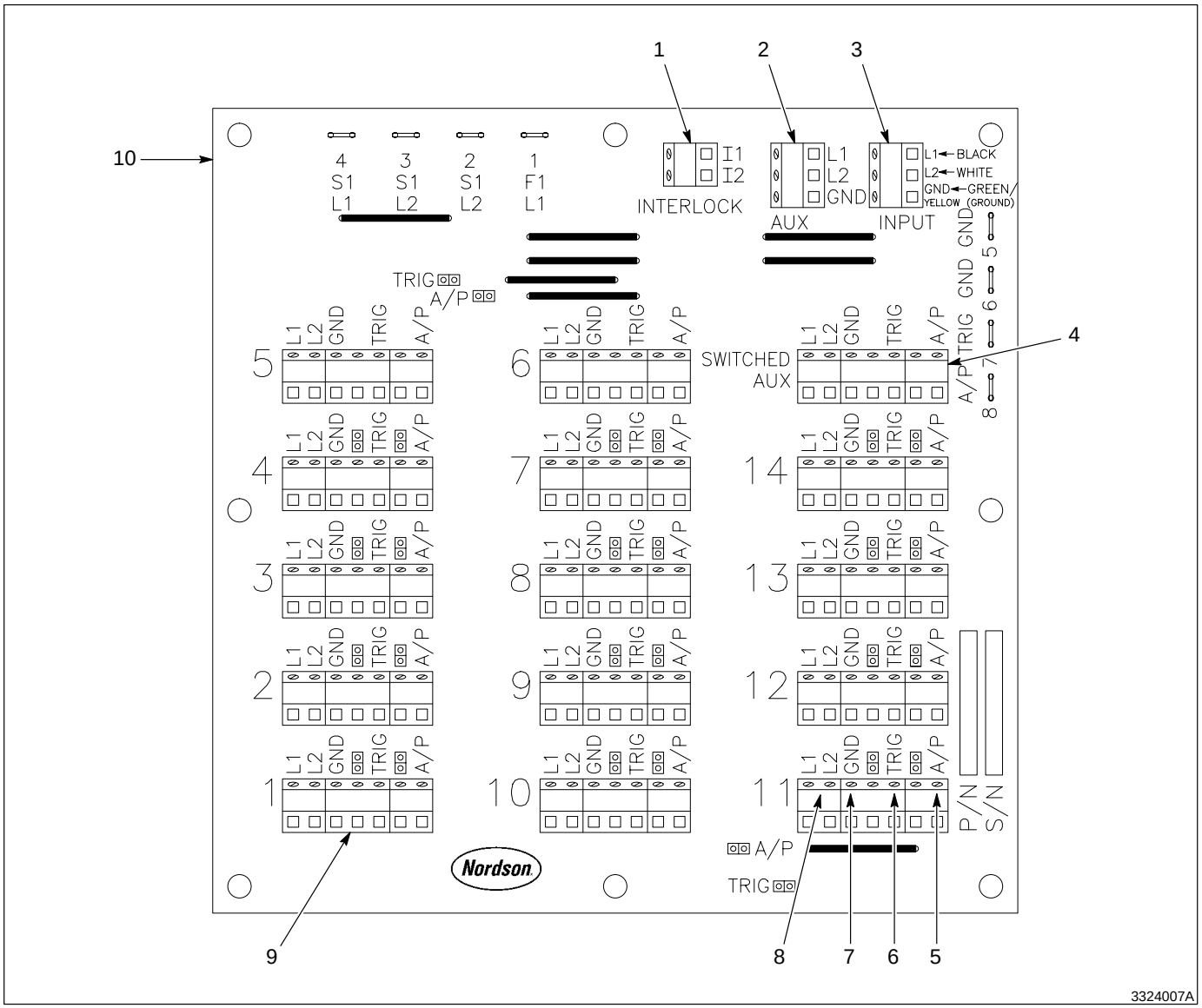

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Fig. 2-5 Distribution Board

1. Interlock distribution block
2. Auxiliary distribution block
3. Input distribution block
4. Switched auxiliary block
5. Flow 1/flow 2 (A/P) connection
6. Trigger (TRIG) connection
7. Ground (GND) connection
8. Input power (L1/L2) connections
9. Distribution block
10. Distribution board

Sub-Plate

See Figure 2-4. Terminal blocks are mounted on the sub-plate (1).

See Figure 2-6. Block A (1) terminates all trigger, flow, and keyswitch signals. Additional wires terminated at Block A come from the 40-conductor cable for external triggering with a PLC, conveyor interlock, F1/F2, and other functions. The conveyor interlock typically is terminated at contacts 8-9. Removing jumpers allows individual access to switch connections for use in a PLC installation.

A typical configuration for a standalone system (no PLC) is to have jumpers between contacts 1-2, 3-4, 5-6, 7-8, and 9-10.

Block B (2) is used for an external single electrical purge-all valve or individual bank purge valves. Typical wiring is from B-1, B-2, B-3, B-4 and B-5. B-5 is the solenoid common, and B-1 is the 40 conductor wire for purge-all.

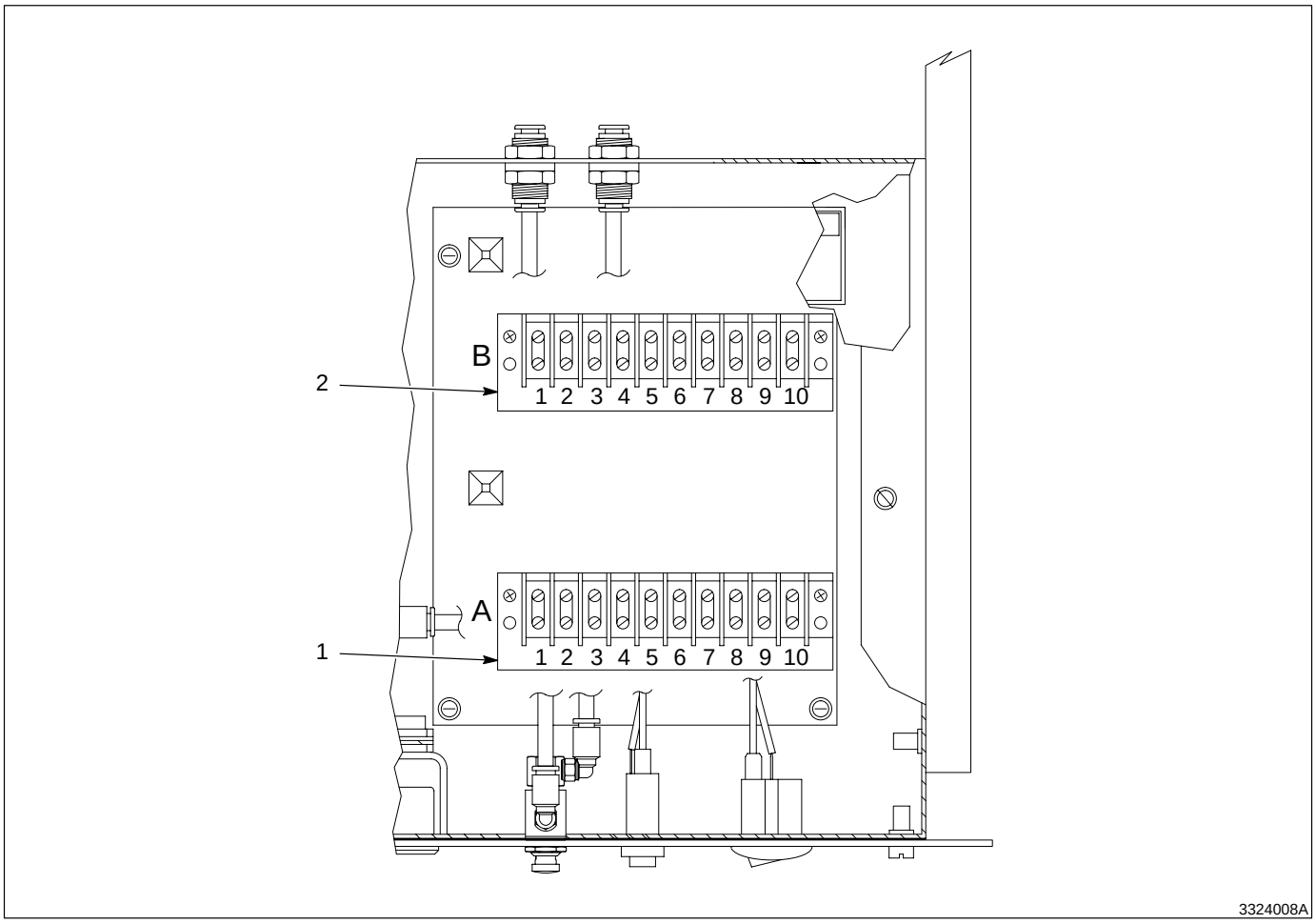

Fig. 2-6 Sub-Plate

1. Terminal block A
2. Terminal block B

Pneumatic Module

See Figure 2-7. The three versions of the pneumatic module are purge-all, no purge, and bank purge.

Purge Feature

When purge is actuated, the purge air flows up through the powder path to blow out any powder residue. Purge is on as long as the operator actuates the control button on the gun. Purge does not override the trigger function and stop powder flow.

Purge-all actuates purging of all guns in the system. Bank purge actuates groups of controllers jumpered together on the distribution board.

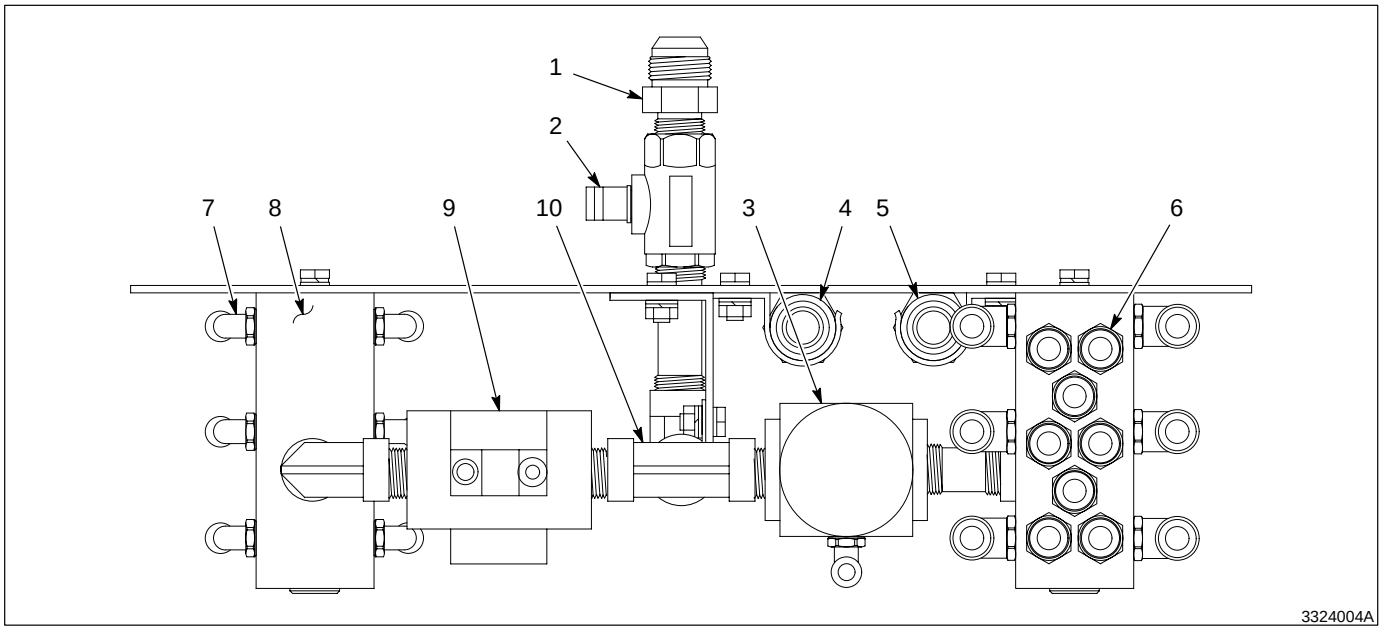

Fig. 2-7 Pneumatic Module Components

1. Supply air input
2. Main air valve
3. System regulator/filter
4. Control flex conduit (connection)
5. Power flex conduit connection
6. Air manifold
7. 6-mm purge-air tubing
8. Purge air manifold
9. Purge valve
10. Air input tee fitting

3. Specifications

The master control unit enclosure meets IP54 and Class II, Division II requirements.

Electrical

The master control operates on electrical input power of 85–240 Vac, @ 10 A maximum, single phase, 50–60 Hz.

Output:	6–21 Vdc to gun
Short circuit output current:	300 mA
Maximum output current:	600 mA

Operating Pressures

Minimum input pressure:	4 bar (60 psi)
Maximum input pressure:	7 bar (100 psi)

Air Supply Quality

Air must be clean and dry. Use a regenerative desiccant or refrigerated air dryer capable of producing a 3.4 °C (38 °F) or lower dew point at 6.89 bar (100 psi) and a filter system with prefilters and coalescent type filters capable of removing oil, water and dirt in the submicron range.

Mounting

The master control is designed to be installed in a standard 19 inch cabinet along with the power units and pneumatic controls. A maximum of fourteen power units and one master control can be mounted in the cabinet.

Section 3

Installation

Section 3
Installation

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

1. Introduction

This section covers the safety precautions and installation procedures needed to set up the control system for normal operation. The system comes factory assembled in a rack.

2. Installation

Perform the following electrical and pneumatic procedures.

Electrical

WARNING: To prevent electrical shock during installation and servicing, install a power isolation device such as a switch or breaker in the service line ahead of the control system.

NOTE: The power flex conduit wiring in the cabinet is done at the factory. Wiring from the cabinet to a booth panel or junction box is required at installation.

Perform the following electrical procedures.

1. Refer to Table 3-1. Connect the power flex conduit wiring to the input power on the back panel of the master control unit.

Table 3-1 Power Flex Conduit

Wire Color	Signal
Black	AC input
White	AC input
Green	Ground
Red	N/C
Orange	N/C

Electrical (contd)

2. Connect each electrostatic spray gun cable to the back of each controller. Refer to the controller manual for additional information.

3. If used, connect the 40-conductor cable to the PLC through a terminal or junction box.

NOTE: The terminal or junction box is system specific. Contact your Nordson representative for additional instructions on connections to a terminal or junction box.

Pneumatic

Perform the following pneumatic procedures.

1. Connect the supply air hose ($1^1/_2$ in. diameter) to the supply air input on the bottom of the pneumatic panel.

2. Connect and route the atomizing and flow rate tubing to the pumps.

3. If used, connect and route the gun air to the guns.

4. If used, connect the purge tubing lines from the pneumatic module to the purge adapter.

3. Configuring the System

NOTE: This section is applicable to all system configurations.

Master Control Unit

WARNING: Do not make contact with the board unless specified. Line voltage is present. Make sure the main disconnect is off at the booth. Failure to comply with this warning could result in an electric shock or death.

Remove the master control unit as follows:

1. See Figure 3-1. Turn off the main power switch (1) to the system.

2. Remove the four screws (2) to the front panel.

3. Slide out the master control unit.

4. Remove the ten screws (4) from the top panel of the master control unit.

CAUTION: Do not connect ac power to terminal block A. Terminal block A is for a low voltage relay contact closure only. The master control unit will be damaged if ac power is connected.

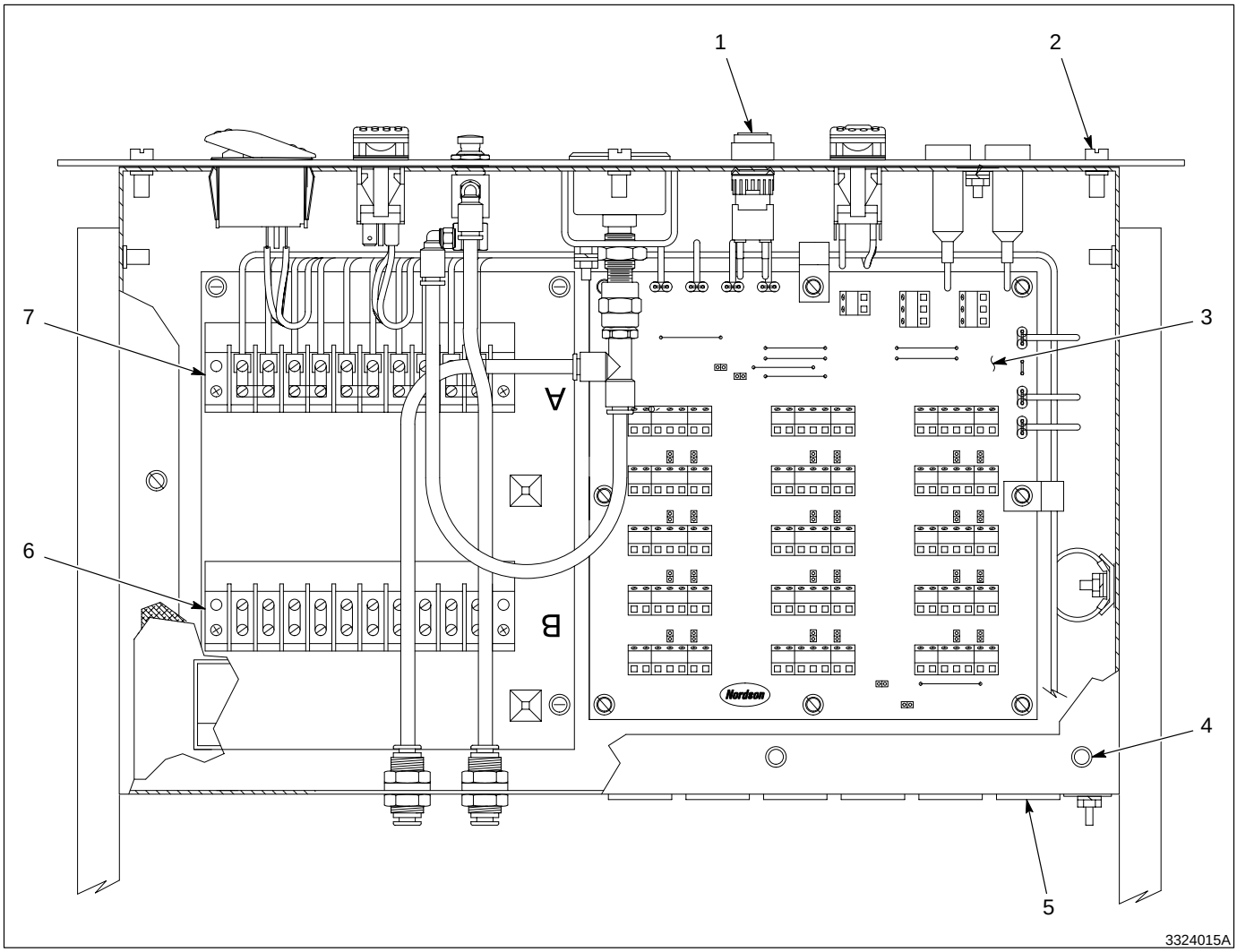

Fig. 3-1 Master Control Unit

1. Main power switch
2. Front panel screw
3. Distribution board
4. Top panel screw
5. Knockout
6. Terminal block B
7. Terminal block A

5. Make sure that the conveyor interlock wires are connected as noted in Table 3-2.

Table 3-2 Terminal Block Connections

Terminal Block	Position	Signal	Wire Colors
A	8	Conveyor bypass	Black, white, orange
A	9	Conveyor bypass	White, red, orange

6. See Figure 3-2. Ensure the jumper is present in the interlock distribution block (1) on the distribution board.

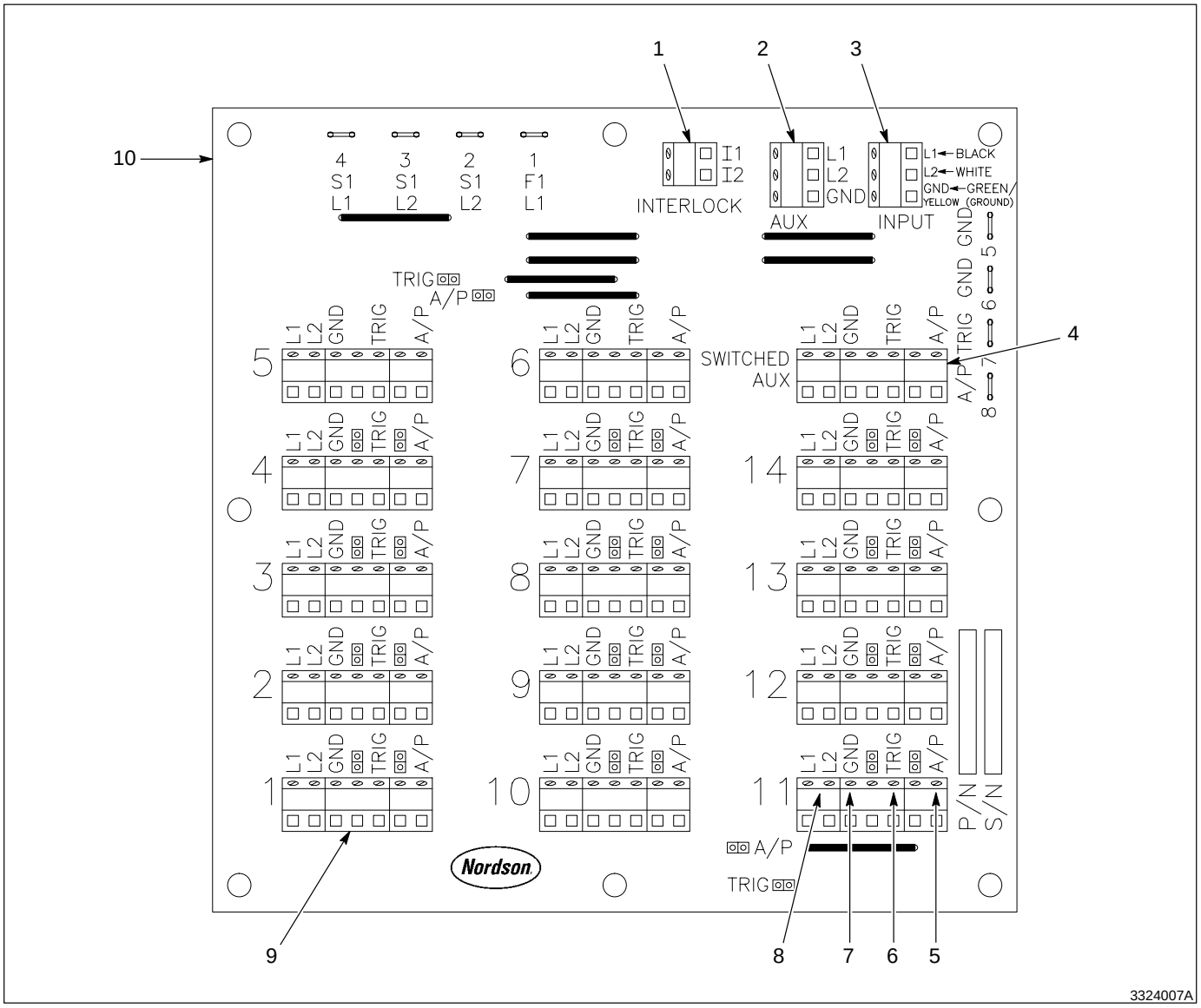

Fig. 3-2 Distribution Board

1. Interlock distribution block
2. Auxiliary distribution block
3. Input distribution block
4. Switched auxiliary block
5. Flow 1/flow 2 (A/P) connection
6. Trigger (TRIG) connection
7. Ground (GND) connection
8. Input power (L1/L2) connections
9. Distribution block
10. Distribution board

Standalone (No PLC)

NOTE: The system is shipped with this configuration. Perform this section only to change from another configuration to a standalone without PLC configuration.

1. Make sure the *Master Control Unit* section has been completed.

2. See Figure 3-2. Ensure that all trigger TRIG (6) and flow A/P (5) jumpers are present in distribution blocks 1 through 14. There are a total of 28 jumpers.

3. See Figure 3-1. Ensure that 5 metal jumpers are present in terminal block A (7) positions 1-2, 3-4, 5-6, 7-8, and 9-10.

Conveyor Interlock

A conveyor interlock signal is required to shut off the guns when the conveyor stops running.

The two signal wires (black, white, orange, and white, red, orange) for the conveyor interlock signals come from the 40-conductor cable and must be terminated at the conveyor junction box through a contact closure or relay.

NOTE: Conveyor junction boxes are system specific. Typically they are wired to a terminal block or the relay switch itself.

The conveyor and guns operate when the conveyor interlock wires are shorted together. The conveyor and guns do not operate when the interlock wires are open.

PLC Control

Sure Coat rack mount systems that use a PLC for triggering and control must interface to the system via the 40-conductor cable connected to the master control unit. The 40-conductor cable has enough signals to allow the user to individually control triggering and F1/F2 selection for a maximum of 14 guns. The 40-conductor cable also carries keyswitch, F1/F2, and trigger switch signals to terminal block A that are used by the PLC to monitor the master control keyswitch positions. Terminal block B is used to terminate the purge-all and bank purge solenoids if present in the system.

Terminal Block A

1. See Figure 3-1. Remove the jumpers 1-2, 7-8, and 9-10 from terminal block A (7). The only remaining jumpers should be 3-4 and 5-6.

NOTE: If needed, the PLC can monitor the master control front panel keyswitches by wiring the 40-conductor cable to an input card to the PLC.

2. Refer to Table 3-3. Make sure the following wires are connected to the PLC from terminal block A.

Table 3-3 Terminal Block A Connections

Position	Signal	Wire Color (40-Conductor Cable)
2	Flow 1/Flow 2	Red/black/green
4	Common	Green/black/orange
5	Trigger enable	Orange/black/green
7	Lockout	Blue/white/orange
8	Conveyor bypass	Black/white/orange
9	Conveyor bypass	White/red/orange

Terminal Block B

See Figure 3-1. Terminal block B (6) is used for PLC control of the purge-all or bank purge solenoids. The solenoids are 24 Vdc and 2 Watts. They are controlled through the 40-conductor cable. Refer to Table 3-4 for connections.

Table 3-4 Terminal Block B Connections

Position	Signal	Wire Color (40-Conductor Cable)
1	Solenoid 1	White/red/blue
2	Solenoid 2	Black/white/green
3	Solenoid 3	White/black/green
4	Solenoid 4	Red/white/green
5	Solenoid common	Orange/white/blue

Distribution Board

The system distribution board has 14 trigger and 14 A/P jumpers that are used to group guns into zones. The PLC uses the groups to control the triggering and F1/F2 functions of the system. The trigger and A/P signals are daisy chained together from one distribution block to the next. Only consecutive distribution blocks (guns) can be grouped together. For example, 1-2-3, 4-5-6, 7-8-9 can be grouped together. The jumpers are added and removed to make a single electrical control point to connect to the PLC.

EXAMPLE: A 12-gun system has to control four different zones of three guns each. Configure the system according to Table 3-5.

If the PLC sinks current through the black wire, common guns 1, 2, and 3 will turn on. When the PLC opens the black wire signal, guns 1, 2, and 3 would turn off. If current sinks through any of the PLC trigger wires, the associated gun groups will turn on.

If the PLC sinks current through the black/red wire, guns 1, 2, and 3 will switch from F1 to F2 for a dual-flow rate system.

Table 3-5 Example Configuration

Group	Guns	Trigger Jumper Removed	A/P Jumper Removed	PLC Trigger Wire	PLC F1/F2 Wire
A	1, 2, 3	Between 3 & 4	Between 3 & 4	Black	Black/red
B	4, 5, 6	Between 6 & 7	Between 6 & 7	Orange	Blue/red
C	7, 8, 9	Between 9 & 10	Between 9 & 10	Red/black	Black/white/red
D	10, 11, 12	Between 12 & 13	Between 12 & 13	Blue/black	Green/black/white

Distribution Board *(contd)*

Refer to Table 3-6 for jumper locations.

Table 3-6 Jumper Locations

Conductor	Description	Wire Color
1	Trigger gun 1	Black
2	Trigger gun 2	White
3	Trigger gun 3	Red
4	Trigger gun 4	Orange
5	Trigger gun 5	Blue
6	Trigger gun 6	White/black
7	Trigger gun 7	Red/black
8	Trigger gun 8	Green/black
9	Trigger gun 9	Orange/black
10	Trigger gun 10	Blue/black
11	Trigger gun 11	Black/white
12	Trigger gun 12	Red/white
13	Trigger gun 13	Green/white
14	Trigger gun 14	Blue/white
15	F1/F2 select gun 1	Black/red
16	F1/F2 select gun 2	White/red
17	F1/F2 select gun 3	Orange/red
18	F1/F2 select gun 4	Blue/red
19	F1/F2 select gun 5	Red/green
20	F1/F2 select gun 6	Orange/green
21	F1/F2 select gun 7	Black/white/red
22	F1/F2 select gun 8	White/black/red
23	F1/F2 select gun 9	Red/black/white
24	F1/F2 select gun 10	Green/black/white
25	F1/F2 select gun 11	Orange/black/white
26	F1/F2 select gun 12	Blue/black/white
27	F1/F2 select gun 13	Black/red/green
28	F1/F2 select gun 14	White/red/green
29	F1/F2 switch	Red/black/green
30	Common	Green/black/orange
31	Trigger switch	Orange/black/green
32	Lockout switch	Blue/white/orange
33	Conveyor bypass	Black/white/orange
34	Conveyor bypass	White/red/orange
35	Solenoid 1	White/red/blue
36	Solenoid 2	Black/white/green
37	Solenoid 3	White/black/green
38	Solenoid 4	Red/white/green
39	Solenoid common	Orange/white/blue
40	Ground	Green

4. Adding Guns/Controllers to a System

WARNING: Risk of electrical shock. Turn off main power and supply air to the system. Failure to observe may result in personal injury, death, or equipment damage.

To add another gun and controller to a system:

1. Turn off power at the booth.
2. Turn the air valve on the bottom of the pneumatic panel off.
3. Take the necessary precautions to ensure that power and air remain off.
4. Remove a blank panel from the location that the controller is to be placed. There are 4 screws and washers that secure this blank panel.
5. Place the gun controller into the open slot.
6. Hold and secure the controller with the 4 screws and washers.

Cable and Wire Connections

Connect cables and wires as follows:

1. Connect the ac power cord to the gun controller.
2. See Figure 3-1. Remove the four screws (2) to the front panel of the master control unit.
3. Slide out the master control unit.
4. Remove the 10 screws (4) on the top panel of the master control unit.
5. Route the power cord to an open position on the master control unit's back panel.
6. Remove the knockout (5) from the back panel.
7. Install a straight watertight strain-relief connector into a knockout on the back panel.
8. Pull the ends of the power cables through the watertight strain-relief connector.
9. Terminate the wires according to Figure 3-3. Distribution block (4) destinations are printed on the board.

Cable and Wire Connections
(contd)

10. Tighten the watertight strain relief connector (2) until the cables are fully captured.
11. Install the top panel to the master control unit.
12. Slide the master control unit into the cabinet.
13. Install the front panel to the master control unit.

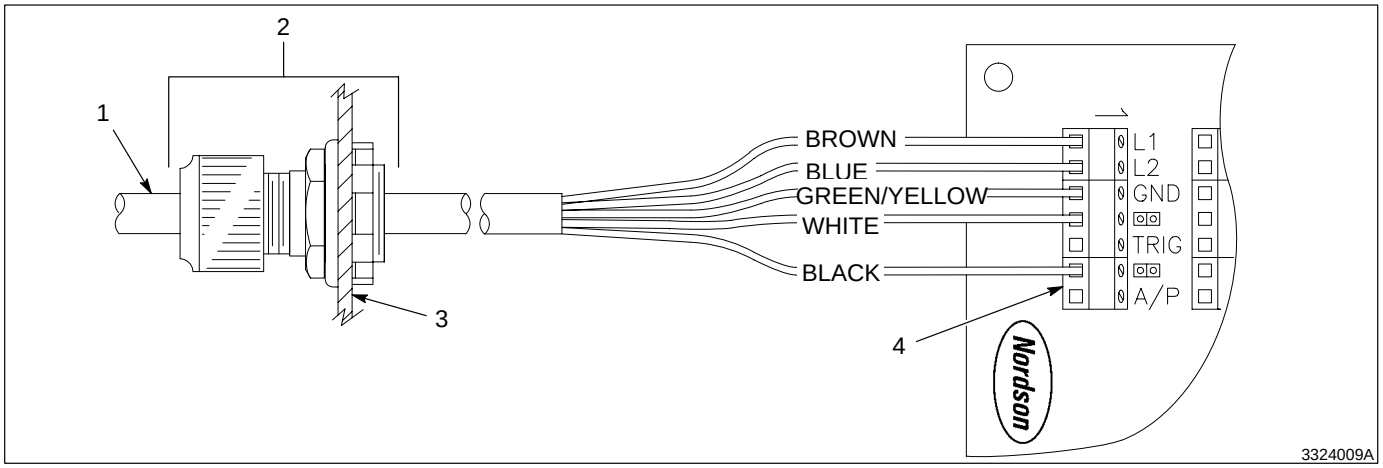

Fig. 3-3 Controller Cable Connections

1. Power cable
2. Watertight strain relief connector
3. Rear panel
4. Distribution block

Pneumatic Connections

See Figure 3-4. Make pneumatic connections as follows:

1. Remove a plug from the air manifold (6) in the pneumatic module and connect the 10 mm poly air tubing from the air input on the gun controller.
2. Connect and route the atomizing and flow rate tubing to the pumps.
3. If used, connect and route the gun air to the guns.
4. If used, connect the purge tubing (7) from the purge air manifold (8) to the purge adapter.

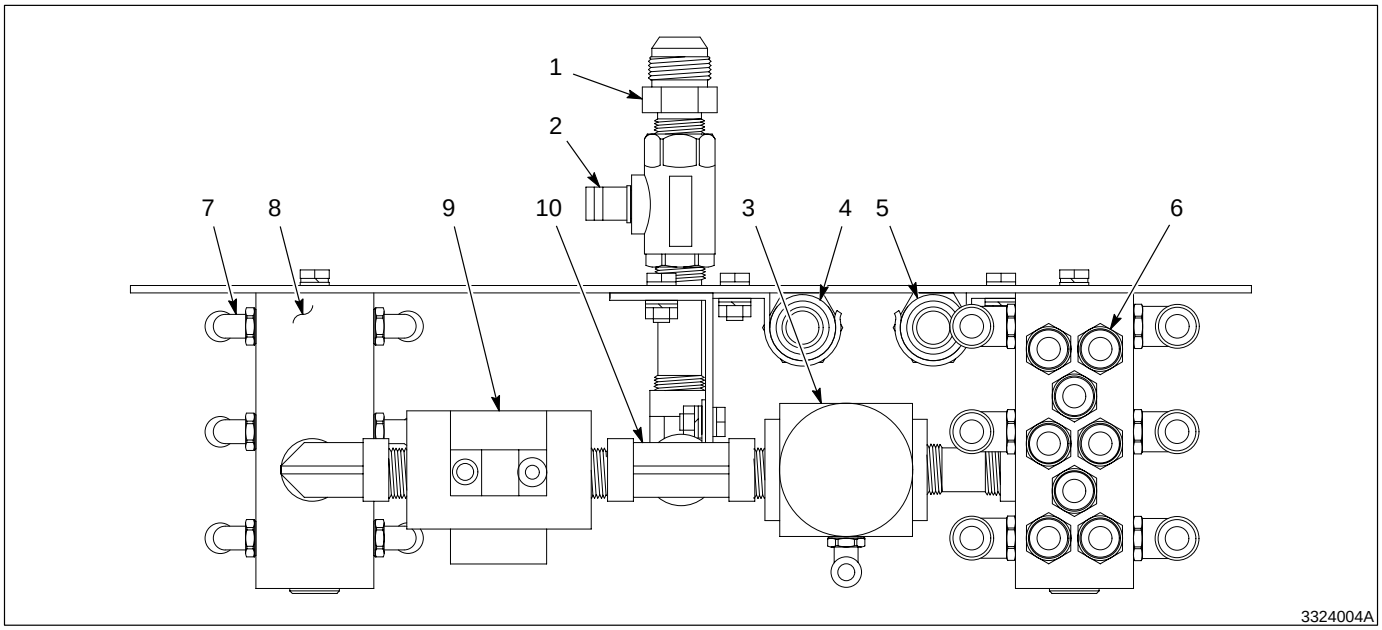

Fig. 3-4 Pneumatic Module Components

1. Supply air input
2. Main air valve
3. System regulator/filter
4. Control flex conduit (connection)
5. Power flex conduit connection
6. Air manifold
7. Purge tubing 6 mm purge tubing
8. Purge air manifold
9. Purge valve
10. Air input tee fitting

5. Adding a Purge-All Module

See Figure 3-4. Add a purge-all module as follows:

1. Remove the 4 screws and remove the pneumatic module from the rack.
2. Separate the pneumatic module from the mounting plate.
3. Remove the pipe plug located inside the purge-all air fitting from the air input tee fitting (10).
4. Connect the purge-all assembly (8, 9) to the air input tee fitting.
5. Use pipe sealing compound to seal the air input tee fitting.

5. Adding a Purge-All Module *(contd)*

6. Align and mount the pneumatic module onto the plate.

7. Secure the pneumatic module assembly to the rack with 3 screws for a standard system and 5 screws for a purge-all system.

8. Route the 6 mm tubing (7) from the purge-all valve fitting up to the purge fitting on the back of the master control back panel.

6. Adding a Purge-All Module with PLC Control

Add a purge-all module with PLC control as follows:

1. Complete the *Adding a Purge-All Module* section.

2. Route the purge-all solenoid wire though the master control back panel opening next to the AUX input hole. Leave a service loop.

3. Remove the 4 screws that secure the master control unit to the rack.

4. Slide out the master control unit.

5. Remove the screws to the top cover.

6. See Figure 3-1. Connect the wires to terminal block B (6) positions 1 and 5. Position 1 is a white wire. Position 5 is a black wire.

7. Replace all covers.

8. Install the master control unit and secure with the mounting screws.

NOTE: The following step converts the solenoid coil operation to 24 Vdc @2 W.

9. Terminate the purge-all solenoid wires to the PLC output card. These wires are white/red/black/orange and orange/white/black.

Section 4

Operation

Section 4
Operation

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

1. Introduction

The following paragraphs provide operating procedures for the master control unit.

Before activating the system, make sure that the

- booth vent fans are on
- powder recovery system is operating
- feed hopper fluidizing air is on
- powder supply is properly fluidized
- air and power is supplied to the powder spray system

2. Initial System Startup

Perform the following sequence for initial system startup:

1. Turn power on to the booth.
2. Turn on the power switch to the master control unit and controllers.
3. Turn on main air at the bottom of the pneumatic module.
4. Check that a red indicator illuminates on the master control unit, the controller LCD display illuminates, and the controller performs internal checks.
5. If the flow option is used, select F1 or F2 on the master control unit.
6. Place the keyswitch on the master control unit in the ready position.

NOTE: Place the keyswitch in the bypass position to spray when the conveyor is not running.

7. Turn on the trigger enable switch on the master control unit and controllers. The system should trigger on and spray.

2. Initial System Startup (contd)

NOTE: If a PLC is used, the system automatically triggers on and off. F1 or F2 are also chosen.

8. Watch the spray pattern at the gun and adjust the main air pressure to 6.9–8.6 bar (100–125 psi).

9. Turn on the controllers voltage switches. Adjust the kV to the desired output. Refer to the controller manual for additional information.

10. Turn off the master control unit conveyor bypass switch.

11. Start the conveyor and test spray workpieces. Adjust the kV output of the controllers for best results.

3. Daily Operation

Perform the following sequence for daily operation:

1. Make sure that the
   - feed hopper is $^{2}/_{3}$ full of clean, dry powder
   - booth vent fans are on
   - powder recovery system is on
   - feed hopper fluidizing air is on
2. Turn power on to the booth.

3. Turn on the power switch to the master control unit, controllers, and conveyor.

4. Turn on main air at the bottom of the pneumatic module.

5. Check that a red indicator illuminates on the master control unit, the controller LCD display illuminates, and the controller performs internal checks.

6. If the flow option is used, select F1 or F2 on the master control unit.

7. Turn on the trigger enable switch on the master control unit and controllers. The system should trigger on and spray.

NOTE: If a PLC is used, the system automatically triggers on and off. F1 or F2 are also chosen.

Purge Option

To purge the system, press the purge button on the master control unit.

4. Shutdown

Shutdown the system as follows:

1. Turn off all the controllers by turning off the trigger switch on the master control unit.
2. If used, press the purge button on the master control unit.
3. Turn the booth power off.

Section 5

Maintenance

Section 5
Maintenance

1. Maintenance

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

WARNING: Turn off the electrostatic voltage and ground the gun electrodes before performing the following tasks. Failure to observe this warning could result in a severe shock.

Perform the following maintenance daily:

WARNING: Check all ground connections thoroughly. Ungrounded equipment and parts may accumulate a charge that could arc and cause a fire or explosion. Failure to observe this warning could cause serious injury.

1. Check all ground connections, including part grounds. Ungrounded or poorly grounded parts affect transfer efficiency, electrostatic wrap, and the quality of the finish.
2. Check power and gun cable connections.
3. Ensure that the air being supplied is clean and dry.
4. Wipe powder and dust off the controller cabinet with a clean, dry cloth.
5. Carefully remove fused powder from the parts with a wooden or plastic dowel or similar tool. Do not use tools that will scratch the plastic. Powder will build up and impact fuse on any scratches.

Section 6

Troubleshooting

Section 6
Troubleshooting

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

1. Introduction

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

2. Troubleshooting Chart

Problem	Possible Cause	Corrective Action
1. Master control unit does not turn on (switch light is not illuminated)	Fuses on the front panel blown or defective	Check the fuses with an ohmmeter and replace if necessary.
	Loose connections on the distribution board terminal block or input power (booth is not powered on)	Tighten the input connections and check the input wiring.
	Power switch failure	Replace the switch.
2. Gun controller does not trigger when the master control unit is switched on and the master trigger switch is depressed	Trigger jumpers or terminal block A are set wrong	Refer to the *Installation* section to verify correct jumpers on terminal block A.
	Trigger wires are loose on the distribution board terminal block	Check for loose wiring on the distribution board. Refer to *Master Control Unit* in the *Installation* section to verify correct wiring.
	Defective trigger switch on the master control unit	Replace the trigger switch.
	Defective power cable from the master control unit to an individual controller	Replace the power cable.
	Keyswitch is in the lockout position	Change the position of the keyswitch on the master control unit's front panel.
	Conveyor interlock signal is open (defective relay or wiring)	Replace the relay or the wiring on terminal block A.
	Defective controller	Refer to the controller's manual.
3. Gun controllers do not switch from F1 to F2 when the master control unit switch is activated **Note: F1/F2 is an option**	Trigger jumpers or terminal block A jumpers are set wrong	Refer to the *Installation* section to verify correct jumpers on terminal block A.
	A/P wiring is loose	Check the wiring to the distribution blocks.

Continued on next page

Problem	Possible Cause	Corrective Action
3. Gun controllers do not switch from F1 to F2 when the master control unit switch is activated **Note: F1/F2 is an option** *(contd.)*	Defective F1/F2 switch on the master control unit	Replace the F1/F2 switch.
	Defective power cable from the master control unit to an individual controller	Replace the power cable.
	Defective controller	Refer to the controller's manual.
4. Gun purge does not operate when pressing the front panel button (purge is an option)	No air to system	1. Check the main air gauge on the front panel. 2. Turn on main air to the system.
	Purge switch defective	1. Disconnect the air hose at the supply air input in the pneumatic module. 2. Press the purge button on the master control unit's front panel. If air is not present, the switch is defective. 3. Replace the purge switch.
	Defective purge valve	1. Check if the purge valve is plugged. Remove the blockage if possible. 2. Otherwise, replace the purge valve. Refer to *Purge Valve Replacement* in the *Repair* section.
5. Cannot spray with system in bypass mode	Loose connections on the keyswitch	Check wiring to the keyswitch.
	Loose wires	Check and replace wiring on terminal block A position 8-9.
	Jumpers missing or loose	Insert or replace jumpers on terminal block A positions 7-8 and 9-10.

Section 7

Repair

Section 7
Repair

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

1. Introduction

WARNING: Disconnect and lock out electrical power before performing the following tasks. Failure to observe this warning could result in personal injury or death.

This section describes procedures necessary to disassemble and repair the Sure Coat rack mount master control system.

2. Distribution Board Removal

NOTE: The circuitry is sensitive to electrostatic discharge. Wear a grounded wrist band when working on the circuitry.

1. Turn off power at the main disconnect or breaker panel.

2. See Figure 7-1. Remove the four front panel screws (1) from the master control unit.

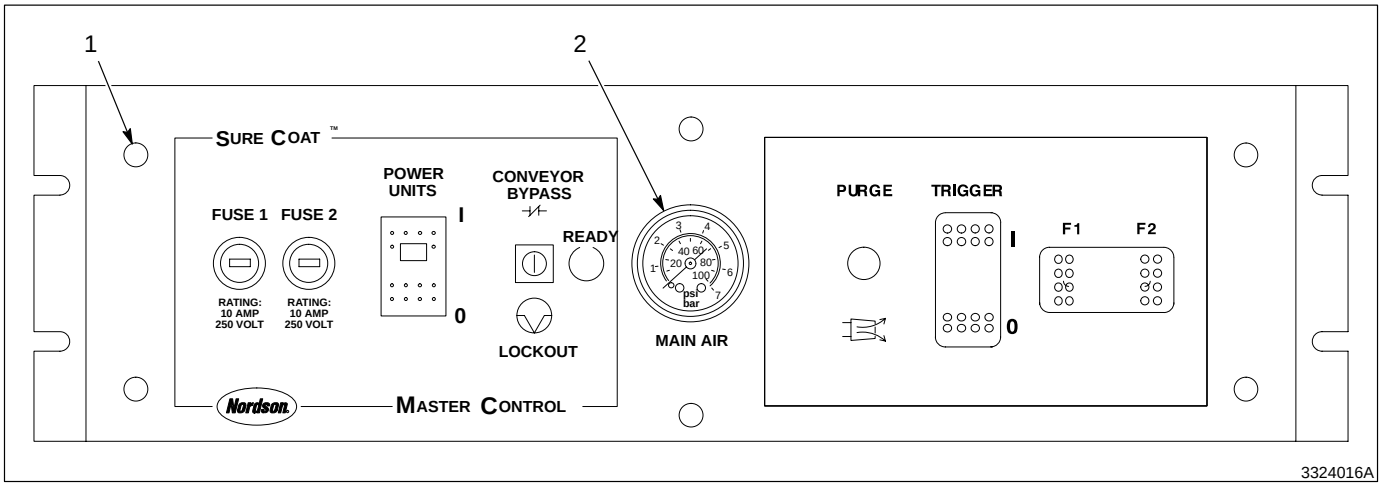

Fig. 7-1 Front Panel Components

1. Front panel screw
2. Air pressure gauge

2. Distribution Board Removal *(contd)*

3. Slide the unit out from the rack.
4. Remove the screws from the top panel and remove the panel.
5. See Figure 7-2. Remove the wiring from distribution blocks 1–14 (9).
6. Remove wiring from the input (3) and interlock (1) distribution blocks.
7. Remove the screws securing the distribution board and remove the board.
8. Lift the distribution board out of the unit.
9. Insert the new distribution board and tighten the screws to secure the board.
10. Replace all wiring to the distribution board.
11. Replace all panels to the master control unit.

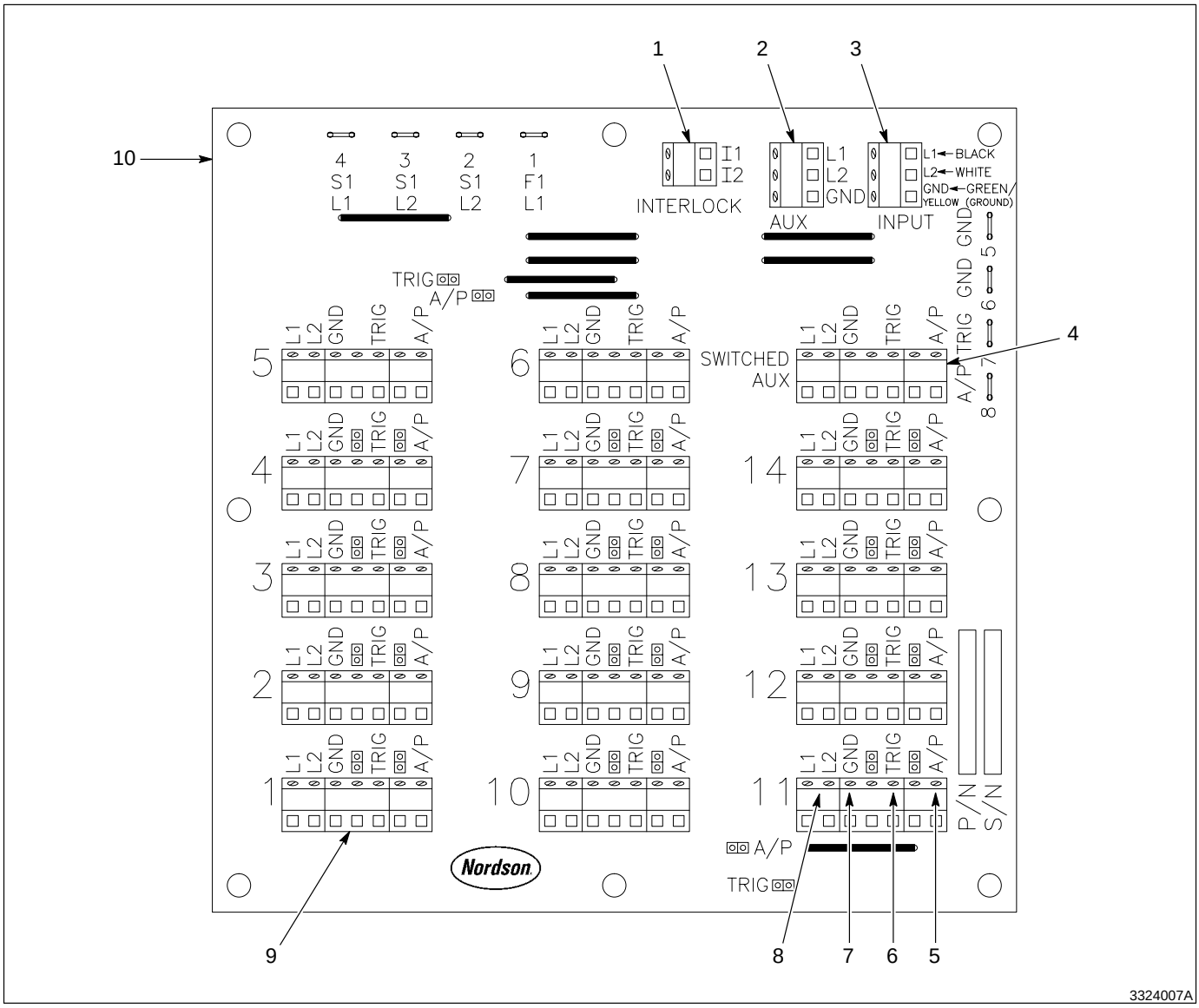

Fig. 7-2 Distribution Board

1. Interlock distribution block
2. Auxiliary distribution block
3. Input distribution block
4. Switched auxiliary block
5. Flow 1/flow 2 (A/P) connection
6. Trigger (TRIG) connection
7. Ground (GND) connection
8. Input power (L1/L2) connections
9. Distribution block
10. Distribution board

3. Pneumatic Manifold

Remove the pneumatic manifold as follows.

1. Turn off power at the main disconnect or breaker panel.
2. Turn off air to the unit.
3. Remove the back panel of the pneumatic manifold.
4. See Figure 7-3. Disconnect the tubing from the supply air input (1), purge valve (9), and air manifold (6).
5. Remove the screws that secure the manifold to the back panel.
6. Lift the entire manifold from the panel.
7. Install and secure the new manifold.
8. Attach the tubing to the supply air input (1), purge valve (9), and air manifold (6).
9. Install the back panel to the pneumatic manifold.

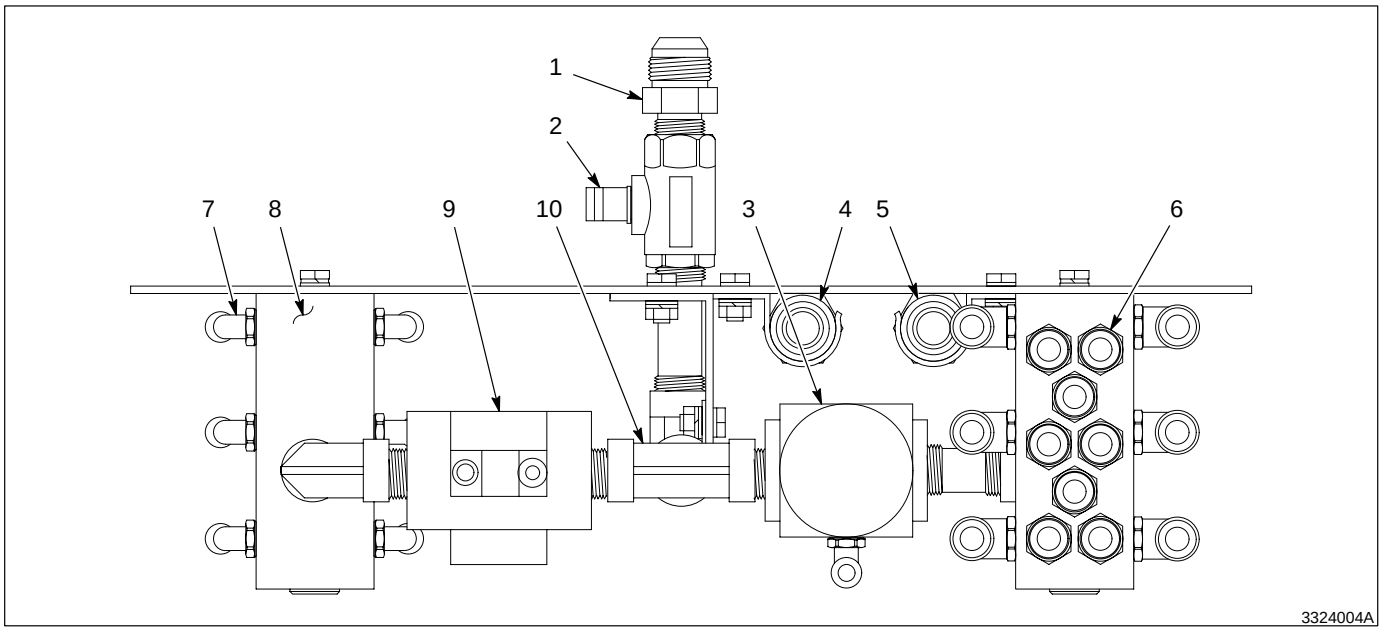

Fig. 7-3 Pneumatic Module Components

1. Supply air input
2. Main air valve
3. System regulator/filter
4. Control flex conduit (connection)
5. Power flex conduit connection
6. Air manifold
7. Purge tubing 6 mm purge tubing
8. Purge air manifold
9. Purge valve
10. Air input tee fitting

4. Regulator/Gauge Replacement

Remove the front panel to the master control unit to access the regulator/gauges.

1. Turn off power at the main disconnect or breaker panel.
2. See Figure 7-1. Remove the four front panel screws (1) from the master control unit.
3. Slide the unit out from the rack.
4. Remove the screws from the top panel and remove the panel.
5. Disconnect the air tubing and remove the air pressure gauge (2) out through the rear unit opening.
6. Install the new air pressure gauge from the rear.
7. Screw on and tighten the regulator mounting ring on the front panel.
8. Connect all tubing.
9. Install all panels.

5. Purge Valve Replacement

Replace the purge valve as follows.

1. Turn off power at the main disconnect or breaker panel.
2. Turn off air to the unit.
3. Remove the back panel of the pneumatic manifold.
4. See Figure 7-3. Unscrew and remove the purge valve (9) from the purge air manifold (8) and the air input tee fitting (10).
5. Insert and tighten the new purge valve.
6. Install the back panel to the pneumatic manifold.

Section 8

Parts

Section 8
Parts

1. Introduction

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.

2. Rack

See Figures 8-1 and 8-2.

Item	Part	Description	Quantity	Note
—	- - - - - -	Rack, basic, Sure Coat, 4-gun	1	
1	129 530	• Cabinet, 19-inch rack, 61.25 space	1	A
1	129 531	• Cabinet, 19-inch rack, 70 space	1	B
2	- - - - - -	• Control unit, Sure Coat	AR	C
3	- - - - - -	• Module, base master	1	D
4	303 073	• Panel, blank, 5.25 x 19.00, blue	1	
5	- - - - - -	• Module, pneumatic, Sure Coat, all-purge	1	E
6	130 629	• Cable, power, 5-wire, 6.5 ft, female	4	
7	303 090	• Cable, 40-conductor, 24 gauge, 80 °C, pvc	25 ft	
8	900 740	• Tubing, polyurethane, 10/6.5–7 mm	26 ft	
9	900 742	• Tubing, polyurethane, 6/4 mm, blue	15 ft	
10	129 535	• Angle, left support	2	
11	129 536	• Angle, right support	2	
12	802 060	• Hose, 5 ft	1	
13	983 121	• Washer, lock, English, external, #10, stainless, zinc	8	
14	981 159	• Screw, pan, 10-32 x 0.50, slotted, brass	4	
15	933 326	• Connector, conduit, $^1/_2$ NPT x 0.437 grip	2	
16	939 122	• Seal, conduit fitting, $^1/_2$	3	
17	984 526	• Nut, lock, $^1/_2$ conduit	2	
18	140 991	• Cable, 5-conductor, 16 gauge, 80 °C, pvc	25 ft	
19	933 056	• Connector, wire, porcelain	1	
20	143 009	• Conduit, carflex liqtite, $^1/_2$	30 ft	
21	303 090	• Cable, 40-conductor, 24 gauge, 80 °C, pvc	25 ft	
22	144 356	• Fitting, straight-through, $^1/_2$ NPT	1	
23	984 192	• Nut, lock, $^1/_2$ NPT, nylon	1	
24	183 474	• Cable, 2-conductor, shield, 20 gauge, pvc	10 ft	

NOTE A: This cabinet accommodates 4–12 control units.

B: This cabinet is used for systems with 13 or 14 control units.

C: The 2-gauge and 3-gauge control units shown in Figures 8-1 and 8-2 are only for reference. Racks are not sold in this configuration. Racks are only sold in 2-gauge or 3-gauge configurations. Refer to the applicable control unit manual for detailed information.

D: Refer to the *Base Master Module* section.

E: Refer to the *Pneumatic Module* section.

AR: As Required

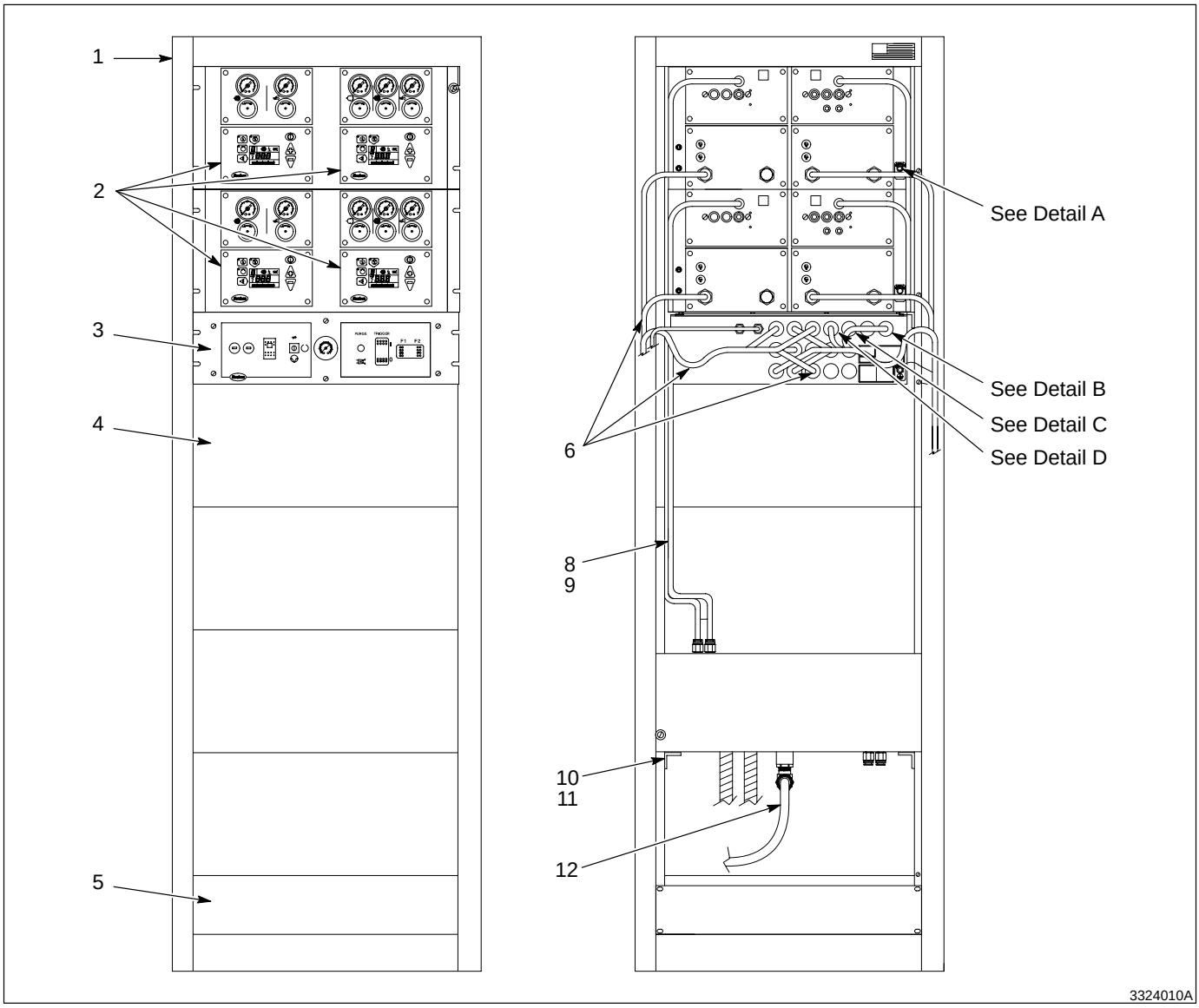

Fig. 8-1 Basic Rack

2. Rack (contd)

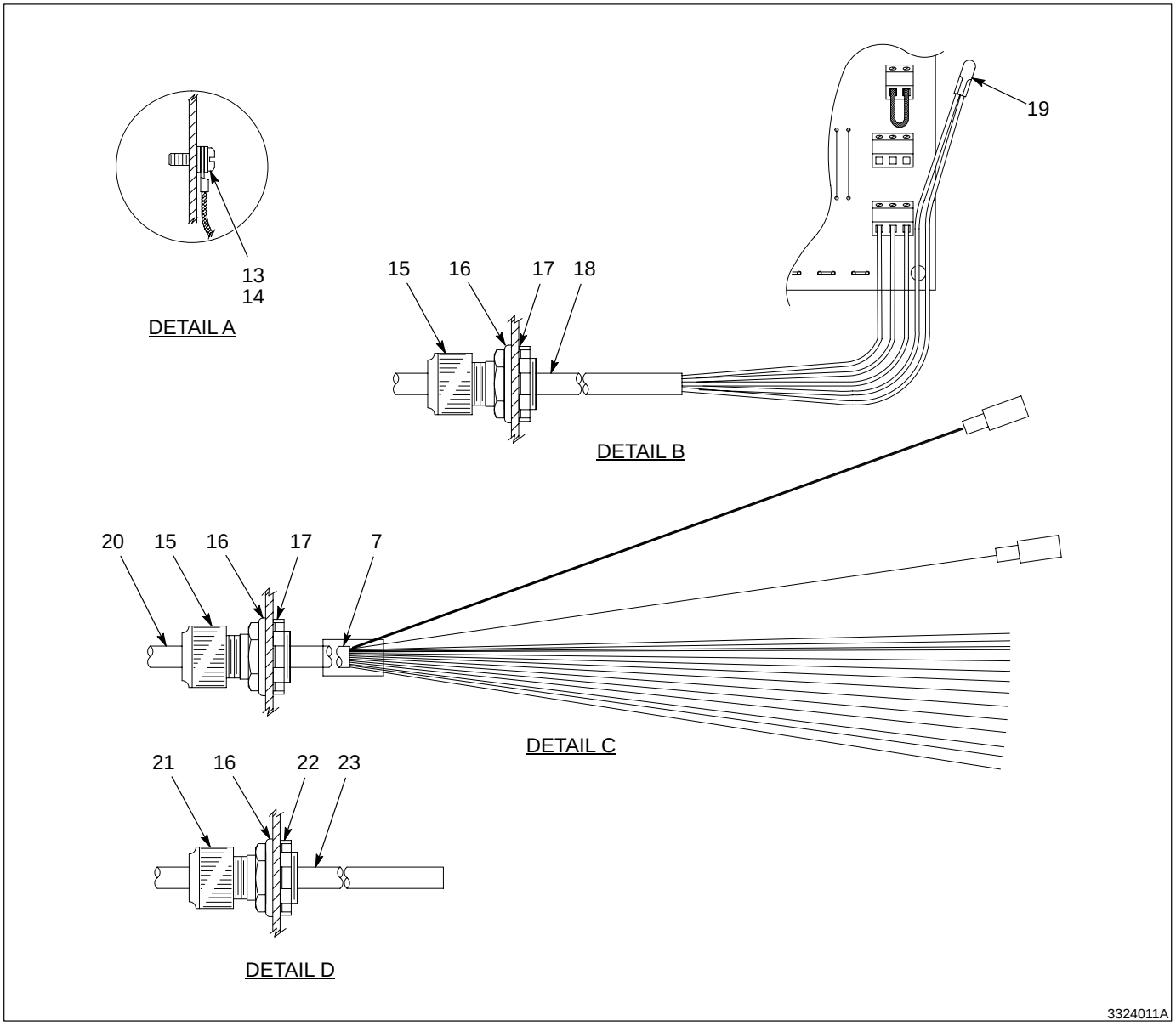

Fig. 8-2 Connections to the Basic Rack

3. Pneumatic Module

See Figures 8-3 and 8-4.

Item	Part	Description	Quantity	Note
—	- - - - - -	Module, pneumatic, Sure Coat, all-purge	1	
—	- - - - - -	Module, pneumatic, Sure Coat, no purge	1	
—	- - - - - -	Module, pneumatic, Sure Coat, bank purge	1	
1	303 083	• Panel, pneumatic, module, Sure Coat	1	
2	973 431	• Plug, pipe, socket, std, $^1/_2$, zinc	3	
3	973 282	• Tee, pipe, hydraulic, $^1/_2$, stainless, zinc	1	
4	972 841	• Connector, male, 10 mm tube x $^1/_4$ unit	8	
5	157 990	• Manifold, pneumatic, 16 port, metric	2	
6	972 125	• Elbow, male, 10 mm tube x $^1/_4$ unit	6	
7	973 128	• Ell, pipe, hydraulic, 90, $^1/_2$, stainless, zinc	2	
8	973 082	• Nipple, steel, schedule 40, $^1/_2$, 2.00	1	
9	933 326	• Connector, conduit, $^1/_2$ NPT x 0.437 grip	2	
10	163 436	• Clamp, 1.0 conduit, one-hole	4	
11	973 524	• Coupling, pipe, hydraulic, $^1/_2$, stainless, zinc	2	
12	143 010	• Fitting, carflex liqtite $^1/_2$	2	
13	973 127	• Elbow, pipe, hydraulic, 90, $^1/_2$, stainless, zinc	1	
14	973 077	• Nipple, steel, schedule 40, $^1/_2$, 3.00	2	
15	163 435	• Clamp, 0.75 conduit, one-hole	1	
16	971 100	• Connector, male, 6 mm tube x $^1/_4$ unit	8	A
17	972 142	• Elbow, male, 6 mm tube x $^1/_4$ unit	7	
18	303 082	• Valve, air or 24 v pilot, $^1/_2$ NPT	1	B
19	183 493	• Bracket, long, l-shaped	1	
20	972 620	• Connector, male, 37, $1^1/_{16}$-12 x $^1/_2$, brass	1	
21	901 151	• Valve, ball, $^1/_2$ NPT	1	
22	984 703	• Nut, hex, m6, stainless, zinc	6	
23	303 084	• Regulator, filter, 100 cfm, $^1/_2$ NPT	1	
24	983 409	• Washer, lock, metric, split, M6, stainless, zinc	10	
25	324 833	• Screw, hex, cap, m6 x 16, zinc	10	A
25	982 112	• Screw, pan, slotted, M6 x 16, zinc	8	C
26	983 410	• Washer, flat, metric, narrow, M6, stainless, zinc	16	
27	973 076	• Nipple, steel, schedule 40, $^1/_2$, 1.12	3	

NOTE A: Available on all-purge and no purge units only.
B: Available on all-purge units only.
C: Available on bank purge units only.

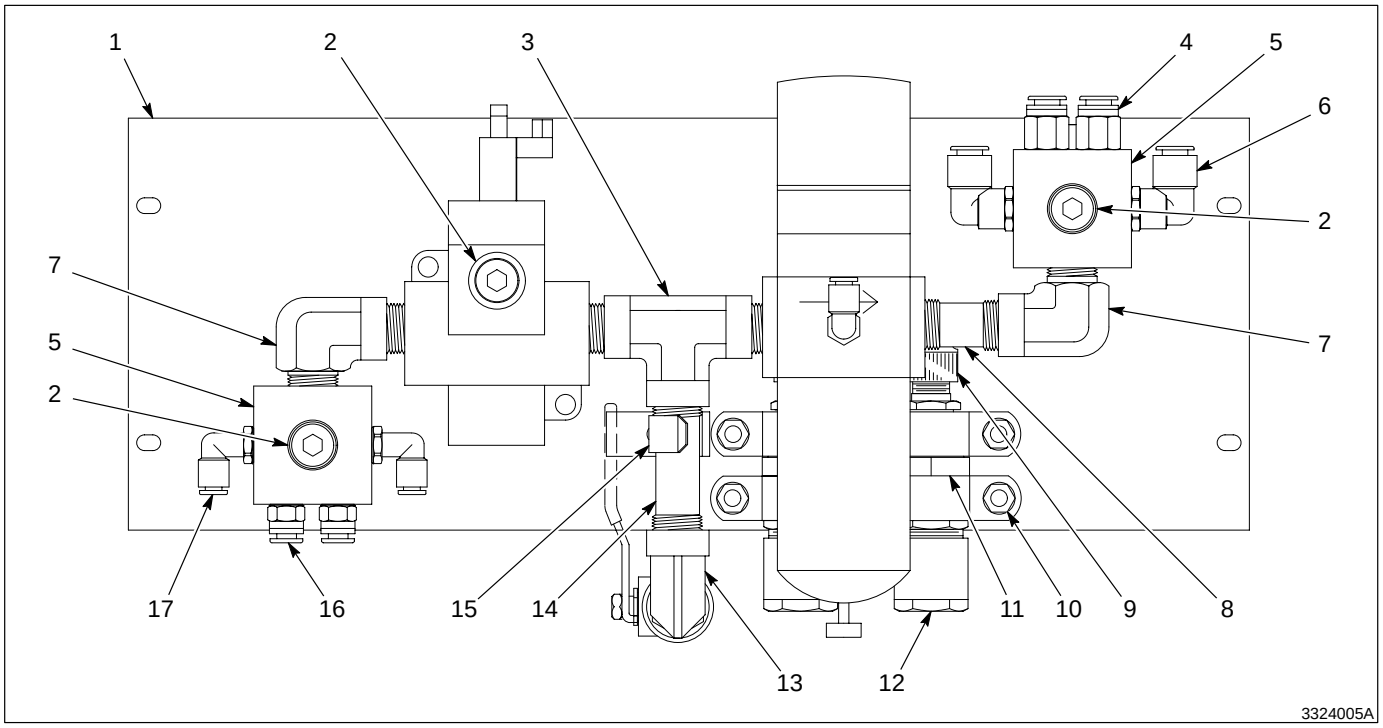

Fig. 8-3 Pneumatic Module

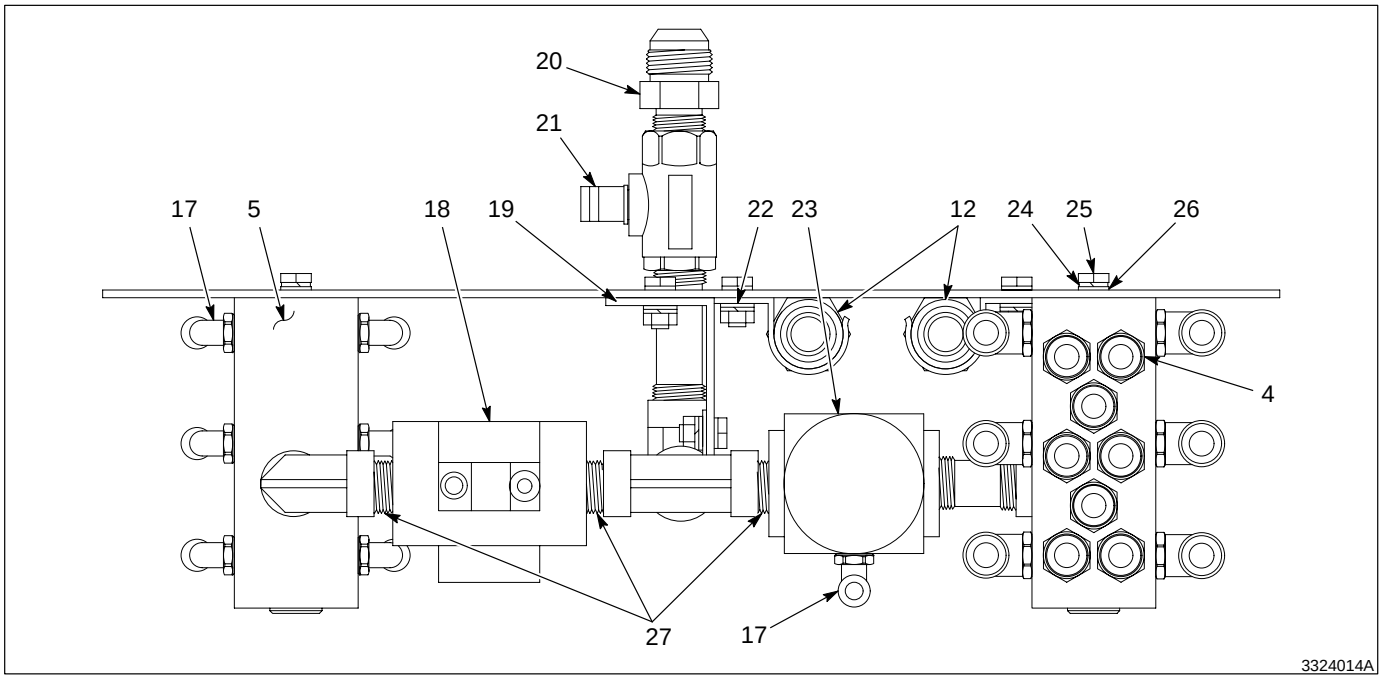

Fig. 8-4 Pneumatic Module

4. Base Master Module

See Figures 8-5 and 8-6.

Item	Part	Description	Quantity	Note
—	- - - - - -	Module, base master	1	
1	322 404	• Switch, rocker, double pole single throw, dust-tight	2	
2	309 455	• Valve, pushbutton nc, pneumatic	1	
3	973 572	• Coupling, pipe, hydraulic, $^1/_8$, stainless, zinc	1	
4	972 840	• Tee, male run, 6 mm tube x $^1/_8$ unit	1	
5	901 260	• Gauge, air, 0–100 psi, 0–7 bar, kpa	1	
6	631 138	• Gasket, gauge, diameter 40 mm	1	
7	305 938	• Switch, keylock, 3-position, rotary	1	
8	148 257	• Switch, rocker, double pulse single throw, red lens	1	
9	984 702	• Nut, hex, M5, brass	4	
10	983 401	• Washer, lock, m, split, M5, stainless, zinc	18	
11	983 021	• Washer, flat, 3, 0.203 x 0.406 x 0.040, brass	4	
12	982 284	• Screw, captive, M5 x 10, stainless steel	6	
13	303 063	• Panel, front, Sure Coat, master control	1	
14	138 426	• Gasket, panel, front, master control	1	
15	288 804	• Fuse holder, panel mount, 5 x 20	2	
16	939 965	• Fuse, 10, slo-blo, 250 V, 5 x 20 mm	2	
17	138 434	• Circuit board, distribution, master control	1	
18	983 421	• Washer, lock, metric, external, M4, stainless, zinc	16	
19	982 092	• Screw, pan, slotted, M4 x 10, zinc	12	
20	187 040	• Mount, cable tie, 4 way, adhesive	2	
21	303 069	• Washer, sealing, $^1/_4$ NPT, 0.54/0.796	2	
22	971 778	• Union, bulkhead, 6 mm tubing	2	
23	900 741	• Tubing, polyurethane, 6/4 mm, black	2 ft	
24	305 935	• Panel, power supply, Sure Coat	1	
25	982 000	• Screw, pan, slotted, M5 x 10, zinc	14	
26	982 444	• Screw, pan, recessed, M4 x 20, zinc	4	
27	933 261	• Block, terminal, 10 terminal	2	
28	933 128	• Jumper, terminal, block, low pf	5	
29	900 809	• Cap, flush, $^7/_8$ diameter	17	
30	305 932	• Cabinet, master control	1	

4. Base Master Module
(contd)

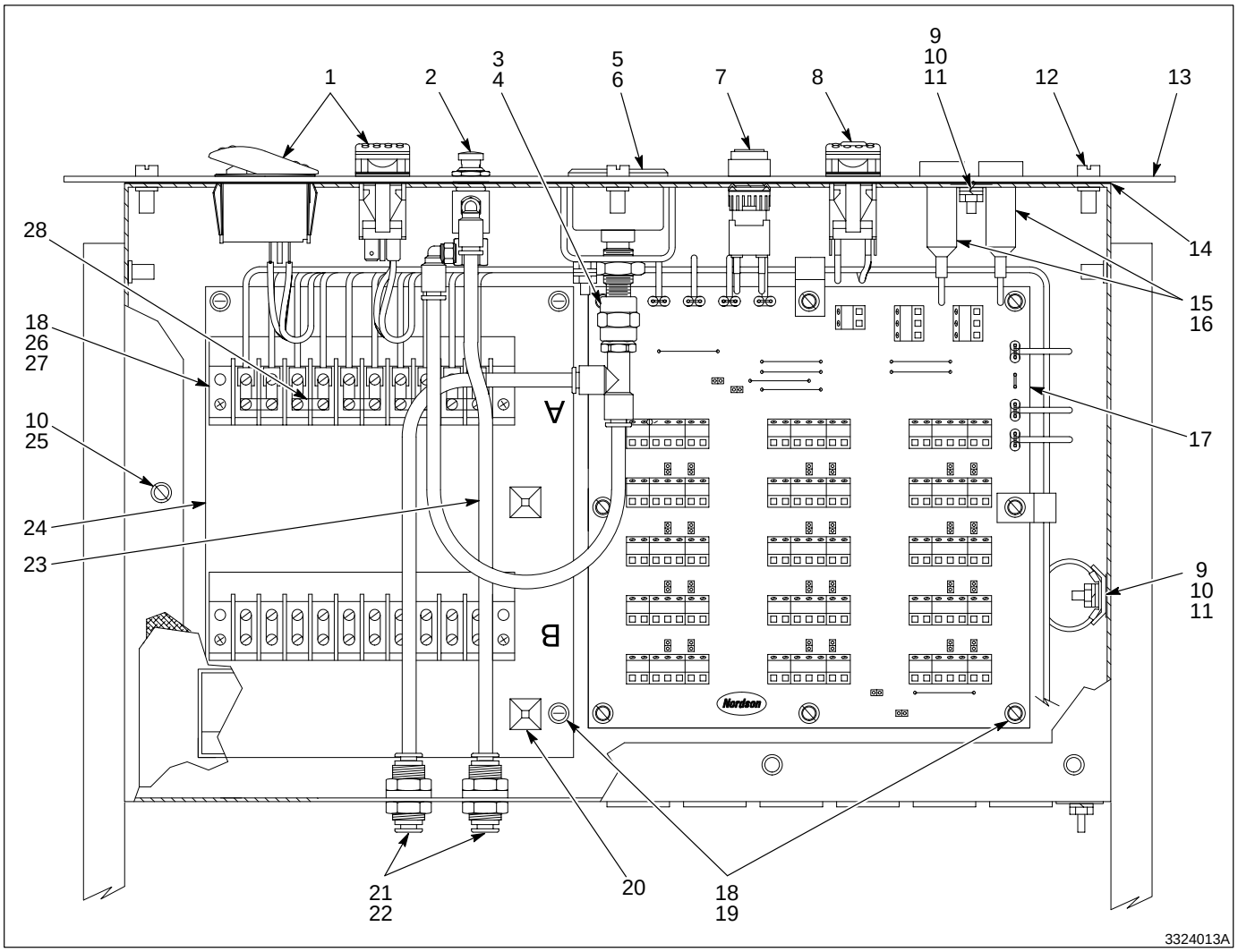

Fig. 8-5 Base Master Module Top View

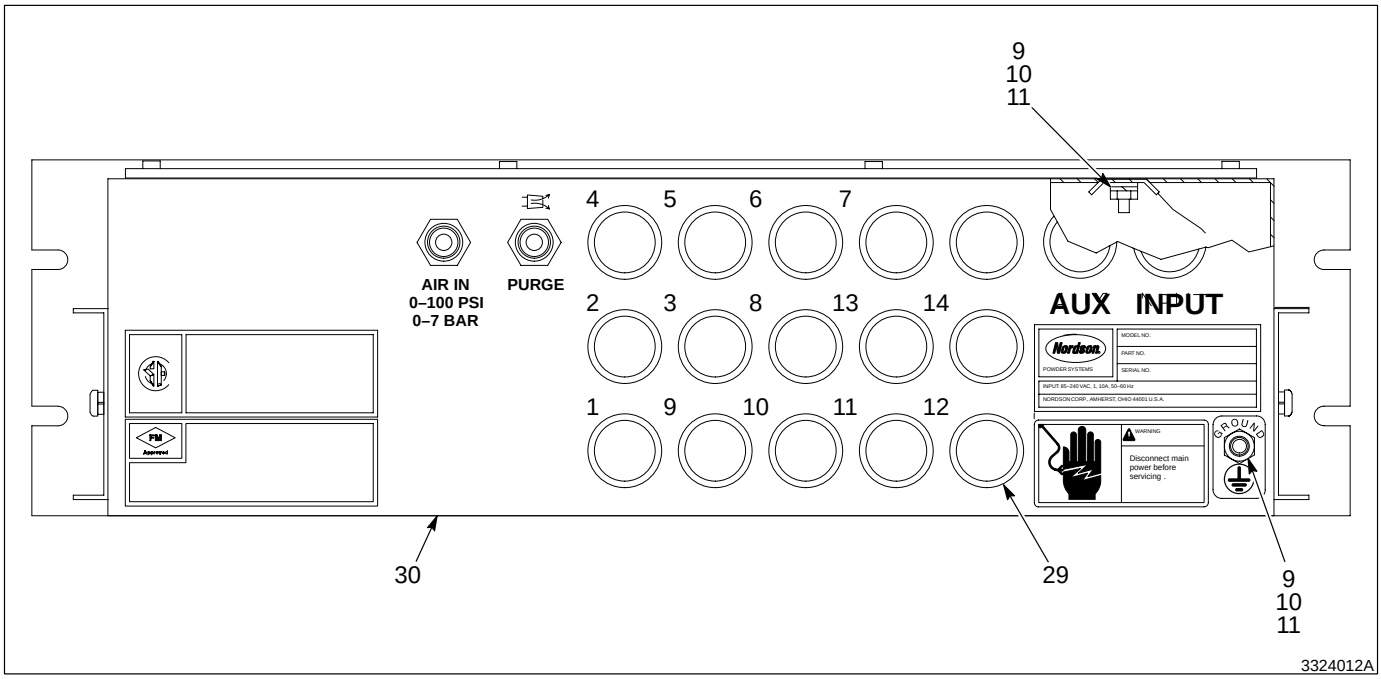

Fig. 8-6 Base Master Module Back View