

iControl® Integrated Control System

Customer Product Manual
Part 1024757E
For Original Style Enclosures
Issued 4/04

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Section 1

Safety

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.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

All phases of equipment installation must comply with all federal, state, and local codes.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- 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.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding



WARNING: Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program. If you receive even a slight electrical shock or notice static sparking or arcing, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

All work conducted inside the spray booth or within 1 m (3 ft) of booth openings is considered within a Class 2, Division 1 or 2 Hazardous location and must comply with NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

- All electrically conductive objects in the spray areas shall be electrically connected to ground with a resistance of not more than 1 megohm as measured with an instrument that applies at least 500 volts to the circuit being evaluated.
- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator platforms, hoppers, photoeye supports, and blow-off nozzles. Personnel working in the spray area must be grounded.
- There is a possible ignition potential from the charged human body. Personnel standing on a painted surface, such as an operator platform, or wearing non-conductive shoes, are not grounded. Personnel must wear shoes with conductive soles or use a ground strap to maintain a connection to ground when working with or around electrostatic equipment.
- Operators must maintain skin-to-handle contact between their hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If gloves must be worn, cut away the palm or fingers, wear electrically conductive gloves, or wear a grounding strap connected to the gun handle or other true earth ground.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments or cleaning powder spray guns.
- Connect all disconnected equipment, ground cables, and wires after servicing equipment.

Action in the Event of a Malfunction

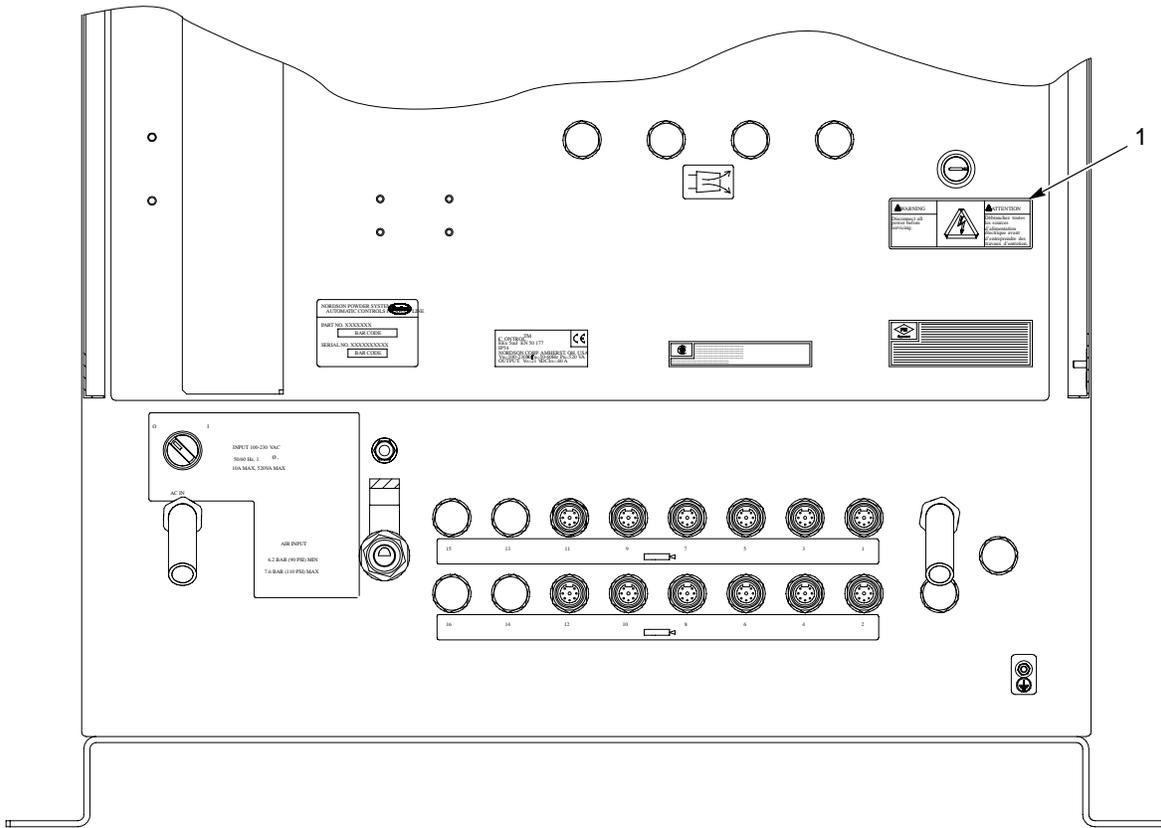
If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the equipment.

Disposal

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

Item	Part	Description
1.	1034161	 WARNING: Disconnect power before servicing.



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Figure 1-1 Safety Labels

Section 2

Description

System Description

Read this section to familiarize yourself with the iControl system and the part detection, identification, and automatic triggering concepts. Read the Configuration, Preset Setup, and Operation sections to learn how to configure the system, set triggering and gun control parameters for each part you coat, and operate the system.

The Nordson iControl Integrated Control System integrates all powder control functions into a single, easy to operate system. It provides digital control and automation for:

- part detection, identification, and tracking
- automatic gun triggering
- electrostatic control
- powder pump and gun air flow control
- gun or nozzle purging

The iControl system is designed for use with the following Nordson automatic powder spray guns:

- Sure Coat
- Tribomatic
- Versa-Spray

An iControl master console controls and triggers 16 powder spray guns. For systems with up to 32 guns, a slave console is added. Only the master console contains the controller and operator interface.

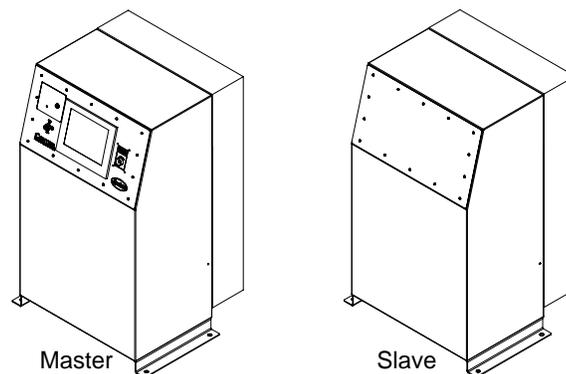


Figure 2-1 iControl Consoles

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Console and System Hardware

See Figures 2-2 and 2-3.

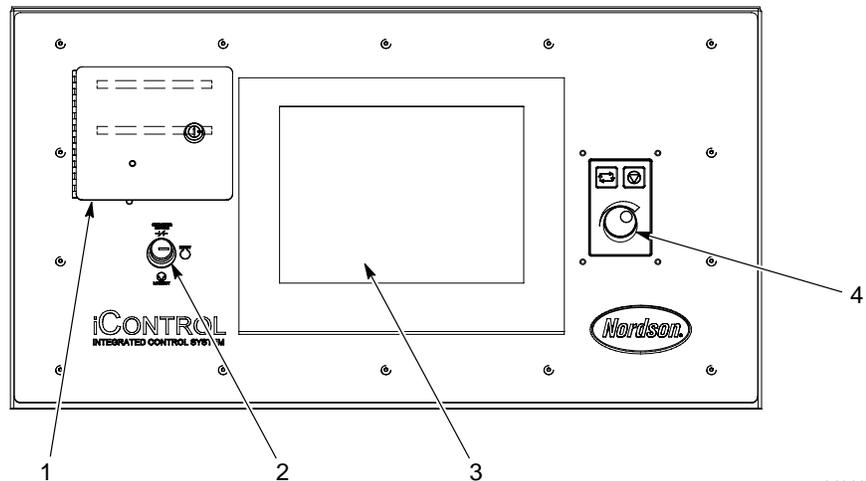
A fully equipped master console controlling 16 spray guns contains the following hardware:

- operator interface consisting of LCD touch-screen display, rotary dial, and interlock keyswitch
- single board computer (SBC)
- CompactFlash cards for program and user data storage
- I/O board
- backplane, card cage, and 8 gun control cards (one card controls two guns)
- power supply
- alarm, remote lockout, and conveyor interlock relays
- 8 iFlow digital flow modules (one flow module supplies two guns with pump and gun (electrode wash) air)
- 4 preset precision regulators (one regulator supplies two flow modules)

Slave consoles control 16 guns but do not have an operator interface, SBC, CompactFlash cards, I/O board, or the alarm, lockout, and interlock relays.

In addition, the system requires the following external hardware:

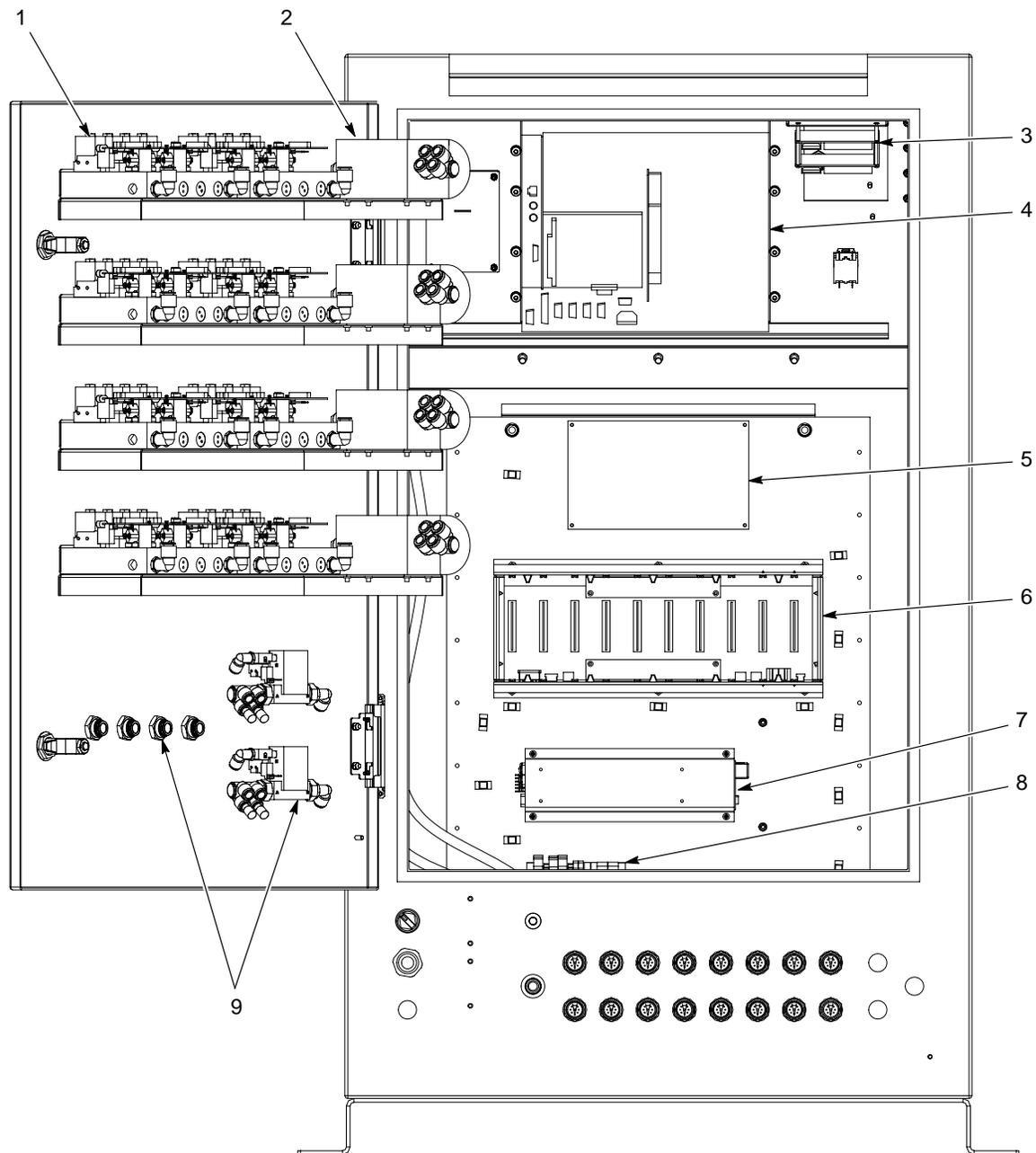
- photoeye junction box with power supply and terminals for zone and flag photoeyes
- up to eight zone photoeyes and eight flag photoeyes or part ID inputs
- one conveyor motion encoder



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Figure 2-2 Master Console Front Panel

- | | |
|------------------------|---------------------|
| 1. CompactFlash cards | 3. LCD touch screen |
| 2. Interlock keyswitch | 4. Rotary dial |



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Figure 2-3 iControl Master Console Internal Components

- | | | |
|----------------------------------|--|---------------------------------|
| 1. iFlow digital airflow modules | 4. SBC and LCD display | 7. Power supply |
| 2. Regulators | 5. I/O board | 8. Relays and terminal block |
| 3. CompactFlash cards | 6. Card cage, backplane, and gun control cards | 9. Nozzle purge kits (optional) |

Photoeye Junction Boxes

A photoeye junction box (PEJB) is provided with each system. It contains a 24 Vdc power supply for the zone and flag photoeyes and the conveyor encoder, along with connections for their cables.

A shielded, 25-conductor I/O cable connects the junction box to the master console. If the master console cannot be located within direct wiring range (19 ft) of the junction box, an extension box and cable are provided.

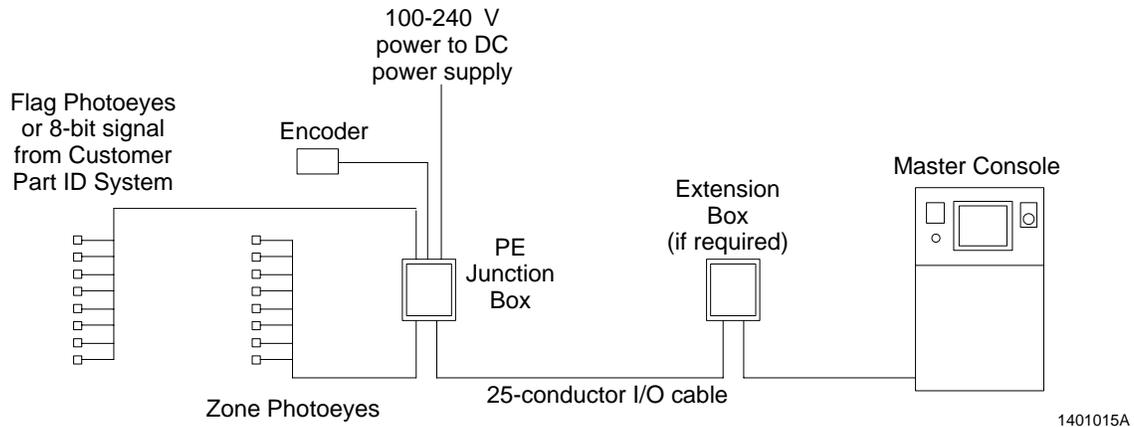


Figure 2-4 System Diagram - I/O Cable Connections

Operator Controls

The iControl software provides a graphical user interface (GUI) that provides screens to

- configure the system
- set up and adjust spray settings (presets) for each gun
- monitor and control gun operation and purging
- control part ID mode
- respond to system alarms

The operator performs all setup and operation tasks with the touch screen and the **Rotary Dial**. The rotary dial allows you to quickly enter values in data fields. Selecting a data field and rotating the dial clockwise increases values; rotating it counterclockwise decreases values.

The 3-position **Interlock Keyswitch** on the front panel allows the operator to run the system (Ready), shut off all guns (Lockout), or trigger the guns without a conveyor on signal (Conveyor Bypass).

The iControl software is a proprietary application developed by Nordson Corporation that runs on a real-time operating system. Communications between internal devices and other iControl consoles are handled by a Controller Area Network (CAN).

The iControl system is designed so that additional features can easily be added. The iControl software resides in a CompactFlash card. Program upgrades involve no more than changing the program card. Another CompactFlash card stores the spray gun settings (user data).

Presets

Presets are spray gun settings that vary depending on the part to be coated. Presets control

- electrostatics
- air flow
- lead and lag triggering
- zone assignments

Up to 255 unique presets can be set for each gun. Presets have a one-to-one relationship with part IDs. For example, when part 2 is identified, all guns are set to preset 2. Although each gun will spray the part using the same preset number, the settings for that preset number can be different for each gun.

The presets are stored on both the user data CompactFlash card and in the gun control cards. When a part is identified, only the corresponding preset number is sent to the card. This allows the spray guns to respond quickly to part changes and reduces traffic on the CAN network.

NOTE: When the system is powered up, it checks to ensure that the presets on the user data card and in the gun control cards is the same. If not, such as when the user data card is changed, the new presets are downloaded from the user data card to the gun control cards.

Electrostatics

For a specific preset, the operator can choose one of the following electrostatic settings:

KV Control

The kV setting controls the voltage output from the spray gun. KV control provides maximum transfer efficiency when coating large objects with a gun-to-part distance of 0.2-0.3 m (8-12 in.), such as flat panels. To set kV, the Select Charge mode must be zero (off).

AFC Control

The AFC (Automatic Feedback Current) setting controls the maximum current output (μA) from the spray gun. AFC control prevents excess charging of the powder and provides an optimum combination of kV and electrostatic field strength for coating parts with interior corners and deep recesses at close range. To set AFC, the Select Charge mode must be zero (off).

Select Charge Mode

In Select Charge mode, one of four electrostatic charging modes can be selected. The settings for modes 1 (Recoat), 2 (Special), and 3 (Deep Cavity) cannot be changed. Select Charge mode 4 is user-programmable, allowing both kV and μA to be controlled. Mode 0 turns Select Charge off and allows you to set kV or AFC. Refer to *Preset Setup* in this manual for a detailed description of each mode and its uses.

Air Flow

The iControl system controls airflow to the spray gun powder pumps, providing a more consistent and steady flow of powder to the spray guns than systems that control air pressure. The airflow controls consist of precision regulators and iFlow digital flow modules.

One regulator supplies air to two iFlow digital airflow modules. Each module supplies flow-rate and atomizing air to two powder pumps, plus gun air (electrode wash air) to two spray guns. Flow-rate and atomizing air is turned on and off when the spray guns are triggered on and off.

The modules provide closed-loop control of flow-rate and atomizing air flow, constantly sensing their output and adjusting it to maintain air flow at the preset settings. The regulators provide air at a constant pressure to the air flow modules so the closed-loop control can operate at the calibrated range. The regulators are set 5.86 bar (85 psi) at the factory—do not change their settings.

Maximum output per powder pump is 13.6 m³/hr (8 scfm). Each channel (flow or atomizing air) has a maximum output of 6.8 m³/hr (4 scfm).

Two solenoid valves on the modules control the flow of gun air (electrode wash air) to the spray guns. The air flow is regulated by a fixed-orifice restrictor at the output. The solenoids can be set to turn on and off as the guns are triggered or for continuous flow.

Lead and Lag Triggering

As parts move through the booth, the spray guns are triggered on and off according to their pickoff points and the preset lead and lag settings.

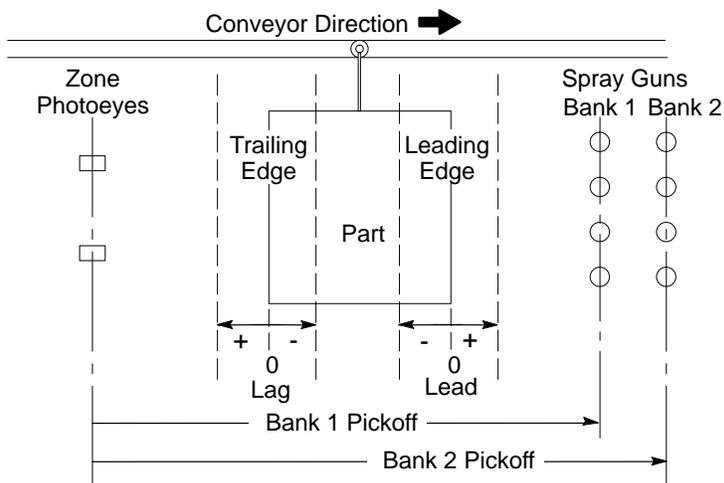
The pickoff point is the distance from the zone photoeyes to the spray guns. Each spray gun or bank of spray guns can have their own pickoff points. The pickoff points are set during system configuration, since they only change if the guns or zone photoeyes are moved.

Lead: Distance from the spray guns to the leading edge of the part. Lead values can be positive, negative, or zero.

- A positive lead value turns on the spray guns before the leading edge reaches them (Extended Spray).
- A negative lead value turns on the spray guns after the leading edge passes them (Restricted Spray).
- A lead value of zero turns on the spray guns when the leading edge reaches the pickoff point (Perfect Pickoff).

Lag: Distance from the spray guns to the trailing edge of the part. Lag values can be positive, negative, or zero.

- A positive lag value turns off the spray guns after the trailing edge passes them (Extended Spray).
- A negative lag value turns off the spray guns before the trailing edge reaches them (Restricted Spray).
- A lag value of zero turns off the spray guns when the trailing edge passes the pickoff point (Perfect Pickoff).

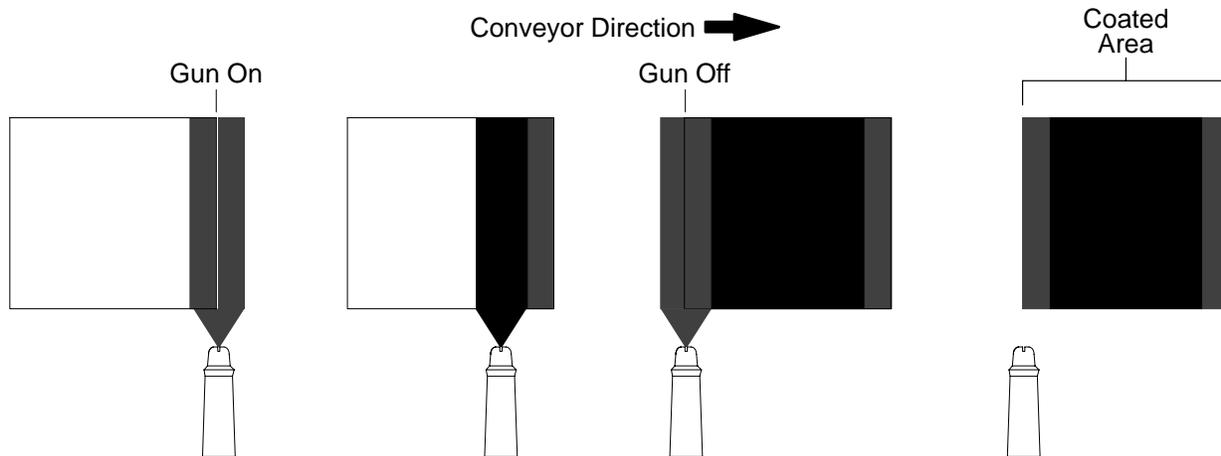


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Figure 2-5 Pickoff Point and Lead and Lag Settings

Perfect Pickoff Example

See Figure 2-6. Setting the lead and lag to zero causes the guns to start spraying just as the leading edge of the part reaches the gun, and to stop just as the trailing edge of the part passes the gun. Because the conveyor is moving forward while the guns turn on and off, the leading and trailing edges are not as well coated as the middle.

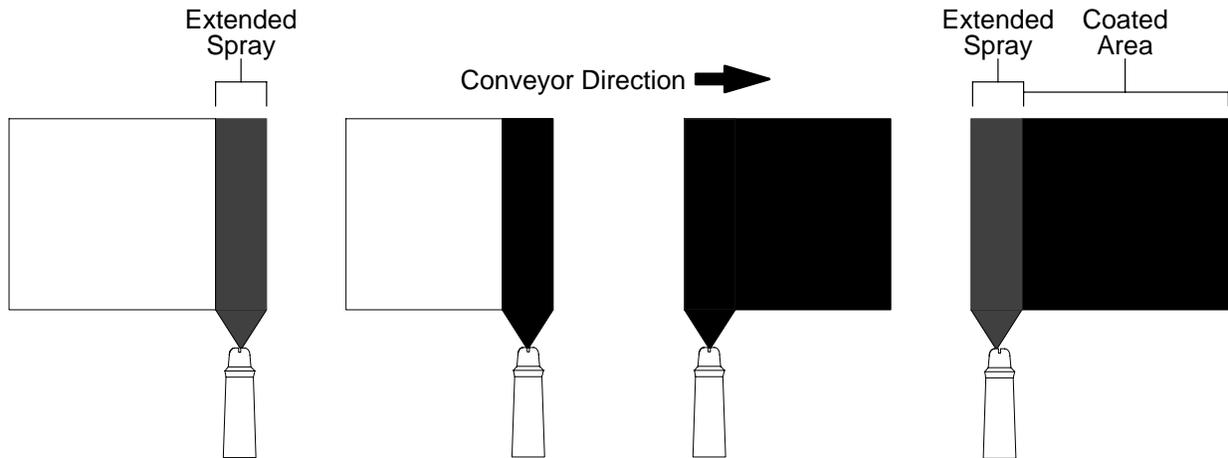


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Figure 2-6 Perfect Pickoff Example

Extended Spray Example

See Figure 2-7. Setting both lead and lag to 5 causes the guns to start spraying 5 units before the leading edge of the part reaches the guns, and to stop spraying 5 units after the trailing edge of the part passes the guns. An extended spray pattern allows the entire part to be coated consistently.

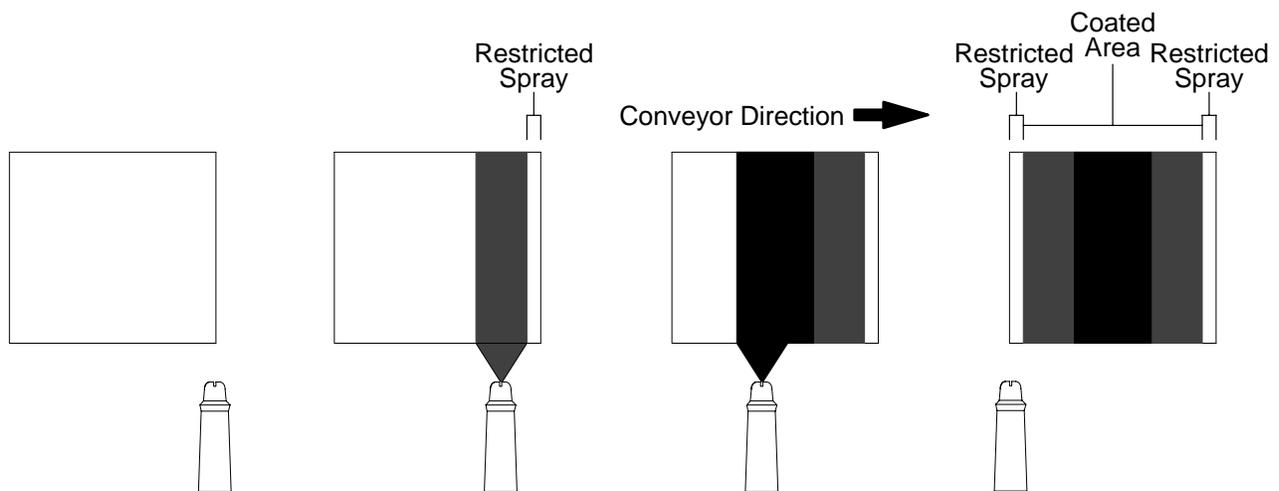


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Figure 2-7 Extended Spray Example

Restricted Spray Example

See Figure 2-8. Setting both lead and lag to -3 causes the guns to start spraying 3 units after the leading edge of the part reaches the guns, and stop spraying 3 units before the trailing edge of the part reaches the guns. A restricted spray pattern leaves the leading and trailing edges of parts uncoated or lightly coated while thoroughly coating the middle.

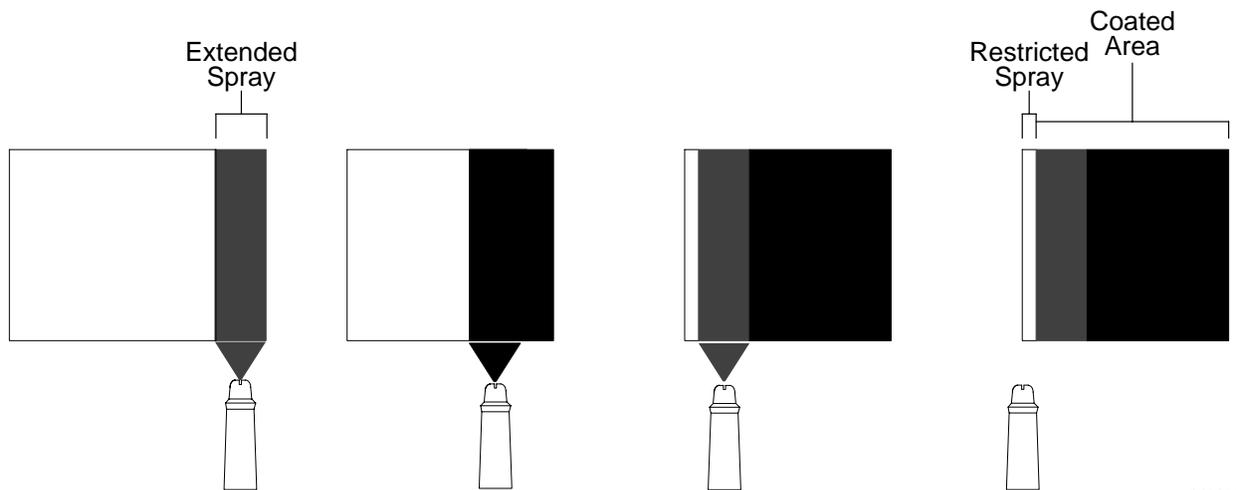


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Figure 2-8 Restricted Spray Example

Extended Leading Edge, Restricted Trailing Edge Example

See Figure 2-9. Setting the lead to 5 and the lag to -3 causes the guns to start spraying 5 units before the leading edge of the part reaches the guns, and stop spraying 3 units before the trailing edge of the part reaches the guns. This combination leaves the trailing edge uncoated or lightly coated, while the leading edge and middle are thoroughly coated.



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Figure 2-9 Extended Leading Edge, Restricted Trailing Edge Example

Part Identification and Automatic Triggering

The iControl system can accept 16 digital inputs for part detection, identification, and automatic triggering, divided into eight zone inputs and eight flag inputs. All inputs are optically isolated at the console I/O board.

Part Identification

Eight flag inputs are provided for part identification and automatic preset selection. The eight flag inputs can be connected to up to eight flag photoeyes or to a customer-supplied part identification system that sends the inputs an 8-bit binary number corresponding to the part ID.

Presets have a one-to-one relationship with part IDs. For example, when part 2 is identified, all guns are set to preset 2.

The system continues to spray parts with a preset until

- a new part ID is received by the flag inputs or
- the operator manually selects a new preset.

The flag inputs can be configured for straight or encoded flagging.

Straight Flagging

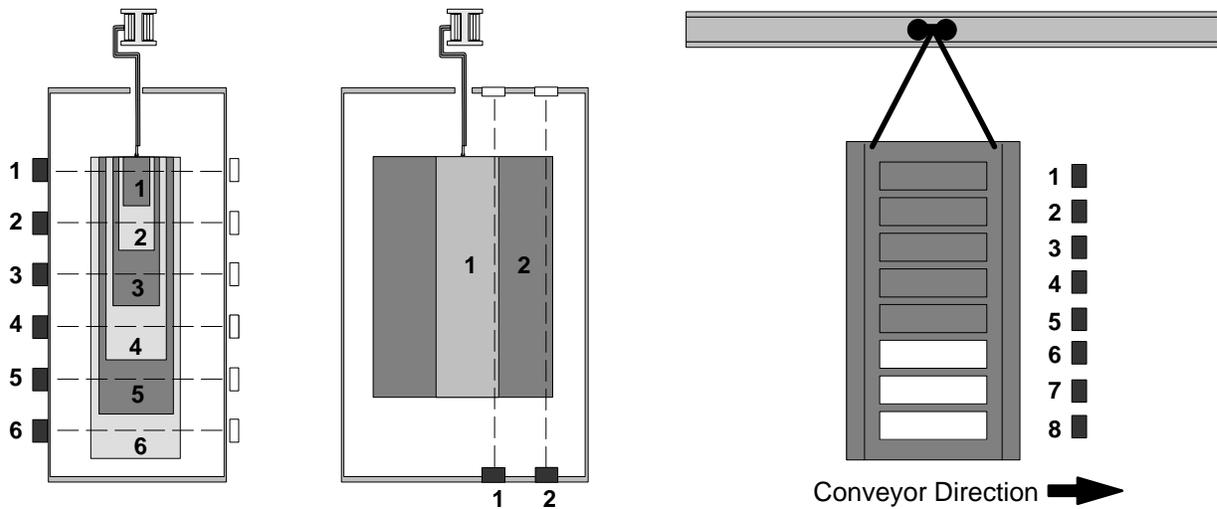
If you configure the flag inputs for straight flagging, the number of inputs receiving a signal determine the part ID. This configuration limits you to 8 part IDs.

Figure 2-10 provides three examples of straight flagging, with the flag photoeyes set for breaklight mode:

The first example uses 6 photoeyes to detect parts (or racks of parts) of different heights. When photoeye 1 detects part 1, preset 1 is loaded; when photoeyes 1 and 2 detect part 2, preset 2 is loaded; and so on.

In the second example, two photoeyes are positioned to detect enclosures with different depths. When photoeye 1 detects part 1, preset 1 is loaded, which coats the inside of a shallow cavity. When photoeyes 1 and 2 detect part 2, preset 2 is loaded, which coats the inside of a deep cavity.

In the third example, eight flag photoeyes are arranged to detect open and closed slots in a part flag. The highest numbered photoeye detecting a closed flag slot determines the part ID number. Slot five is closed, so part ID 5 is detected and preset 5 is loaded.



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Figure 2-10 Straight Flagging Example

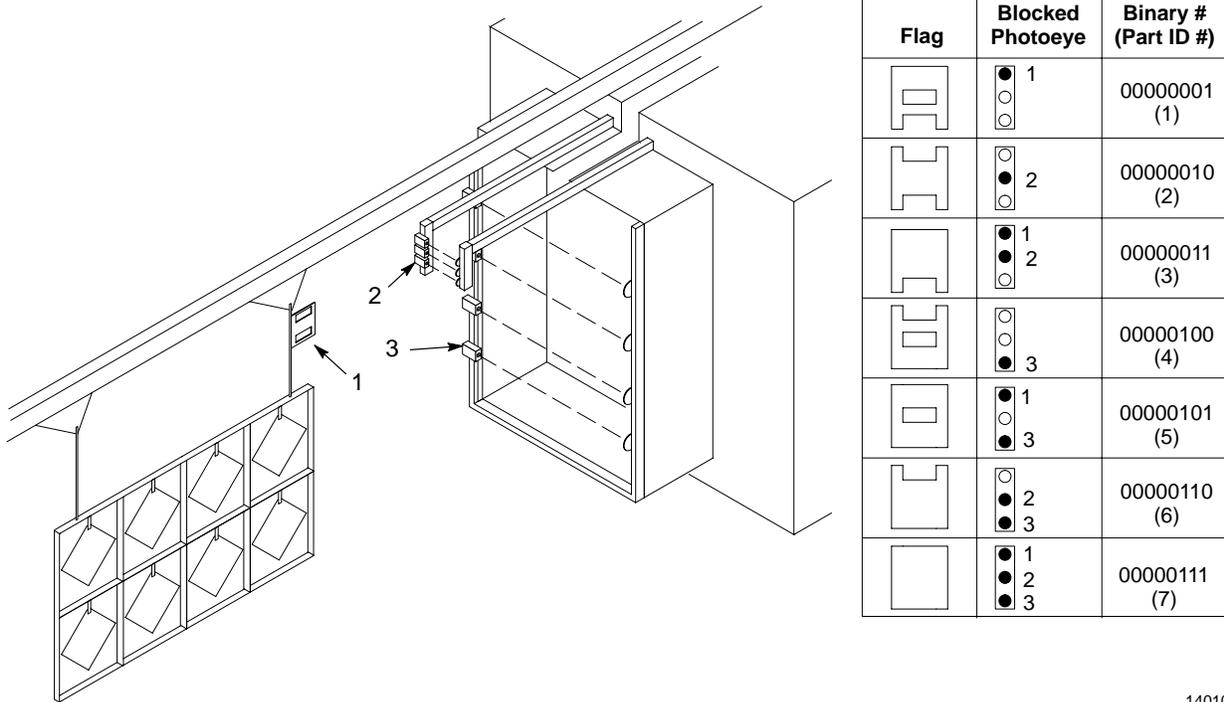
Encoded Flagging

Configuring the flag inputs for encoded flagging tells the system to receive 8-bit binary signals at the inputs. Encoded flagging allows you to identify up to 255 different part IDs (zero is not a valid part ID). The inputs can be connected to up to eight photoeyes or to a customer's part identification system, which could use bar code readers or other devices.

In a typical system that uses photoeyes for encoded flagging, the flag photoeyes read coded flags attached to the conveyor or part carrier. The flags are usually pieces of metal with rectangular slots cut in them.

NOTE: The flag photoeyes must be positioned far enough ahead of the zone photoeyes so that the flag inputs receive the part ID signal before the leading edge of the part is detected by the zone photoeyes.

Figure 2-11 provides an example of encoded flagging using three flag photoeyes. This allows you to identify 7 different parts (0 is not a valid part ID).



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Figure 2-11 Example of Encoded Flagging Using Three Flag Photoeyes

1. Flag

2. Flag photoeyes

3. Zone photoeyes

Flag Filter Delay

The flag filter delay is the distance the conveyor moves after the flag photoeyes detect the flag before the iControl controller reads the signal from the photoeyes. The delay must always be positive. The delay prevents reading a false part ID from the solid edge of the flag before the slots.

Automatic Triggering (Zones)

Zone inputs are used for automatic triggering. Up to eight photoeyes connected to the zone inputs can be mounted in front of the entrance to the booth to detect parts as they enter the booth, the zones the parts occupy, and the length of the part.

See Figure 2-12. In the first example, four zone photoeyes are mounted so that they create four vertical zones within the booth. The spray guns could then be assigned to the zones as follows:

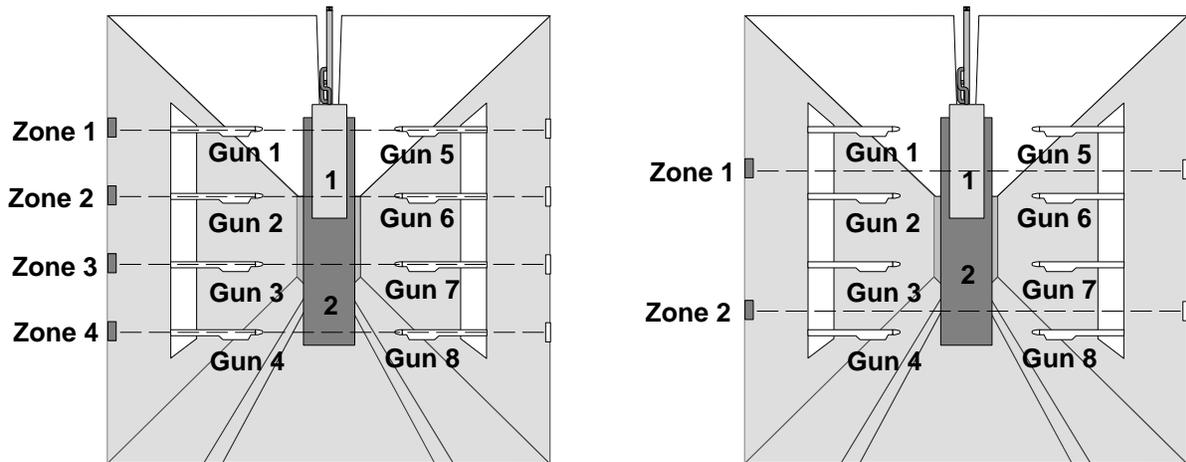
Automatic Triggering (Zones) *(contd)*

Part ID 1		Part ID 2	
Guns	Zones	Guns	Zones
1, 5	1	1, 5	1
2, 6	2	2, 6	2
-	-	3, 7	3
-	-	4, 8	4

When part 1 is sent through the booth, only guns 1, 2, 5, and 6 are triggered since only zone 1 and 2 photoeyes detect the part. When part 2 is sent through the booth, all spray guns are triggered since all four zone photoeyes detect the part.

In the second example, if you had only two zone photoeyes, you could assign guns 1, 2, 5, and 6 to zone 1 and guns 3, 4, 7 and 8 to zone 2.

Zone assignments are part of the preset settings. This allows you to change a gun's zone assignment depending on the part being sprayed, if necessary. If you set a zone assignment to zero, the gun will not be triggered. This allows you to shut off a gun for a particular part.



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Figure 2-12 Zone Example

The zone photoeye signal is combined with the encoder signal to track the part location and trigger the spray guns according to the zone and the lead and lag trigger settings in the the preset for the part.

Zone Photoeye Filter

The zone filter is a positive or negative length that adds or subtracts from the photoeye signal. A positive length extends the zone photoeye signal to prevent narrow part skipping and signal chattering; a negative length shortens the zone photoeye signal to prevent hanger detection.

Part Tracking (Encoder)

The iControl system provides one optically isolated digital input for a conveyor motion encoder. The signals from the encoder along with the signals from the zone photoeyes track parts as they move through the booth and trigger the spray guns on and off according to the zone and the lead and lag settings in the presets.

The encoder also serves as a backup to the conveyor interlock. If the conveyor stops moving the encoder stops sending signals to the iControl system. The system then shuts off the spray guns. To trigger the spray guns without an encoder signal, the conveyor interlock must be bypassed.

The encoder can be either mechanical or optical. The encoder must have a 50% duty cycle.

Units of travel are given in inches or centimeters. At a resolution of one inch to one pulse (1:1), the effective distance parts can be tracked by the iControl system is approximately 333 feet. At a 2:1 resolution ($1/2$ inch per pulse), the effective tracking distance is halved, to approximately 166 feet.

Interlock Keyswitch Functions

When the keyswitch on the front of the console is in the **Ready** position, the spray guns cannot be triggered unless the controller is receiving a signal from the conveyor. This prevents powder waste and hazardous operating situations.

In the **Bypass** position, you can trigger the guns on and off without a signal from the conveyor. Use the Bypass position to set up and test spray gun settings.

In the **Lockout** position, the guns cannot be triggered. Use this position when working inside the booth.

Purge Functions

There are three purge functions:

- **Nozzle Purge:** Used only with Versa-Spray guns equipped with purge adapters. Uses air pressure (typically line pressure) to blow powder out of the gun nozzle.
- **Evacuation Purge:** Can be used with all gun models. Uses atomizing air to blow powder out of the powder hose and gun, to help minimize powder surging when the guns are triggered on for some powders or application conditions.
- **Soft Start:** Can be used with all gun models. When the guns are triggered on, ramps up the powder flow rate slowly and softly to help minimize powder surging for some powders or application conditions.

Nozzle Purge

Nozzle purge supplies high-pressure air (typically line pressure) to the spray guns to blow out the powder path and nozzle and minimize powder buildup. To use nozzle purge:

- the Versa-Spray guns must be equipped with the optional purge adapters.
- purge kits containing solenoids valves, manifolds, and fittings must be installed in the iControl cabinets.

Nozzle purge kits are available in two configurations:

Single Purge Kit: One solenoid valve, manifold, and fittings for up to 16 guns. If you have a single console system, installing one single purge kit provides one bank of guns. If you have a two-console system, installing one single purge kit in each console provides two banks of guns.

Dual Purge Kit: Two solenoid valves, two manifolds, and fittings for up to 16 guns. If you have a single console system, installing one dual purge kit provides two banks of guns. If you have a two-console system, installing one dual purge kit in each console provides four banks of guns.

Nozzle purging must be enabled and configured through the Nozzle Purge Configuration screen before it can be used. Settings are enable/disable, timer, delay, line gap, number of banks, and gun-to-bank assignment.

Nozzle purging has two modes, **Auto** and **Manual**, set from the Nozzle Purge mode screen, which is directly accessible from the Main screen.

Auto Mode Operation

If you set the nozzle purge mode to Auto, then nozzle purging takes place automatically according to the nozzle purge configuration settings. It works as follows:

If the gap between the part being sprayed and the next part is equal to or greater than the line gap setting, then nozzle purging starts after the trailing edge of the part passes the bank of spray guns and moves the purge delay distance. Purging continues until the purge timer expires.

If the distance between the part being sprayed and the next part is less than the line gap setting, then purging is not activated between those parts. If a new part enters the gap area while the spray guns are being purged, then purging is turned off and the spray guns start spraying at the preset settings.

Manual Mode Operation

To purge the spray gun nozzles manually, you set the purge mode to manual, and touch the manual trigger button to turn on the purge. All the spray guns in the booth are purged until you touch the button again.

Evacuation Purge

Evacuation purge uses atomizing air (Versa-Spray and Sure Coat guns) or diffuser air (Tribomatic guns) air to softly purge the powder hose and gun (gun only for Tribomatic guns). This function operates automatically for all guns when configured and enabled. It works as follows:

As each spray gun triggers off the atomizing or diffuser air flow is changed to the purge setting and continues to flow until the purge timer expires. If a new part reaches the spray gun trigger on point (pickoff plus lead setting) while the spray guns are being purged, purging is immediately stopped and the guns start spraying at the preset settings.

NOTE: This mode should not be used with In-Line powder pumps (used in Powder Feed Centers) because the atomizing air will pump powder to the spray guns, defeating the purpose of the purge function.

Soft Start

Soft Start is used to help minimize powder surging. This function operates automatically for all guns when configured and enabled. It works as follows:

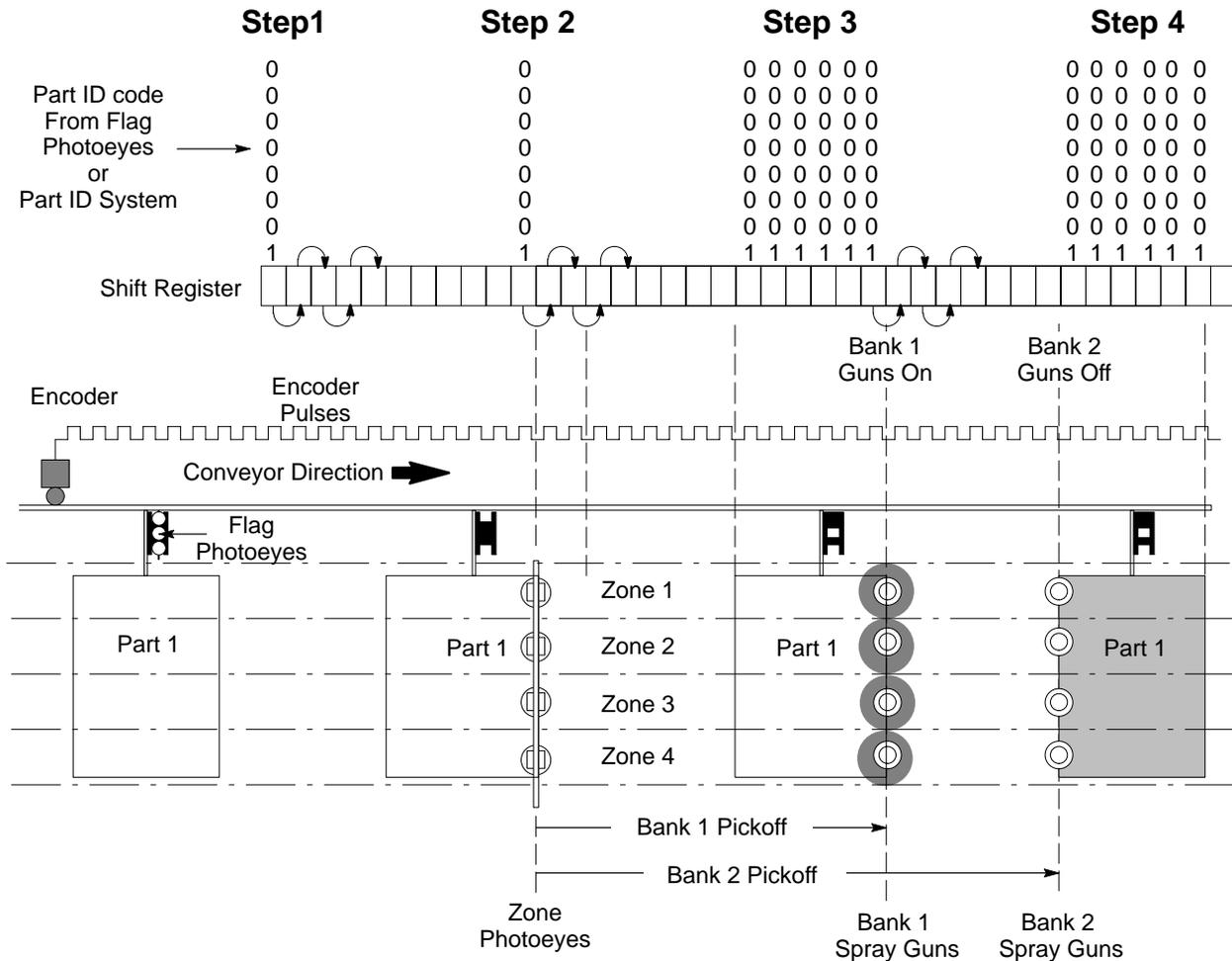
When the spray guns are triggered on, the flow-rate and atomizing air flows are increased from zero to the preset flow settings over the Soft Start ramp time (0-7.5 seconds).

NOTE: With Soft Start enabled, the powder flow takes longer to reach full flow. To compensate for this, you should increase the preset lead settings so that the spray guns trigger on farther ahead of the part.

System Operation Summary

Figure 2-13 is a diagram showing how the system functions work together to coat parts, using as an example a system with four zone photoeyes and two banks of guns.

Step	Description
1	The part ID code for part 1, from the flag photoeyes or customer's part ID system, is read into the controller's shift register. The part ID can also be entered manually. With each pulse of the encoder, the part ID is shifted forward in the shift register.
2	The zone photoeyes detect the leading edge of part 1 and latch the part ID into the shift register until the trailing edge passes. This tracks the part as it moves through the booth.
3	The leading edge of part 1 reaches the pickoff point for gun bank 1. The spray guns in the zone the part occupies turn on and start coating the part, using preset 1 settings for air flow, electrostatics, lead and lag, and zone assignment.
4	The trailing edge of part 1 reaches the pickoff point for gun bank 2. The bank 2 guns are turned off. The part ID is discarded when it reaches the end of the shift register.



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Figure 2-13 System Operation Summary

Specifications

General

Air Pressures	
Input	6.2-7.6 bar (90-110 psi)
Supply air hose	³ / ₄ .in. ID minimum
Maximum output per pump	13.6 m ³ /hr (8 scfm)
Maximum output per channel (flow-rate, atomizing)	6.8 m ³ /hr (4 scfm)
Gun air (electrode wash)	0.36 m ³ /hr (0.2 scfm)
Electrical Requirements	
Input	Unswitched: 100-240 Vac, 50/60 Hz 1 Ø, 3.15 A max., 120 VA max.
	Switched: 100-240V ac, 50/60 Hz 1 Ø, 10A max., 400VA max.
Output (to spray gun)	6-21 Vdc, 0.60 A
NOTE: The iControl system must be interlocked with the fire detection system so that the spray guns are shut off if a fire is detected inside the spray booth.	
ANSI/ISA S82.1	
Pollution Degree	2
Installation (Overvoltage)	Category II
Environmental	
Operating Temperature	32-104 °F (0-40 °C)
Operating Humidity	5-95%, non-condensing

Air 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 7 bar (100 psi) and a filter system with prefilters and coalescent type filters capable of removing oil, water and dirt in the submicron range.

Recommended Air Filter Screen Size:	5 micron or smaller
Maximum Oil Vapor in Air Supply:	0.1 ppm
Maximum Water Vapor in Air Supply:	0.48 grains/ft ³

Moist or contaminated air can cause the iFlow modules to malfunction; the powder to cake in the feed hopper, or clog the pump venturi throats, feed hoses, and spray gun powder paths; and cause grounding or arcing inside the spray gun.

Approvals

FM, CE

Rated for Class II Division 2 Hazardous Location Area (North America), or
Normal Usage Area Zone 22 (European Union)

Approved Program and User Data Cards

SanDisk, Lexar, Lexar HS, Toshiba, PNY, and Memorex 128 Mb
CompactFlash cards.

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.



WARNING: This equipment can be dangerous unless it is used in accordance with the rules laid down in this manual.

Console Mounting

The iControl system consists of a one or two iControl consoles, a photoeye junction box, and if necessary, an extension box. Power and air must be supplied to the consoles, and power must be supplied to the photoeye junction box. Your Nordson application engineer can help you plan your system installation.

The console(s) should be bolted to the floor. The photoeye junction box is typically mounted on the booth or photoeye stand.

Connections

Figure 3-1 shows the connections for a single iControl master console (up to 16 spray guns), or a master and slave console (up to 32 guns). Use this illustration and the referenced tables and figures to make the connections.



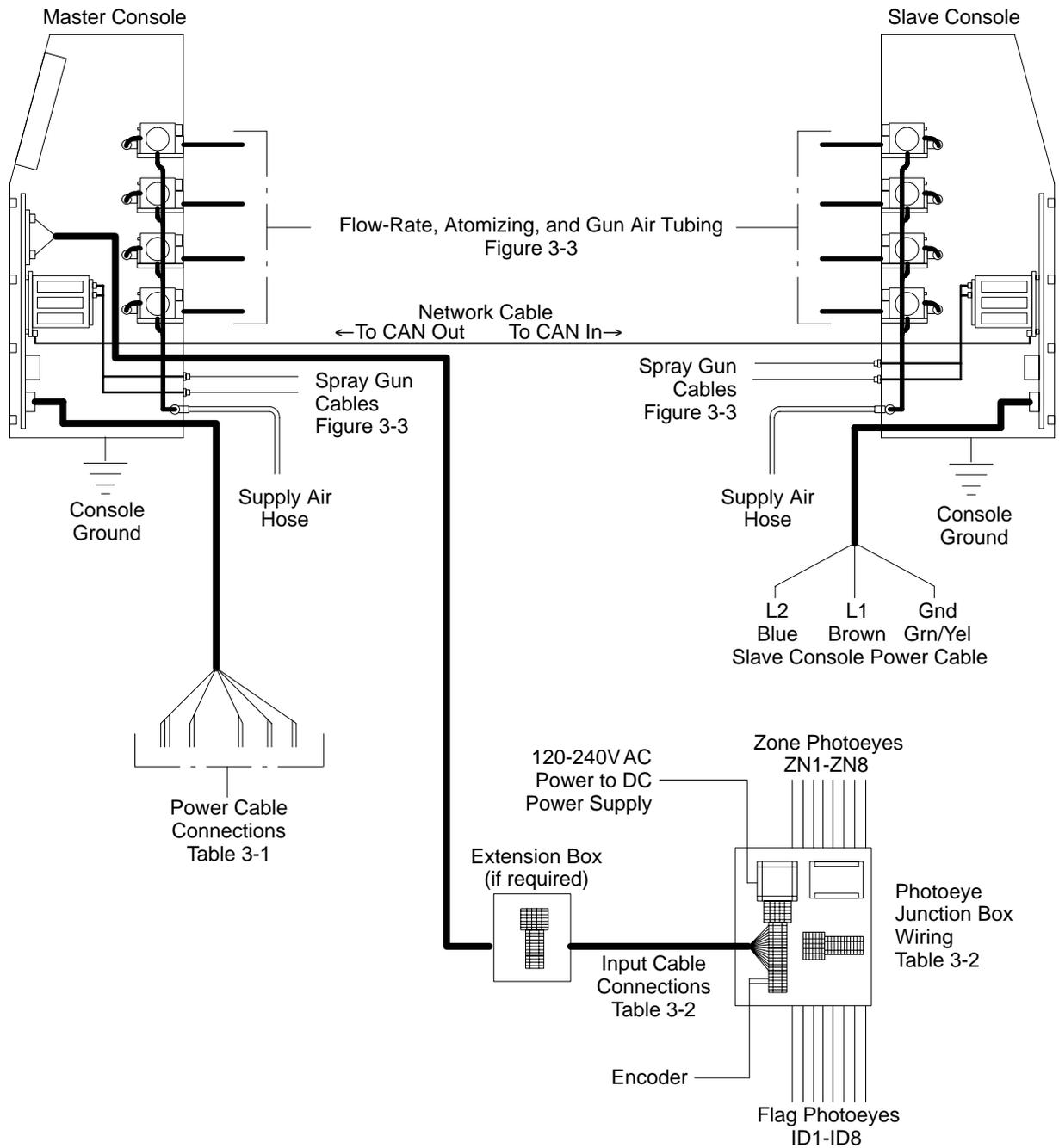
WARNING: Do not turn on console power until all electrical connections are made and checked. Failure to observe this warning could result in equipment damage, personal injury, or death.

Grounding



WARNING: All electrically conductive equipment in the spray area must be connected to a true earth ground. Ungrounded or poorly grounded equipment can store an electrostatic charge that can give personnel a severe shock or arc and cause a fire or explosion.

Use the provided ground strap to connect the console ground stud(s) to a true earth ground.



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Figure 3-1 Console Connections

Power Cable Connections

Power cables are provided with each console. Power cable connections are described in Table 3-1. Connect the power cables to the booth electrical panel, or a panel equipped with a main disconnect switch that provides the required connections.

Table 3-1 Power Cable Connections

Wire Color	Connection	Function
Black	L1 (hot)	100-240 Vac power to SBC (master console only) (unswitched)
White	L2 (neutral)	
Brown	L1 (hot)	120-240 Vac power to console power supply (master and slave consoles) (switched with booth exhaust fan motor)
Blue	L2 (neutral)	
Green/Yellow	Chassis ground (master and slave consoles)	
Gray (2)	Remote Lockout (master console only) 120/240 Vac	
Yellow (2)	Alarm (master console only) (N.C. dry contact, for customer use)	
Red	120/240 Vac N.O. conveyor interlock (master console only)	
Orange		

Switching Conveyor Interlock and Remote Lockout to 240V

See Figure 3-2. Do not remove the 20K resistors. Switch wires as follows:

- Conveyor interlock: Red from terminal G to 240 V terminal to right.
- Remote Lockout: Gray from terminal K to 240 V terminal to right.

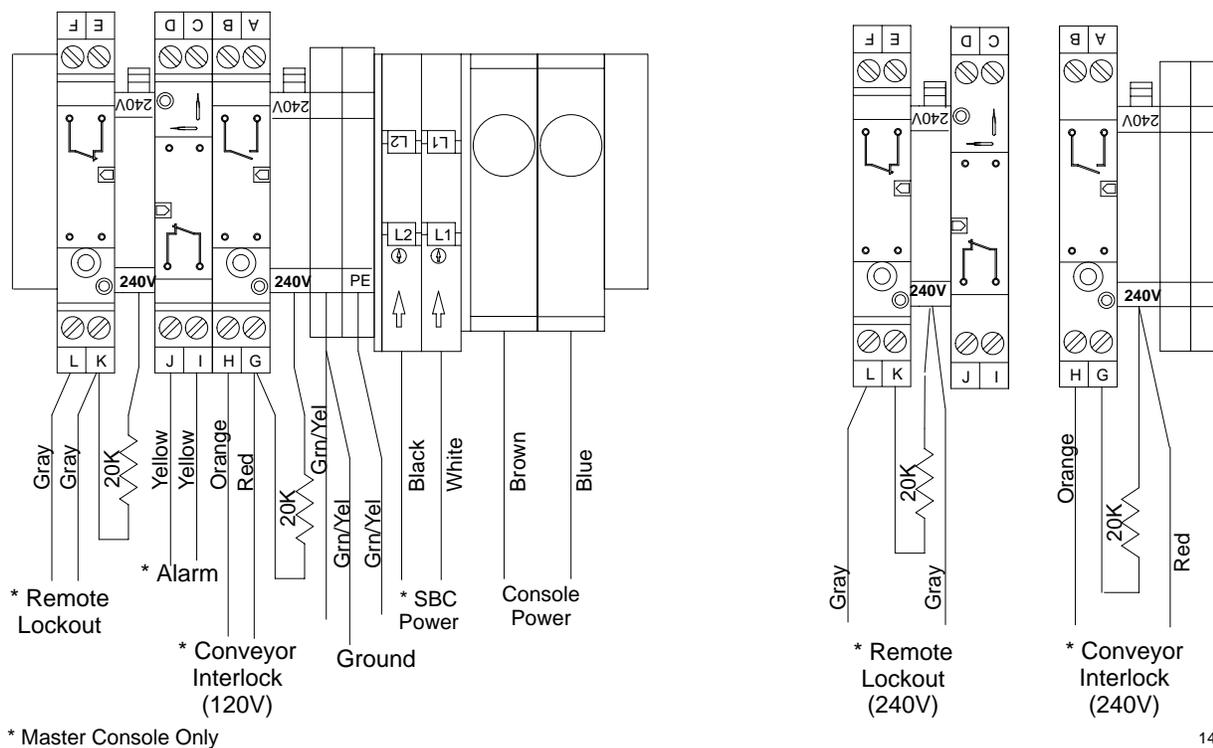


Figure 3-2 Conveyor Interlock and Power Cable Connections at Main Terminal Block in Master Console

Photoeye and Junction Box Installation

Mounting

The iControl shift register contains 4000 cells. At an encoder resolution of one inch to one pulse (1:1), this provides you with an effective part tracking capability of approximately 333 feet. At a 2:1 resolution ($1/2$ inch per pulse), the effective tracking capability is halved, to approximately 166 feet. Position your zone photoeyes and flag photoeyes so that the distance from the photoeyes to the last gun is no longer than the tracking capability provided by your encoder resolution.

A photoeye junction box (PEJB) is provided with each iControl master console. The junction box includes a power supply to provide 24 Vdc power to the encoder, photoeyes, and the load requirements of the console I/O card. 15 and 30 watt junction boxes are available. The junction box will be configured for your system when shipped. Mount the junction box on the photoeye stand or booth base.

If the PEJB cannot be direct-wired to the console with the cable provided, an extension box will also be provided. Install the extension box in a convenient location between the PEJB and the console.

Connections and Settings

Make the following connections to the PEJB. Use dust or liquid-tight strain reliefs to bring cables into the box through knockouts.

- 120-240 Vac, single phase, 50/60 Hz, 2A customer-supplied power through an unused knockout
- Zone photoeye cables to receptacles labeled ZN1 to ZN8
- Flag (part ID) photoeye cables, if used, to receptacles labeled ID1 to ID8
- 25-conductor I/O cable from iControl master console or extension box, through an unused knockout
- encoder cable, through an unused knockout

Field wiring instructions for the junction boxes and extension box are included in Section 10, Wiring and Pneumatic Diagrams. Table 3-2 lists the terminal connections at both the master console I/O board and the PEJB.

Switching Inputs to Sourcing

All inputs to the iControl console from the junction box are configured as sinking. 24 vdc is applied to all HI terminals on the I/O card. If sourcing inputs are required, configure the I/O board connections as follows.

Refer to Table 3-2 and the I/O board schematic (*iControl Schematics, Sheet 2 of 5*) in *Appendix A*.

1. Disconnect all wires from the I/O card terminals.
2. Move the 6-pole jumpers from the HI terminals to the LO terminals.
3. Install the red wire jumpers to connect all 6-pole jumpers together.
4. Connect the red wire from the 25-conductor cable to terminal 1 LO.
5. Connect the remaining wires to the HI terminals.

Table 3-2 Input Cable Connections From I/O Board to PE Junction Box
(Inputs to I/O Board are Sinking)

Wire Color	I/O Board Terminal	Junction Box Terminal Number	Function
BLK	1 LO	1	Zone 1
WHT	2 LO	2	Zone 2
GRN	3 LO	3	Zone 3
ORG	4 LO	4	Zone 4
BLU	5 LO	5	Zone 5
WHT/BLK	6 LO	6	Zone 6
RED/BLK	7 LO	7	Zone 7
GRN/BLK	8 LO	8	Zone 8
ORG/BLK	9 LO	9	Part ID bit 1
BLU/BLK	10 LO	10	Part ID bit 2
BLK/WHT	11 LO	11	Part ID bit 3
RED/WHT	12 LO	12	Part ID bit 4
GRN/WHT	13 LO	13	Part ID bit 5
BLU/WHT	14 LO	14	Part ID bit 6
BLK/RED	15 LO	15	Part ID bit 7
WHT/RED	16 LO	16	Part ID bit 8
ORG/RED	17 LO	17	spare
BLU/RED	18 LO	18	spare
RED/GRN	19 LO	19	spare
ORG/GRN	20 LO	20	Encoder A
BLK/WHT/RED	21 LO	21	Encoder B
WHT/BLK/RED	22 LO	22	spare
RED/BLK/WHT	23 LO	23	spare
GRN/BLK/WHT	N/C	- -	- - - -
BLUE from Keyswitch	24 HI	- -	Conveyor Interlock
WHITE from Keyswitch	24 LO	- -	Conveyor Interlock
RED		(+)	VDC

Gun Cables

Sure Coat automatic gun cables connect directly to the receptacles on the bottom rear panel of the iControl console. Connect gun 1 cable to receptacle 1, gun 2 cable to receptacle 2, and so on.

NOTE: If you are using Versa-Spray and Tribomatic guns, connect an adapter cable to each console receptacle, then connect the gun cables to the adapter cables. If you did not receive the necessary adapter cables with your system, refer to the *Parts* section of this manual for adapter part numbers. Order the adapters from your Nordson representative.

Supply Air

Maximum input air pressure:	7.6 bar (110 psi)
Minimum input air pressure:	6.2 bar (90 psi)
Connection:	1- ¹ / ₁₆ -12 JIC, on rear panel
Air hose:	19 mm (³ / ₄ in.) minimum ID

The compressed air supply must be clean and dry. Use prefilters and coalescent filters with automatic drains and a refrigerated or regenerative desiccant air dryer capable of producing a 3.4 °C (38 °F) dewpoint at 7 bar (100 psi). A 5-micron filtration system is recommended.

A five-foot air hose is provided with the console. Connect one end of the hose to the 1-¹/₁₆-12 JIC threaded male connector at the ball valve. Connect the other end of the hose to your air supply.

NOTE: If supplying air to more than one console, run a separate hose to each console from the air drop. Do not daisy chain the air supply hoses from one console to the next. Doing so will affect the air supply to the second console.

Gun and Pump Air Connections

See Figure 3-3 for console gun and pump air connections and fitting layout.

Connect flow-rate and atomizing air tubing from the quick-disconnect fittings on the console rear door to the spray gun pumps as follows:

- Flow-Rate: 8-mm black air tubing to pump fitting marked “F”.
- Atomizing: 8-mm blue air tubing to pump fitting marked “A”.

Make sure you connect the tubing correctly, so that gun 1 pump is connected to the gun 1 fittings on the console, and so on.

Gun Air (Electrode Wash) Connections	
Gun Type	Gun Air
Sure Coat	Required
Versa-Spray	Optional ⁽¹⁾
Tribomatic	Not Used

⁽¹⁾ Versa-Spray guns can only use the gun air connection if the gun is equipped with a diffuser. Refer to your Versa-Spray gun manual for more information about the gun diffuser.

If your spray guns use gun air, connect 4-mm clear air tubing from the gun air connectors on the console rear door to the spray guns. Make sure you connect the tubing correctly, so that gun 1 is connected to the gun 1 fitting and so on.

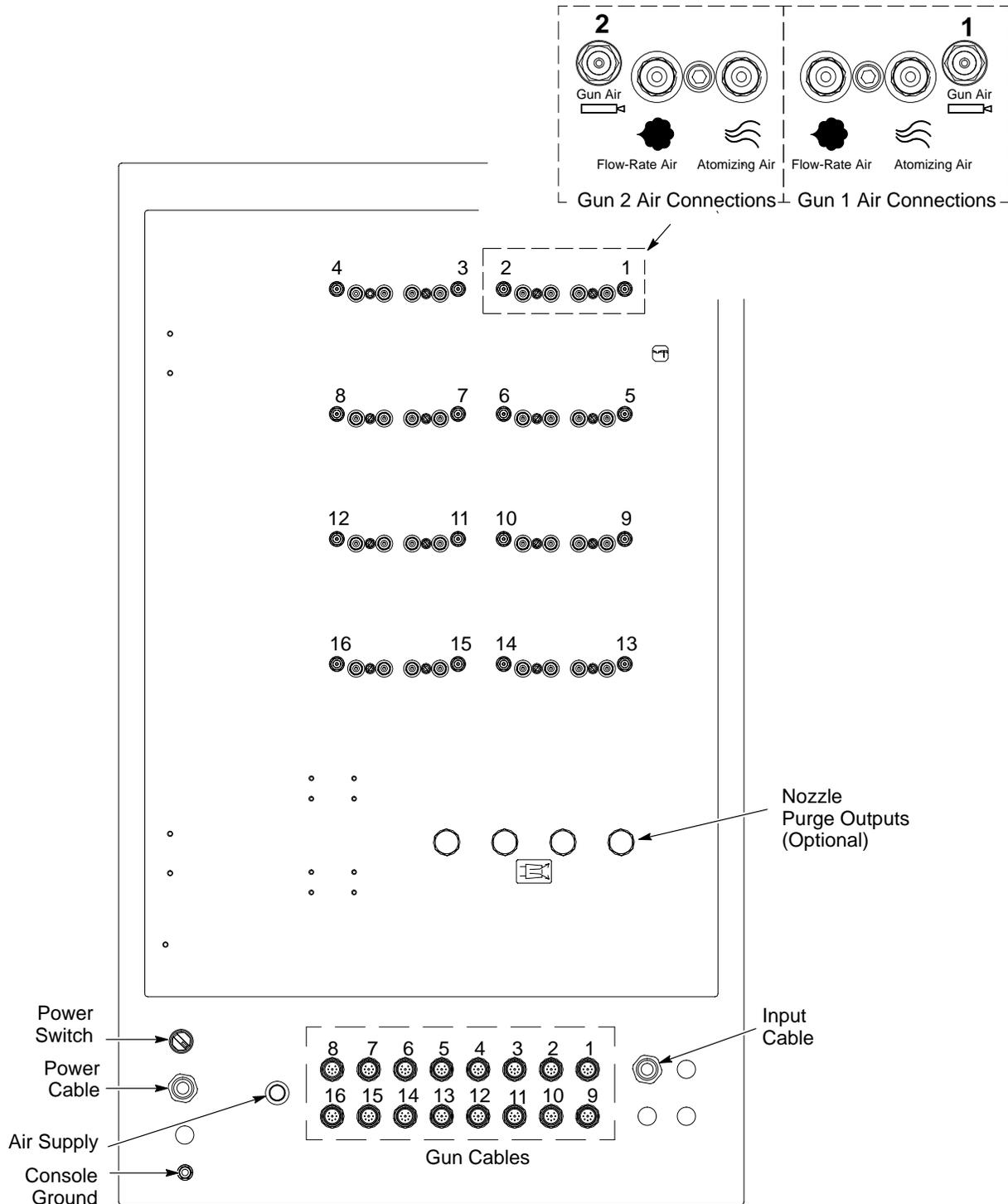


Figure 3-3 Console Rear Panel (Cover Removed)

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Nozzle Purge Kit Installation and Connections (Optional)

Refer to the instruction sheet included with the nozzle purge kits for installation instructions. After installing the kits, save the instruction sheet with this manual for future reference.

Nozzle purge configuration and operation instructions are included in the *Configuration and Operation* sections of this manual.

Network Connections and Settings

See Figure 3-4. To connect a master console to a slave console:

1. Install dust-tight strain reliefs in unused knockouts in the rear panels and route the provided 2-conductor shielded twisted-pair network cable through the strain reliefs.
2. Connect the network cable to the terminal blocks as shown. Use the CAN OUT receptacle on the master backplane and the CAN IN receptacle on the slave backplane.
3. Make sure all console and flow module address and termination switch settings are as described in *Console Address and Termination Settings* and *iFlow Module Address Settings* in this section.

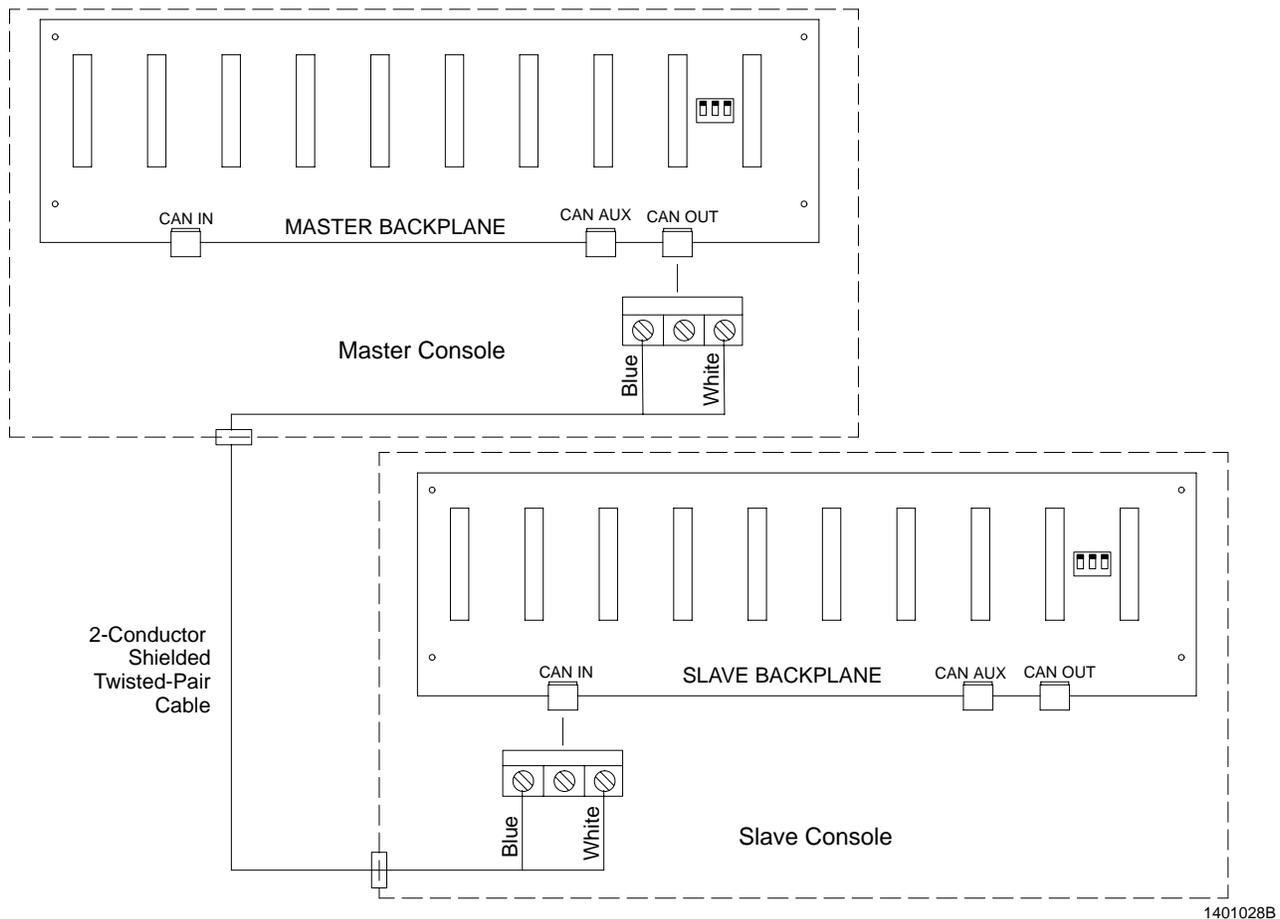


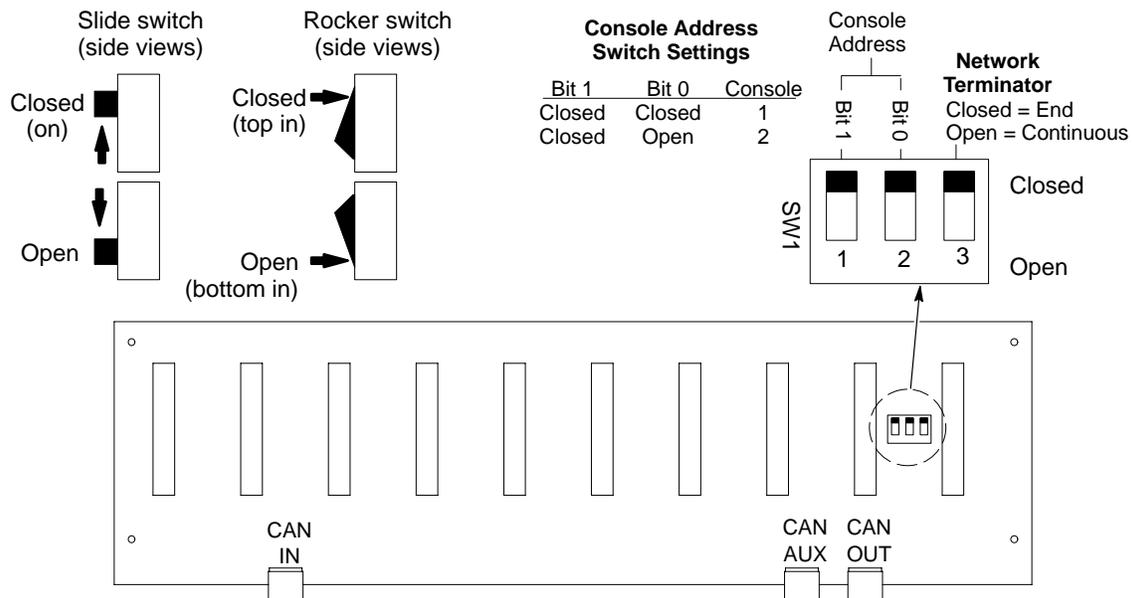
Figure 3-4 Network Cable Connections

Console Address and Termination Settings

See Figure 3-5.

The network terminator dipswitch and console address dipswitches on the backplane must be set properly for the consoles to communicate with the internal devices and with each other, if the system includes a slave console.

- Set the network terminator dipswitch as follows:
 - Master console only: Set the network terminator to END.
 - Master and slave console: Set the master console network terminator to CONTINUOUS and the slave console network terminator to END.
- Set the network address dipswitches as follows:
 - Set the master console to 1.
 - Set the slave console to 2.



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Figure 3-5 Network Connections, Console Addresses, and Termination

iFlow Module Dipswitch Settings

The dipswitches on the iFlow digital flow modules set gun air flow triggering, the console address, and the module address.

Gun air (electrode wash) can be set to continuous or trigger:

- Versa-Spray automatic guns: Trigger (air flow only when gun spraying)
- Sure Coat automatic guns: Continuous

Each iFlow module must have a unique network address. The system will not be able to operate flow modules with duplicate addresses, and will notify the operator if it detects two modules with the same address.

iFlow Module Dipswitch Settings (contd)

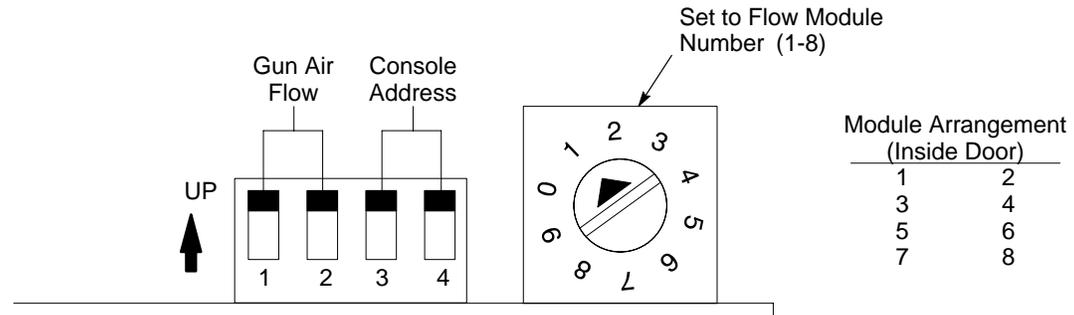
The module address consists of the console number (1 or 2) and the number of the module (1-8) within the console. Use switches 3 and 4 on the 4-position dipswitch and the rotary dipswitch on each iFlow module circuit board to set the network address.

See Figure 3-6 and Table 3-3.

1. If you are using Sure Coat automatic guns, set switches 1 and 2 on the 4-position dipswitch so that gun air is on continuously. For Versa-Spray guns equipped with the gun air option, set switches 1 and 2 to trigger gun air.
2. Set switches 3 and 4 on the 4-position dipswitch to the console address, which is the same as the address set at the dipswitch on the backplane shown in Figure 3-5.
3. Set the rotary dipswitch on each module to the correct module number. The modules are numbered as shown in the module arrangement chart in Figure 3-6.

Table 3-3 Flow Module 4-Position Dipswitch Settings

Gun Air			Console Address		
Switch 1 (Gun A)	Switch 2 (Gun B)	Air Flow	Switch 3	Switch 4	Address
Down	Down	Continuous	Up	Up	1
Up	Up	Trigger	Up	Down	2



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Figure 3-6 iFlow Module Address

Program and User Data Storage

The iControl program and user data are stored on two 128 Mb CompactFlash cards. These cards function as removable hard drives. They CANNOT be hot-swapped; you must shut off console power before removing them.

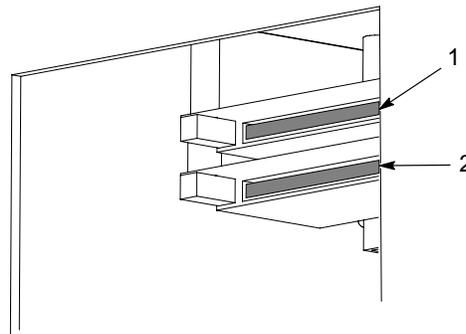


CAUTION: Never turn off console power without first shutting down the iControl program and operating system. Doing so could corrupt the system software. Refer to *Program Shutdown/Console Power Off* in the *Operation* section of this manual for the shutdown procedure.



CAUTION: Shut down the iControl program and operating system, then shut off console power at the switch on the rear panel, bottom left, before removing the CompactFlash cards. Removing them while power is on could result in damage to the data on the cards.

Open the access door to the left of the touch-screen display. The top card (1) is the user data card; the bottom card (2) is the iControl program card. To remove a card from the slot, press the button to the left of the card.



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Figure 3-7 User Data and Program Card Locations

1. User data card

2. Program card

The iControl program can be updated by installing a new program card. Up to 255 presets per gun can be stored on one user data card. Additional cards will provide you with a virtually unlimited number of presets.

To preserve the preset data on a card, you can back up the data on one card to another, using the Data Backup function. Refer to *Data Backup* in the *Configuration* section of this manual for instructions.

NOTE: Not all CompactFlash cards are the same. If you purchase additional cards, make sure they are from a Nordson-approved manufacturer and are the same size (128 Mb). For approved cards, refer to *Specifications* in the *Description* section of this manual or contact your Nordson controls engineer.

System Upgrades

Parts requirements for system upgrades depend on your existing system configuration. Contact your Nordson representative for help in ordering upgrade parts.

Adding Guns to Existing iControl Console

1. Shut down the powder coating system. Disconnect and lock out power to the system and the iControl consoles.
2. Install the new spray guns in the booth and powder pumps on the feed hoppers or feed center. Install powder feed hose between the pumps and the guns.
3. Install the new iFlow module(s) and regulator(s) on the inside of the rear door with the fasteners provided. Make sure the module gasket seals against the door.
4. Connect the new modules together with the new network harnesses. Refer to the iControl Schematics, Sheet 5, in Appendix A for harness requirements and connections.
5. Disconnect the network termination harness from the last old module and connect it to the last new module.
6. Connect the regulator to the air supply fitting below the door with 12-mm tubing.
7. Connect the flow modules to the regulator with 10-mm tubing.
8. Set the iFlow module network addresses as described in this section.
9. Install the new gun control cards in the card cage, starting with the first open slot. Cards are installed from left to right.
10. Install the gun control harness receptacles in the rear panel, starting with the first unused knockout in the row of existing gun control harness receptacles. Plug the harnesses into the gun control card receptacles. Use the existing harness installations as a guide.
11. Connect the spray gun cables to the new harness receptacles as described in this section. If you are using Versa-Spray or Tribomatic guns you must install an adapter cable between the receptacles and the gun cables.
12. Connect 8-mm blue and black air tubing from the new flow module flow-rate and atomizing air fittings to the new powder pumps as described in this section.
13. If used, connect clear 4-mm air tubing from the new flow module gun air fittings to the new spray guns as described in this section.
14. Turn on the console and configure the iControl program to add the new guns to the system. Refer to *Consoles/Guns Configuration* in the *Configuration* section of this manual.
15. Shut down the iControl software, then turn console power off, then back on. This will register the new guns with the iControl program.

16. If you physically rearranged the existing spray guns, set new pickoff points as described in the *Configuration* section.
17. Set up presets for the new guns as described in the *Preset Setup* section.

Adding a Slave Console to an Existing System

Adding a slave console increases the system capacity to 32 guns.

1. Connect the slave console power cable and ground cable as described in this section.
2. Connect the slave console to the master console with the provided network cable. Connect the network cable from the CAN OUT terminal block on the master console backplane to the CAN IN terminal block on the slave console backplane. Route the cable through dust-tight strain reliefs.
3. Set the slave console network address to console 2 as described in this section.
4. Set the slave console iFlow module network addresses as described in this section.
5. Connect the compressed air supply to the slave console as described in this section.
6. Connect the spray gun cables and the flow-rate, atomizing, and gun air tubing to the slave console as described in this section.
7. Turn on the console and configure the iControl program to add the new guns to the system. Refer to *Consoles/Guns Configuration* in the *Configuration* section of this manual.
8. Shut down the iControl software, then turn console power off, then back on. This will register the new guns with the iControl program.
9. If you physically rearranged the existing spray guns set new pickoff points as described in the *Configuration* section.
10. Set up presets for the new guns as described in the *Preset Setup* section.

Installing Optional Nozzle Purge Kits

Nozzle purge kits are used only with Versa-Spray guns equipped with optional purge adapters. Nozzle purge uses high-pressure compressed air, typically at line pressure, to purge the spray gun nozzles.

The nozzle purge kits are field-installed in the iControl consoles, pneumatically connected to the console air manifold and spray guns, and electrically connected to the P5 receptacle on the backplane.

Installation instructions are shipped with the nozzle purge kits.

Section 4

Configuration



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



CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl program and operating system on the program card. Refer to *Program Shutdown* in this section for the shutdown procedure.

Introduction

You must configure your system, using the tasks in this section, before you can use it for production. Most tasks need to be repeated only when if you replace the encoder, or add or move photocells or spray guns. Purge configurations can be adjusted as needed.

NOTE: Always configure consoles/guns before configuring pickoffs.

Common Interface Elements



Touch the **Tools** buttons to open configuration screens.



Touch the **Close** button to close an open screen.



Radio Buttons choose between options. Touch a button to select an option. Selected option buttons have a black dot in the center. Only one button in a group can be selected.



Data Fields are used to enter values. Touch the field to activate it, then use the rotary dial or up and down arrows to edit the field value. Some screens allow you to open a numeric keypad you can use to edit the field value.



Touch the **OK** button to save changes or proceed with an action.



Touch the **Cancel** button to cancel changes or an action.

Security Configuration

NOTE: A new iControl system, at power up, will start up with the security system disabled. All iControl screens and functions will be available to the customer.



Touch the **Security** button on the main screen open the Login/Logout screen.

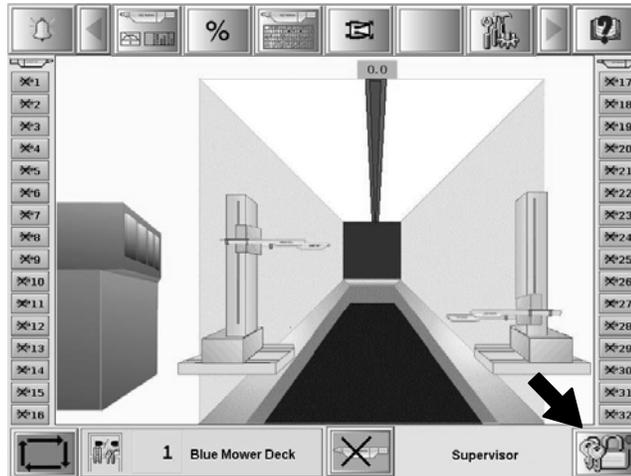


Figure 4-1 Main Screen and Security Button

See Figure 4-2. The Login/Logout screen has buttons for logging in, logging out, and the Security Configuration screen. All users (levels 2, 3, and 4) can open the Login/Logout screen. Only users with supervisor level access (level 4) can open the Security Configuration screen.

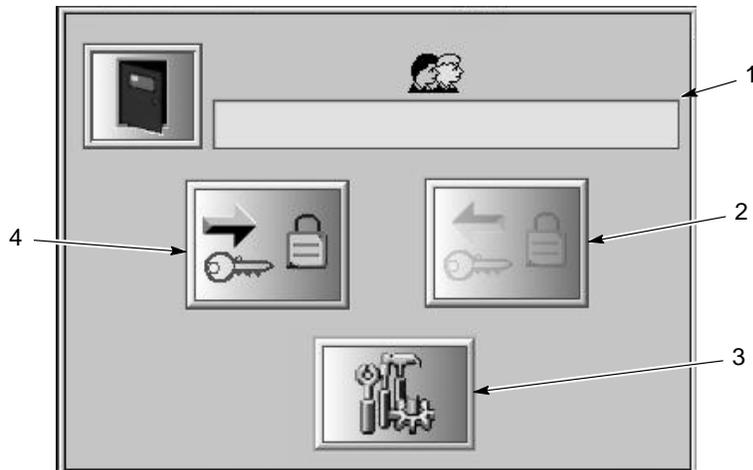


Figure 4-2 Login/Logout Screen

- 1. User currently logged in
- 2. Log Out
- 3. Open Security Configuration screen (level 4 access only)
- 4. Log In

Log In

See the Login/Logout screen, Figure 4-2. The logout button is inactive (grayed out), as no user is logged in. Only one user can be logged in at a time. A new user can log in at any time; the previous user does not need to log out.

1. Touch the **Log In** button. The Login screen appears. Until you select a user the **OK** button will be inactive (grayed out).

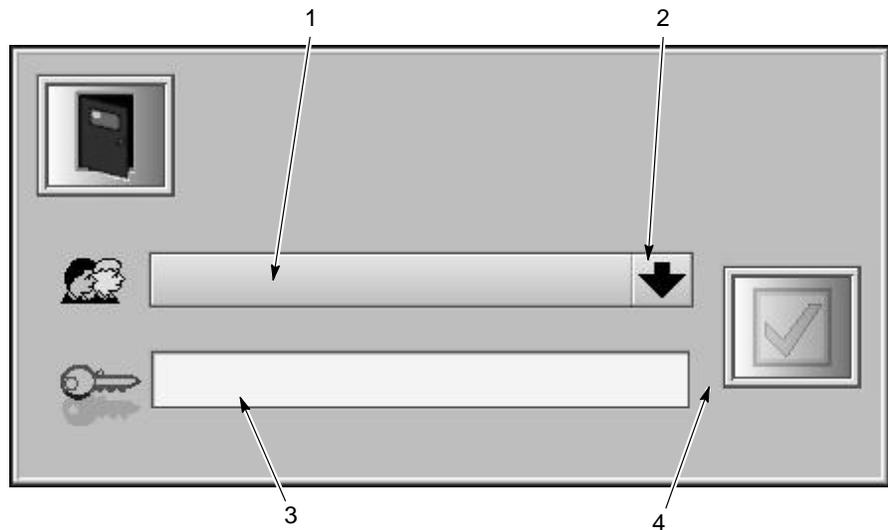


Figure 4-3 Login Screen

- | | |
|-----------------------------|-----------------------|
| 1. User name | 3. Password |
| 2. Down arrow (user select) | 4. OK button (log in) |
2. Touch the **Down** arrow in the user name field. A list of users appears. Touch your user name.
 3. Touch the **Password** field. The keyboard screen appears. Type in your password and close the keyboard. **Passwords are case-sensitive.**
 4. Touch the **OK** button to log in. To cancel the login, close the screen.

Log Out

See Figure 4-2. Touch the **Logout** button. A confirmation window opens. Touch the **Yes** button to logout; touch the **No** button to cancel the logout.

Security Configuration



See Figure 4-2. Touch the **Tools** button on the Login screen to display the Security Configuration screen.

This screen allows you to:

- enable or disable the security system.
- change a user name, password, or security level.
- set up a new user.
- enable or disable the automatic logout timer, and set the timer (0-999 minutes). This feature only applies to the supervisor level (level 4).
- view the security log.

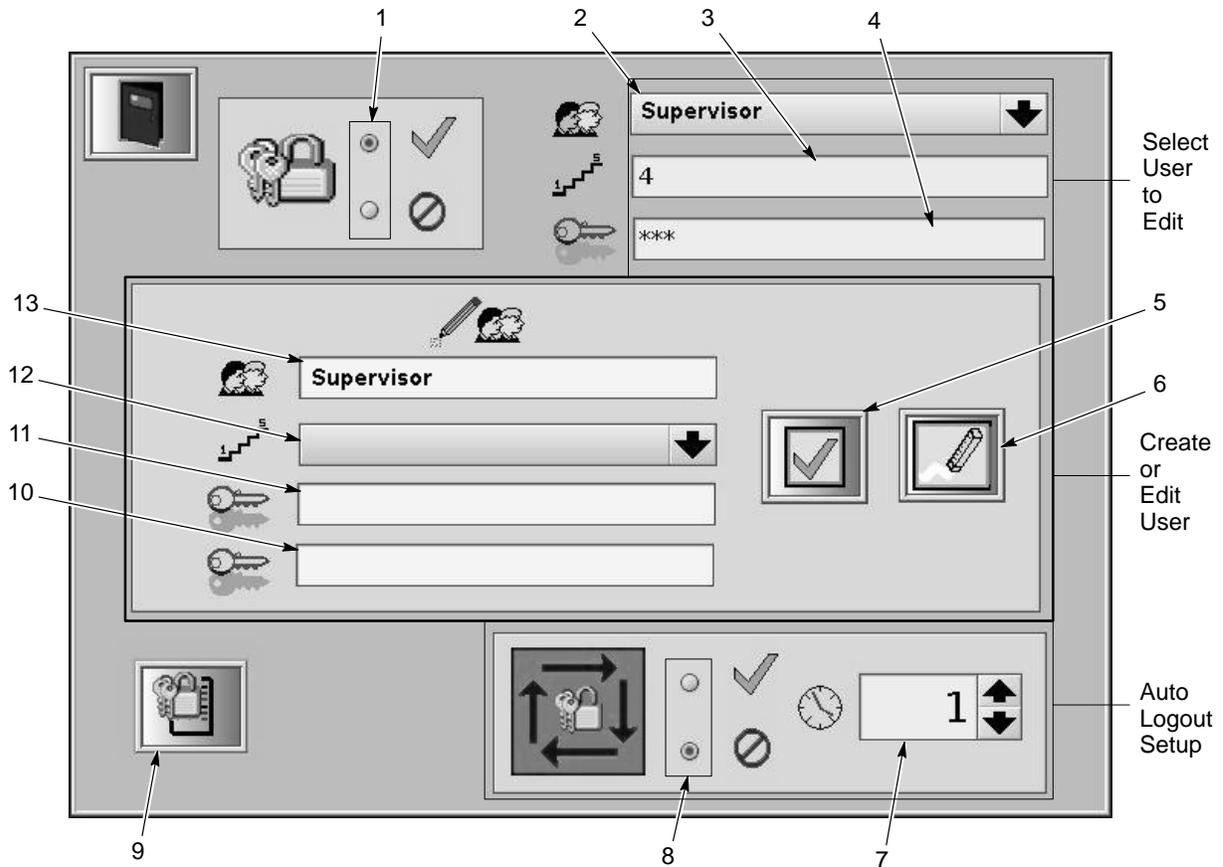


Figure 4-4 Security Configuration Window

- | | | |
|---|-------------------------------------|-----------------------|
| 1. Enable/Disable security system | 6. Delete user | 10. Re-enter password |
| 2. User to edit | 7. Automatic logout timer (minutes) | 11. Password |
| 3. User level to edit | 8. Enable/Disable auto logout timer | 12. Security level |
| 4. User password to edit | 9. View security log | 13. User name |
| 5. OK new user or edit to existing user | | |

Create or Edit a User

See Figure 4-4. To create a new user, or change (edit) an existing user's name, password, or security level:

1. If editing an existing user, touch the **Down** arrow in the Select User to Edit name field. The selected user name will appear in the Create or Edit user fields.
2. Enter a new user name and password in the Create or Edit fields by touching the fields and using the keyboard screen. The password must be entered twice, once in each password field. **Passwords are case-sensitive.**
3. Select a security level for the user: 2=Operator, 3=Lead, 4=Supervisor. Refer to *Security Levels and Access Permissions* on the following page for a list of the screens and functions each level can access and use.

NOTE: All fields must be filled out correctly, or one of the following error messages will appear:

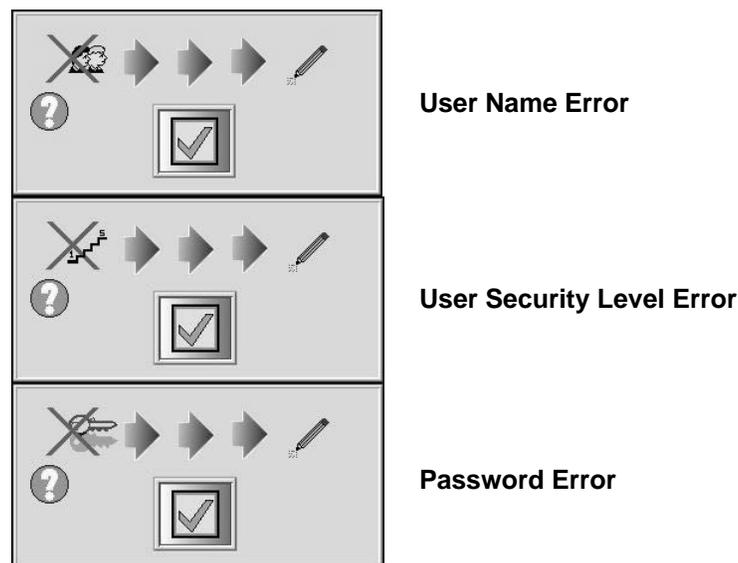


Figure 4-5 User Create/Edit Error Messages

Security Levels and Access Permissions

- Level 4: Supervisor
- Level 3: Lead
- Level 2: Operator
- Level 1: No one logged in

The chart on the following pages lists the access permissions for all screens and functions.

Screen	Button	Security Level Required	
		Viewing	Changing
Main Screen	Alarm	All levels	—
	Global Status	All levels	—
	Percent Adjust	2, 3, 4	—
	Preset Table	All levels	—
	Nozzle Purge	All levels	—
	Configuration	2, 3, 4	—
	Help	All levels	—
	Gun Buttons	All levels	—
	Part ID	2, 3, 4	—
	Global Trigger Mode	2, 3, 4	—
Security	All levels	—	
Alarm	Reset All Alarms	—	3, 4
	Alarm Log	All	3, 4
	Help	All	—
Global Gun Status	CA/CB (Consoles A, B)	All	—
Percent Adjust	Flow Air	All	2, 3, 4
	Atomizing Air	All	2, 3, 4
Preset Table	All preset settings	All	3, 4
	Save	—	3, 4
Nozzle Purge	Auto	All	2, 3, 4
	Manual	All	2, 3, 4
	- Purge All	—	2, 3, 4
Trigger Mode	Auto	—	2, 3, 4
	Manual	—	2, 3, 4
	- Preset Number	—	2, 3, 4
	- Trigger All	—	2, 3, 4
	Off	—	2, 3, 4
Help	All buttons	All	—
Security	Login	All	All
	Logout	—	All
	Configuration	—	4
Gun Control/Status	Trigger Mode	—	2, 3, 4
	Trigger	—	2, 3, 4
	Preset Number/Name	—	3, 4
	Preset settings	—	3, 4
	Copy All	—	3, 4
	Copy Selected	—	3, 4
Part ID	Auto	—	2, 3, 4
	Manual	—	2, 3, 4
	Manual Part ID select	—	2, 3, 4
	Manual Part ID enter	—	2, 3, 4

Screen	Button	Security Level Required	
		Viewing	Changing
System Configuration	Encoder	—	4
	Photoeye	—	4
	Pickoff	—	4
	Consoles/Guns	—	4
	Purge	—	4
	Units	—	4
	Data Backup	—	4
	Shutdown	—	4
	About (software versions)	—	2, 3, 4

Automatic Log Out

See Figure 4-4. Automatic logout only applies to supervisor-level users. To set up automatic logout:

1. Enable automatic logout by touching the radio button next to the Checkmark icon.
2. Set the timer by touching the timer field and using the rotary dial or the up and down arrow buttons.

NOTE: The timer starts when the system detects no activity in the user interface.

Security Log

Touch the **Security Log** button to open the Security Log. The log file contains a list of user names and the times they logged in and out.

Only a Nordson customer service representative can erase the log file. The Erase button is inactive for all other users.

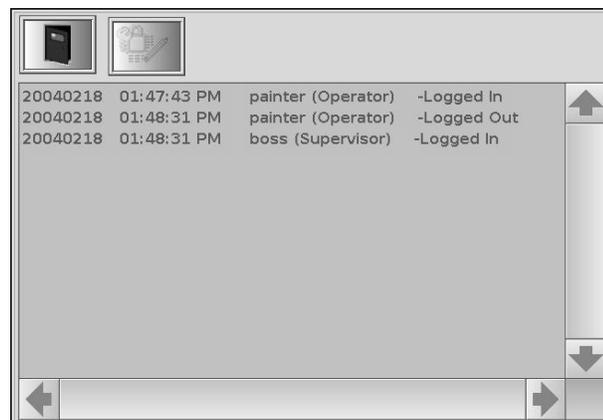


Figure 4-6 Security Log (Level 4 access only)

System Configuration Screen



Touch the **Tools** button on the main screen to display the System Configuration screen.

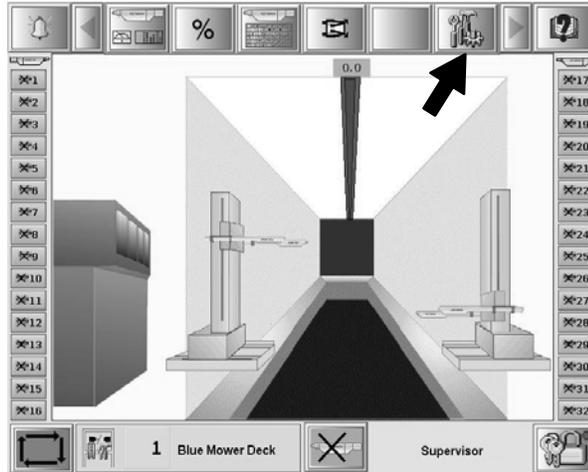


Figure 4-1 Main Screen and Tools Button

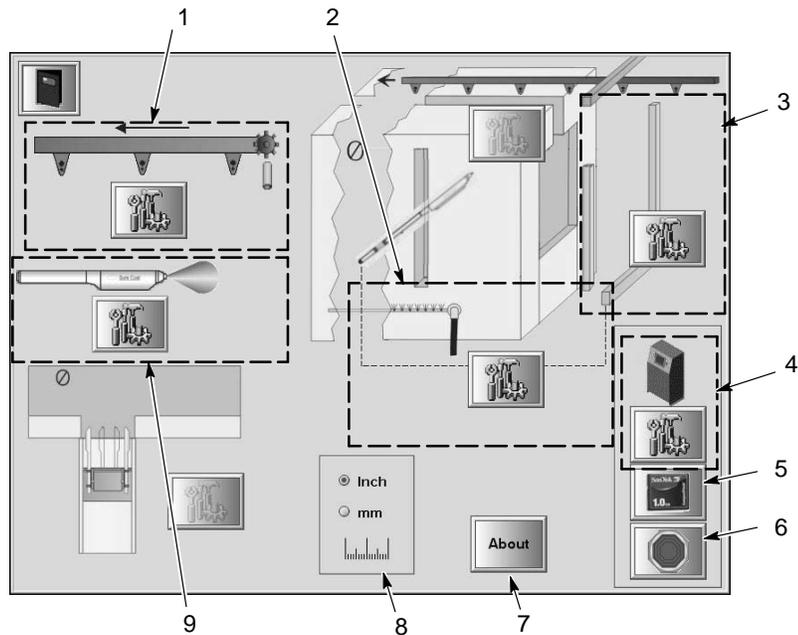
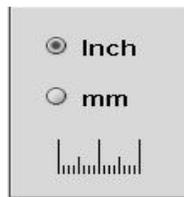


Figure 4-2 System Configuration Screen

- | | |
|------------------|---------------------|
| 1. Encoder | 6. Program shutdown |
| 2. Pickoff | 7. Program version |
| 3. Photoeye | 8. Units |
| 4. Consoles/Guns | 9. Purge |
| 5. Backup data | |

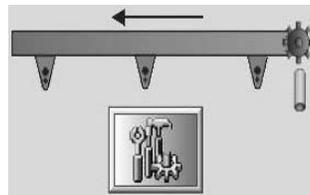
Note: Grayed-out items are either not applicable to your application or are features not yet available.

Units Configuration



On the System Configuration screen, select the units of measurement you want to use: Inch (English) or millimeters (Metric). This setting applies to settings such as dimensions and air flow.

Encoder Configuration



On the System Configuration screen, touch the **Encoder Tools** button to display the Encoder Configuration screen:

Refer to *Part Tracking (Encoder)* in the *Description* section for more information on encoder resolution.

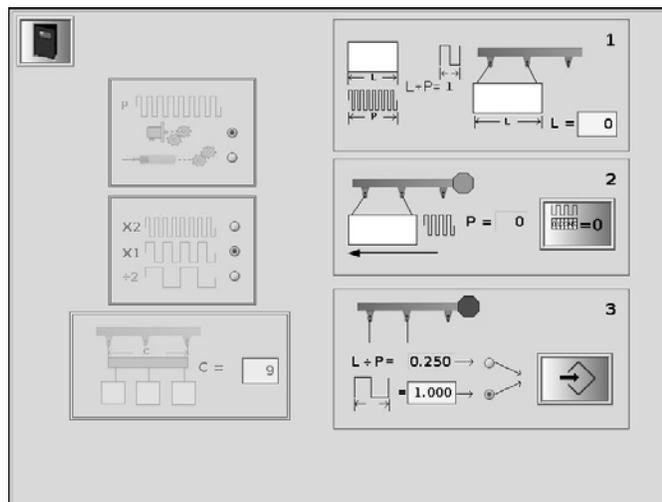
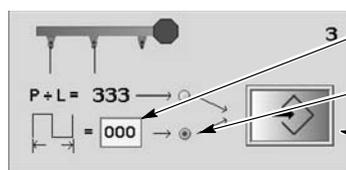


Figure 4-3 Encoder Configuration Screen

Entering a Known Encoder Resolution

If you know your encoder resolution, touch the data field and enter a known encoder resolution, touch the radio button to the right, then touch the Accept button:



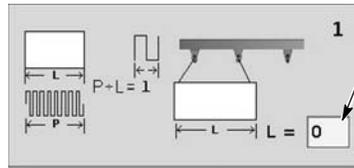
- 1 Touch the data field and enter the encoder resolution.
- 2 Touch the radio button to select the entered resolution.
- 3 Touch the **Enter** button.

Touch the **Close** button to close the Encoder Configuration screen and return to the System Configuration screen.

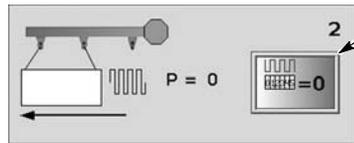
Teaching the Encoder Resolution

To teach the iControl system your encoder resolution, perform the following procedure:

1. Measure the length of a part and hang it on the conveyor, near the entrance to the booth.

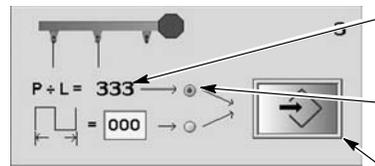


2. Touch the data field and enter the part length.



3. Touch the reset button to reset the counter to zero.

4. Start the conveyor and move the part past the zone photoeyes. Stop the conveyor once the part is completely past the zone photoeyes.



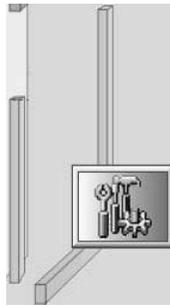
5. The controller calculates and displays the encoder resolution.

Touch the radio button to select the calculated resolution.

Touch the **Enter** button.

Touch the **Close** button to close the Encoder Configuration screen and return to the System Configuration screen.

Photoeye Configuration



On the System Configuration screen, touch the **Photoeye Tools** button to display the Photoeye Configuration screen:

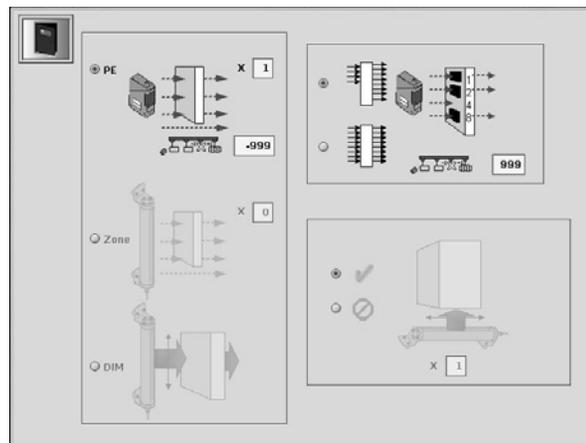
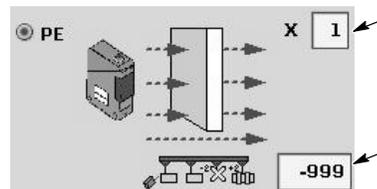


Figure 4-4 Photoeye Configuration Screen

Configuring Zone Photoeyes



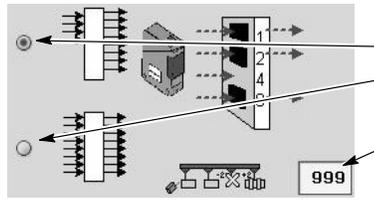
Touch the Photoeye Number data field and enter the number of zone photoeyes connected to the iControl master console.

If using the Photoeye Filter, touch the filter data field and enter the length, in inches or millimeters, for photoeye filtering.

A positive filter length adds to the photoeye signal to prevent narrow part skipping and signal chattering; a negative length subtracts from the photoeye signal to prevent hanger detection.

NOTE: Refer to *Automatic Triggering* in the *Description* section for an explanation of zones and how they are used.

Configuring Flag Photoeyes or Inputs



Select the type of flagging you will use: **Encoded Flagging** (shown selected) or **Straight Flagging**.

If you are using flags, touch the Flag Photoeye Filter data field and enter the length in inches or millimeters for encoded flag filtering.

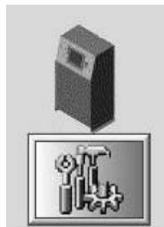
NOTE: The encoded flag filter length must always be a positive number, and must be greater than the distance from the leading edge of the flag to the beginning of the flag slots.

Touch the **Close** button to close the Photoeye Configuration screen and return to the System Configuration screen.

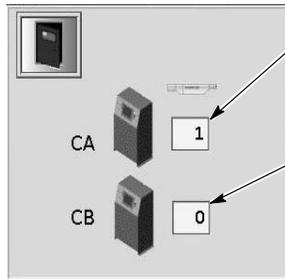
NOTE: Refer to *Part Identification* in the *Description* section for explanations of Straight and Encoded flagging and flag filtering.

Consoles/Guns Configuration

NOTE: Always configure consoles/guns before configuring pickoffs.



On the System Configuration screen, touch the **Consoles/Guns Tools** button to display the Consoles/Guns screen and set the number of consoles and guns in your system.



Touch the Console A (master) guns field and use the rotary dial to set the number of guns connected to the master console.

If you have a slave console in your system, touch the Console B (slave) guns field and use the rotary dial to set the number of guns connected to the slave console.

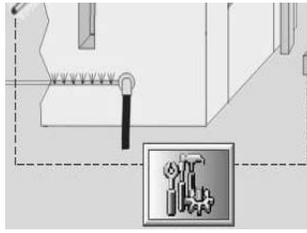
NOTE: If you have no console B (slave) set the number of guns for Console B to zero.

Touch the **Close** button to close the Consoles/Guns screen and return to the System Configuration screen.

Adding or Removing Guns from the System

If you add or remove guns from the system, you must shut down the iControl software, then power off and on the master console so the change will be recognized. Refer to *Program Shutdown* on page 4-20 for the shutdown procedure.

Pickoff Configuration



On the System Configuration screen, touch the **Pickoff Tools** button to display the Pickoff Configuration screen.

The pickoff is the distance from the zone photoeyes to the spray guns (centerline to centerline). A pickoff must be entered for each spray gun.

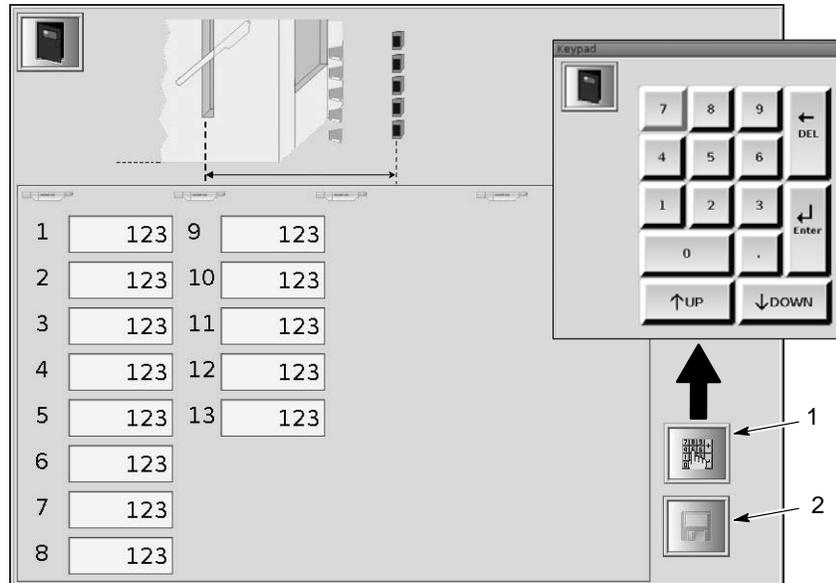


Figure 4-5 Pickoff Configuration Screen

1. Keypad button
2. Save button

NOTE: Changing the encoder resolution may change the pickoffs and require that you reset all pickoffs. To make sure your encoder resolution is correct and to avoid having to reconfigure all your gun pickoffs, do the following:

1. Configure the pickoff for one gun, mounted farthest from the zone photoeyes.
2. Hang a part on the conveyor.
3. For the part's preset, set the zone assignment for the gun, and set the lead and lag trigger points to zero.
4. Run the part through the booth and make sure that gun triggers on and off at the leading and trailing edges of the part correctly
5. Adjust the encoder resolution to compensate as necessary for any errors in triggering, then configure the pickoffs for the rest of your guns.

To set pickoffs, touch the **Data Field** for each gun and enter the pickoff. Use either the rotary dial or the screen keypad. To use the keypad, first touch the data field, then the **Keypad** button.

Pickoff Configuration *(contd)*

When you have entered pickoff values for every gun in your system, touch the **Save** button to save your entries.

If you do not touch the **Save** button, a confirmation screen will appear when you close the Pickoff Configuration screen. Touch the **OK** button to save your changes or the **Cancel** button to discard your changes.

Touch the **Close** button to close the Pickoff Configuration screen and return to the System Configuration screen.

Purge Configuration



On the System Configuration screen, touch the **Purge Tools** button to display the Purge Configuration screen.

Use this screen to configure Nozzle Purge, Evacuation Purge, and Soft Start.

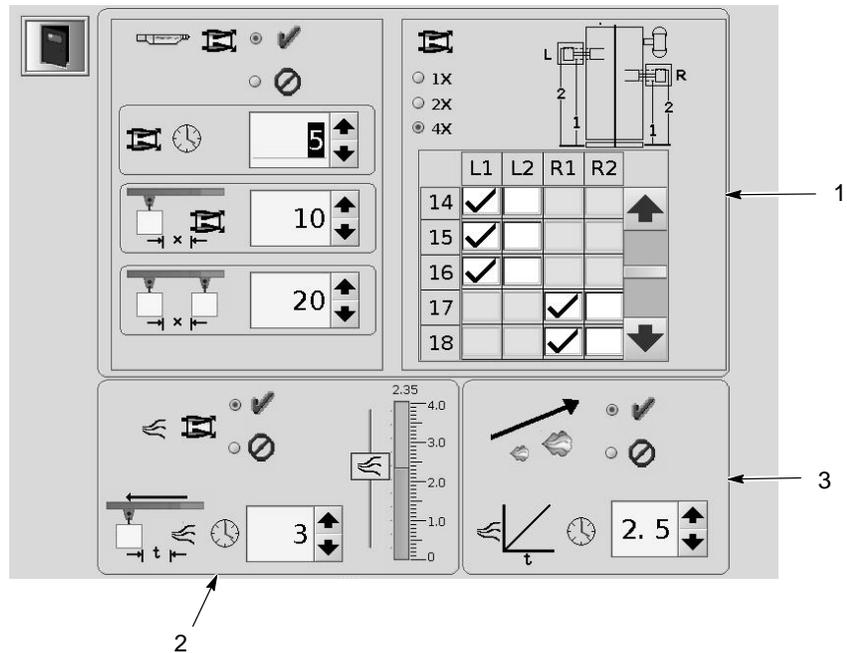


Figure 4-6 Purge Configuration Screen

- 1. Nozzle purge
- 2. Evacuation purge
- 3. Soft start

Nozzle Purge

To use nozzle purge, you must have Versa-Spray spray guns equipped with optional purge adapters, and you must install an optional nozzle purge kit in the iControl console. The nozzle purge settings apply to all guns.

The nozzle purge mode, **Auto** or **Manual**, is set from the Nozzle Purge Mode screen. Refer to the *Operation* section for instructions.

Two purge kits are available: a single solenoid valve kit, and a dual solenoid kit. The possibilities for a system with one or two consoles (master/slave) are:

Consoles/Kits	Banks
1 console, 1 single kit	1
1 console 1 dual kit	2
2 consoles, 2 single kits	1 or 2
2 consoles, 2 dual kits	4

The purge kits must be field-installed in the consoles. The kits are shipped with installation instructions.

Nozzle Purge Configuration

Use the nozzle purge portion of the Purge Configuration screen:

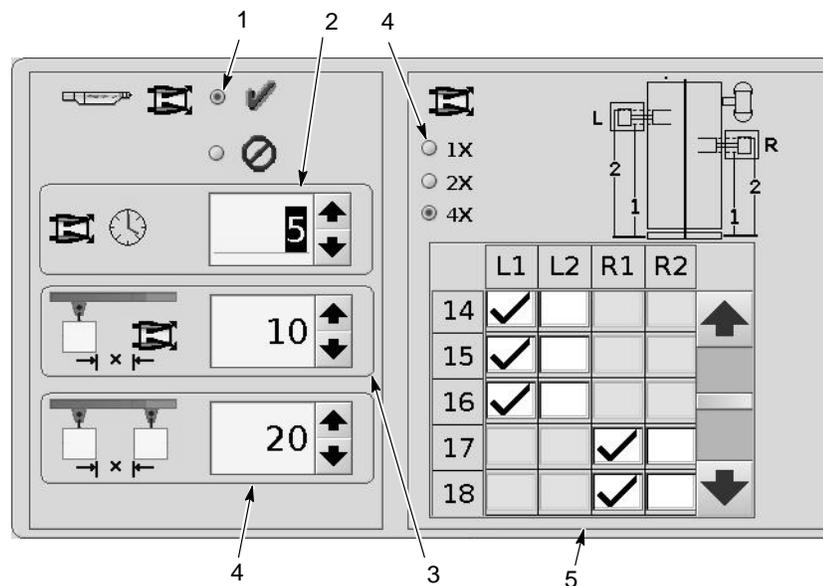


Figure 4-7 Nozzle Purge Setup

1. Enable/disable nozzle purge
2. Purge timer setting
3. Purge delay setting
4. Line gap setting
5. Number of banks
6. Gun-to-bank assignment

Nozzle Purge Configuration *(contd)*

The **purge timer**, **purge delay**, and **line gap** settings work as follows: If the line gap between the part being sprayed and the next part is equal to or greater than the line gap setting, then nozzle purge is activated after the part moves the distance set for the purge delay, if no guns are spraying.

Purging is terminated when the timer expires, or a part enters the gap area or spray zone, or when the operator turns off **Auto** purge by selecting **Manual** from the Purge Mode screen.

1. **Enable** nozzle purging by touching the radio button next to the check mark. This setting applies to all guns.
2. Set the **purge timer** (0-30 seconds) by touching the data field and then using the arrow buttons or the rotary dial. Setting the timer to zero disables automatic mode, so that nozzle purging can only be done manually. This setting applies to all spray guns.
3. Set the **purge delay** (0-99 inches or 0-2515 millimeters, depending on your Units of Measurement setting). This is the distance past the spray guns that the trailing edge of the part must move before nozzle purging is activated.

Use the purge delay setting with a restricted spray or perfect pickoff (0 or negative lag settings), where the coating could be ruined if purging starts too soon. With an extended spray (positive lag setting), the part will move past the spray guns before purging begins, so the delay may not be necessary. This setting applies to all spray guns.

4. Set the **line gap** (0-240 inches or 0-6096 millimeters, depending on your Units of Measurement setting). This is the minimum distance you require between parts for nozzle purging.

If the distance between the part being sprayed and the next part is equal to or greater than line gap setting, then purging is activated. If the distance between the parts is less than the line gap settings than purging is not activated. This setting applies to all spray guns.

5. Set the **number of banks** desired: 1, 2, or 4. This is dependent on how many purge solenoids you have installed in your iControl consoles.
6. Assign your **guns-to-banks**. This is dependent on the number of banks set in Step 5, and the physical location of the guns. Possibilities are:

Consoles	Purge Kits	Banks
1	1 single	1 bank: L1 all guns automatically assigned to L1
1	1 dual	2 banks: L1 and L2, assign guns to banks depending on location
2	2 single	2 banks: L1 for guns 1-32 or L1 for guns 1-16, R1 for guns 17-32
2	2 dual	4 banks: L1 and L2 for guns 1-16, R1 and R2 for guns 17-32

For example, if you have two consoles with a dual kit in each, then you can set the number of banks to 4 and split up the guns in the master console (guns 1-16) between banks L1 and L2, and the guns in the slave console (guns 17-32) between banks R1 and R2.

If you have one console with a dual kit, then you can choose 2 banks, and assign guns 1-8 to L1, and guns 9-16 to L2, or any number of guns to either bank.

A check mark in a bank field indicates that the gun is assigned to that bank. Touch the field to toggle the checkmark on or off. Touch the scroll bar arrows to scroll up and down the gun list.

Touch the **Close** button to close the Purge Configuration screen and return to the System Configuration screen.

Nozzle Purge Mode

The nozzle purge mode, **Auto** or **Manual**, is set from the main screen. Manual triggering of nozzle purge is also done from the main screen. Refer to the *Operation* section for instructions.

Evacuation Purge

NOTE: Do not use evacuation purge with In-Line powder pumps (used in Powder Feed Centers). With these pumps, the atomizing air used for purging will pump powder.

Evacuation Purge Configuration

Use the evacuation purge portion of the Purge Configuration screen:

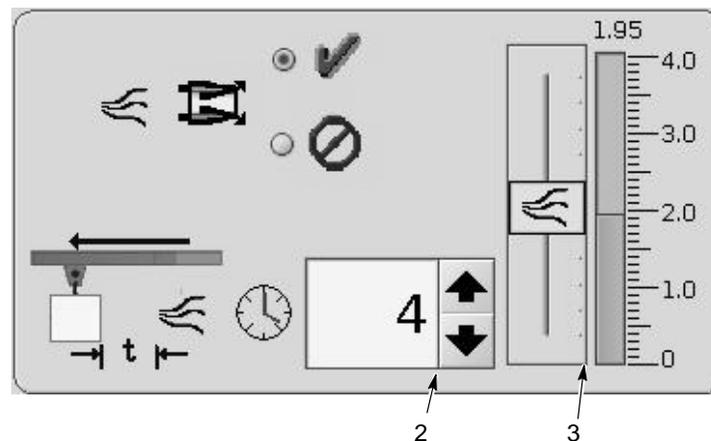


Figure 4-8 Evacuation Purge Setup

- | | |
|------------------------------------|-------------------|
| 1. Enable/disable evacuation purge | 3. Purge pressure |
| 2. Purge timer | |

NOTE: Evacuation purge settings apply to all guns. They cannot be set or controlled for individual guns or presets.

1. **Enable** evacuation purge by touching the check mark radio button.
2. Set the **purge timer** (0-999 seconds) by touching the data field and the arrow buttons or with the rotary dial.
3. Set the **purge air flow** (0.5-4.0 scfm).

Touch the **Close** button to close the Purge Configuration screen and return to the System Configuration screen.

Soft Start

Soft start can be used with all gun models. When the guns are triggered on, flow-rate and atomizing air flow is increased (ramped up) to the preset settings over the ramp time setting.

NOTE: Soft start is activated at the gun trigger on signal. Since it takes longer for the powder flow to increase to the preset setpoints, the preset lead settings may need to be increased to compensate when soft start is enabled. This adjustment must be made by the user.

Soft Start Configuration

Use the soft start portion of the Purge Configuration screen:

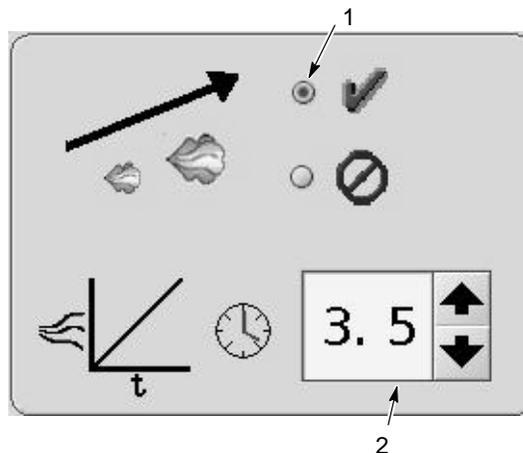


Figure 4-9 Soft Start Setup

1. Enable/disable soft start
2. Ramp timer

NOTE: Soft Start settings apply to all guns. They cannot be set or controlled for individual guns or presets.

1. **Enable** soft start by touching the radio button next to the check mark.
2. Set the **ramp timer** (0-7.5 seconds, in 0.5 second intervals) by touching the data field and then using the arrow buttons or the rotary dial.

Touch the **Close** button to close the Purge Configuration screen and return to the System Configuration screen.

Data Backup

The Data Backup function allows you to make a copy of your user data CompactFlash card. You should do this once you set up and test presets for your parts (refer to the *Preset Setup* section of this manual).

NOTE: Use only approved CompactFlash cards. For approved cards, refer to *Specifications* in the *Description* section of this manual or contact your Nordson representative.

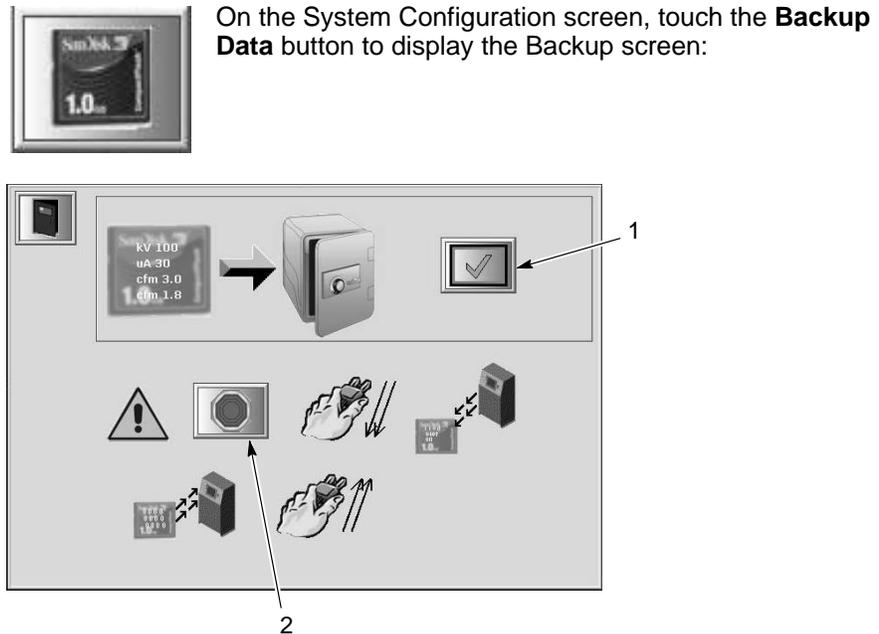


Figure 4-10 Backup Data Screen

1. Copy data button
2. Program shutdown button



CAUTION: Follow the backup procedure exactly. Do not remove the CompactFlash card while console power is on. Doing so will corrupt the data on the card.

1. Touch the **Copy Data** button. This copies all the data on the user data card to the program card.
2. Touch the **Program Shutdown** button. Wait until the iControl program shuts completely down.
3. Turn off console power at the switch on the rear panel.
4. Open the card access door and press the button to the left of the top card slot. Remove the user data card.
5. Insert a blank CompactFlash card in the card slot.
6. Turn on console power.

The console will boot up and copy your data to the new card. Store the original card in a safe place, away from magnetic fields.

Program Shutdown



CAUTION: Do not turn off console power without first performing a program shutdown. Repeatedly doing so could corrupt the iControl program and operating system on the program card. If the software is corrupted you will have to replace the program card.



On the System Configuration screen, touch the **Program Shutdown** button to shutdown the iControl program and operating system **before** you turn off power to the console. This shuts down all running processes in an orderly sequence and prevents file corruption.

First, the iControl shutdown screen appears and the iControl program shuts down.

When the iControl program shutdown is complete, the operating system shutdown screen appears. At this point you can choose to shut down the operating system or reboot it. Choose **Shutdown** to complete the system shutdown. When shutdown is complete the screen will go completely black. You can now turn off console power safely.

When you turn console power on, the operating system and iControl console will load automatically.

Program Version

Touch the **About** button on the System Configuration screen for the iControl program version number. If you are calling for technical support, you will need to report the version number along with the details of your problem.

System Configuration Record

Make copies of the system configuration record on the following page and use them to record your iControl system configuration.

System Configuration Record

Date:

System Settings	
Encoder Resolution:	No. of Zone Photoeyes:
Zone Photoeye Filter:	No. of Flag Photoeyes or Inputs:
Type of Flagging: Straight Encoded	Encoded Flag Filtering:
Purging Enabled: Nozzle Evacuation Soft Start	Nozzle Purge Timer:
Evacuation Purge Timer:	Nozzle Purge Line Gap:
Evacuation Purge Air Flow:	Nozzle Purge No. of Banks:
Soft Start Ramp Timer:	

Console (A or B)	Gun Number	Pickoff	Nozzle Purge Bank
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
	32		

System Configuration Record

Date:

System Settings	
Encoder Resolution:	No. of Zone Photoeyes:
Zone Photoeye Filter:	No. of Flag Photoeyes or Inputs:
Type of Flagging: Straight Encoded	Encoded Flag Filtering:
Purging Enabled: Nozzle Evacuation Soft Start	Nozzle Purge Timer:
Evacuation Purge Timer:	Nozzle Purge Line Gap:
Evacuation Purge Air Flow:	Nozzle Purge No. of Banks:
Soft Start Ramp Timer:	

Console (A or B)	Gun Number	Pickoff	Nozzle Purge Bank
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		
	31		
	32		

Section 5

Preset Setup



CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl program and operating system on the program card. Refer to *Program Shutdown/Console Power Off* in the *Configuration* section for the shutdown procedure.

Introduction

Presets are spray gun characteristics that can vary depending on the part. Presets control

- flow-rate and atomizing air flow
- electrostatics
- lead and lag triggering
- gun-to-zone assignments

Up to 255 unique presets can be set for each gun. Presets have a one-to-one relationship with part IDs: When part ID 1 enters the booth preset 1 is used to coat it.

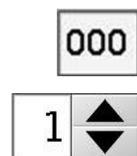
NOTE: This section covers only offline preset setup. Refer to the *Operation* section of this manual for detailed information on online adjustment of preset settings, controlling gun triggering, monitoring gun output and status, and responding to alarms.

Common Interface Elements

Buttons perform actions, such as opening screens, activating options, or executing a command. All buttons have a border around them.



Touch the **Close** button to close an open screen.



Data Fields allow you to enter settings. Touch the field to activate it, then use the rotary dial or up and down arrows if present to change the displayed value. Some screens also allow you to open a numeric keypad to change the value in the data field after selecting it.

Preset Setup Screens

You can use either the Gun Control/Status Screens or the Preset Table screen to create and set up presets.

The **Gun Control/Status** screen displays preset settings for one gun, one preset at a time. Once you set up a preset for a gun, you can use the Copy functions to copy the settings to other presets and to other guns. The Gun Control/Status screen can be used online or offline to adjust one or more preset settings for one or more presets.

Touch a **Gun Button** to open the Gun Control/Status screen for that spray gun.

The **Preset Table** screen provides an overall view of all the presets settings for all the guns in the system, one preset at a time, in a table format. Use this screen to quickly setup your presets. You can then modify them as desired, using this screen or the Gun Control/Status screen. This screen is intended for offline use.

Touch the **Preset Table** button to open the Preset Table screen. The last preset edited or preset 1 settings are displayed.

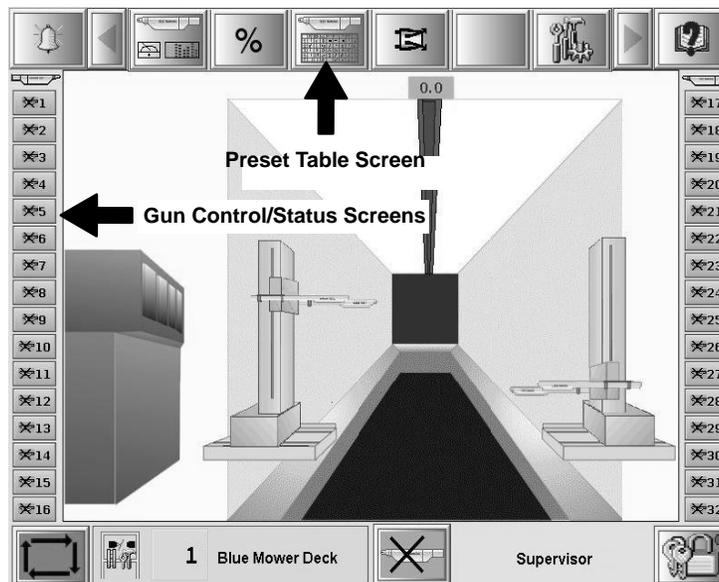


Figure 5-1 Accessing the Gun Control/Status and Preset Table Screens

Using the Gun Control/Status Screen

The Gun Control/Status screen provides the following features for setting up presets:

- Air flow and electrostatics are set with the four function buttons, two slider bars, and two vertical bar scales.
- Lead and lag values and zone assignments are set with data fields.
- To copy your settings, use the Copy functions. Refer to Copying on page .
- To save your settings, touch the **Save** button. If you do not save your settings before closing the screen, a dialog box appears asking you if you want to save or cancel.

To use the slider bars to set air flow and electrostatics, touch the function button below the vertical scale to activate it, then

- touch and drag the slider bar up or down, or
- touch the slider bar slot on either side of the bar, or
- use the rotary dial.

NOTE: The active button and scale are colored. Only one scale can be active at a time for each slider. Touching the slider bar slot increases or decreases the scale value in increments (0.2 for air flow, 5 for kV and μA).

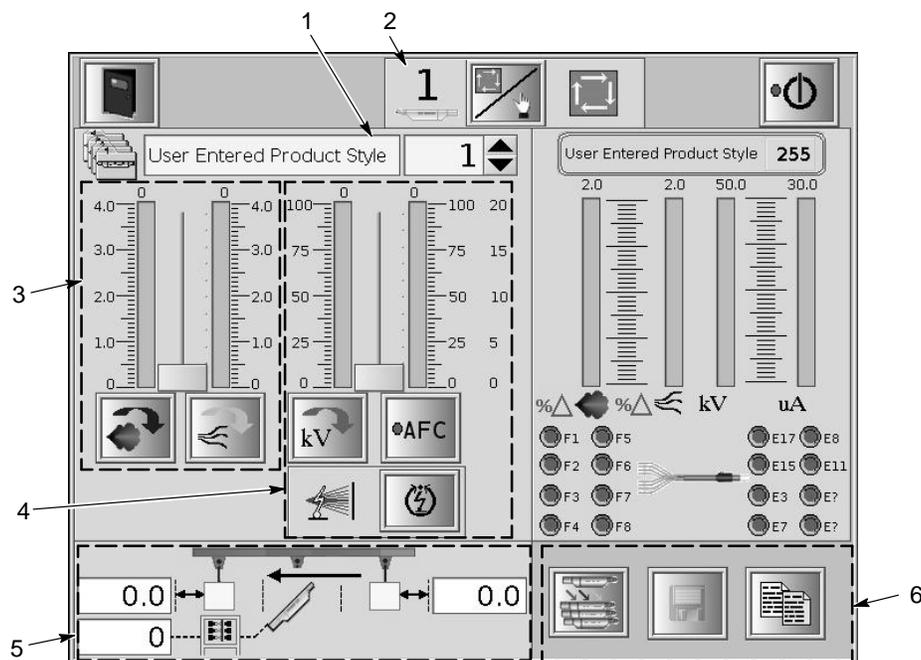


Figure 5-2 Gun Control/Status Screen

- | | | |
|---------------------------|---------------------------|---------------------------------|
| 1. Preset name and number | 3. Air flow settings | 5. Lead, lag, and zone settings |
| 2. Gun number | 4. Electrostatic settings | 6. Copy and save functions |

Using the Preset Table Screen

See Figure 5-3. When you open the Preset Table screen, it displays a list of the preset settings, starting with preset 1, or the last preset edited, for all guns in the system.

- To scroll the screen, touch and drag the horizontal and vertical scroll bars, or touch the scroll bar arrows.
- To change a numerical value, touch the data field to select it, then use the rotary dial or press the **Keypad** button to open the keypad.
- To copy the settings for Gun 1 to the rest of the guns, touch the **Copy All** button.
- To save your settings, touch the **Save** button. If you do not save your settings before closing the screen, a dialog box appears asking you if you want to save or cancel.

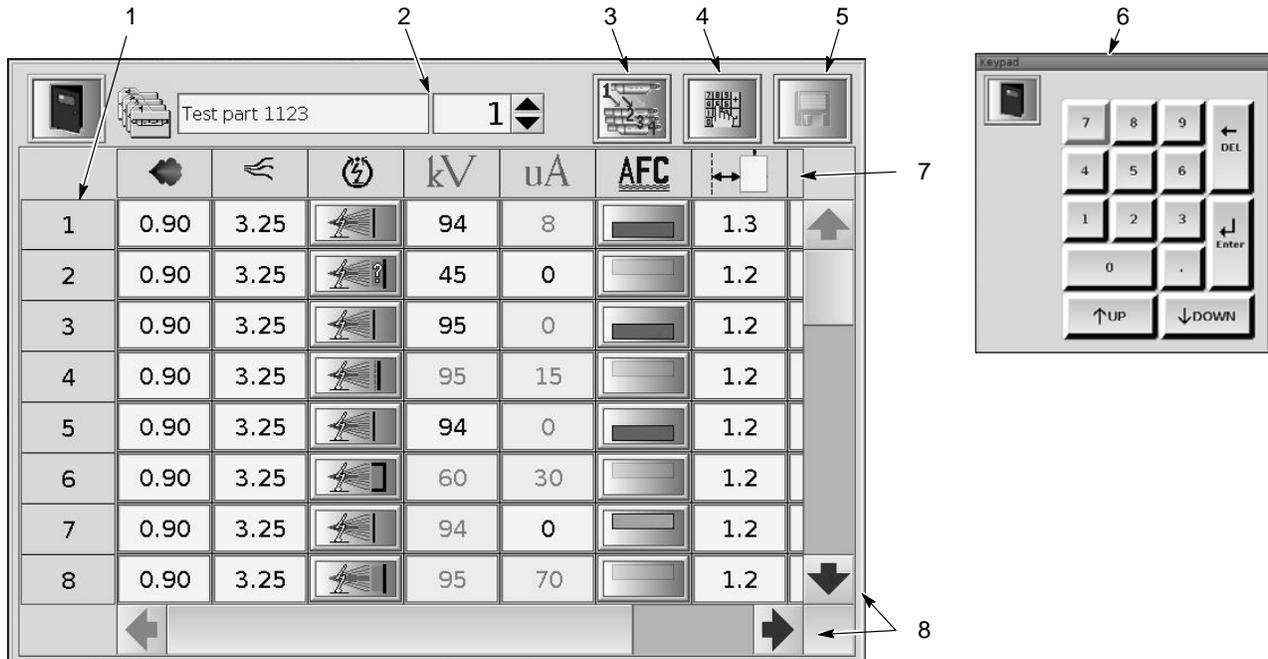


Figure 5-3 Preset Table Screen

- | | | |
|---------------------------|------------------|--------------------|
| 1. Gun number | 4. Keypad button | 7. Preset settings |
| 2. Preset number and name | 5. Save button | 8. Scroll bars |
| 3. Copy All button | 6. Keypad | |

Making Preset Settings

Selecting and Naming Presets

Use the Preset Name and Preset Number fields to select a preset and to give the preset a name.



Figure 5-4 Preset Name and Preset Number Fields - Gun Control Screen

Selecting Presets

There are two ways to select the preset number you want to set up:

- Touch the Up (▲) or Down (▼) arrows.
- Touch the Preset Number data field and use the rotary dial.

Naming Presets

Touch the Preset Name field. The keyboard screen opens.

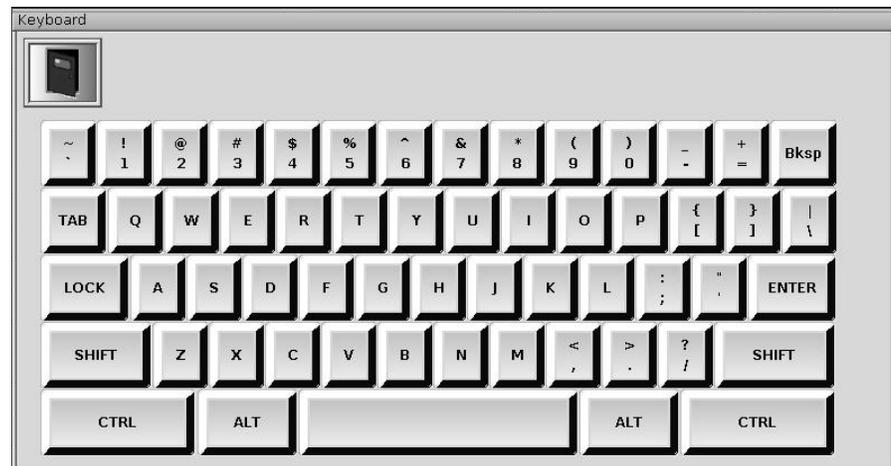


Figure 5-5 Keyboard Screen

The preset name allow you to easily identify your parts. Since the preset numbers and part ID numbers have a one-to-one relationship, you will typically give the preset the name of the corresponding part ID. For example, if part ID 1 is your part number 974367B, enter 974367B in the name field for preset 1.

Setting Air Flow

NOTE: Air flow settings depend on the Units setting made in System Configuration: If you set units to English then air flow settings are in scfm; for Metric they are in m³/hour.



Flow-Rate



Atomizing

The optimum settings of flow-rate and atomizing air and their ratio depend on the powder pump used and the diameter of the air tubing. Typically, the optimum setting is determined by manually triggering the spray gun, observing the spray pattern, and adjusting the air flow. Then, when all guns are set up, spray parts, check the applied coating, and make additional adjustments to the air flow, if necessary.

Refer to your pump manuals for suggested starting points for flow-rate and atomizing air, then adjust the air flows as required to obtain the best results. Tables 5-1 and 5-2 convert air pressure to air flow.

NOTE: The air flow settings in Tables 5-1 and 5-2 will provide slightly more powder to the spray guns with a Nordson Modular powder pump and slightly less powder with a Nordson In-Line powder pump (used in Powder Feed Centers).

Table 5-1 Pressure to Flow Conversion Table: 6-mm Tubing/100 Plus Nozzle
(P1 is pressure at digital flow module (console) outlet)

20 ft of 6-mm Tubing with 100 Plus Nozzle		40 ft of 6-mm Tubing with 100 Plus Nozzle	
m ³ /hr (scfm)	P1 bar (psi)	m ³ /hr (scfm)	P1 bar (psi)
.846 (0.50)	0.275 (4.0)	846 (0.50)	0.414 (6.0)
1.26 (0.75)	0.482 (7.0)	1.26 (0.75)	0.689 (10.0)
1.68 (1.00)	0.758 (11.0)	1.68 (1.00)	1.03 (15.0)
2.1 (1.25)	1.10 (16.0)	2.1 (1.25)	1.38 (20.0)
2.52 (1.50)	1.45 (21.0)	2.52 (1.50)	1.83 (26.5)
2.94 (1.75)	1.86 (27.0)	2.94 (1.75)	2.24 (32.5)
3.36 (2.00)	2.21 (32.0)	3.36 (2.00)	2.69 (39.0)
3.78 (2.25)	2.55 (37.0)	3.78 (2.25)	3.10 (45.0)
4.2 (2.50)	2.93 (42.5)	4.2 (2.50)	3.55 (51.5)
4.62 (2.75)	3.34 (48.5)	4.62 (3.75)	4.00 (58.0)
5.04 (3.00)	3.72 (54.0)	5.04 (3.00)	4.34 (63.0)
5.52 (3.25)	4.07 (59.0)	5.22 (3.10)	4.48 (65.0)
5.64 (3.35)	4.21 (61.0)	-	-

Table 5-2 Pressure to Flow Conversion Table: 8-mm Tubing/100 Plus Nozzle
(P1 is pressure at digital flow module (console) outlet)

20 ft of 8-mm Tubing with 100 Plus Nozzle		40 ft of 8-mm Tubing with 100 Plus Nozzle	
m ³ /hr (scfm)	P1 bar (psi)	m ³ /hr (scfm)	P1 bar (psi)
0.846 (0.50)	0.137 (2.0)	0.846 (0.50)	0.172 (2.5)
1.26 (0.75)	0.275 (4.0)	1.26 (0.75)	0.345 (5.0)
1.68 (1.00)	0.483 (7.0)	1.68 (1.00)	0.552 (8.0)
2.1 (1.25)	0.724 (10.5)	2.1 (1.25)	0.862 (12.5)
2.52 (1.50)	1.03 (15.0)	2.52 (1.50)	1.17 (17.0)
2.94 (1.75)	1.34 (19.5)	2.94 (1.75)	1.48 (21.5)
3.36 (2.00)	1.65 (24.0)	3.36 (2.00)	1.83 (26.5)
3.78 (2.25)	1.96 (28.5)	3.78 (2.25)	2.14 (31.0)
4.2 (2.50)	2.31 (33.5)	4.2 (2.50)	2.48 (36.0)
4.62 (2.75)	2.65 (38.5)	4.62 (3.75)	2.86 (41.5)
5.04 (3.00)	2.96 (43.0)	5.04 (3.00)	3.21 (46.5)
5.52 (3.25)	3.31 (48.0)	5.52 (3.25)	3.52 (51.0)
5.96 (3.5)	3.59 (52.0)	5.69 (3.35)	3.65 (53.0)

Setting Electrostatics

The iControl system allows you to set different electrostatic charging modes and levels for each preset, if desired. The following modes are available:

NOTE: When Tribomatic guns are used, only the AFC mode is available, and it is used to set the current feedback alarm level.



kV



AFC

kV Control

Use kV control to set the voltage output from the spray gun (Versa-Spray and Sure Coat guns). KV control provides maximum transfer efficiency when coating large objects with a gun-to-part distance of 0.2-0.3 m (8-12 in.). This control is not used with Tribomatic guns.

AFC Control

Use AFC (Automatic Feedback Current) control to set the maximum current output (μA) from the spray gun. This prevents excess charging of the powder for coating parts with interior corners and deep recesses at close range.

For Tribomatic guns, use AFC control to set the minimum current feedback level. If the current feedback falls below this level, an alarm alerts the operator that the sprayed powder is not receiving the desired electrostatic charge.

NOTE: You must turn AFC on (touch the AFC button) before you can set the maximum current output.

Select Charge Mode

Use the Select Charge mode to set one of four preset electrostatic charging modes. The settings for modes 1, 2, and 3 cannot be changed. Select Charge mode 4 is user-programmable, allowing both kV and μA to be controlled. Mode 0 turns off Select Charge and allows you to set kV or AFC. Select Charge mode is not used with Tribomatic guns.

Table 5-3 Select Charge Mode Values

Select Charge Mode	Application	kV/AFC Setting	Initial kV Value		Maximum Current
			Sure Coat Gun	Versa-Spray Gun	Sure Coat or Versa-Spray Gun
1	Recoat	not adjustable	95 kV	100 kV	15 μA
2	Special	not adjustable	60 kV	60 kV	30 μA
3	Deep Cavity with gun inside	not adjustable	95 kV	100 kV	70 μA
4	User Programmable	adjustable	60 kV	60 kV	30 μA



To activate Select Charge and select a mode:

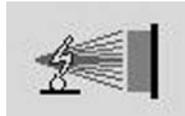
- On the Gun Control/Status screen, touch the **Select Charge button** to the right of the Select Charge mode icon. Touch the button repeatedly to toggle through the modes. The icon indicates the mode setting.
- On the Preset Table screen, touch the **Select Charge button** in the Select Charge field. Touch the button repeatedly to toggle through the modes. The button icon indicates the mode setting.



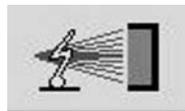
Select Charge Off (Flat Panels): When Select Charge is off you can set kV or AFC by touching the kV or AFC buttons.



Mode 1 (Recoat): Use this mode for recoating parts that have already been coated and cured. Gun current is aggressively reduced to eliminate back ionization.



Mode 2 (Special): Use this mode for coating with special powders (dry blend metallics or micas).



Mode 3 (Deep Cavity): Use this mode for coating inside boxes or other deep cavities. Low kV and current coats the front edges of the cavity and high kV and current coats the back of the cavity.



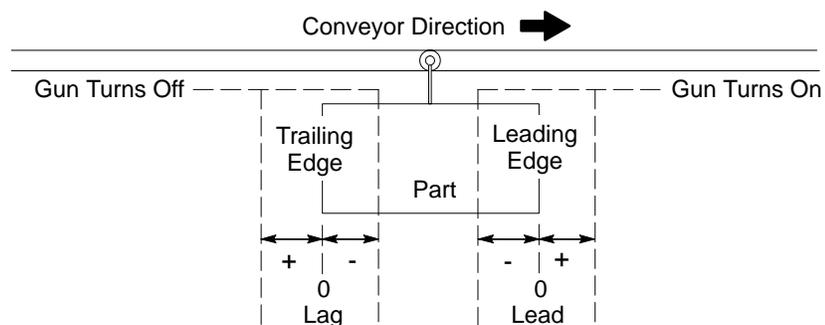
Mode 4 (User Programmable): This mode allows you to set both kV and μA for a particular part or powder and store the setting. The settings are loaded each time Mode 4 is selected.

Setting Lead and Lag Triggering

Lead and lag settings determine when the spray guns turn on and off in relation to the position of the part's leading and trailing edges. Lead and lag values can be zero, positive, or negative, or any combination.

- Positive settings extend powder spray: A positive lead triggers the gun on BEFORE the leading edge passes; a positive lag triggers the gun off AFTER the trailing edge passes.
- Negative settings restrict power spray: A negative lead triggers the gun on AFTER the leading edge passes; a negative lag triggers the gun off BEFORE the trailing edge passes.
- Zero settings trigger the gun on at the leading edge and off at the trailing edge.

NOTE: Refer to *Lead and Lag Triggering* in the *Description* section of this manual for a more detailed explanation of this feature.



1400233A

Figure 5-6 Lead and Lag Triggering

Setting Lead and Lag Triggering (contd)

Set the lead and lag values by touching each field then using the rotary dial to enter a positive or negative number.

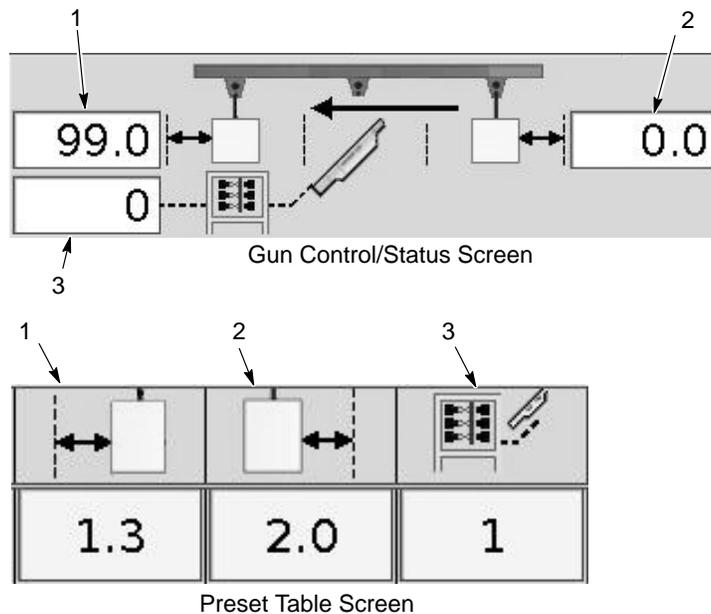


Figure 5-7 Setting Lead, Lag, and Zone Assignments

- | | |
|---------|---------|
| 1. Lead | 3. Zone |
| 2. Lag | |

Zone Assignment

When a part is detected by a zone photoeye, the spray guns assigned to that zone by the preset for that part are triggered when the part passes by the guns.

See Figure 5-7. To set the zone assignment, touch the Zone field, then use the rotary dial to enter a zone number. Normally you will assign the spray gun to the physical zone the gun is in, but you can assign it to any zone. Setting a zone to zero or to a invalid number will prevent triggering.

You can use the zone assignment setting to prevent a gun from spraying. For example, for part 3, you do not want gun 1 to spray, even though the gun is assigned to zone 1, which will detect the part. Set the zone assignment for Gun 1, Presets 3 to zero.

NOTE: Do not change zone assignments while parts are moving through the system. Doing so could cause errors in zone assignments and erratic results.

Refer to *Part Detection and Identification* in the *Description* section of this manual for a more detailed explanation of zones.

Copying

Copy All: Gun Control/Status Screen

The Copy All function on the Gun Control/Status screen copies only the air flow and electrostatic settings (spray settings) for the current preset to all presets with the same number for all guns. For example, if the current preset is preset 1 for gun 1 and you have 16 guns in your system, the Copy All function copies preset 1 spray settings to preset 1 for guns 2 to 16.

To use the Gun Control/Status screen Copy All function:



1. Select the preset number to use as the source.
2. Touch the **Copy All** button. The Copy All confirmation screen opens:

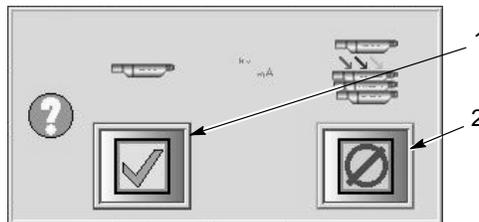


Figure 5-8 Copy Functions - Copy All Confirmation Screen

1. Confirm
2. Cancel
3. Touch the **Confirm** button to start copying. If you change your mind touch the **Cancel** button.

Copy All: Preset Table Screen

The Copy All function on the Preset Table screen copies all the preset settings for Gun 1 to all other guns, for the current preset number. For example, if preset 1 is the current preset the Copy All function will copy all the preset 1 settings for gun 1 to the preset 1 settings for all the guns listed.

To use the Preset Table screen Copy All function:



1. Select the preset number to use as the source.
2. Set the preset settings for Gun 1.
3. Touch the **Copy All** button. The Copy All confirmation screen opens:

Copy All: Preset Table Screen (contd)

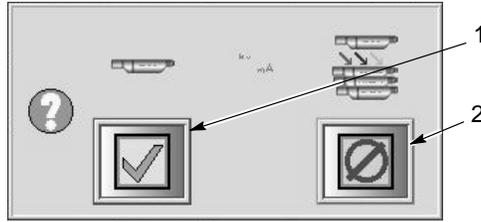


Figure 5-9 Copy Functions - Copy All Confirmation Screen

- 1. Confirm
- 2. Cancel

4. Touch the **Confirm** button to start copying. If you change your mind touch the **Cancel** button.

Copy Selected

This function is only available through the Gun Control/Status screen.

NOTE: Shut off all guns before using this function. The iControl system will not allow copying while the guns are in Auto or Manual mode.



The Copy Selected function allows you to select settings for a gun for a range of presets (source), and copy the settings to a range of guns and presets (destination).

1. Touch the **Copy Selected** button to open the Copy Selected screen:

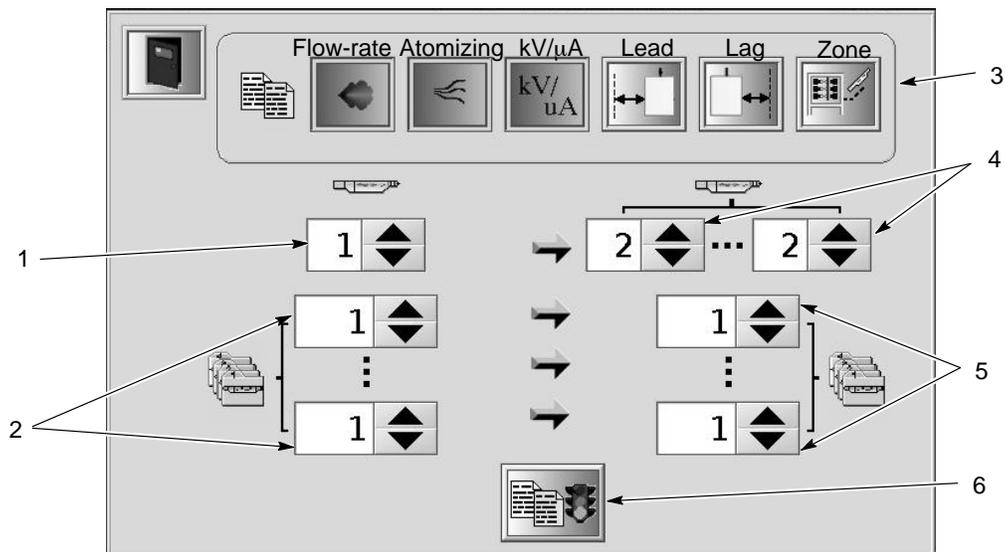


Figure 5-10 Copy Selected Screen

- 1. Source gun
- 2. Source presets
- 3. Source settings
- 4. Destination guns
- 5. Destination presets
- 6. Copy Start button

2. Select the:
 - a. desired source settings (3). You can select one or more settings.
 - b. source gun (1).
 - c. source preset or range of presets (2).
 - d. destination gun or range of guns (4).
 - e. destination preset or range of presets (5).

To change the field values touch the Up (▲) or Down (▼) arrows next to the fields or touch the field and use the rotary dial.

NOTE: All selections must be valid or the **Copy Start** button will not function. If the button is gray, check your selections for errors such as an unequal number of source and destination presets.

3. Press the **Copy Start** button. The Copy Selected Confirmation screen appears.
 - All guns must be turned off. If they are not, the **Copy** button will not function. Use the **Global Trigger Mode** button at the top of the Main screen to turn all guns off.
 - If you wish to cancel the copy operation, touch the **Close** button.
4. Press the **Copy** button to start copying. The Progress bar will fill from left to right to indicate the copy operation's progress.
5. When the copy operation is complete, the screen will close automatically.

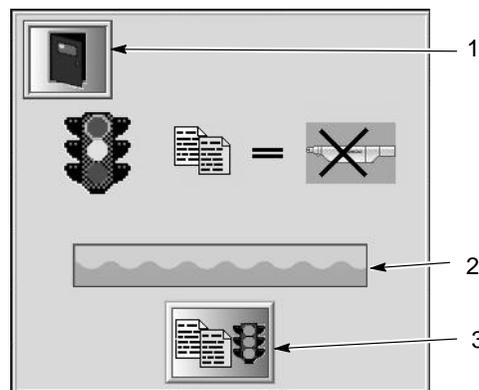


Figure 5-11 Copy Selected Confirmation Screen

- | | |
|-------------------------------|----------------|
| 1. Close (cancel copy) button | 3. Copy button |
| 2. Progress bar | |

Preset Setup Record

Make copies of the record sheet on the following page and use them to record your preset settings.

5-14 Preset Setup

Date: _____ **Preset No:** _____ **Preset Name:** _____

Gun	Flow-Rate	Atomizing	kV	μA	Select Charge	Lead	Lag	Zone
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
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Section 6

Operation



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



CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl program and operating system on the program card. Refer to *Program Shutdown* in the *Configuration* section for the shutdown procedure.

Introduction

This section tells you how to monitor system and gun operation and status, stop and start automatic triggering, trigger guns manually, adjust spray settings by percentages, adjust most preset settings, and control nozzle purging (Versa-Spray guns only).

These sections of this manual will help you operate your iControl system:

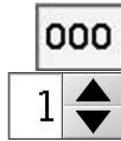
- Section 2 Description: Overview of system hardware and an explanation of how the system functions work together to accomplish part detection, identification, tracking, gun control, triggering, and purging.
- Section 4 Configuration: Detailed explanation of configuration settings that affect part ID and tracking, gun triggering, and purging.
- Section 5 Preset Setup: Detailed explanation of preset settings and their functions.

Common Interface Elements

Buttons perform actions, such as opening screens, activating options, or executing a command. All buttons have a border around them.



Touch the **Close** button to close an open screen.



Data Fields are used to enter values. Touch the field to activate it, then use the rotary dial or up and down arrows to edit the field value. Some screens allow you to open a numeric keypad you can use to edit the field value.



Touch the **OK** button to save changes or proceed with an action.



Touch the **Cancel** button to cancel changes or an action.

Icons

The iControl user interface uses icons instead of words. Use this brief guide to learn the meaning of each icon.

Settings		Miscellaneous	
	Atomizing air flow (scfm)		Spray gun
	Flow-rate air flow (scfm)		Part ID
	Voltage (kilovolts)		Preset
	Microamperes (current)		Trigger Switch
	Select Charge (electrostatics)		Zones
Trigger or Operation Modes			
	Automatic		
	Manual		
	Off (guns, triggering)		

System Startup

If the iControl system is not on, use the power switch on the rear panel, to power on the system. When the system is turned on, it performs a series of self-tests and then displays the Main screen. All settings are restored to the state they were in when the system was shut down.

NOTE: On power up, if a new user data card containing new presets was installed after the power was shut off, all presets are downloaded from the user data card to the gun control cards.

1. Log into the system, if required: *Password Security*, page 6-4.
2. Set the desired Trigger Mode for all guns: *Setting Global Trigger Mode*, page 6-6.
3. Set the desired Part ID Mode: *Setting Part ID Mode*, page 6-7.
4. If used, set the desired Nozzle Purge Mode: *Setting Nozzle Purge Mode*, page 6-8.
5. Start the powder recovery system, booth exhaust fan, and conveyor. Start running parts through the booth.

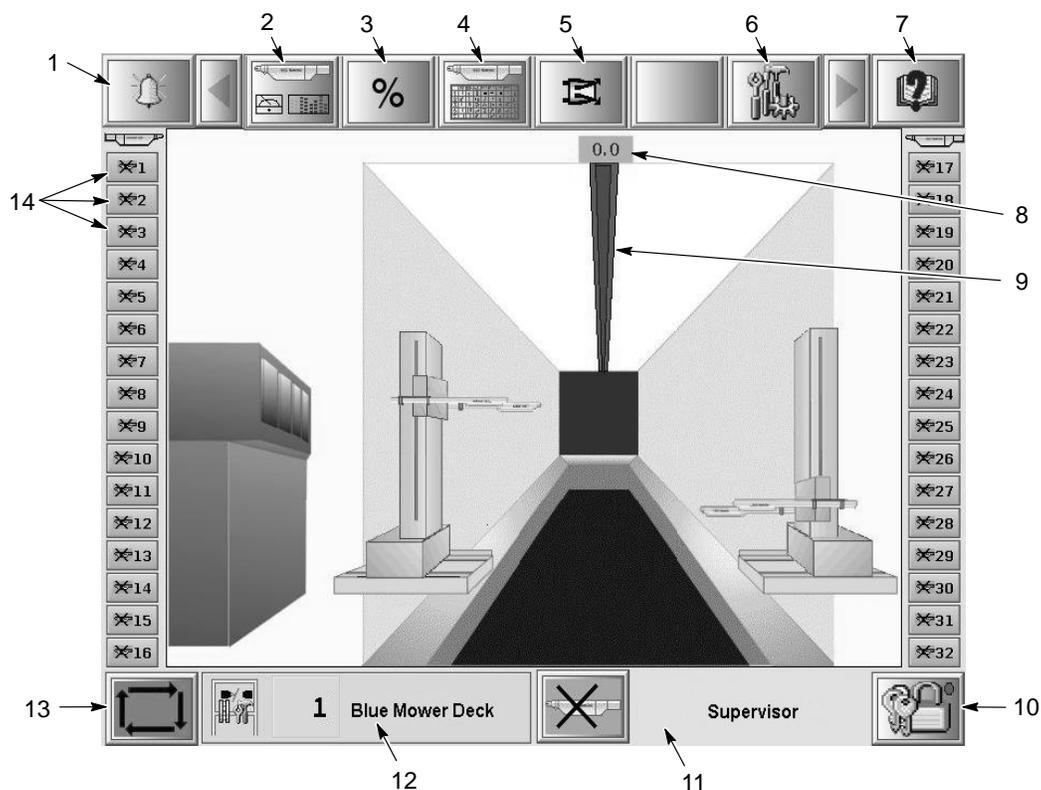


Figure 6-1 Main Screen Operation Functions

- | | | |
|------------------------------|---|------------------------------------|
| 1. Alarms | 6. Configuration | 11. Global trigger mode (all guns) |
| 2. Global status (all guns) | 7. Help | 12. Part ID and name |
| 3. Percent adjust (air flow) | 8. Conveyor speed | 13. Part ID mode |
| 4. Preset table | 9. Conveyor on/off indicator | 14. Gun buttons |
| 5. Nozzle purge mode | 10. Login/logout/security configuration | |

Note: The Part ID and name (7) is the part in front of the zone photoeyes, not the part being sprayed.

Password Security



Touch the **Security** button on the main screen open the Login/Logout screen.

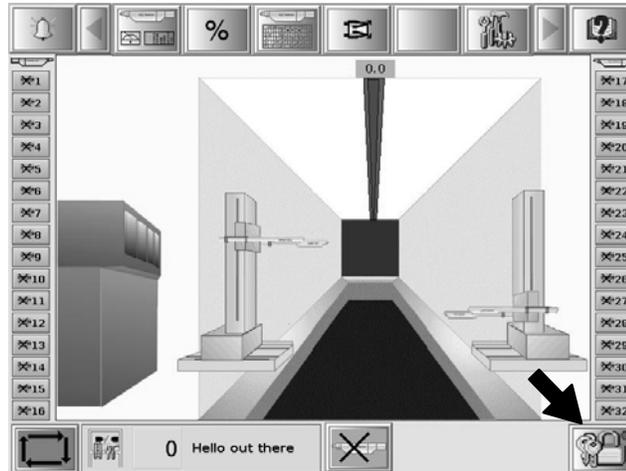


Figure 6-2 Security Button on Main Screen

See Figure 6-3. The Login/Logout screen has buttons for logging in, logging out, and the Security Configuration screen. All users (levels 2, 3, and 4) can open the Login/Logout screen. Only users with supervisor level access (level 4) can open the Security Configuration screen.

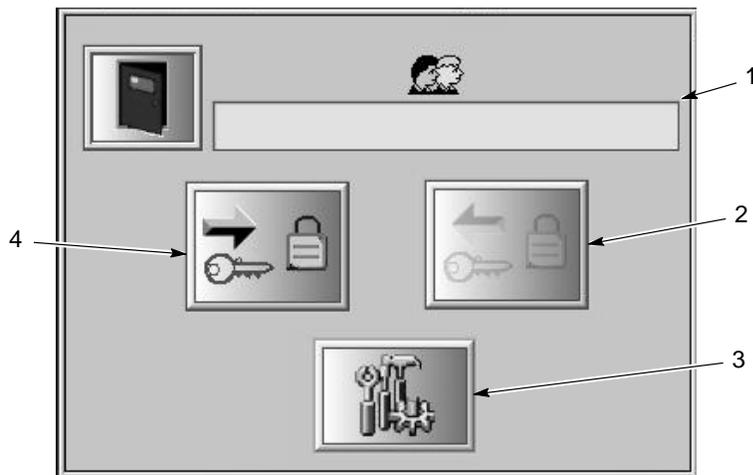


Figure 6-3 Login/Logout Screen

- | | |
|---|--|
| <ul style="list-style-type: none"> 1. User currently logged in 2. Log Out | <ul style="list-style-type: none"> 3. Open Security Configuration screen (level 4 access only) 4. Log In |
|---|--|

Log In

See the Login/Logout screen, Figure 6-3. The logout button is inactive (grayed out), as no user is logged in. Only one user can be logged in at a time. A new user can log in at any time; the previous user does not need to log out.

1. Touch the **Log In** button. The Login screen appears. Until you select a user the **OK** button will be inactive (grayed out).

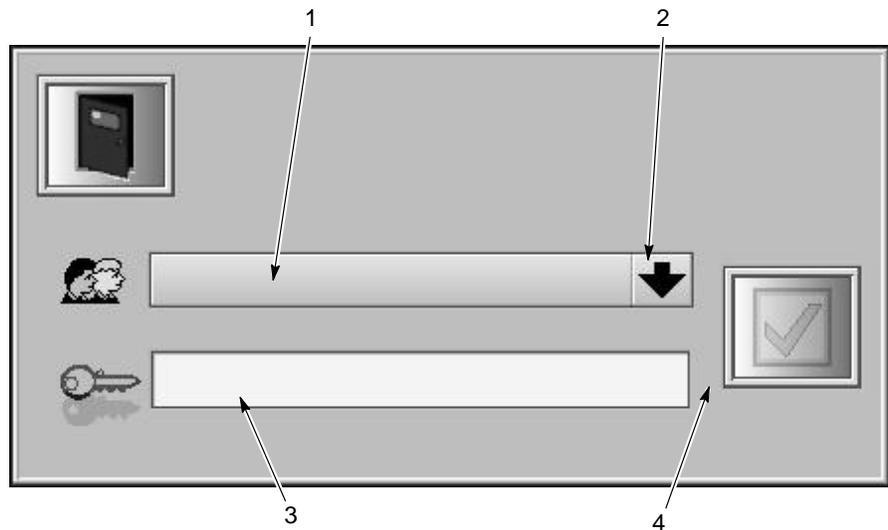


Figure 6-4 Login Screen

- | | |
|-----------------------------|-----------------------|
| 1. User name | 3. Password |
| 2. Down arrow (user select) | 4. OK button (log in) |
2. Touch the **Down** arrow in the user name field. A list of users appears. Touch your user name.
 3. Touch the **Password** field. The keyboard screen appears. Type in your password and close the keyboard. **Passwords are case-sensitive.**
 4. Touch the **OK** button to log in. To cancel the login, close the screen.

Log Out

See Figure 6-3. Touch the **Logout** button. A confirmation window opens. Touch the **Yes** button to log out; touch the **No** button to cancel the log out.

Setting Global Trigger Mode/Manual Triggering

The **Global Trigger Mode** button icons show the current mode setting for all guns. Touching the **Global Trigger Mode** button opens the Trigger Mode screen without changing the current trigger mode.

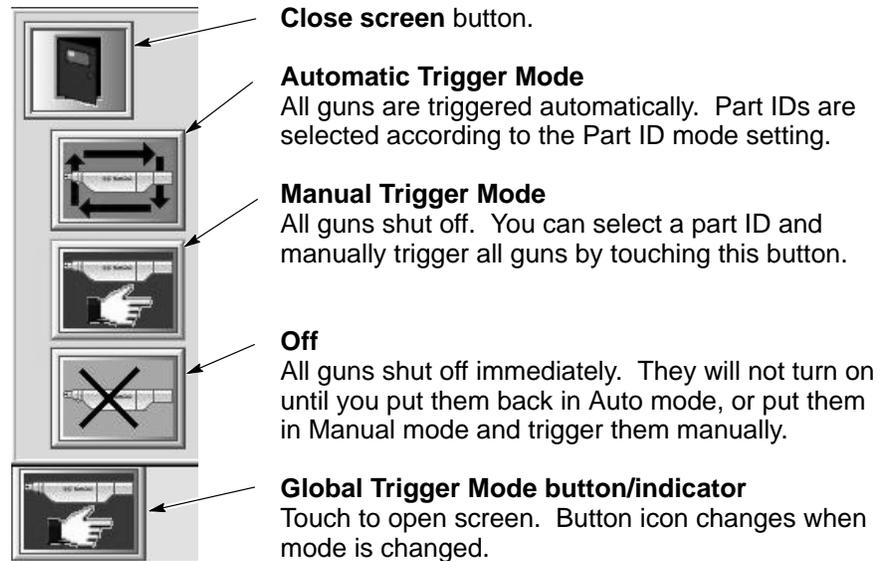


Figure 6-5 Trigger Mode Screen

Global Manual Triggering

When you touch the global **Manual Trigger Mode** button, all guns are shut off and placed in Manual mode. The screen expands to allow you to select a preset and trigger all guns manually.

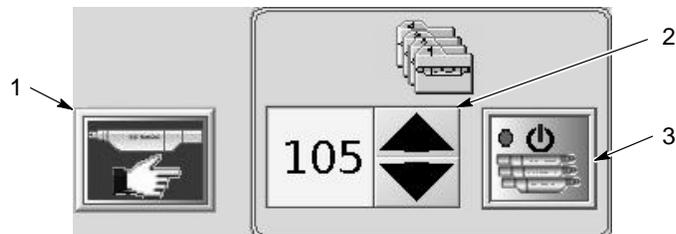


Figure 6-6 Manual Trigger Mode Screen

- | | |
|-----------------------|--------------------------|
| 1. Manual mode button | 3. Manual trigger button |
| 2. Preset number | |

To select the desired preset number, touch the Up (▲) and Down (▼) arrows or touch the preset number field and use the rotary dial.

Touch the **Manual Trigger** button to trigger all guns. Touch the button again to shut all guns off.

Setting Part ID Mode/Manual Part ID Entry

The Part ID Mode screen allows you to set the part ID mode:

- **Auto:** The part ID is entered into the part queue by signals received from the flag photoeyes or a customer part ID system.
- **Manual:** The part ID is selected and entered by the operator. Typically used for batch coating.

NOTE: Manually changing the part ID affects only the part entering the booth, not the part currently being sprayed.

To change the Part ID mode:

1. Touch the **Part ID Mode** button/indicator (this will not change the mode). The Part ID mode screen opens.

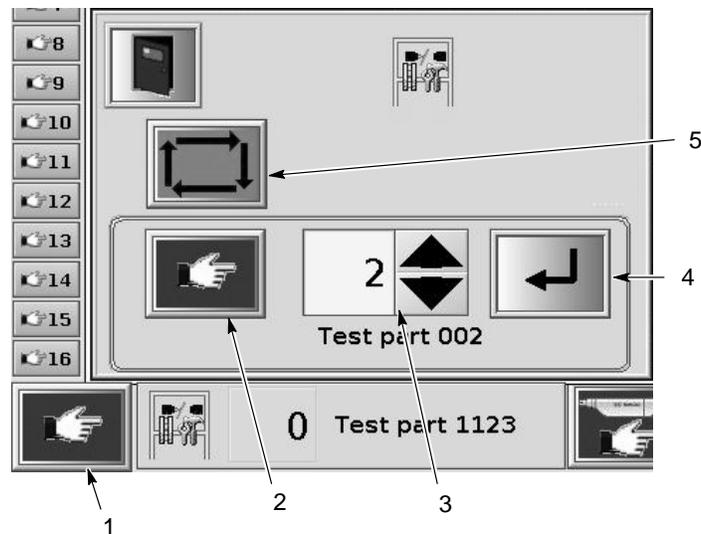


Figure 6-7 Part ID Mode Button and Screen

- | | |
|----------------------------------|---------------------|
| 1. Part ID Mode button/indicator | 4. Enter button |
| 2. Manual mode button | 5. Auto mode button |
| 3. Part ID number | |

2. Select a mode by touching the **Auto** (5) or **Manual** (2) buttons.

- If you selected **Auto** you can close the screen.
- If you selected **Manual** you can now change the part ID:
 - a. Touch the Up (▲) and Down (▼) arrows or touch the part ID number field and use the rotary dial.
 - b. Touch the **Enter** button to enter the new part ID into the part queue.

NOTE: If you enter a new part ID number while a part is passing in front of the zone photoeyes, the part will be sprayed first by the preset for the previous part ID number, then by the preset for the new part ID number.

Setting Nozzle Purge Mode/Manual Purging

Nozzle purge must be configured and enabled during System Configuration. It is only used with Versa-Spray guns, and purge kits must be installed in the iControl console(s) and purge adapters must be installed on the spray guns.

The Nozzle Purge Mode screen allows you to set the nozzle purge mode:

- **Auto:** Purging takes place automatically according to the configured settings. The purge timer controls the purge duration.
- **Manual:** Purging is activated when you touch the Manual Trigger button. Purging continues until you touch the button again.

To set the nozzle purge mode:

1. Touch the **Nozzle Purge Mode** button/indicator (1). The nozzle purge mode screen opens:

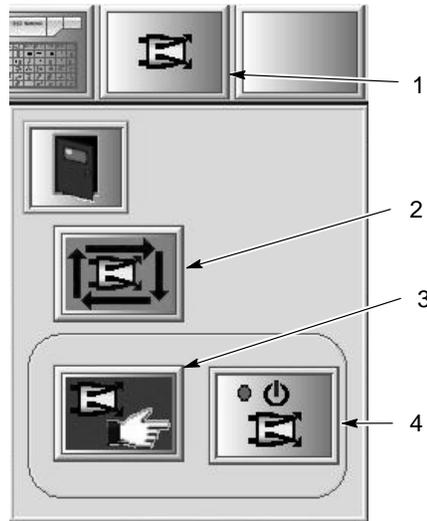


Figure 6-8 Nozzle Purge Mode Button and Screen

- | | |
|---------------------------------------|--------------------------|
| 1. Nozzle purge mode button/indicator | 3. Manual mode button |
| 2. Auto mode button | 4. Manual trigger button |

2. Select a mode by touching the **Auto** (2) or **Manual** (3) buttons.
 - If you selected **Auto** you can close the screen. The **Nozzle Purge Mode** button turns green while the nozzles are being purged.
 - If you selected **Manual** you can now start a nozzle purge by touching the **Manual Trigger** button (4). This will purge all guns at once, so do not purge the guns while any parts are in front of them. Touch the button again to turn purging off.

Monitoring Operation

Global Status



Touching the **Global Status** button at the top of the Main screen opens the Global Status screen, which displays the current preset number, air flow, and electrostatic output for up to sixteen guns at a time.

The legend on the left side of the screen shows the color coding used in the bar scales and the meaning of the numbers next to the scales.

Touch the Up (▲) and Down (▼) arrows on the console selector to display the guns connected to the second console, if used. Console A is the master console, console B is the slave console.

Touch the **Close** button to close the screen.

NOTE: You can use the Gun Control/Status screens to monitor the status and output of any individual gun. Open a screen by touching any **Gun** button on the Main screen.

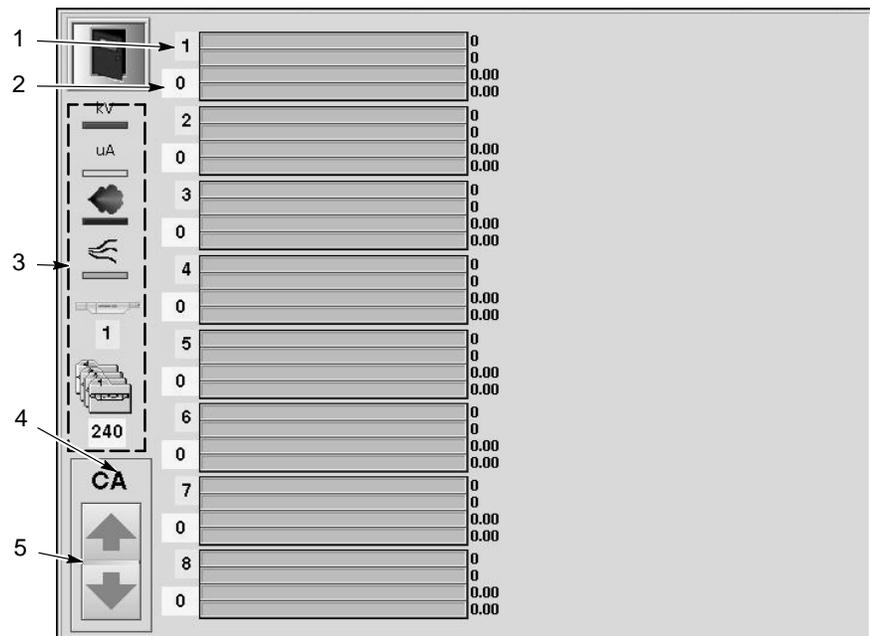


Figure 6-9 Global Status Screen

- | | |
|------------------|---------------------|
| 1. Gun number | 4. Console letter |
| 2. Preset number | 5. Console selector |
| 3. Legend | |

Part Entering Booth

The part ID number and name of the part entering the booth is displayed at the bottom left of the main screen. This is the part in front of the zone photoeyes, not the part being sprayed.

The current part ID mode is shown on the **Part ID Mode** button: the auto symbol for Auto mode, and the manual symbol for Manual mode. Refer to *Setting Part ID Mode* on page 6-7 for information on the part ID modes.



Figure 6-10 Part ID Mode Button (Auto Mode) and Part ID Number and Name

To view the part being sprayed, touch the **Global Status** button or the **Gun Control/Status** button of a spraying gun.

Gun Buttons

The **Gun** button colors and icons change to indicate the trigger status and trigger mode of each gun.



Auto Trigger: Auto icon appears on the buttons. Buttons are gray when the gun is off; green when on.



Manual Trigger: Manual icon appears on the buttons. Buttons are gray when the gun is off; green when on.



Trigger Off: Gun off icon appears on the buttons. The buttons are gray.

If a malfunction or error occurs that is gun related, the relevant gun button will alternately flash yellow. If this occurs, touch the button to open the Gun Control/Status screen to find the error code number. Refer to *Alarms* in this section for more information.

Gun Control/Status Screens

Touch a **Gun** button to open the Gun Control/Status screen for that gun. See Figure 6-11. The Gun Status area of the screen shows you the:

- preset number currently being sprayed
- air flow and electrostatic outputs
- gun type
- error code number, if an alarm exists for that gun

If $\Delta\%$ (delta %) symbols appear below the air flow bar graphs, then the air flow is being adjusted automatically with the Percent Adjust function.

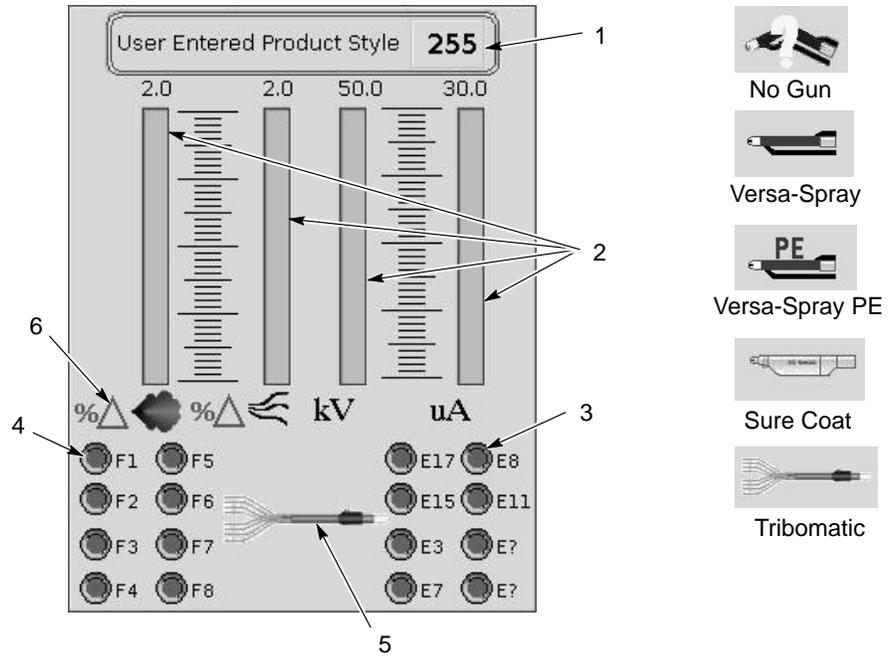


Figure 6-11 Gun Status - Gun Control/Status Screen

- | | |
|--------------------------------------|-----------------------------|
| 1. Preset being sprayed | 4. Air flow error codes |
| 2. Air flow and electrostatic output | 5. Gun type |
| 3. Electrostatic error codes | 6. Percent adjust indicator |

Note: Refer to *Alarms* in this section for error codes. ? error codes are reserved for future use.

Percent Adjust

While the guns are spraying, you can increase or decrease the flow-rate and atomizing air flow by a percent of each air flow setting, through the Percent Adjust screen.

The adjustments you make apply immediately to all guns, for all presets. The settings are stored on the program card, so shutting off the system will not cancel them. They are recalled on power up.

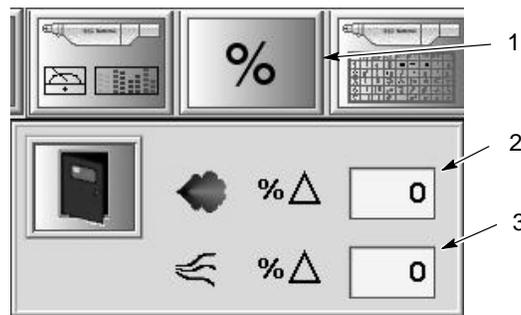


Figure 6-12 Percent Adjust Button and Screen

- | | |
|-----------------------------|-----------------------------|
| 1. Percent Adjust button | 3. Atomizing air flow field |
| 2. Flow-rate air flow field | |

Percent Adjust (contd)

1. From the Main screen, touch the **Percent Adjust** button.
2. Touch the **Flow-rate** (2) and **Atomizing** (3) air flow fields and use the rotary dial to enter a percent value greater or lesser than zero. Positive values increase air flow and negative values decrease air flow.

When Percent Adjust is active the button turns green.

To cancel the percent adjust, set the field values to zero.

3. Touch the **Close** button to close the screen.

Adjusting Preset Settings

See Figure 6-13. Use the Gun Control/Status screens to adjust your preset settings for one gun at a time, online or offline.

NOTE: You can use the Copy All function to copy the air flow and electrostatic settings to the same preset for all guns, while the guns are spraying. To use the Copy Selected function, you must shut off all guns. Refer to *Copying* in the *Preset Setup* section of this manual.

Touch the **Gun** button for the desired gun:

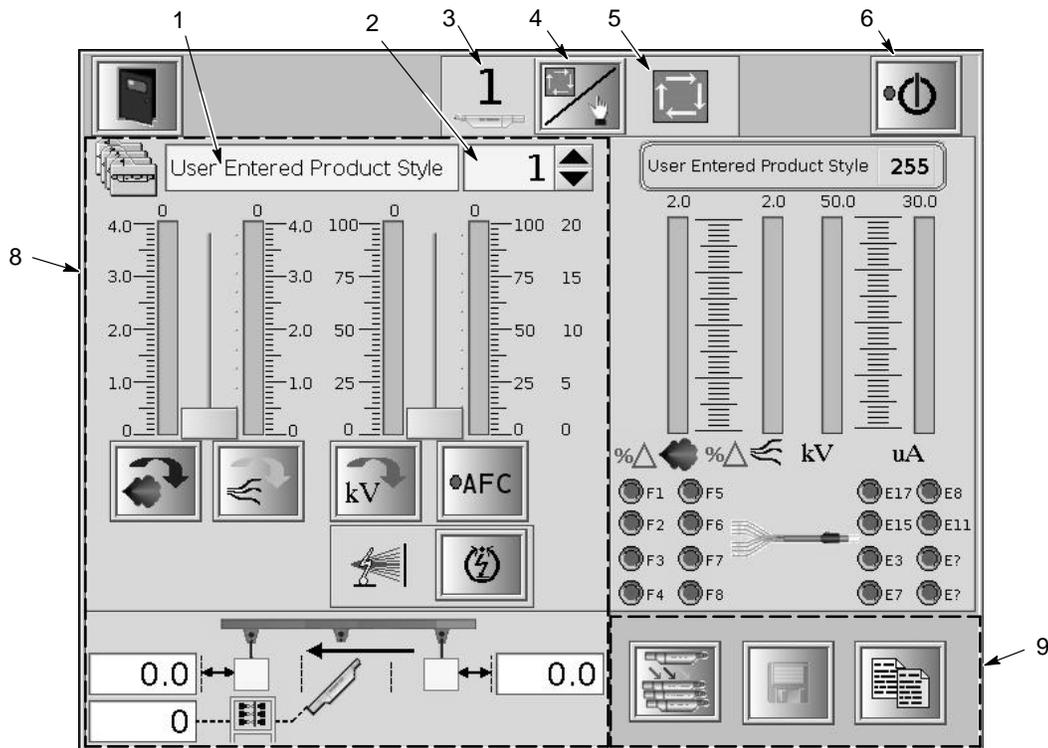


Figure 6-13 Gun Control Screen Functions

- | | | |
|------------------|-----------------------------------|---------------------------|
| 1. Preset name | 4. Trigger mode button | 7. Preset setting display |
| 2. Preset number | 5. Current trigger mode indicator | 8. Copy functions |
| 3. Gun number | 6. Manual trigger button | |

The Preset Setting (8) and Gun Status (7) displays are independent of each other. For example, you open the Gun Control/Status screen for Gun 1 while it is spraying Part 1:

- The Gun Status display shows the output of Gun 1 for preset 1.
- The Preset Setting display shows the settings for preset 1.

While you have the screen open, Part 2 moves in front of the guns.

- The Gun Status display shows the output of Gun 1 for Preset 2.
- The Preset Setting display does not change; it still shows the settings for Preset 1.

You touch the Gun Control/Status button for Gun 2 while Part 2 is being sprayed by Gun 2.

- The Gun Status display shows the output of Gun 2 for Preset 2.
- The Preset Setting display shows the settings for Preset 1.

You can use the Preset Setting display to adjust the settings for any preset, one gun at a time.

Adjusting Airflow and Electrostatic Settings

Refer to the *Preset Setup* section of this manual for more information on setting airflow and electrostatics and copying preset settings.

See Figure 6-13. When adjusting flow-rate air, atomizing air, kV, or AFC (μA) note that

- the active button and bar scale are colored, the inactive button and bar scale are gray.
- only one setting can be changed at a time for each slider bar.

Touch the setting button below the vertical bar scale to activate it, then

- touch and drag the slider bar up or down, or
- touch the slider bar slot on either side of the bar, or
- use the rotary dial.

NOTE: Touching the slider bar slot increases or decreases the setting in small increments (0.2 for air flow, 5 for kV and μA).

To set kV or AFC, the Select Charge mode must be off or set to user programmable mode.

Changing Select Charge Settings

See Figure 6-13. The Select Charge button toggles through the available modes:



Select Charge Off: When the Select Charge mode is off, you can set kV or AFC.



Recoat: Use for recoating already coated parts.



Special: Use for special powders, such as dry blend metallics and micas.



Deep Recesses: Use when coating inside deep recesses of parts.



User Programmable (kV and μA): Allows you to adjust both kV and μA as desired.

Adjusting Lead, Lag, and Zone Settings

See Figure 6-14.

The lead and lag settings determine when the spray guns turn on and off in relation to the part position. Lead and lag values can be zero, positive, or negative, or any combination.

- Positive settings extend powder spray: A positive lead triggers the gun on BEFORE the leading edge passes; a positive lag triggers the gun off AFTER the trailing edge passes.
- Negative settings restrict power spray: A negative lead triggers the gun on AFTER the leading edge passes; a negative lag triggers the gun off BEFORE the trailing edge passes.
- Zero settings trigger the gun on at the leading edge and off at the trailing edge.

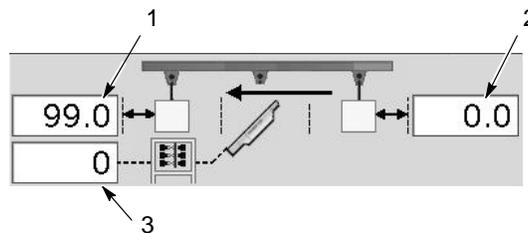


Figure 6-14 Changing Lead, Lag, and Zone Settings - Gun Control Screen

1. Lead field
2. Lag field
3. Zone field

NOTE: Adjustments to lead and lag settings will not affect any part that is already in front of the zone photoeyes or being sprayed. Changes will not take effect until the next part enters the booth.

The Zone setting assigns a spray gun to a zone photoeye. If a photoeye detects a part, the guns assigned to it are triggered. If the zone setting is zero or an invalid number, the gun will not be triggered.



CAUTION: Do not change zone assignments while parts are moving through the booth. Doing so could cause erratic operation.

Single Gun Trigger Mode/Manual Trigger

See Figure 6-13. To change the gun trigger mode for one gun, or to trigger the gun manually:

1. Touch the **Gun** button for the desired gun to open the Gun Control/Status screen for that gun.
2. Touch the **Trigger Mode** button to toggle through Auto, Manual, and Off modes.
3. To trigger the gun manually, change the gun's trigger mode to Manual, then touch the **Manual Trigger** button to trigger the gun on and off.

Single Gun Shutdown

To shut down one or more guns while the rest continue to spray, touch the **Gun** buttons for the desired guns and change their operating mode to Manual or Off.

To quickly return all shut down guns to operation, touch the **Trigger Mode** button/indicator at the top of the main screen, then touch the **Auto** mode button. Refer to *Setting Global Trigger Mode* on page 6-6.

Using the Ready/Lockout/Bypass Switch

The 3-position keyswitch on the front panel provides the following functions:

- **Ready:** Run the system in normal mode.
- **Lockout:** Shut off all guns and prevent gun triggering.
- **Conveyor Bypass:** Allows you to trigger the guns without running the conveyor (no signal from encoder or conveyor).

NOTE: When you place the keyswitch in the Lockout position, the following notice appears on the display:

Using the Ready/Lockout/Bypass Switch *(contd)*

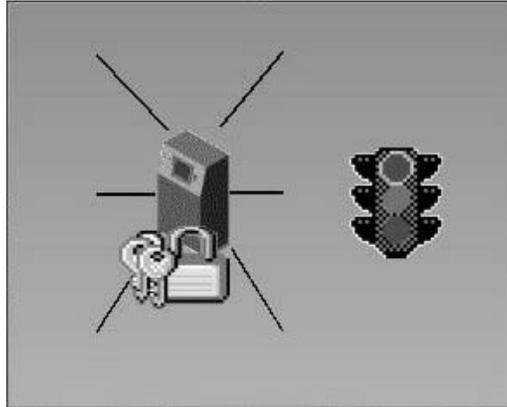


Figure 6-15 Lockout Notice

Alarms



If the alarm is gun related, the gun button for the alarmed gun alternates between yellow and grey (off) or green (on).



The **Alarm** button on the Main screen turns yellow when a malfunction or error generates an alarm.

Error Codes on Gun Control/Status Screen

Touch the flashing yellow **Gun** button to find the gun-related error code in the Gun Status area, shown in Figure 6-11, then open the Alarm screen to find the error message.

Electrostatic Error Codes	Description
E3	kV not within commanded gun drive voltage
E7	Gun cable or multiplier open circuit
E8	Gun cable or multiplier short circuit
E11	Gun driver card hardware
E15	Foldback fault
E17	Tribomatic μ A below setpoint

NOTE: E? and F (Flow) error codes are reserved for future use.

Refer to the *Troubleshooting* section of this manual for an explanation of the error code and suggested methods to correct the errors. Contact your Nordson representative or call the Finishing Customer Support Center at 800-433-9319 for help.

Alarm Screens

Touching the **Alarm** button opens the Alarm screen.

See Figure 6-16. When the Alarm screen opens, it displays all active alarms, one per line, with the date and time the alarm was activated. To reset all active alarms, touch the **Reset All** button.

To display the alarm log, touch the **Alarm Log** button. The alarm log lists all alarms, resets, and status messages for the current day.

Touch the scroll bar arrows to scroll the screen horizontally or vertically as necessary.

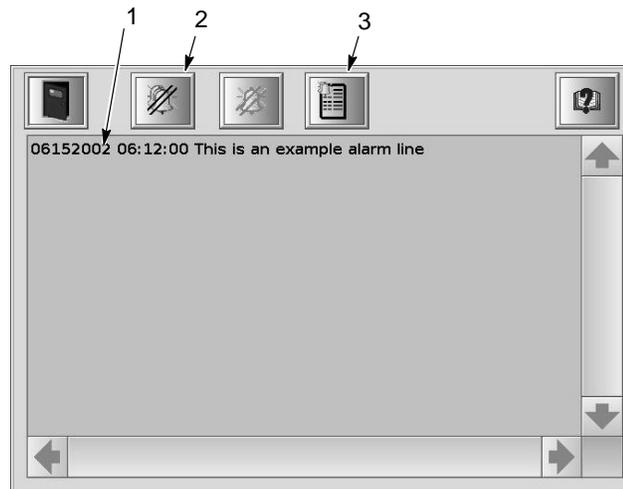


Figure 6-16 Alarm Screen

- | | |
|---------------------|---------------------|
| 1. Active alarm | 3. Alarm Log button |
| 2. Reset All button | |

Help



Touch the **Help** button on the Main screen to open the Help screen. This screen provides quick access to abbreviated versions of the configuration, preset setup, and operation sections of this manual.

The Help screen works very much like an Internet browser. Tap twice on blue underlined links to jump from one page to another.

Use the **Forward** and **Back Arrow** buttons at the top of the Help screen to jump back and forth between pages.

Use the scroll bars to scroll up and down the pages. The HOME link at the bottom of each page takes you back to the home page.

Section 7

Troubleshooting



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



CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl program and operating system on the program card. Refer to *Program Shutdown* in the *Configuration* section for the shutdown procedure.

Gun Control Card Troubleshooting

Refer to Figure 7-1 and Tables 7-1 and 7-2.

You can use the error codes on the Gun Control screens, the error messages on the Alarm screen, and LEDs on the gun control cards to diagnose problems with the gun control cards, gun cables, and gun multipliers.

Error Code Troubleshooting

Table 7-1 Error Code Troubleshooting

Error Codes	Description	Correction
E3	kV not within commanded gun drive voltage	<p>Check the gun current with no parts in front of the gun. If the current is 105 μA, check for a short circuit of the current feedback wires in the gun cable:</p> <p>Unplug the cable from the gun and trigger the gun.</p> <ul style="list-style-type: none"> • If the error stays E3, replace the cable. • If the error changes to E7, check the resistance of the multiplier as described in the gun manual.
E7	Gun cable or multiplier open circuit	<p>If the current display is 1 μA or less, check the multiplier cable and electrode assembly for loose connections.</p> <ul style="list-style-type: none"> • If the connections are secure, check the multiplier with an ohmmeter as described in the gun manual. • If the multiplier reading is acceptable, check for a defective cable as described in the gun manual.

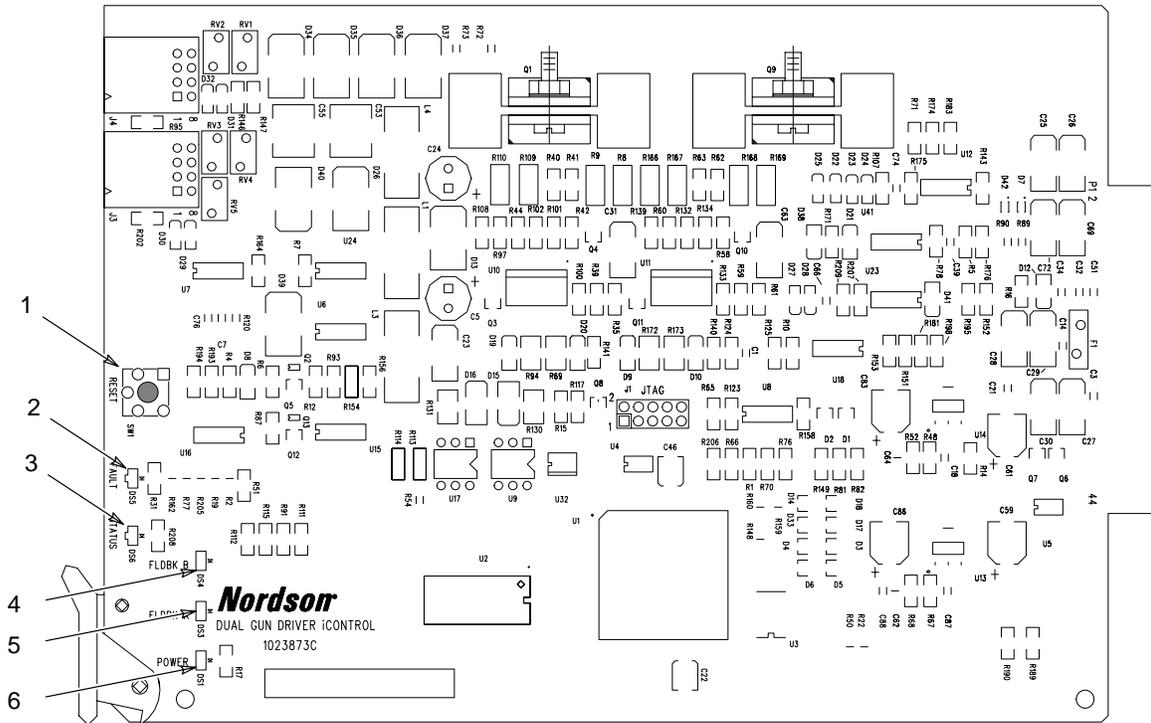
Error Codes	Description	Correction
E8	Gun cable or multiplier short circuit	<p>Unplug the cable from the gun and trigger the gun.</p> <ul style="list-style-type: none"> If the error changes to E7, check the resistance of the multiplier as described in the gun manual. If the error code stays E8, check the continuity of the cable as described in the gun manual.
E11	Gun control card hardware	<ol style="list-style-type: none"> Turn off the power to the system. Unplug the cable from the back of the gun. Turn on the power to the system. <p>If the error code changes to 7 (open circuit), the card is working correctly. Check the gun multiplier.</p> <p>If the error code remains at 11, replace the gun control card.</p>
E15	Foldback fault	<p>Unplug the cable from the gun and trigger the gun.</p> <ul style="list-style-type: none"> If the error changes to E7, check the resistance of the multiplier as described in the gun manual. If the error code stays E15, check the continuity of the cable as described in the gun manual.
E17	Tribomatic μ A below setpoint	Check the powder flow for poor charging. Check for moisture in the compressed air supply.

LED Troubleshooting

See Figure 7-1.

Table 7-2 LED Troubleshooting

LED	Color	Function	Correction
Fault	Red	Lights when an error is detected (communication, gun cable, RAM, or hardware).	Check the alarm messages on the operator interface. Correct problem if possible, replace card if malfunction cannot be corrected.
Status	Green	Flashing (heartbeat) when communicating properly with system.	If not flashing, make sure the card is properly seated in the backplane. Turn console power off and on. Replace card if other cards have heartbeats.
Foldback B (even-numbered gun)	Yellow	Lights when the over-current protection circuit is triggered due to high current draw from the gun drive circuitry.	Refer to the corrections for Error Code E15 in Table 7-1.
Foldback A (odd-numbered gun)			
Power	Green	Light when power (5 volts) is applied to the board).	If card has no power, make sure card is properly seated in backplane and the locking tab is working correctly. Replace the card if other gun control cards have power.



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Figure 7-1 Gun Control Card LEDs and Switches

- | | | |
|-----------------|-------------------|-------------------|
| 1. Reset switch | 3. Status LED | 5. Foldback A LED |
| 2. Fault LED | 4. Foldback B LED | 6. Power LED |

Note:

Photoeye, Encoder, and Conveyor Interlock Troubleshooting

Use the I/O board and relay LEDs in the master console to troubleshoot problems with the photoeye, encoder, conveyor interlock, and alarm circuits.

Inputs	I/O Board Terminals	Troubleshooting
Zone Photoeyes	1 - 8	Photoeyes are wired for breaklight. When a part passes in front of the zone photoeyes, the LEDs for the zone photoeyes should light. If they do not, check the photoeye wiring and photoeyes.
Flag Photoeyes or Inputs from customer Part ID system	9 -16	Photoeyes are wired for breaklight. When a flag passes in front of the photoeyes and the inputs are read after the filter delay, the LEDs for those photoeyes blocked by the flag, or the LEDs receiving a signal from the customer part ID system should light. If they do not check the wiring and photoeyes or customer part ID system.
Encoder	20 or 21	The LED should flash at the same rate as the encoder signal. If it is not flashing when the conveyor is moving check the encoder wiring and encoder.
Conveyor Interlock	24	The LED should light as long as the conveyor is on or the keyswitch is in the bypass position. If it is not on check the conveyor interlock wiring. Without this signal the spray guns will not be triggered.
Relays (DIN rail)	-	The conveyor interlock relay LED lights when the conveyor is running or the keyswitch is in the bypass position. The remote lockout relay LED is lit as long as it is receiving a signal (lockout on). The alarm relay LED stays lit until an alarm occurs, then goes out.

Section 8

Repair



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



CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl program and operating system on the program card. Refer to *Program Shutdown/Console Power Off* in the *Configuration* section for the shutdown procedure.



WARNING: Hazardous voltages exist within the iControl console. Unless power must be on to test circuits, always shut off and lock out power before opening the console to make repairs. All repairs should be made by a qualified electrician. Failure to observe this warning could result in personal injury or death.

Repair consists of removing malfunctioning components and replacing them with new ones. There are no components inside the cabinet that can be repaired by the customer, except for the flow module.

Refer to the pneumatic and wiring diagrams provided in Section 10 for connections.



WARNING: Whenever replacing a component that interfaces with the exterior of the cabinet, such as an iFlow digital flow module, make sure that the dust-tight integrity of the cabinet is intact by installing the correct gaskets and seals. Failure to maintain the dust-tight integrity of the cabinet could invalidate agency approvals and create a hazardous condition.

Flow Module Repair

Repair of the flow module is limited to

- cleaning or replacing the proportional valve
- replacing the gun air solenoid valve

Field replacement of other parts is not possible, due to the need to calibrate the module at the factory using equipment not available to the field.



CAUTION: The module circuit cards are electrostatic sensitive devices (ESD). To prevent damage to the cards when handling them, wear a grounding wrist strap connected to the iControl enclosure or other ground. Handle the cards only by their edges.

Proportional Valve Cleaning

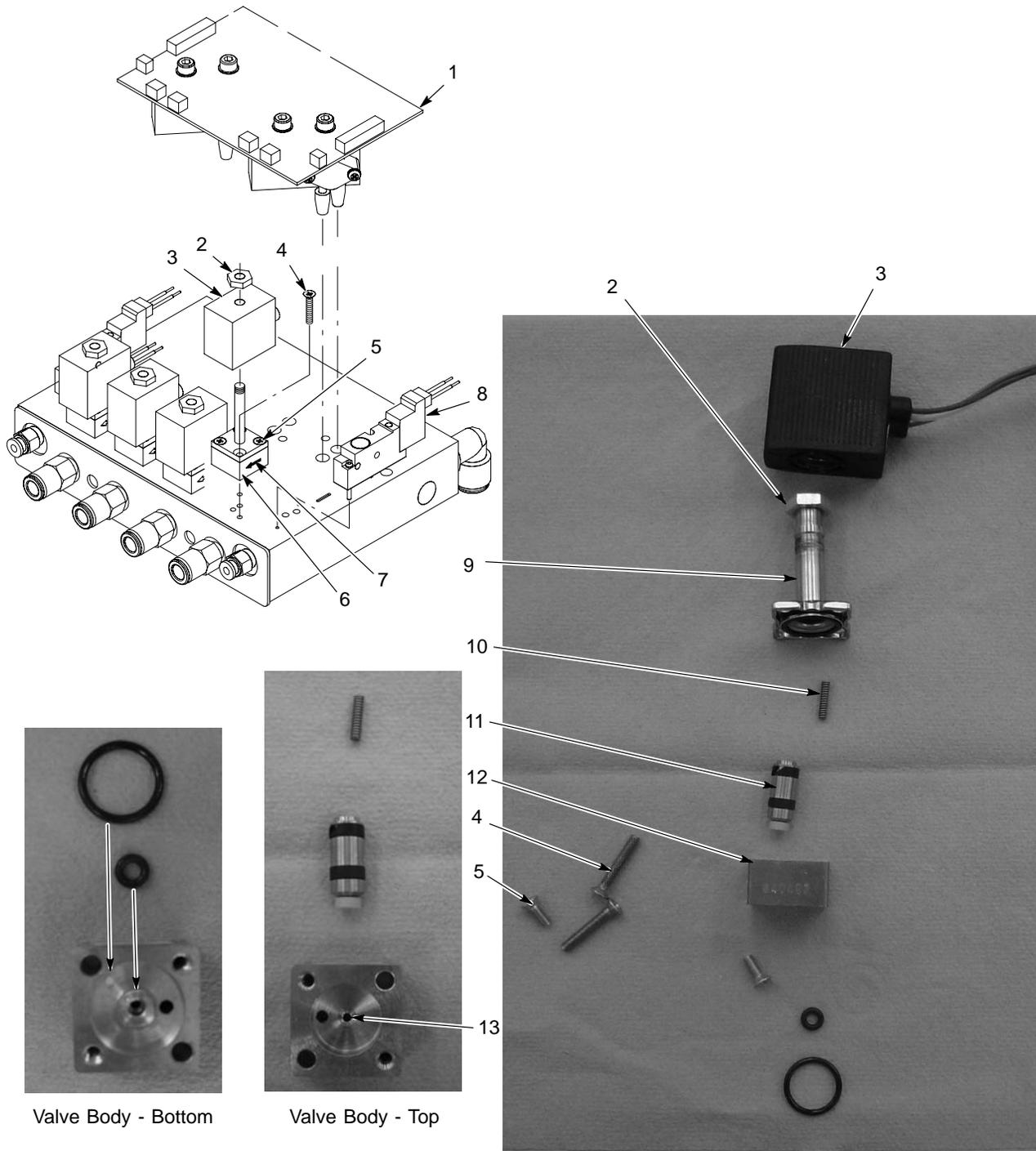
See Figure 8-1. A dirty air supply can cause the proportional valve (6) to malfunction. Follow these instructions to disassemble and clean the valve.

1. Disconnect the coil (3) wiring from the circuit board (1). Remove the nut (2) and coil from the proportional valve (6).
2. Remove the two long screws (4) to remove the proportional valve from the manifold.



CAUTION: The valve parts are very small, be careful not to lose any. Do not mix the springs from one valve with those from another. The valves are calibrated for different springs.

3. Remove the two short screws (5), then remove the valve stem (9) from the valve body (12).
4. Remove the valve cartridge (11) and spring (10) from the stem.
5. Clean the cartridge seat and seals, and the orifice in the valve body. Use low-pressure compressed air. Do not use sharp metal tools to clean the cartridge or valve body.
6. Install the spring and then the cartridge in the stem, with the plastic seat on the end of the cartridge facing out.
7. Make sure the O-rings furnished with the valve are in place on the bottom of the valve body.
8. Secure the valve body to the manifold with the long screws, making sure the arrow on the side of the body points toward the outlet fittings.
9. Install the coil over the valve stem, with the coil wiring pointing toward the circuit board. Secure the coil with the nut.
10. Connect the coil wiring to the circuit board.



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Figure 8-1 Flow Module Valve Removal and Replacement

- | | | |
|--|--|----------------|
| 1. Circuit board (shown removed for clarity) | 5. Short screws-valve stem to body (2) | 9. Stem |
| 2. Nut-coil to proportional valve (4) | 6. Proportional valve (4) | 10. Spring |
| 3. Coil-proportional valve (4) | 7. Direction of flow arrow | 11. Cartridge |
| 4. Long screws-valve to manifold (2) | 8. Gun air solenoid valve (2) | 12. Valve body |
| | | 13. Orifice |

Proportional Valve Replacement

If cleaning the proportional valve does not correct the flow problem then replace the valve. Remove the valve by performing steps 1 and 2 of *Proportional Valve Cleaning*.

Before installing a new valve, remove the protective cover from the bottom of the valve body. Be careful to not lose the O-rings under the cover.

Gun Air Solenoid Valve Replacement

See Figure 8-1. To remove the gun air solenoid valves (8), remove the two screws in the valve body and lift the valve off the manifold.

Make sure the O-rings furnished with the new valve are in place before installing the new valve on the manifold.

Gun Control Card Removal/Installation



WARNING: Shut off console power before removing and installing gun control cards. Failure to observe this warning could result in damage to the cards, and could result in personal injury or even death.



CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl program and operating system on the program card. Refer to *Program Shutdown* in the *Configuration* section for the shutdown procedure.

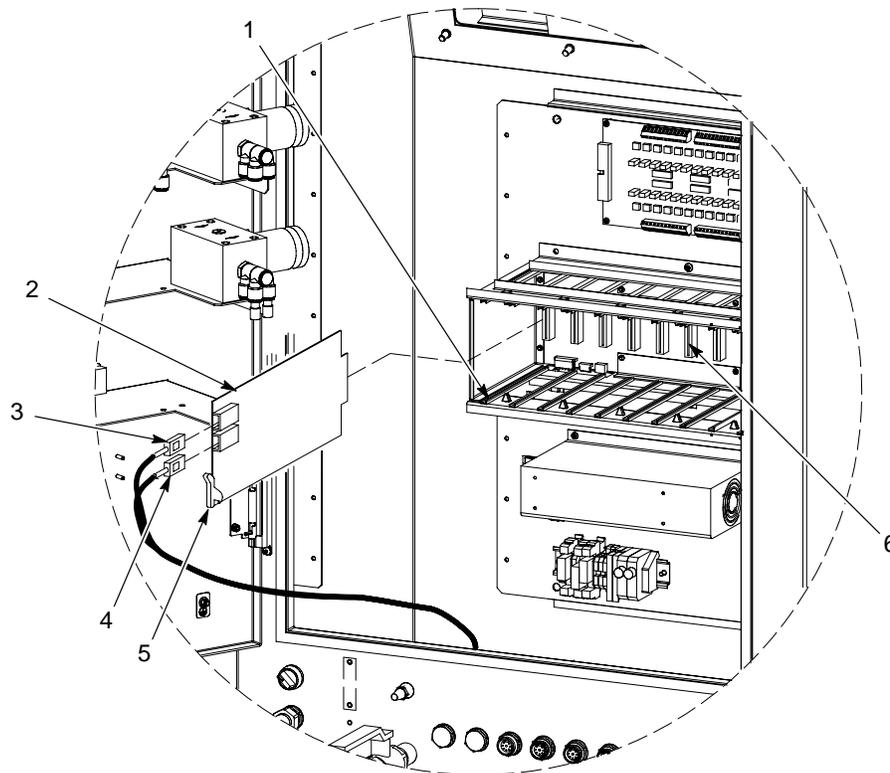


CAUTION: The gun control cards are electrostatic sensitive devices (ESD). To prevent damage to the cards when handling them, wear a grounding wrist strap connected to the iControl enclosure or other ground. Handle the cards only by their top and bottom edges.

See Figure 8-2. Gun control cards (2) are installed in the backplane (6) from left to right. Each card controls two guns: the bottom receptacle on the card is the odd gun number; the top receptacle the even gun number.

To remove a card, disconnect the gun harness connectors (3 and 4), pull down the locking tab (5), then slide the card out of the card cage.

To install a new card, slide the card into the slots in the card cage and seat it firmly into the backplane. Push the locking tab up to lock the card into the card cage. Connect the gun harness to the two receptacles on the card.



1401033A

Figure 8-2 Gun Control Card Replacement

- | | | |
|-----------------------|--------------------|----------------|
| 1. Card cage (slot 1) | 3. Gun 2 connector | 5. Locking tab |
| 2. Gun control card | 4. Gun 1 connector | 6. Backplane |

Section 9

Parts

Introduction

To order parts, call the Nordson Finishing Customer Support Center or your local Nordson representative.

Finishing Customer Support Center
 Telephone: (800) 433-9319
 Facsimile: (888) 229-4580
 Email: finishing_csc@nordson.com

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 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.

- 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.

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

Consoles

Part	Description	Note
1034225	Controller, iControl, 16 gun, w/cpu (Master)	
1034226	Controller, iControl, 14 gun, w/cpu (Master)	
1034227	Controller, iControl, 12 gun, w/cpu (Master)	
1034228	Controller, iControl, 10 gun, w/cpu (Master)	
1034229	Controller, iControl, 8 gun, w/cpu (Master)	
1034230	Controller, iControl, 6 gun, w/cpu (Master)	
1034231	Controller, iControl, 16 gun, w/o cpu (Slave)	
1034232	Controller, iControl, 14 gun, w/o cpu (Slave)	
1034233	Controller, iControl, 12 gun, w/o cpu (Slave)	
1034234	Controller, iControl, 10 gun, w/o cpu (Slave)	
1034235	Controller, iControl, 8 gun, w/o cpu (Slave)	
1034236	Controller, iControl, 6 gun, w/o cpu (Slave)	

Console Parts

Figures 9-1 through 9-6 show the replaceable parts for both master and slave consoles. Contact your Nordson representative or Nordson Customer Support for help in obtaining unlisted parts. Refer to Section 10 for pneumatic and electrical diagrams.

See Figure 9-1 for the parts listed in this table:

Item	Part	Description	Quantity	Note
1	1032648	CONTROL UNIT, PC, panel mount	1	A
2	1000594	SWITCH, keylock, 3 position	1	
3	983403	WASHER, lock split, M4, steel, zinc	AR	
4	1036690	PANEL, keypad, iControl	1	A
5	984715	NUT, hex, M4, steel, zinc	AR	
6	1000595	CONTACT BLOCK, 1-N.O., 1-N.C. contact	2	
7	1036629	ADAPTER, CompactFlash, dual	1	A
8	984702	NUT, hex, M5, brass	AR	
9	983401	WASHER, lock, split, M5, steel, zinc	AR	
10	983021	WASHER, flat, 0.203 x 0.406 x 0.040 in., brass	AR	
11	152233	JUMPER, ground, box feeder, vibratory	1	
12	246458	JUMPER, ground, 4 in.	1	
13	240674	TAG, ground	AR	
14	1034281	MEMORY, CompactFlash	1	A
15	1034283	MEMORY, programmed, iControl	1	A, B
63	1051542	CABLE, IDE, 80-conductor	1	A
64	1051543	CABLE, power supply, Compact Flash adapter	1	A
65	1051544	INTERFACE CARD, PC104 CAN	1	A

Continued...

Item	Part	Description	Quantity	Note
66	1051545	CARD, I/O, PC104	1	A

NOTE A: Used only on master consoles.
 B: Contains iControl software and operating system. Contact your Nordson representative for replacement and upgrades.
 AR: As Required

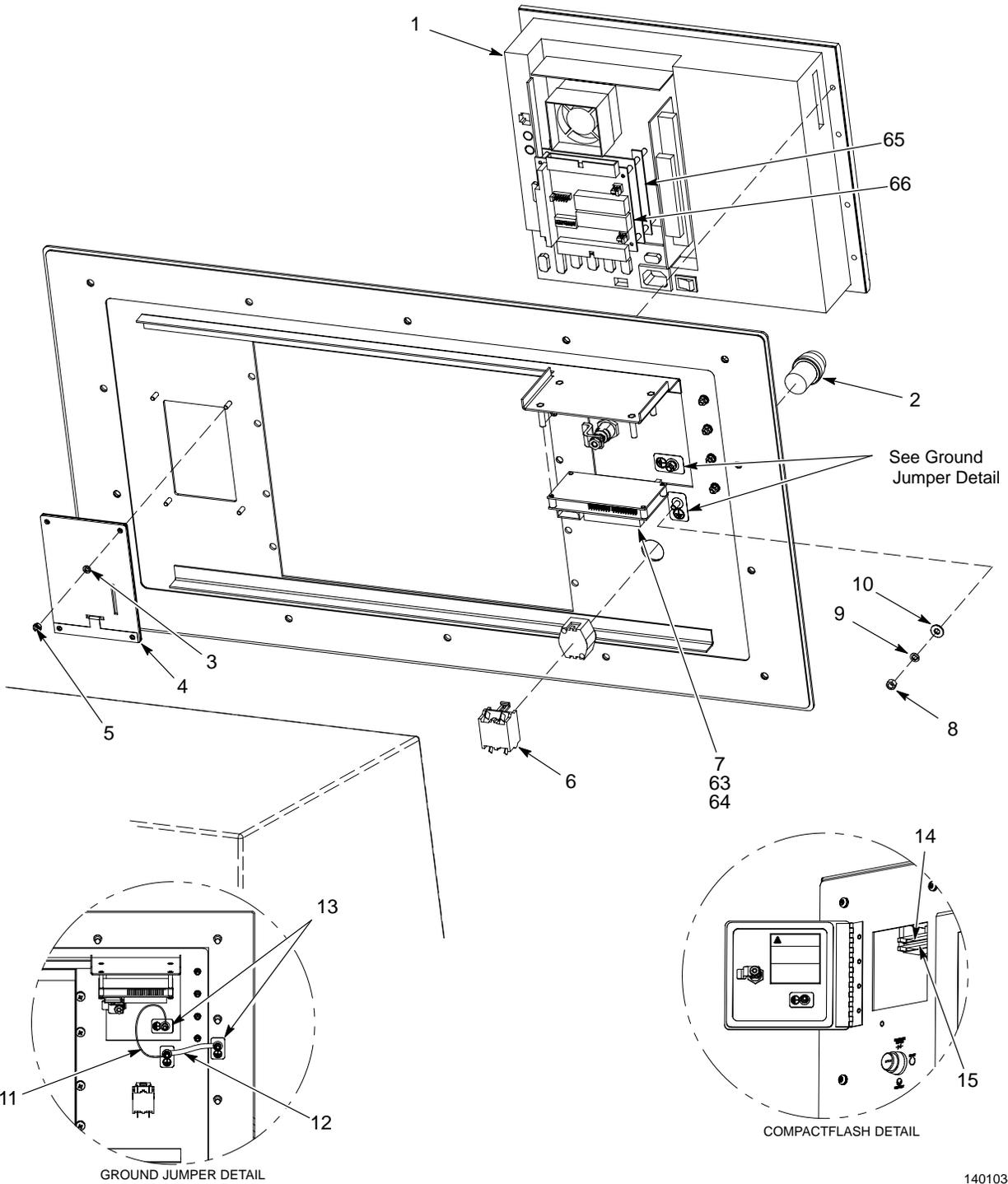


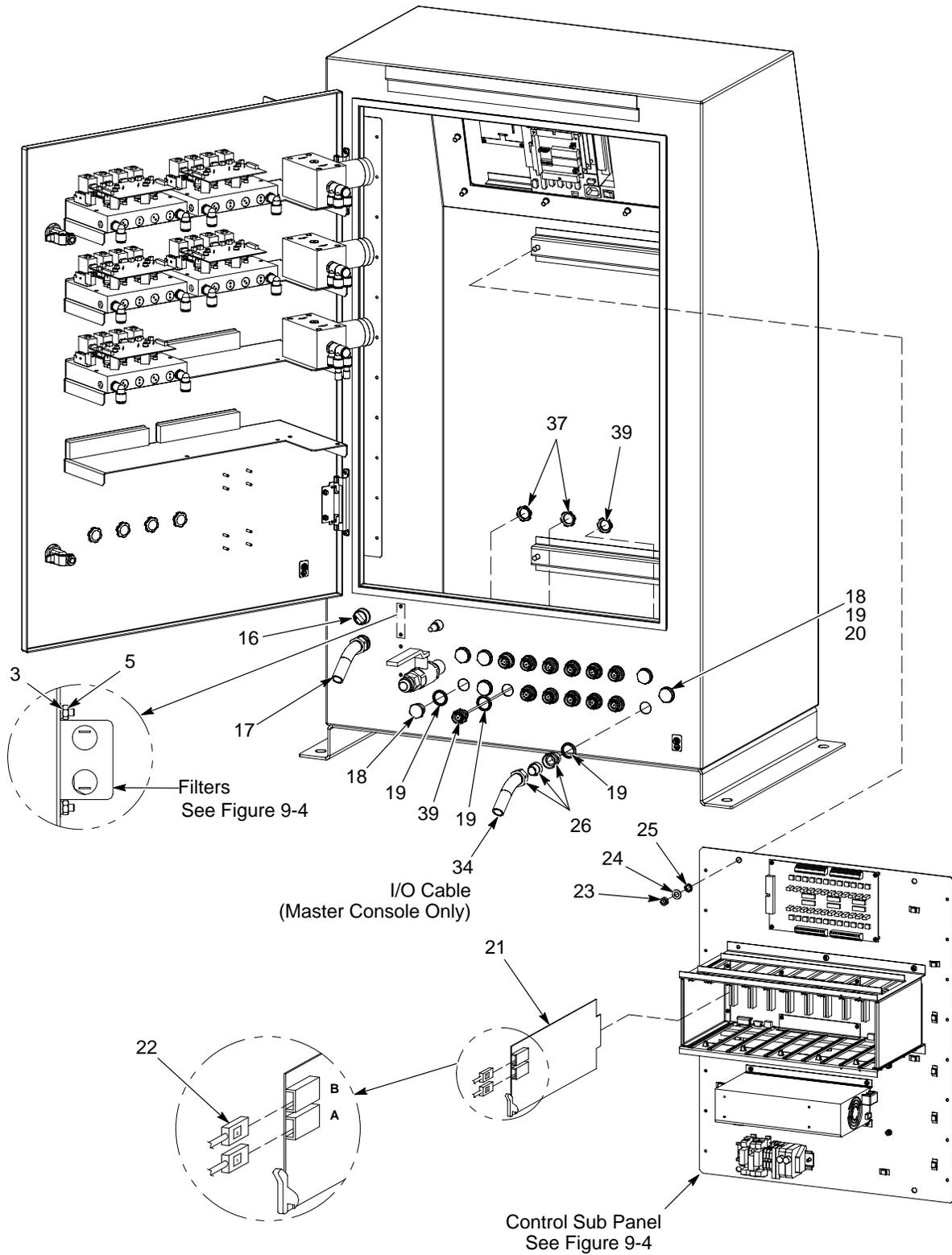
Figure 9-1 Console Parts (1 of 5)

1401034A

Console Parts *(contd)*

See Figure 9-2 for the parts listed in this table:

Item	Part	Description	Quantity	Note
16	334806	SWITCH, round, 2 position, 90 degree	1	
17	-----	CONDUIT, flexible, bulk, 1/2 in.	AR	C
18	334800	PLUG, 1/2 in. pipe, 1 in. hex	AR	D
19	939122	SEAL, conduit fitting, 1/2 in.	AR	D
20	984526	NUT, lock, 1/2 in. conduit	AR	D
21	1023877	PCA, dual gun driver, iControl	AR	D
22	1031501	RECEPTACLE, 8 position, gun, 70 in.	AR	D
23	984707	NUT, hex, M8 steel, zinc	AR	
24	983013	WASHER, flat, M8, steel, zinc	AR	
25	983152	WASHER, lock, internal, 5/16 in. steel, zinc	AR	
26	324343	CONNECTOR, conduit, straight, 0.50 in.	AR	
C: Order in increments of one foot. D: Quantities of noted parts depends on system configuration and console type. AR: As Required				
				<i>Continued...</i>



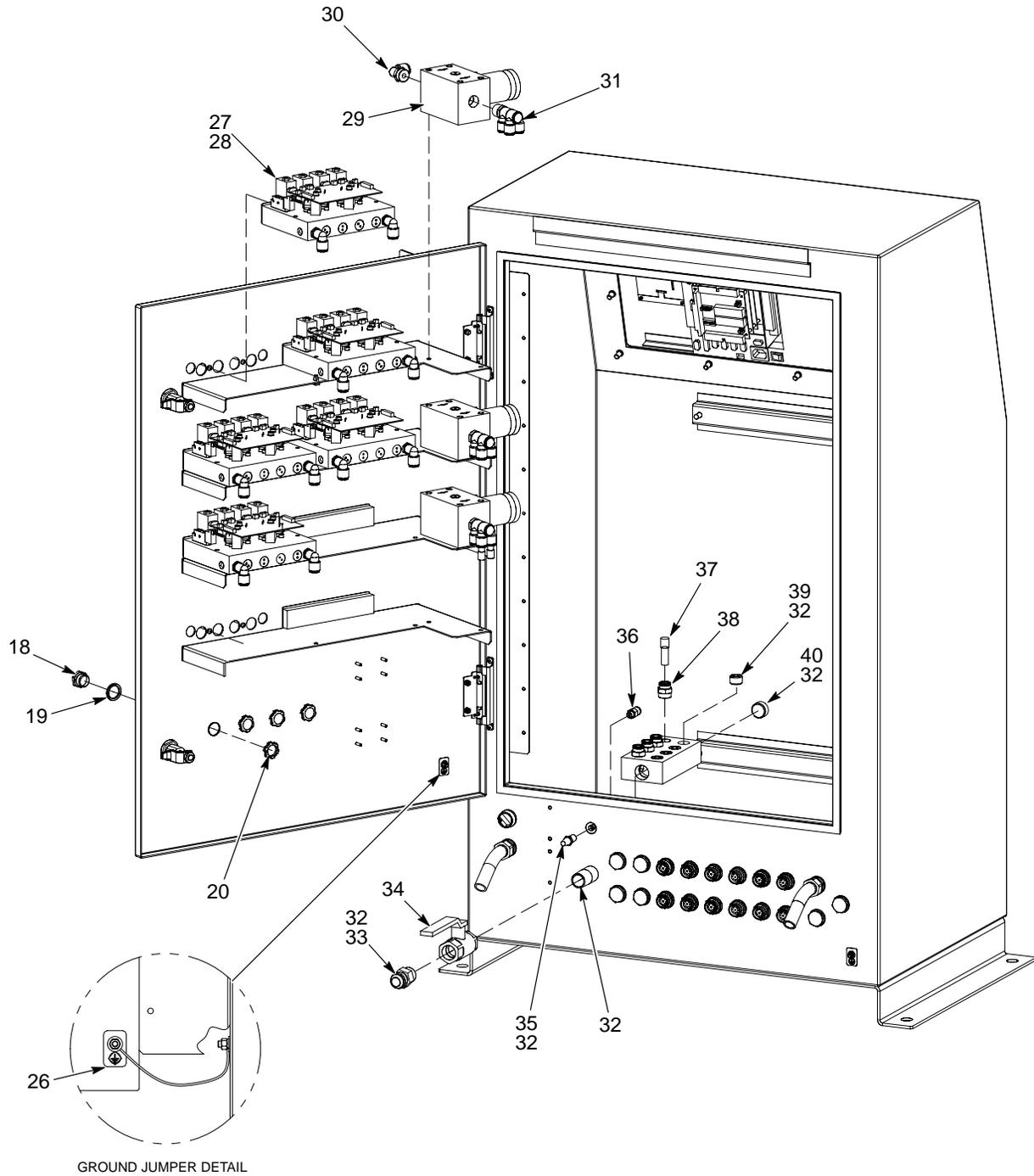
1401035A

Figure 9-2 Console Parts (2 of 5)

Console Parts *(contd)*

See Figure 9-3 for the parts listed in this table:

Item	Part	Description	Quantity	Note
27	1036657	MODULE, digital airflow control	AR	D
28	326139	PLUG, 4 mm tubing	AR	
29	1033878	REGULATOR, rolling diaphragm, 0-120, 1/2 in. NPT	AR	D
30	972240	ELBOW, male, 12 mm tube x 1/2 in., unithread	AR	D
31	1034000	FITTING, 1/2 in RPT x 10 mm tube	AR	D
32	900481	ADHESIVE, pipe/thread/hydraulic sealant	AR	
33	972105	CONNECTOR, male, 37, 1 1/16-12 x 3/4 in., steel	1	
34	170734	VALVE, ball, 3/4 in. NPT, brass	1	
35	241040	MUFFLER, air, 1/8 in. NPT	1	
36	344252	VALVE, check, M8T x R18, M output	1	
37	183418	PLUG, 12 mm, tube	AR	D
38	971106	CONNECTOR, male, 12 mm tube x 1/2 in. unithread	AR	D
39	973431	PLUG, pipe, socket, standard, 1/2 in. NPT, zinc	1	
40	973442	PLUG, pipe, socket, flush, 3/4 in. NPT, zinc	1	
NS	900740	TUBING, polyurethane, 10/6.5-7 mm	AR	C
NS	226690	TUBING, polyurethane, 12/8mm, blue	AR	C
NS	240976	CLAMP, ground, with wire	1	
NS	802060	HOSE, 5 ft	1	
<p>C: Order in increments of one foot. D: Quantity of noted parts depends on system configuration and console type. Refer to <i>Flow Module Parts</i> in this section for repair parts.</p> <p>AR: As Required NS: Not Shown</p>				
				<i>Continued...</i>



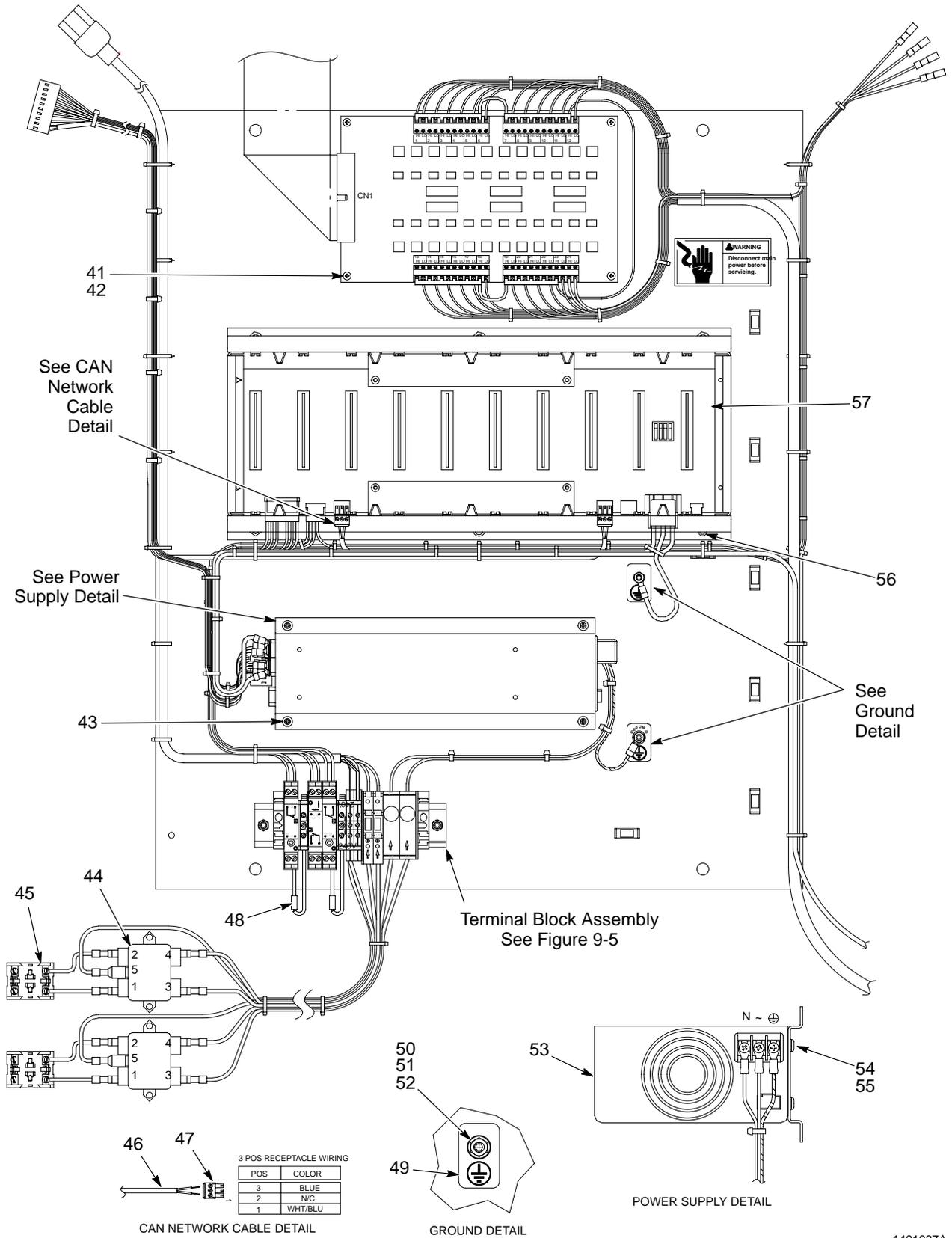
1401036A

Figure 9-3 Console Parts (3 of 5)

Console Parts *(contd)*

See Figure 9-4 for the parts listed in this table:

Item	Part	Description	Quantity	Note
41	982815	SCREW, pan head, slotted, #6-32 x 0.375 in., steel, zinc	4	
42	983102	WASHER, lock, split, #6, steel, zinc	4	
43	982825	SCREW, pan head, recessed, M4 x 12, w/internal lockwasher	4	
44	334805	FILTER, line, RFI, power, 10A	AR	E
45	288806	CONTACT BLOCK, 2 N.O. contacts	AR	E
46	227103	CABLE, twisted pair, 2-conductor, 22 AWG, 300V	AR	C, D
47	185034	CONNECTOR, terminal block, MC1, 5/ST, single row	AR	D
48	320586	RESISTOR, MF, 20K, 1W, 5 AXL	2	
49	240674	TAG, ground	2	
50	983401	WASHER, lock, split, M5, steel, zinc	4	
51	983021	WASHER, flat, 0.203 x 0.406 x 0.040 in., brass	2	
52	984702	NUT, hex, M5, brass	2	
53	1027564	POWER SUPPLY, 400W, +24V, +/-12V, +5V	1	
54	983403	WASHER, lock, split, M4, steel, zinc	4	
55	982164	SCREW, pan head, slotted, M4 x 6, zinc	4	
56	334799	SCREW, pan head, recessed, M5 x 10, w/internal lockwasher	6	
57	1023939	PCA, backplane, iControl	1	
<p>C: Order in increments of one foot. D: Quantity of noted parts depends on system configuration and console type. E: Master console uses 2, slave console uses 1. AR: As Required NS: Not Shown</p>				
				<i>Continued...</i>



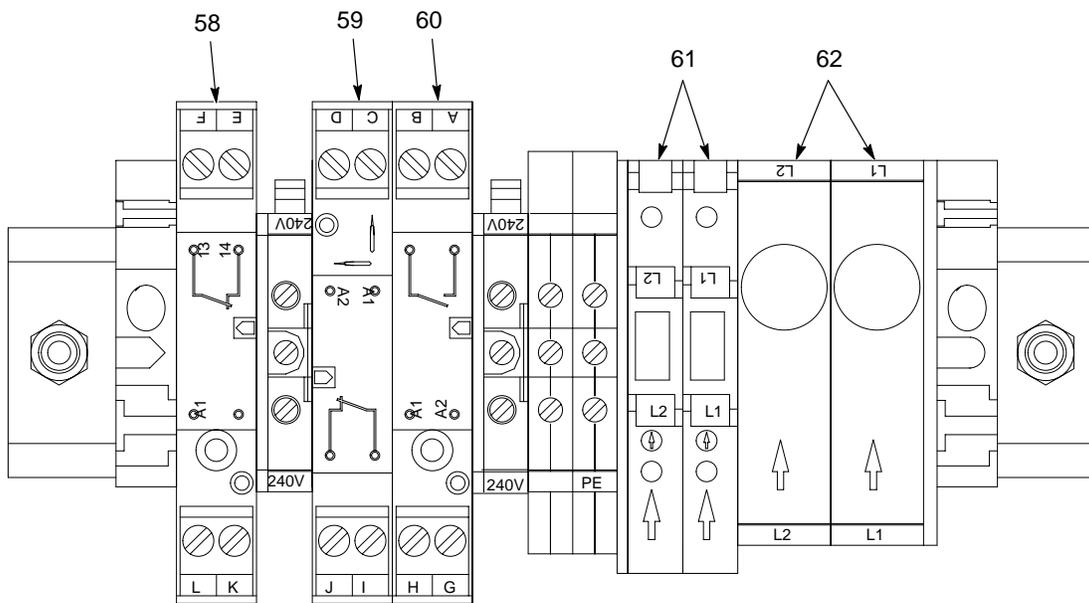
1401037A

Figure 9-4 Console Parts (4 of 5)

Console Parts *(contd)*

See Figure 9-5 for the parts listed in this table:

Item	Part	Description	Quantity	Note
58	1034119	CONTROL RELAY, 120 VAC, NC, DIN mount	1	
59	320589	CONTROL RELAY, 24 VDC, NC, DIN mount	1	
60	320588	CONTROL RELAY, 120 VAC, open fixed	1	
61	939306	FUSE, 3.15, fast-acting, 250V, 5x20	2	
62	939709	FUSE, 10.0, fast-acting, 250V	2	



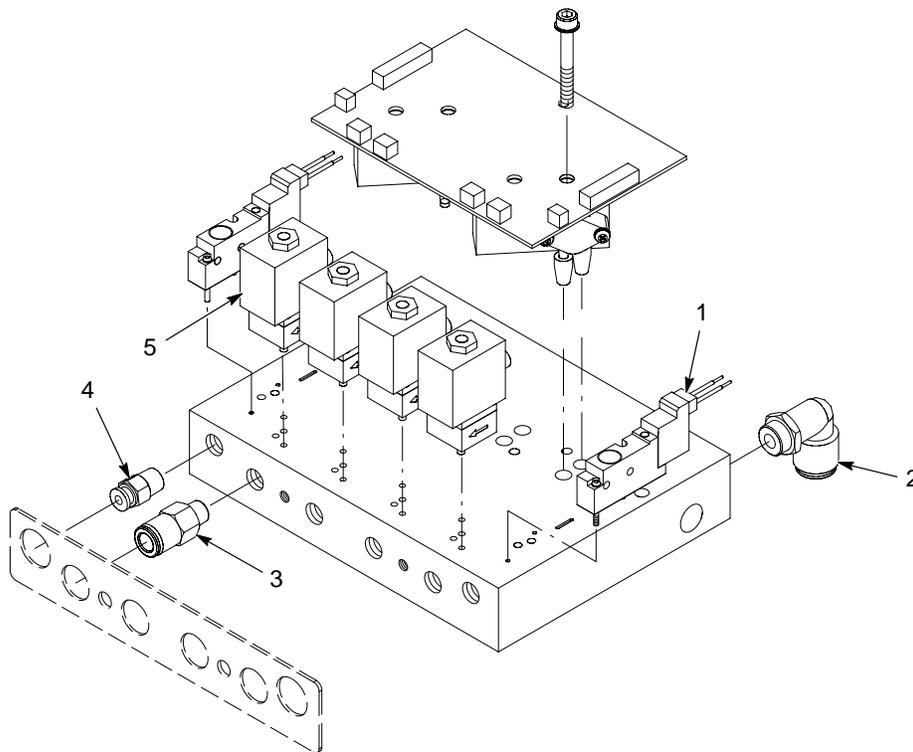
1401038A

Figure 9-5 Console Parts (5 of 5)

Flow Module Parts

See Figure 9-6.

Item	Part	Description	Quantity	Note
-	1036657	MODULE, digital airflow control	1	
1	1033170	• VALVE, solenoid, 3-way, w/connector	2	
2	972125	• ELBOW, male, 10 mm tube x 1/4 in. unithread	2	
3	1030873	• VALVE, check, M8T x R1/8, M input	4	
4	1033171	• CONNECTOR, orifice, 4mm x R1/8, dia 0.4mm	2	
5	1027547	• VALVE, proportional, solenoid, sub-base	4	



1401039A

Figure 9-6 Flow Module Parts

Options

Adapter Cables for Versa-Spray and Tribomatic Spray Guns

Part	Description	Note
334783	ADAPTER, gun cable, Versa-Spray (black)	
341622	ADAPTER, gun cable, Versa-Spray, porcelain enamel (gray)	
334784	ADAPTER, gun cable, Tribomatic	

Photoeye Junction Boxes and Extension Boxes

Part	Description	Note
1035898	JUNCTION BOX, photoeye, 15 watt, iControl	A
1035897	JUNCTION BOX, photoeye, 30 watt, iControl	A
1035899	JUNCTION BOX, photoeye extension, iControl	A
NOTE A: Refer to Section 10, Wiring and Pneumatic Diagrams, for repair parts.		

Nozzle Purge Kits

Part	Description	Note
1035665	KIT, purge, single, controller	A
1035666	KIT, purge, dual, controller	A

Miscellaneous Kits

Part	Description	Note
1039881	KIT, tester, iFlow (air flow verification kit)	
1039886	KIT, boost, iControl (flow-rate air flow boost kit for PE spray guns)	A

Section 10
Wiring and Pneumatic Diagrams

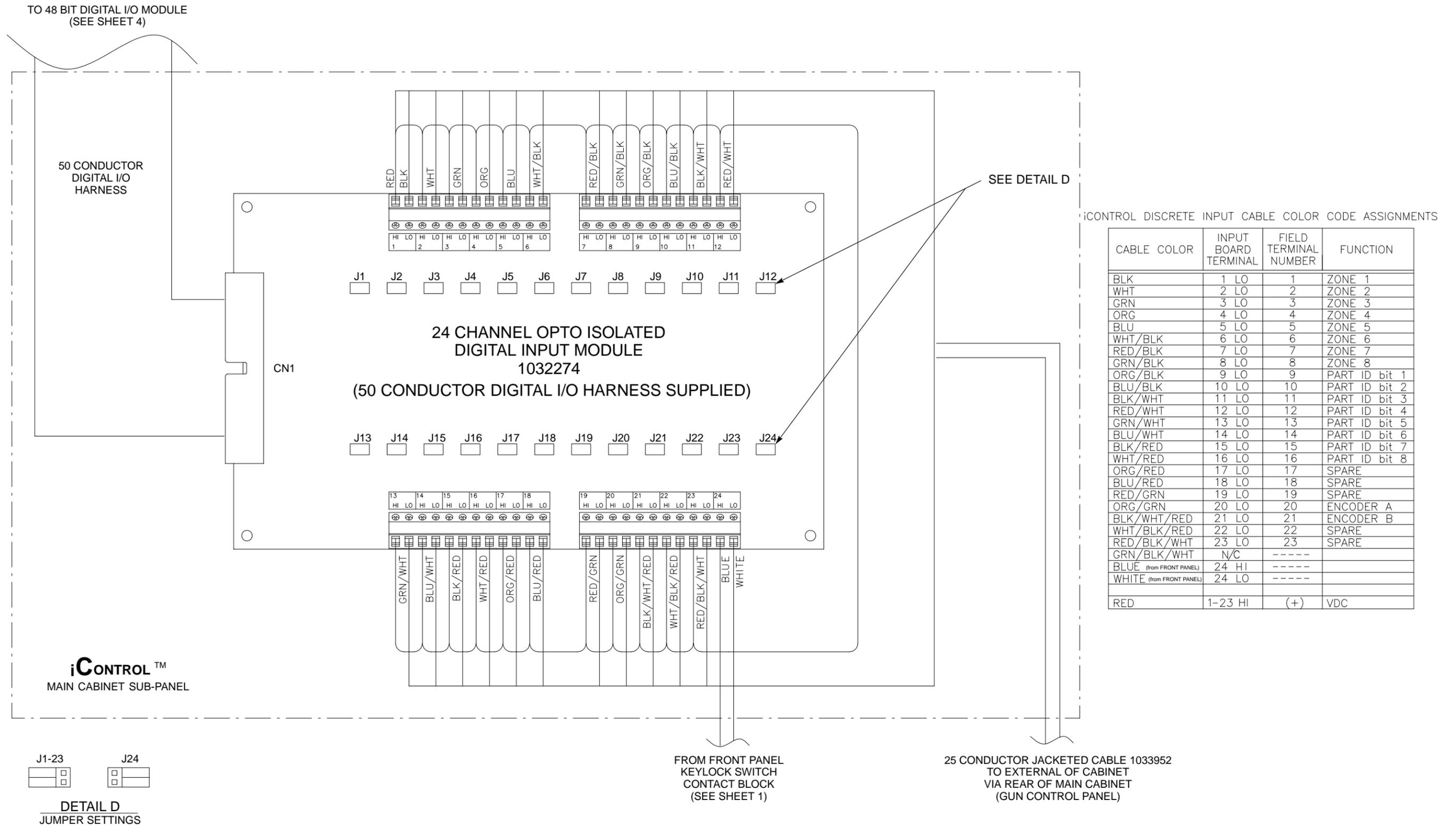


Figure 10-2 iControl Console Schematics (Sheet 2 of 5)

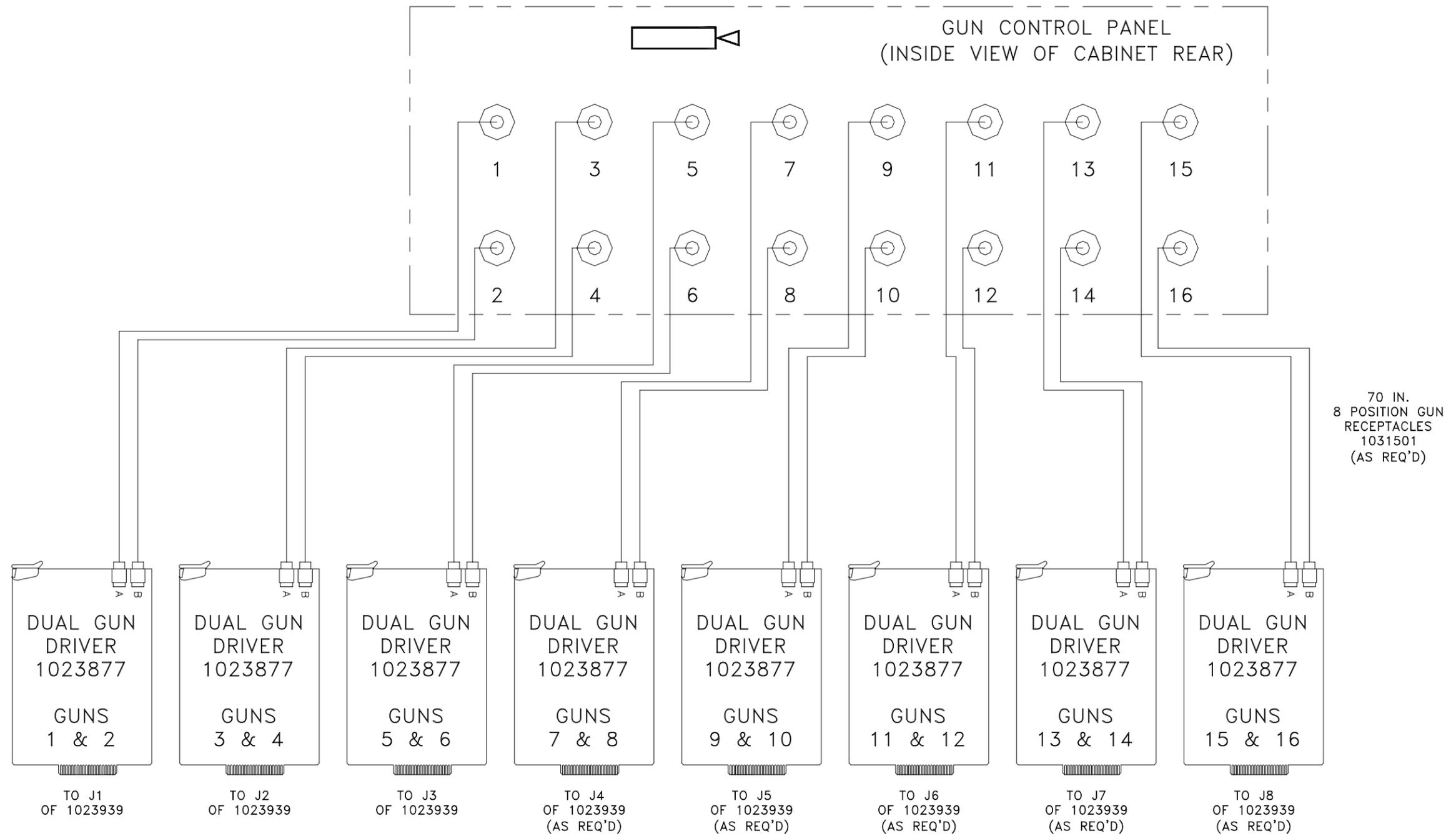
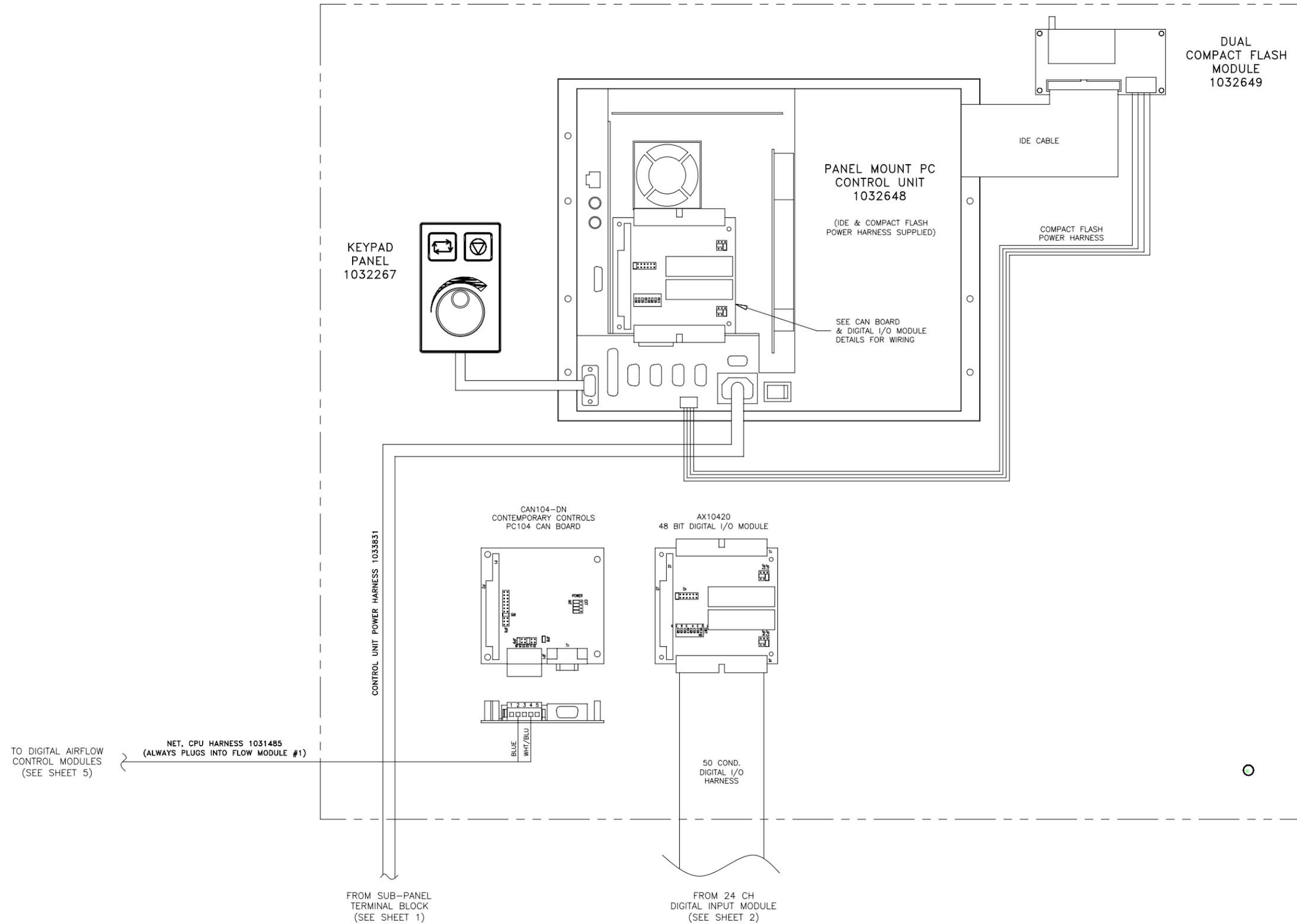
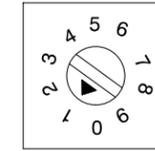
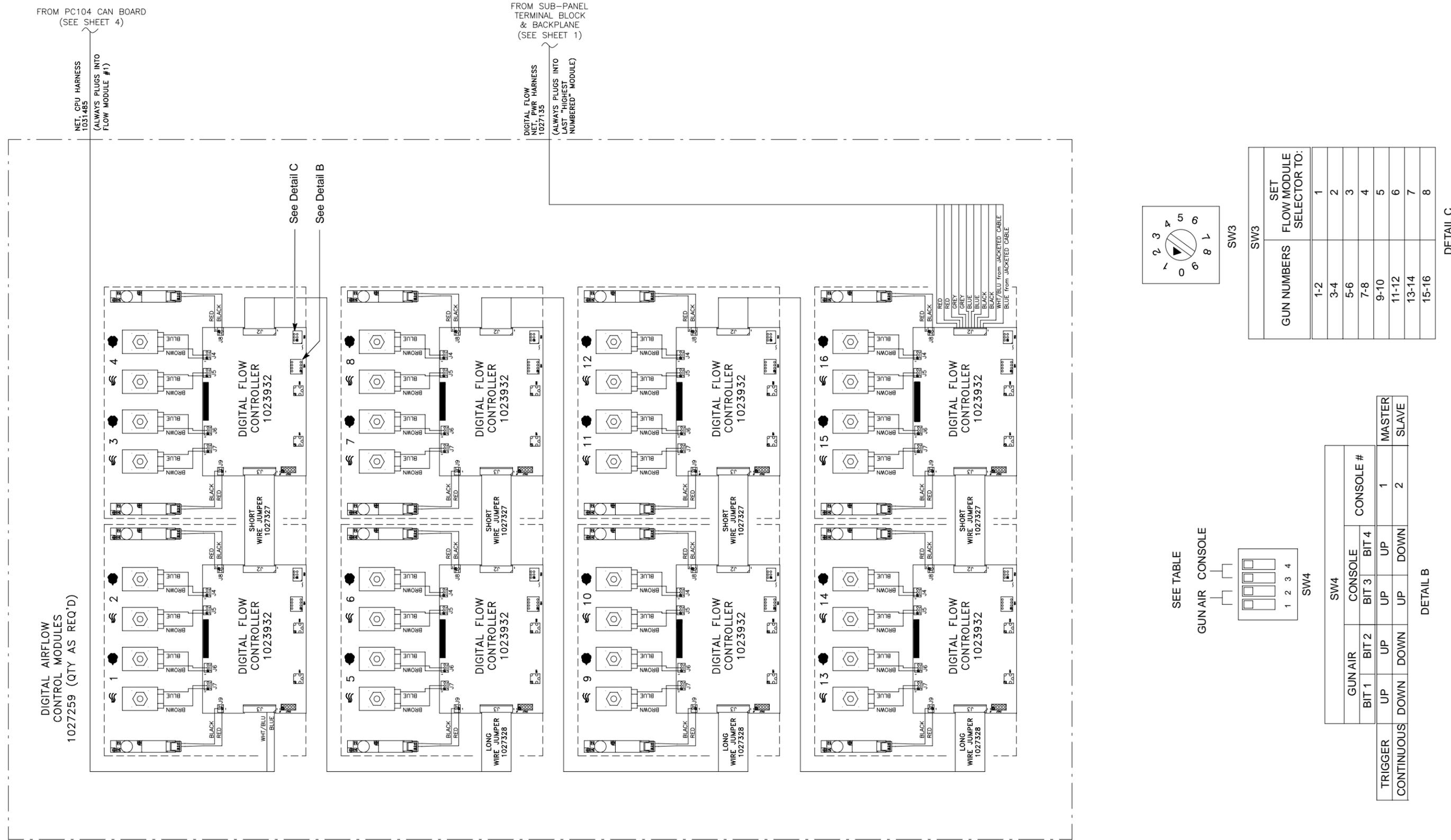


Figure 10-3 iControl Console Schematics (Sheet 3 of 5)



1401043A

Figure 10-4 iControl Console Schematics (Sheet 4 of 5)



GUN NUMBERS	SET FLOW MODULE SELECTOR TO:
1-2	1
3-4	2
5-6	3
7-8	4
9-10	5
11-12	6
13-14	7
15-16	8

GUN AIR		CONSOLE		CONSOLE #	
BIT 1	BIT 2	BIT 3	BIT 4	CONSOLE #	
UP	UP	UP	UP	1	MASTER
DOWN	DOWN	UP	DOWN	2	SLAVE

DETAIL C

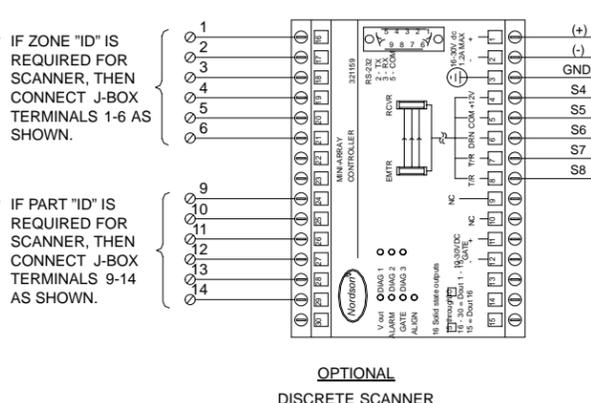
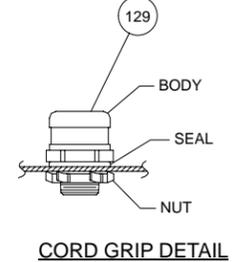
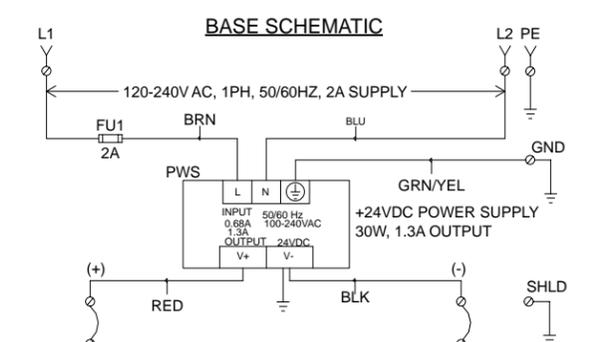
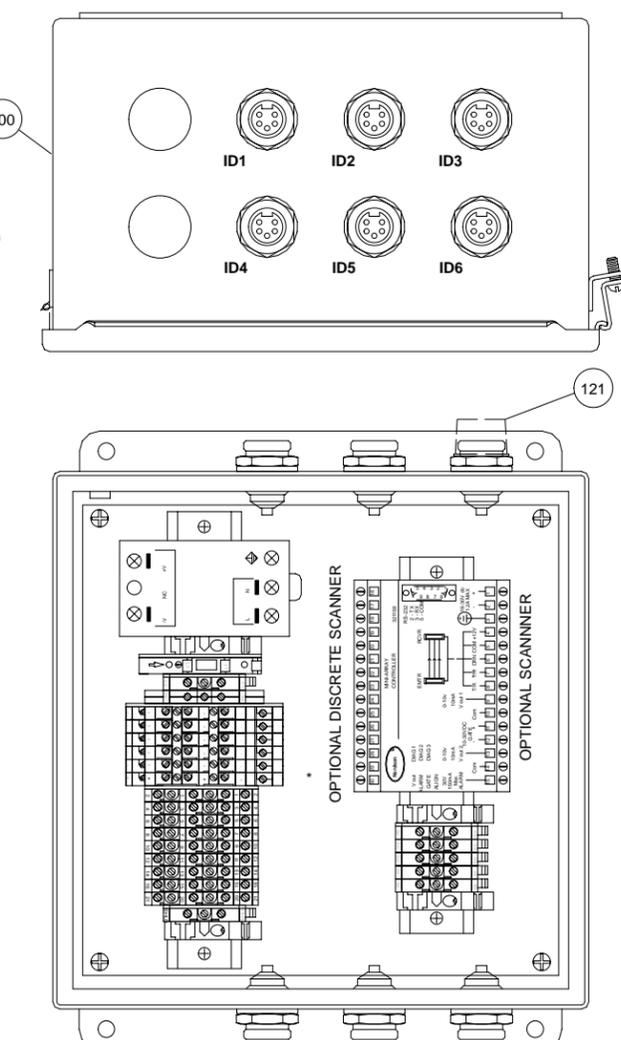
DETAIL B

Figure 10-5 iControl Console Schematics (Sheet 5 of 5)

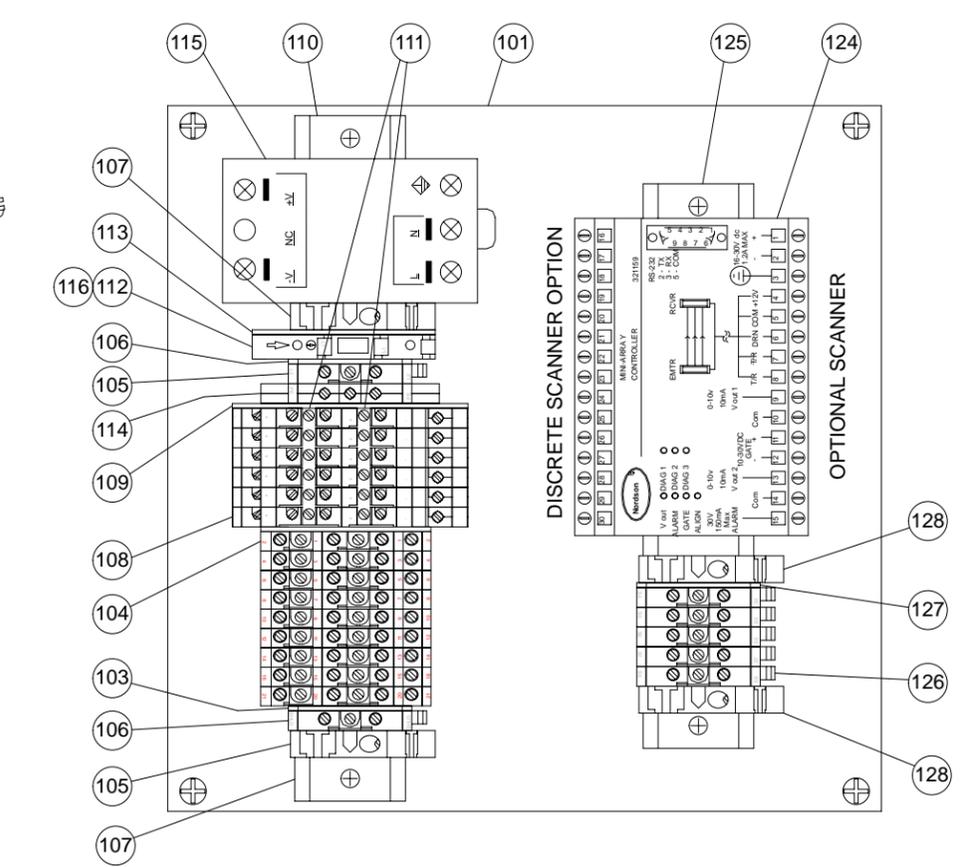
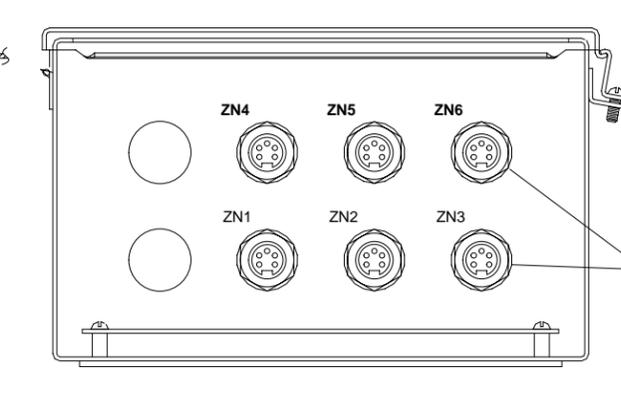
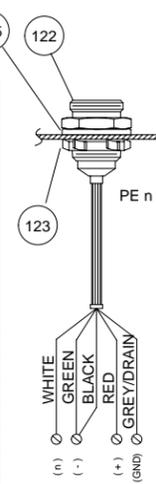
ITEM	DESCRIPTION	VENDOR	PARTNUMBER	QTY
100	BOX, W/ KNOCKOUTS (based on PN A-10106CH)	BROHL & APPELL	831RB	1
101	PANEL	HOFFMAN ENG. CO.	A-10P10	1
102				
103	TERMINAL, DUAL LEVEL, DK 4Q	WEIDMULLER INC.	59016	9
104	END PLATE, DK 4Q	WEIDMULLER INC.	139716	1
105	TERMINAL, SAK 2.5/35	WEIDMULLER INC.	38046	2
106	END PLATE, SAK 2.5	WEIDMULLER INC.	46056	2
107	EW35 END BRACKET	WEIDMULLER INC.	38356	2
108	TERMINAL, DLD 2.5/PE	WEIDMULLER INC.	159595	6
109	END PLATE, DLD 2.5/PE	WEIDMULLER INC.	159596	1
110	TS 35X7.5 STEEL RAIL	WEIDMULLER INC.		A/R
111	JUMPER, PREASSEMBLED, Q10	WEIDMULLER INC.	131310	2
112	FUSE TERMINAL, ASK 1	WEIDMULLER INC.	47456	1
113	END PLATE, ASK 1	WEIDMULLER INC.	38036	1
114	TERMINAL, GROUND, EK 2.5N	WEIDMULLER INC.	66106	1
115	POWER SUPPLY, 24VDC, 15W	IDEC CORP.	PS5R-B24	1
116	FUSE, 2.0 AMP	WEIDMULLER INC.	43090	1
117				2
118				
119	5 WIRE, FEMALE, INPUT RECEPTACLE	ELCOR INC.	347223	A/R
120	1/2 INCH CONDUIT NUT	APPLETON ELEC. CO.	BL-50, TIGER GRID	A/R
121	CAP/PLUG, .911 TAPERED, RED	CAPPLUGS	T-11	A/R
122	1/2 INCH CONDUIT SEAL	APPLETON ELEC. CO.	STG50	A/R
123				
124	CONTROLLER, SCANNER	NORDSON	321159	1
125	TS 35X7.5 STEEL RAIL	WEIDMULLER INC.		A/R
126	TERMINAL, SAK 2.5/35	WEIDMULLER INC.	38046	5
127	END PLATE, SAK 2.5	WEIDMULLER INC.	48056	1
128	EW35 END BRACKET	WEIDMULLER INC.	38356	2
129	CORD GRIP, 1/2 NPT X .437	CROUSE-HINDS	CGB194-SG	2
130	CABLE, SCANNER, RATED	NORDSON	343207	2
131	CABLE, SCANNER, NON-RATED	NORDSON	321155	2

OR EQUIVALENT

RECEPTACLE OPTION



RECEPTACLE WIRING CHART	
PE n	(n)
ZONE 1	1
ZONE 2	2
ZONE 3	3
ZONE 4	4
ZONE 5	5
ZONE 6	6
ZONE 7	7
ZONE 8	8
PART ID 1	9
PART ID 2	10
PART ID 3	11
PART ID 4	12
PART ID 5	13
PART ID 6	14
PART ID 7	15
PART ID 8	16



* IF SCANNER ORDER SPECIFIED BOTH "ZONE ID" AND "PART ID" (NO PHOTOEYES), CONNECT 1-6 and 9 - 14 AS SHOWN ABOVE.

DETAIL "E"
OPTIONAL PHOTOEYE RECEPTACLE

USE THESE LOCATIONS FOR OPTIONAL SCANNER CABLE ACCESS.

Figure 10-6 iControl Photoeye Junction Box - 15 Watt (1 of 2) (Optional Photoeye Receptacles and Scanner Controller Board Shown)

FIELD WIRING CONNECTIONS

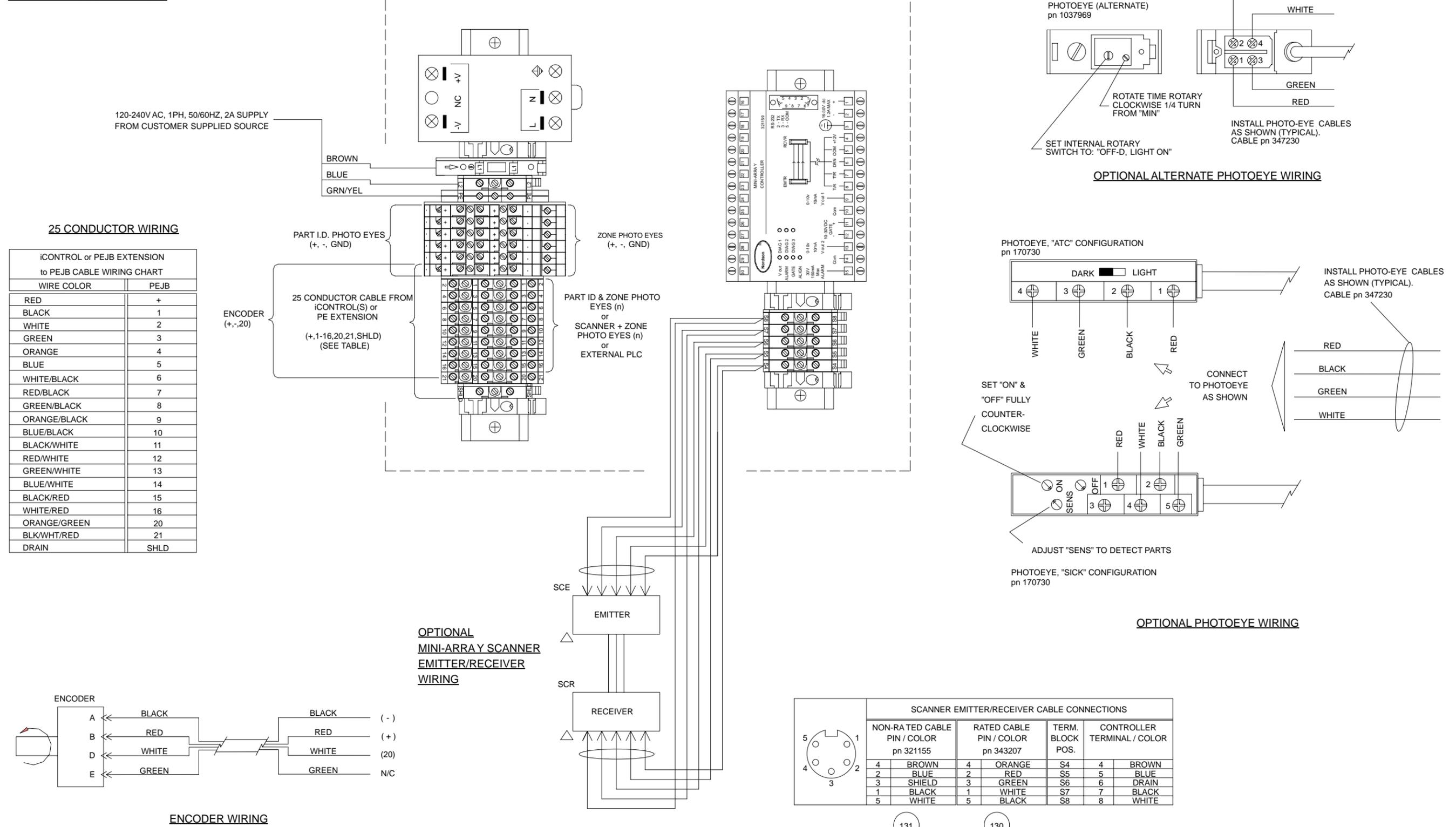


Figure 10-7 iControl Photoeye Junction Box - 15 Watt (2 of 2) Field Wiring Connections (Optional Photoeye and Scanner Connections Shown)

ITEM	DESCRIPTION	VENDOR	PART NUMBER	QTY
100	BOX, W/ KNOCKOUTS, based on PN A-1412CH	BROHL & APPELL	832RB	1
101	PANEL	HOFFMAN ENG. CO.	A-14P12	1
102				
103	TERMINAL, DUAL LEVEL, DK 4Q	WEIDMULLER	59016	11
104	END PLATE, DK 4Q	WEIDMULLER INC.	139716	1
105	TERMINAL, SAK 2.5/35	WEIDMULLER INC.	38046	9
106	END PLATE, SAK 2.5	WEIDMULLER INC.	46056	2
107	EW35 END BRACKET	WEIDMULLER INC.	38356	4
108	END PLATE, DLD 2.5/PE	WEIDMULLER INC.	159596	1
109	TERMINAL, DLD 2.5/PE	WEIDMULLER INC.	159595	8
110	TS 35X7.5 STEEL RAIL	WEIDMULLER INC.		A/R
111	JUMPER, PREASSEMBLED, Q10, Trim to 8 pos.	WEIDMULLER INC.	131310	2
112	JUMPER, PREASSEMBLED, Q2	WEIDMULLER INC.	33640	2
113	FUSE TERMINAL, ASK 1	WEIDMULLER INC.	47456	1
114	END PLATE, ASK 1	WEIDMULLER INC.	38036	1
115	TERMINAL, GROUND, EK 2.5N	WEIDMULLER INC.	66106	1
116				
117	WIRE DUCT, 1"W x 2"D, W/ COVER	PANDUIT	--	A/R
118	POWER SUPPLY, 24VDC, 30W	IDEC CORP.	PS5R-C24	1
119	FUSE, 2.0 AMP	WEIDMULLER INC.	43090	1
120				
121				
122	5 WIRE, FEMALE, INPUT RECEPTACLE	ELCOR INC.	347223	A/R
123	1/2 INCH CONDUIT NUT	APPLETON ELEC.	BL-50, TIGER GRID	A/R
124	CAP/PLUG, ø.911 TAPERED, RED	CAPPLUGS	T-11	A/R
125	1/2 INCH CONDUIT SEAL	APPLETON ELEC.	STG50	A/R
126				
127	CONTROLLER, BANNER SCANNER	NORDSON	321159	1
128	TS 35X7.5 STEEL RAIL	WEIDMULLER INC.		A/R
129	TERMINAL, SAK 2.5/35	WEIDMULLER INC.	38046	5
130	CORD GRIP, 1/2 NPT X .437	CROUSE-HINDS	CGB117	2
131	CABLE, SCANNER, RATED	NORDSON	343207	2
132	CABLE, SCANNER, NON-RATED	NORDSON	321155	2

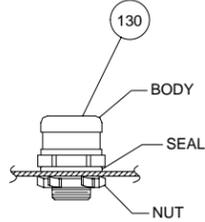
PEJB ASSEMBLY AND B.O.M.

OR EQUIVALENT

ITEM 107 (QTY.2), 108, 109, 110, & 111 NOT REQUIRED IF 2 SCANNERS.

PHOTOEYE RECEPTACLE OPTION

SCANNER OPTION, B.O.M. PER SCANNER ITEM 129 NOT PROVIDED IF 2 SCANNERS

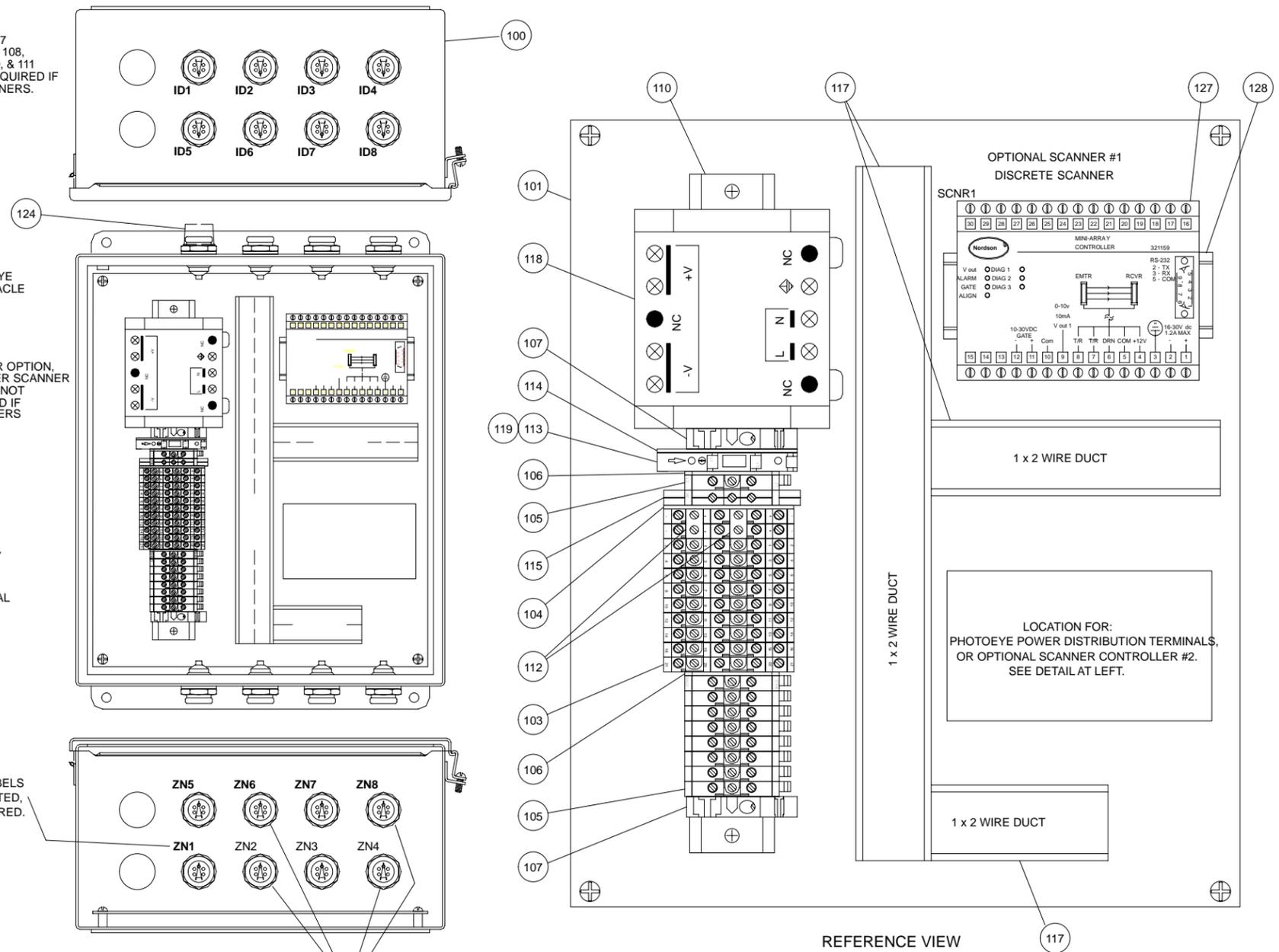
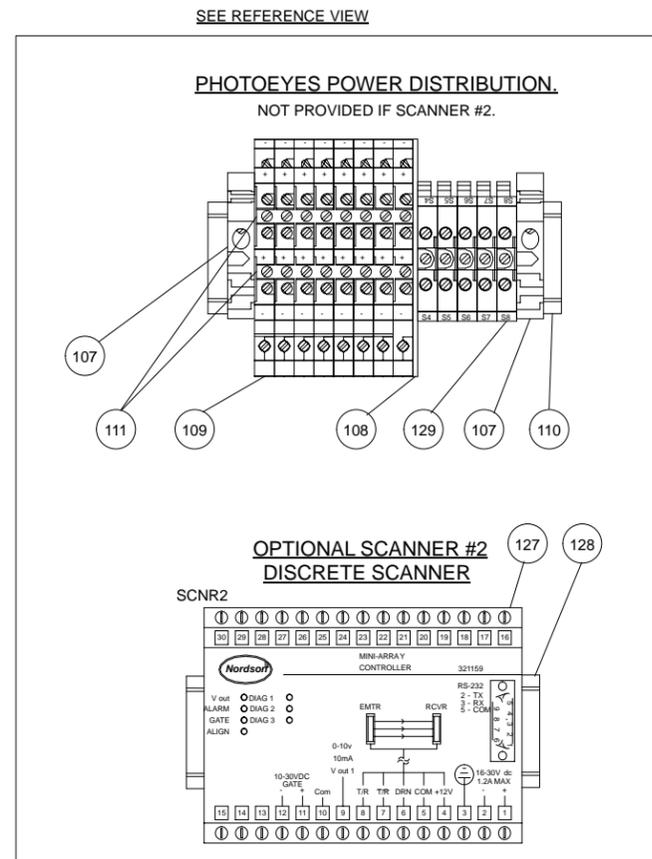


CORD GRIP DETAIL

APPLY LABELS AS INDICATED, AS REQUIRED.

USE THESE LOCATIONS FOR OPTIONAL SCANNER CABLE ACCESS.

LABEL EACH CONNECTOR OF A CORD GRIP PAIR AS "SCNR1", WHEN CONNECTED TO "SCNR1". AS "SCNR2", WHEN CONNECTED TO "SCNR2".



REFERENCE VIEW

Figure 10-8 iControl Photoeye Junction Box - 30 Watt (1 of 3) (Optional Photoeye Receptacles and Scanner Controller Board Shown)

NOTES:

3. WIRE DEVICES AS INDICATED IN BASE SCHEMATIC.

4. LOCATE AND LABEL OPTIONAL PHOTOEYE RECEPTACLE(S) AND/OR OPTIONAL SCANNER CORD GRIP CONNECTORS AS INDICATED ON DRAWING SHEET 1.

5. IF DUAL SCANNERS, ONE AS "ZONE ID" AND ONE AS "PART ID", THEN SCANNER #1 IS ALWAYS THE "ZONE" SCANNER.

6. IF DUAL SCANNERS, BOTH AS "ZONE ID", THEN SCANNER #1 IS FOR UPPER ZONES AND SCANNER #2 IS FOR LOWER ZONES.

- WIRING FROM EACH SCANNER TO PANEL TERMINALS BASED ON ORDER SPECIFICATION. EACH SCANNERS WIRING NOT TO OVERLAP AT PANEL TERMINALS BUT ALWAYS SEQUENCED AS SCANNER #1 OUTPUTS FIRST, FOLLOWED BY SCANNER #2 OUTPUTS.

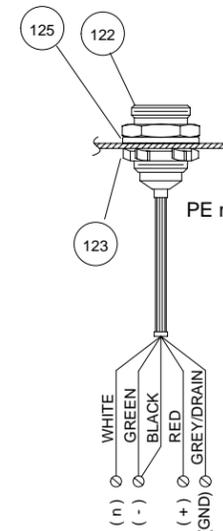
- TERMINAL WIRING FORMULA:
 SCANNER #1 TERMINALS 16 TO [(16 + "n") - 1], CONNECTED TO PANEL TERMINALS 1 TO "n",
 WHERE "n" = NUMBER OF SPECIFIED ZONES FOR UPPER SCANNER.
 SCANNER #2 TERMINALS 16 TO [(16 + "nn") - 1], CONNECTED TO PANEL TERMINALS ("n" + 1) TO ("n" + "nn"),
 WHERE "nn" = NUMBER OF SPECIFIED ZONES FOR LOWER SCANNER.

- FOR EXAMPLE:
 FOR UPPER SCANNER (SCNR1) ORDER SPECIFIED AS 4 ZONES, THEN WIRE SCANNER #1 TERMINALS 16, 17, 18, & 19 TO PANEL TERMINALS 1, 2, 3, & 4.
 FOR LOWER SCANNER (SCNR2) ORDER SPECIFIED AS 3 ZONES, THEN WIRE SCANNER #2 TERMINALS 16, 17, & 18 TO PANEL TERMINALS 5, 6, & 7.

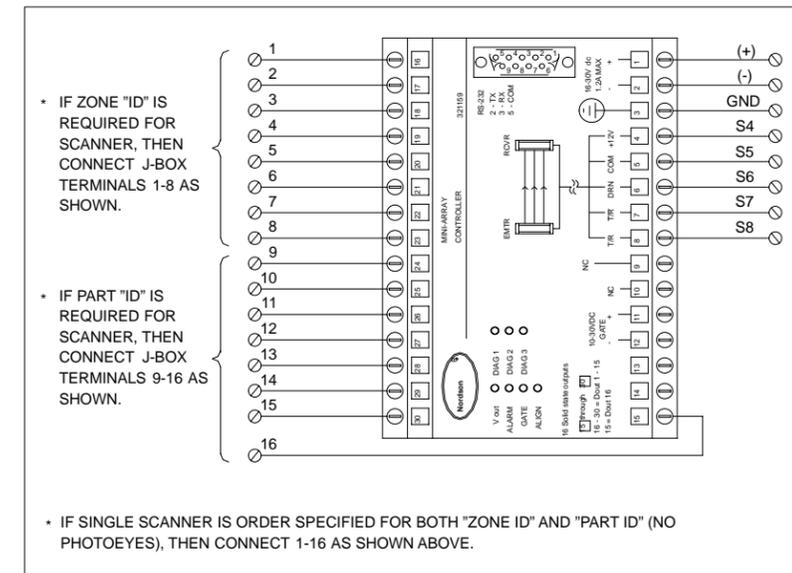
PEJB INTERNAL WIRING AND INSTRUCTION

DETAIL "E"
 OPTIONAL PHOTOEYE RECEPTACLE

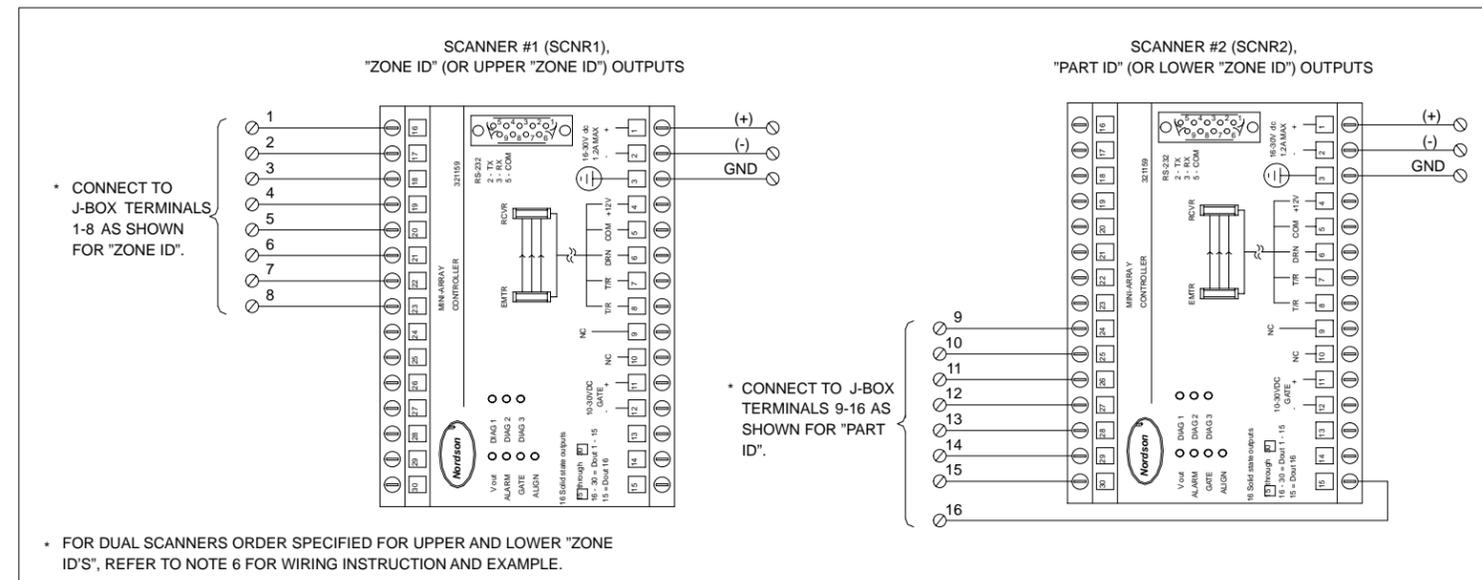
RECEPTACLE WIRING CHART	
PE n	(n)
ZONE 1	1
ZONE 2	2
ZONE 3	3
ZONE 4	4
ZONE 5	5
ZONE 6	6
ZONE 7	7
ZONE 8	8
PART ID 1	9
PART ID 2	10
PART ID 3	11
PART ID 4	12
PART ID 5	13
PART ID 6	14
PART ID 7	15
PART ID 8	16



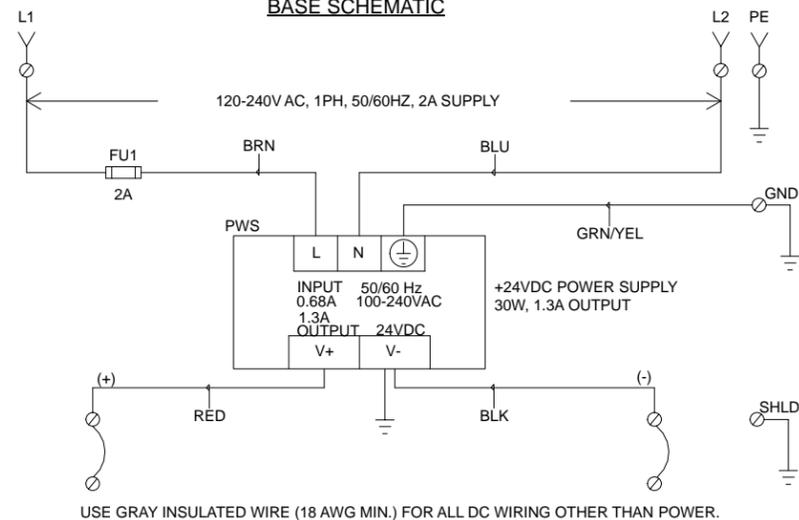
SINGLE SCANNER OPTION



DUAL SCANNER OPTION



BASE SCHEMATIC



USE GRAY INSULATED WIRE (18 AWG MIN.) FOR ALL DC WIRING OTHER THAN POWER.

Figure 10-9 iControl Photoeye Junction Box - 30 Watt (2 of 3) Field Wiring Connections (Optional Photoeye and Scanner Connections Shown)

FIELD WIRING CONNECTIONS TO PEJB

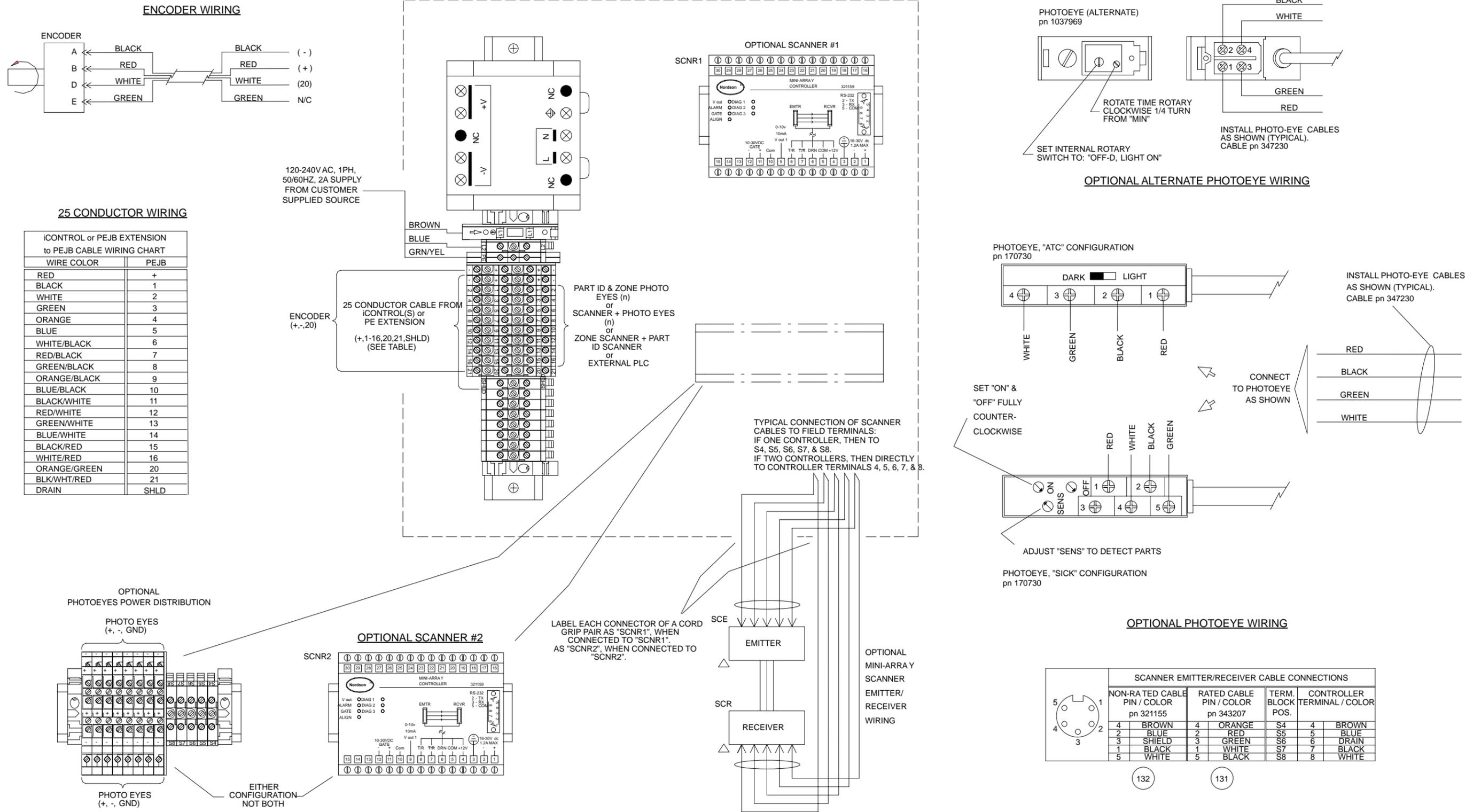


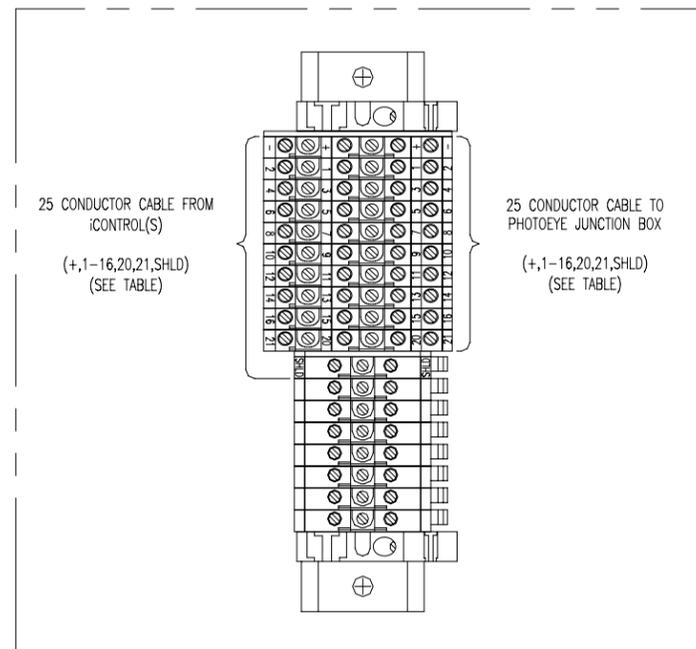
Figure 10-10 iControl Photoeye Junction Box - 30 Watt (3 of 3) Field Wiring Connections (Optional Photoeye and Scanner Connections Shown)

ITEM NUMBER	DESCRIPTION	VENDOR	PART NUMBER	QTY
100	BOX, CONTINUOUS HINGE, NEMA TYPE 12	HOFFMAN ENG. CO.	A-808CH	1
101	PANEL	HOFFMAN ENG. CO.	A-8PB	1
102	TS 35X7.5 STEEL RAIL	WEIDMULLER INC.		A/R
103	TERMINAL, DUAL LEVEL, DK 4Q	WEIDMULLER INC.	59016	10
104	END PLATE, DK 4Q	WEIDMULLER INC.	139716	1
105	TERMINAL, SAK 2.5/35	WEIDMULLER INC.	38046	8
106	END PLATE, SAK 2.5	WEIDMULLER INC.	46056	1
107	EW35 END BRACKET	WEIDMULLER INC.	38356	2
108	DECAL,NORDSON TRADEMARK,5.50 IN.	NORDSON	246950B	2

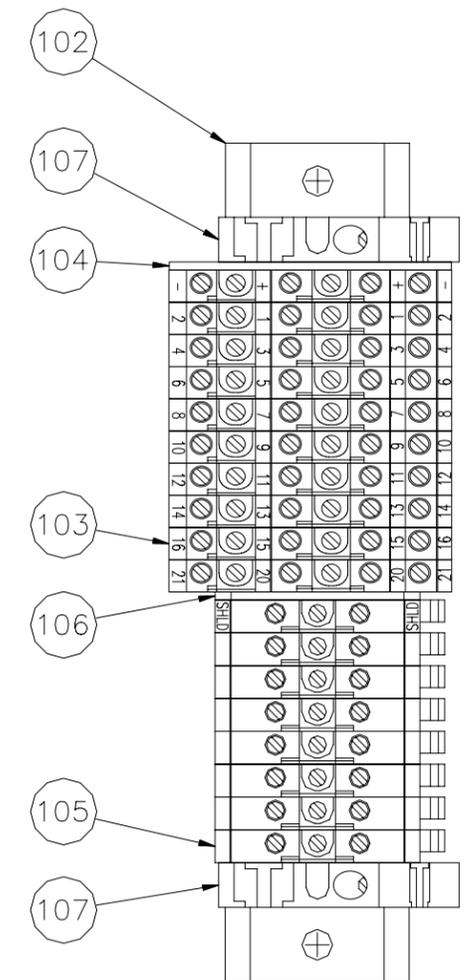
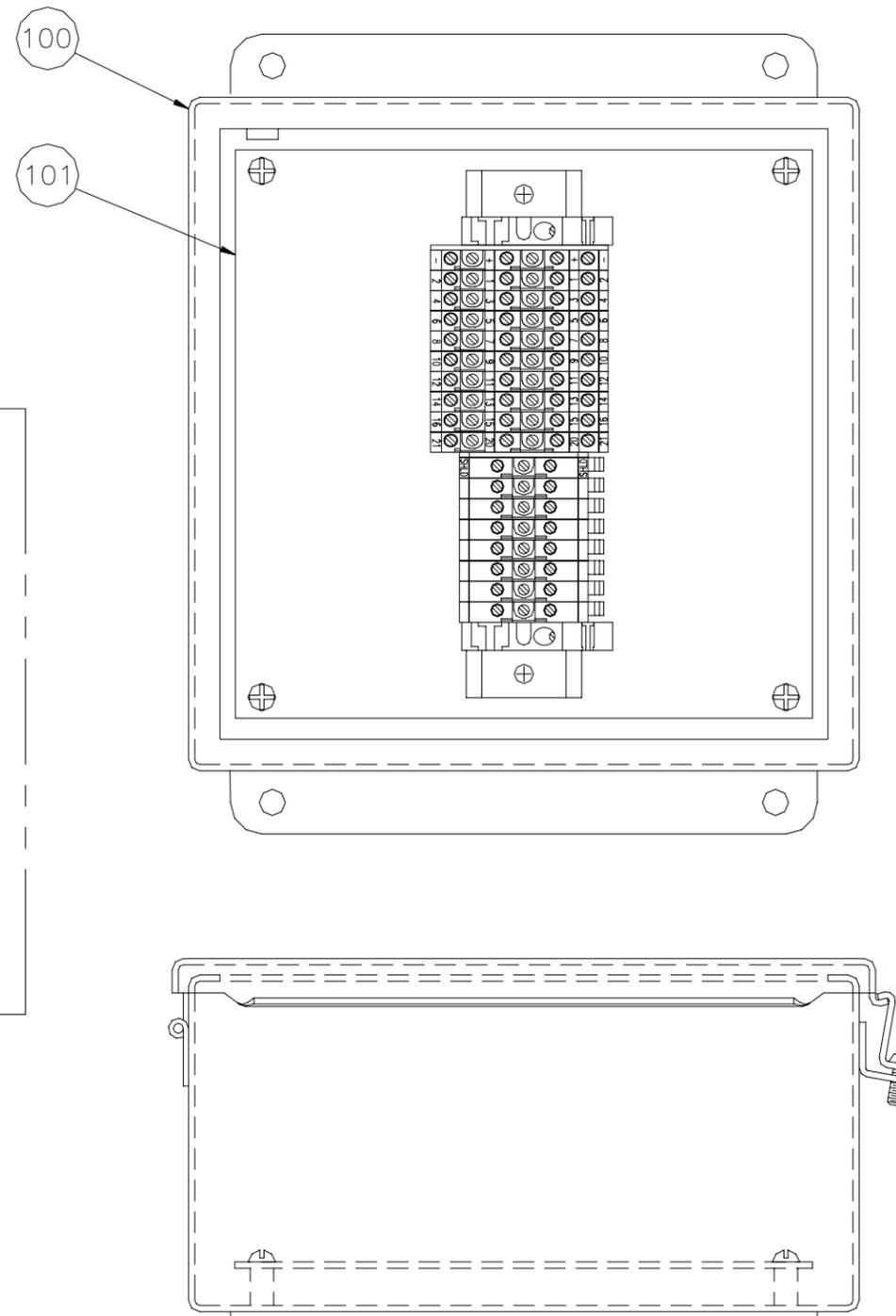
25 CONDUCTOR WIRING

iCONTROL or PEJB EXTENSION to PEJB CABLE WIRING CHART

WIRE COLOR	PEJB
RED	+
BLACK	1
WHITE	2
GREEN	3
ORANGE	4
BLUE	5
WHITE/BLACK	6
RED/BLACK	7
GREEN/BLACK	8
ORANGE/BLACK	9
BLUE/BLACK	10
BLACK/WHITE	11
RED/WHITE	12
GREEN/WHITE	13
BLUE/WHITE	14
BLACK/RED	15
WHITE/RED	16
ORANGE/GREEN	20
BLK/WHT/RED	21
DRAIN	SHLD



FIELD WIRING CONNECTIONS



REFERENCE VIEW

Figure 10-11 iControl Extension Box - Field Wiring Connections for 25-Conductor I/O Cable

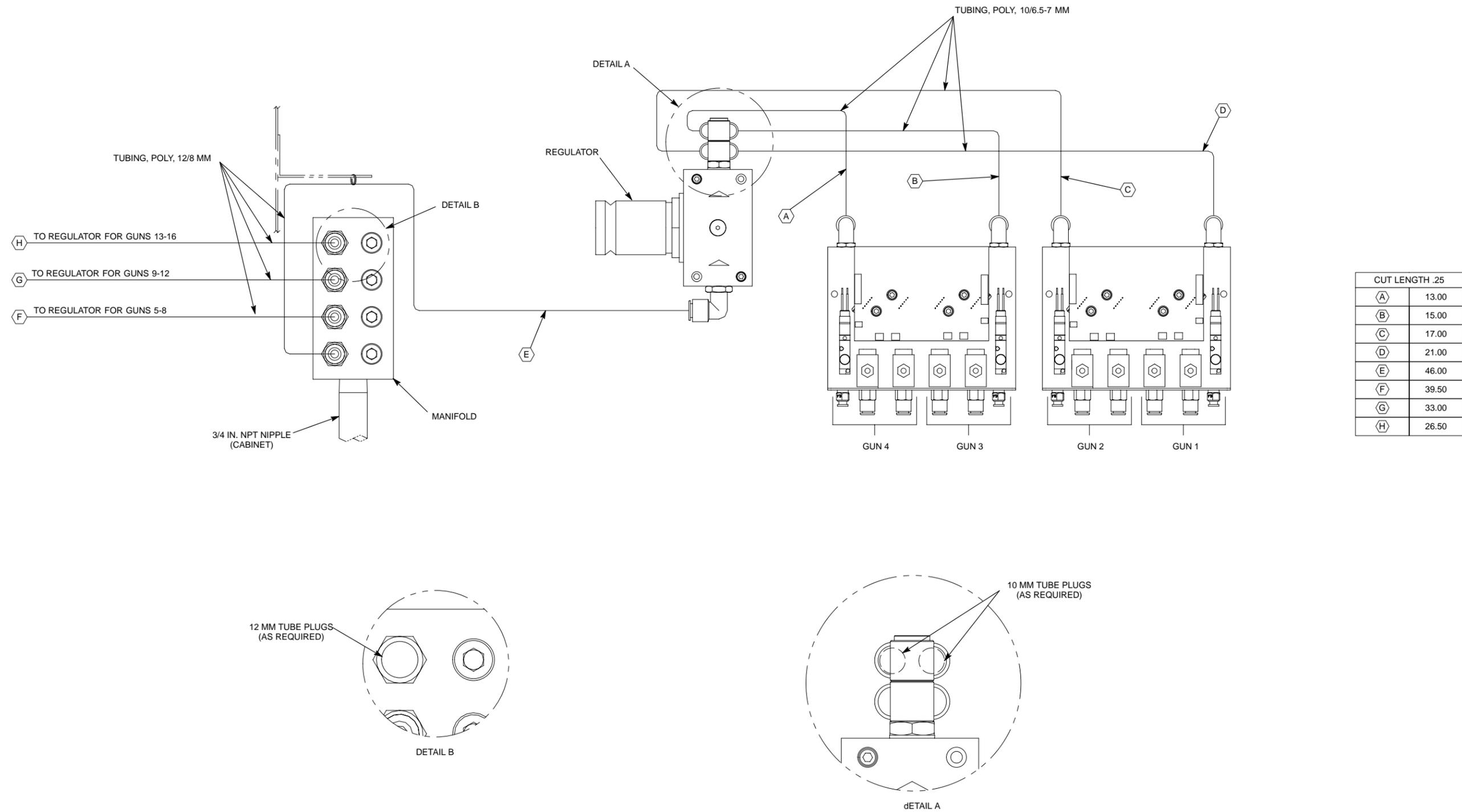


Figure 10-12 iControl Pneumatic Schematic

DECLARATION of CONFORMITY

PRODUCT:

Versa-Spray or SureCoat (bar or tube mount) IPS Automatic Powder Spray Applicators; Tribomatic or Tribomatic II, Automatic Tribo Charging Powder Spray Applicators. Used with iControl System.

APPLICABLE DIRECTIVES:

89/37/EEC Machinery
73/23/EEC Low Voltage
89/336/EEC Electromagnetic Compatibility

STANDARDS USED FOR COMPLIANCE:

EN292	EN50081	IEC417L
EN50014	EN50082	FM7260
EN50177	EN55011	
EN50050	EN60204	

PRINCIPLES:

This product has been manufactured according to good engineering practices.
The product specified conforms to the directives and standards described above.

CERTIFICATIONS:

ISO 9001 DNV No. QSC3277
Quality Notification (Notified Body No. 1180) Baseefa ATEX 0771



Herb Turner
Vice President, Powder Systems Group

Date: 06 February 2003