Encore® HD iControl® 2 Integrated Control System

Installation, Troubleshooting, Repair

Customer Product Manual

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– English –
Issued 11/24

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Change Record

Revision	Date	Change
01	10/17	New Release.
02	08/18	Added Rev 2 Arbor PC to parts list and sections regarding program and data cards. Updated wiring diagrams.
03	02/22	Updated approvals.
04	03/22	Updated drawings section.
05	06/22	Updated approvals information and drawings section.
06	03/23	Updated drawing and DOC revs
07	11/24	Updated manufacturer’s address.

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 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 (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored. Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

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.

Grounding inside and around the booth openings must comply with NFPA requirements for Class II, Division 1 or 2 Hazardous Locations. Refer to 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 system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

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

Safety Labels

Table 1-1 contains the text of the safety labels on the front of the iControl® master and auxiliary cabinets and on the rear of the pedestal. The safety labels are provided to help operate and maintain the console safely. See Figure 1-1 for the location of the safety labels.

Table 1-1 Safety Labels

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

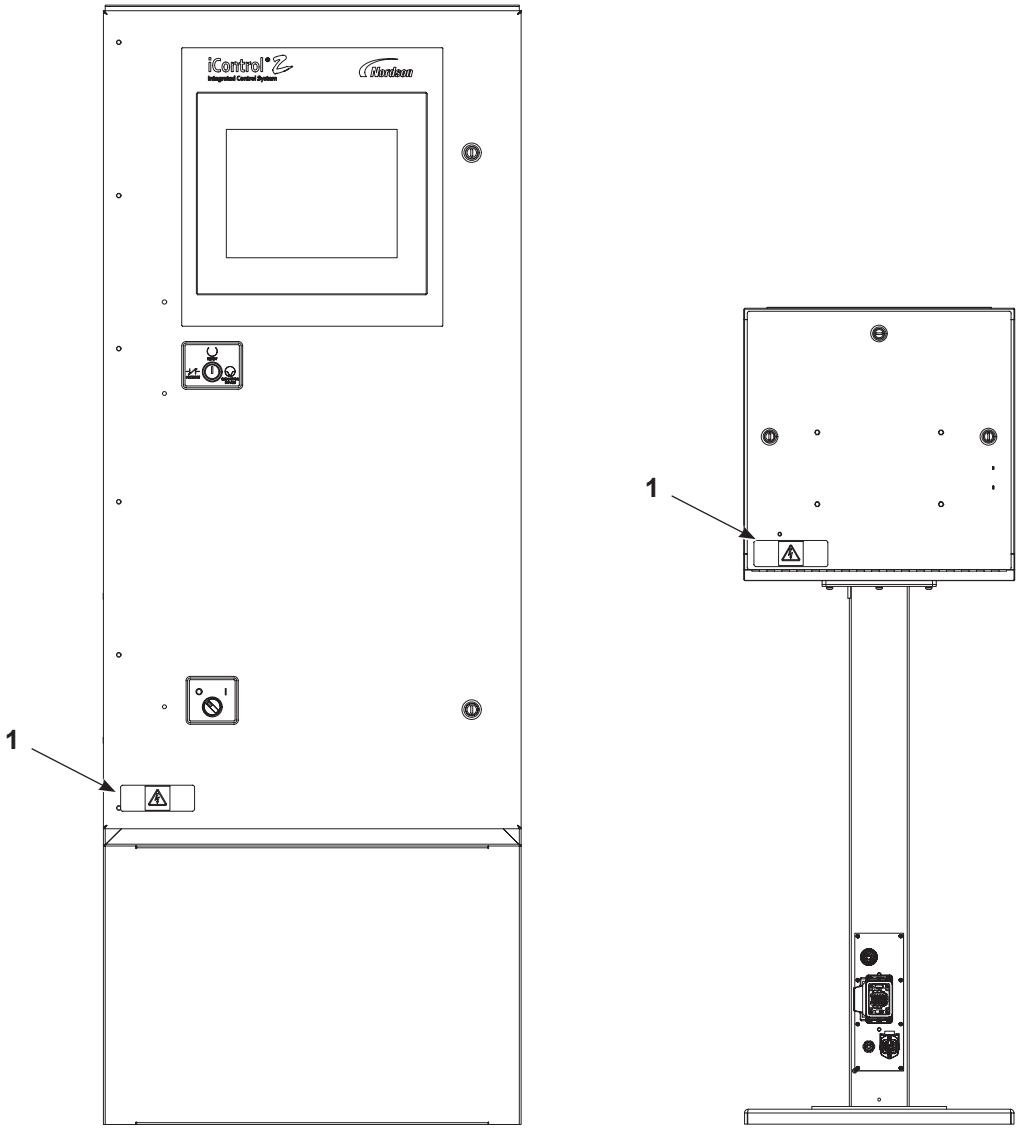


Figure 1-1 Safety Labels

Section 2
Overview

System Manuals

This manual covers the iControl 2 system hardware for Encore® HD iControl® 2 systems used with Encore automatic spray guns.

iControl 2 manuals are organized as follows:

Operator Interface Manual: Covers configuration, preset setup, and operation using the iControl 2 software and touch screen.

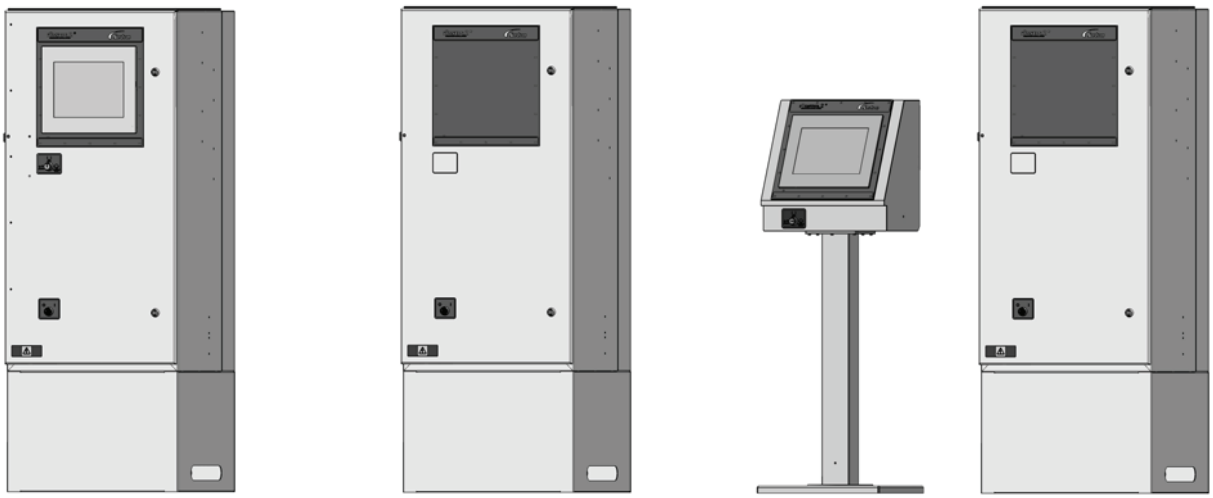
- 1056418

Operator Card: for all versions of the iControl 2 systems.

- 1024758

Hardware Manual: Covers installation, troubleshooting, repair, parts, and drawings for this system only.

The Encore HD iControl 2 systems can consist of a main console, an auxiliary console, and a pedestal system. Each system can support up to 32 spray guns.



Main Console **Auxiliary Console** **Pedestal System**

Figure 2-1 iControl 2 Consoles and Pedestal

Console and System Hardware and Software

Main Console Components

See Figure 2-2 and Figure 2-3. A fully equipped main console controlling 16 spray guns contains the following hardware:

- LCD touch-screen display, interlock keyswitch, and power switch
- Computer (PC)
- Two CompactFlash cards, one for the iControl 2 program and one for user data
- I/O board and relay board
- Up to 2 backplanes, 16 spray gun control cards, and card cage (1 card controls 2 spray guns)
- Up to two 400 watt and one 120 watt 24 Vdc power supplies

Auxiliary Console Components

Auxiliary consoles do not include the computer, display, interlock switch, or I/O board.

Pedestal / Main Components

The operator interface can be located in the pedestal instead of the main console if desired. The pedestal houses the display, computer, interlock keyswitch, and I/O board, while all other hardware stays in the main console.

Standard System Functions

Standard iControl 2 system functions control spray gun triggering, electrostatic charging, and powder flow and velocity. Up to 255 part recipes (presets) can be created containing settings for each. In addition to the console/pedestal hardware, the iControl 2 system also requires external part ID sensors such as photoeyes or scanners for part identification and zone detection and a conveyor encoder to track part movement.

In addition, the iControl 2 system also controls in/out positioners and reciprocators. Recipes can include move settings for these devices.

Positioners move the spray guns in and out of the booth as parts pass through the booth. Positioner motion is typically horizontal but for some applications the positioners move the spray guns up and down.

Reciprocators move the spray guns up and down with stroke lengths that vary depending on part size. For both, travel and motion is dependent on the recipe settings for the part.

Both positioners and reciprocators require analog scanner signals for accurate part width and height measurement.

The spray guns can also be mounted on oscillators, which move up and down with fixed stroke lengths. Oscillators are typically controlled from the main system control panel.

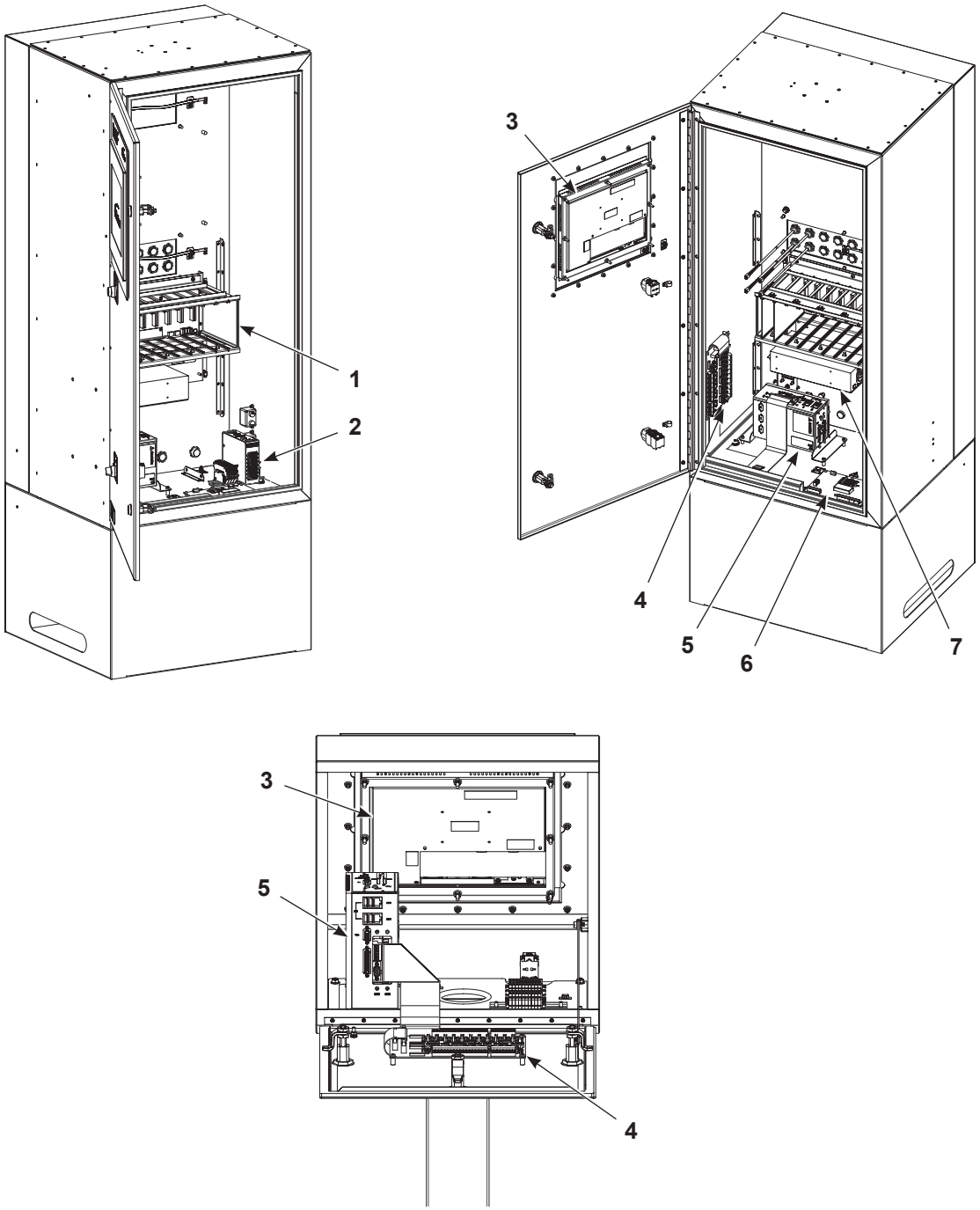


Figure 2-2 iControl 2 Main Console and Pedestal Internal Components

1. Dual spray gun cards, card cage, and backplane
2. 24Vdc power supply
3. Touch screen display
4. I/O board
5. PC
6. Relay board
7. Power supply − multiple output

Operator Interface

The operator performs all configuration and operation tasks with the touch screen and iControl 2 software. The software provides the operator a graphical user interface for system configuration, operation, and troubleshooting.

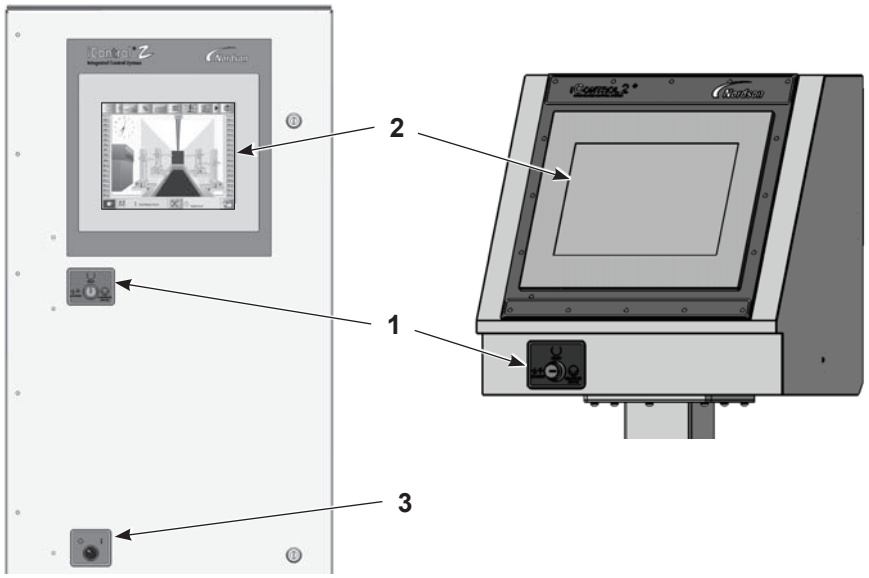


Figure 2-3 Main Console and Pedestal Front Panels

1. Interlock keyswitch
2. LCD touch screen
3. Power switch

NOTE: The operator interface software and operating system should be completely shut down before turning off console power.

Interlock Keyswitch Functions

In the **Ready** position, the spray guns cannot be triggered unless the conveyor is running. This prevents powder waste and hazardous operating situations.

In the **Bypass** position, spray guns can be triggered on and off without running the conveyor. Use the Bypass position to set up and test spray gun settings.

In the **Lockout** position, the spray guns cannot be triggered and the in/out positioners and reciprocators cannot be moved. Use this position when working inside the booth. The lockout can be overridden for the in/out positioners and reciprocators from their configuration screens.

DC Power Supplies

There are up to three power supplies in the console:

- Multiple output
- Two 400-watt − provides power to the dual spray gun cards
- One 120-watt 24 − provides 24 Vdc power to the PC and relay board

NOTE: The relay board converts 24 Vdc to 12 Vdc for the display.

Dual Spray Gun Cards

Each dual spray gun card in the card cage provides electrostatic controls for two Encore automatic powder spray guns. The cards provide a 0−20 VAC (peak) signal to drive the electrostatic power supplies inside the Encore spray guns. The dual spray gun card also provides process feedback to the operator interface.

Spray Gun Pump Control

The iControl console and the manual spray gun controllers control the Prodigy HDLV powder pumps through the CAN network. In the pump cabinet, one pump control card controls two pumps.

Refer to the Prodigy HDLV pump and pump panel manuals for wiring diagrams, parts lists, and other information.

Internal and External Networks

The iControl 2 system uses both a CAN network for internal communications and an Ethernet network for external communications.

CAN Network: Handles communications between the spray gun control cards, iFlow modules, and the iControl 2 PC. The CAN network is also used to communicate with the spray gun control cards and iFlow modules in auxiliary consoles. If two booths are on the same line, the CAN network can also communicate with auxiliary consoles controlling the second booth spray guns.

Ethernet Network: Handles communications between the iControl 2 system, the main electrical control panel, and the part ID panel(s).

Digital Inputs

The iControl 2 system includes an I/O board that provides optically isolated digital inputs. Included are:

- eight discrete (digital) inputs for zone detection (spray gun triggering),
- eight discrete (digital) inputs for part identification (recipe select),
- one input for a conveyor encoder (encoder A),
- one input each for trigger bank 0, trigger bank 1, and trigger select.

The above inputs are used to track parts through the powder coating system, select the desired recipe for the part, and trigger on and off the appropriate spray guns when the parts reach the desired trigger points.

All the digital inputs are routed through a part ID junction box on the part ID stand. A 24 Vdc power supply in the junction box provides power for the photoeyes and scanners. A second junction box may be used depending on the number and type of scanners in the system.

A cable connects the part ID junction box to the iControl 2 main console or pedestal. The cable plugs into the PD1 connector on the console or pedestal, then is field-wired to the terminal block in the part ID junction box.

Conveyor Encoder

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

Resolution: At an encoder resolution of one inch to one pulse (1:1), the effective distance parts can be tracked by the iControl 2 system is approximately 1333 feet. At a 2:1 resolution (1/2 inch per pulse), the effective tracking distance is halved, to approximately 666 feet.

The maximum speed of the encoder input is 10 Hz (10 pulses per second). This may require a trade-off between desired conveyor speed and part tracking resolution (the higher the conveyor speed the coarser the tracking resolution).

NOTE: An internal clock or an external timer may be used instead of an encoder. Consult your Nordson representative.

Specifications

General

See Figure 2-7 and Figure 2-8 for pedestal and console dimensions.

Electrical Requirements	
Input	100−230 Vac, 50−60 Hz, 1 ∅, 465VA max.
	Conveyor Interlock, Remote Lockout: 120/230 Vac, 50/60 Hz, 1 ∅, 6 mA
	Alarm Relay contact rating: 120/230 Vac, 1 ∅, 6 A
Output (to spray gun)	± 19V, ±1A (peak)
Output (to pedestal)	+24 Vdc, +12 Vdc
NOTE: The iControl 2 system must be interlocked with the fire detection system so that the spray gunsare shut off if a fire is detected inside the spray booth.	
ANSI/ISA S82.02.01	
Pollution Degree	2
Installation (Overvoltage)	Category II
Environmental	
Operating Temperature	+15° C to +40° C
Operating Humidity	5−95%, non-condensing
Hazardous Location Rating **(See Note A)**	Class II Division 2, Groups F & G Zone 22 area.
NOTE: A. Only the iControl 2 Pedestal is certified for hazardous locations or zones. The Main and Auxiliary Consoles must always be located outside the hazardous area or zone. **B. Branch circuit breaker 10A Max.**	

Prodigy Pump and Spray Gun Pattern Air Quality

Air must be clean and dry. Use a regenerative desiccant or refrigerated air dryer capable of producing a 3.4 oC (38 oF) 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 HDLV pumps to malfunction; the powder to cake in the reclaim system, or cause clogging in the feed tubing or spray gun powder paths.

Special Conditions for Safe Use

The Encore HD iControl 2 Integrated Controller Main and Auxiliary Consoles and Display Pedestal with Main Console for Pedestal shall be used within the ambient temperature range of +15°C to +40°C with Encore HD Automatic Powder Applicators.

The Encore HD iControl 2 Integrated Controller Main and Auxiliary Consoles and Display Pedestal with Main Console for Pedestal shall be installed in a non-explosive atmosphere location.

CAUTION: Caution should be taken when cleaning plastic services on the Encore HD iControl 2 consoles and pedestal. There is a potential for static electricity buildup on these components.

Approvals

FM (US / Canada), CE / ATEX, UKCA/UKEX
Pedestal − Rated for Class II Division 2 Groups F & G Hazardous Location Area, or Zone 22

Approval Labels

The following figures show the content of the approvals labels on the system cabinets.

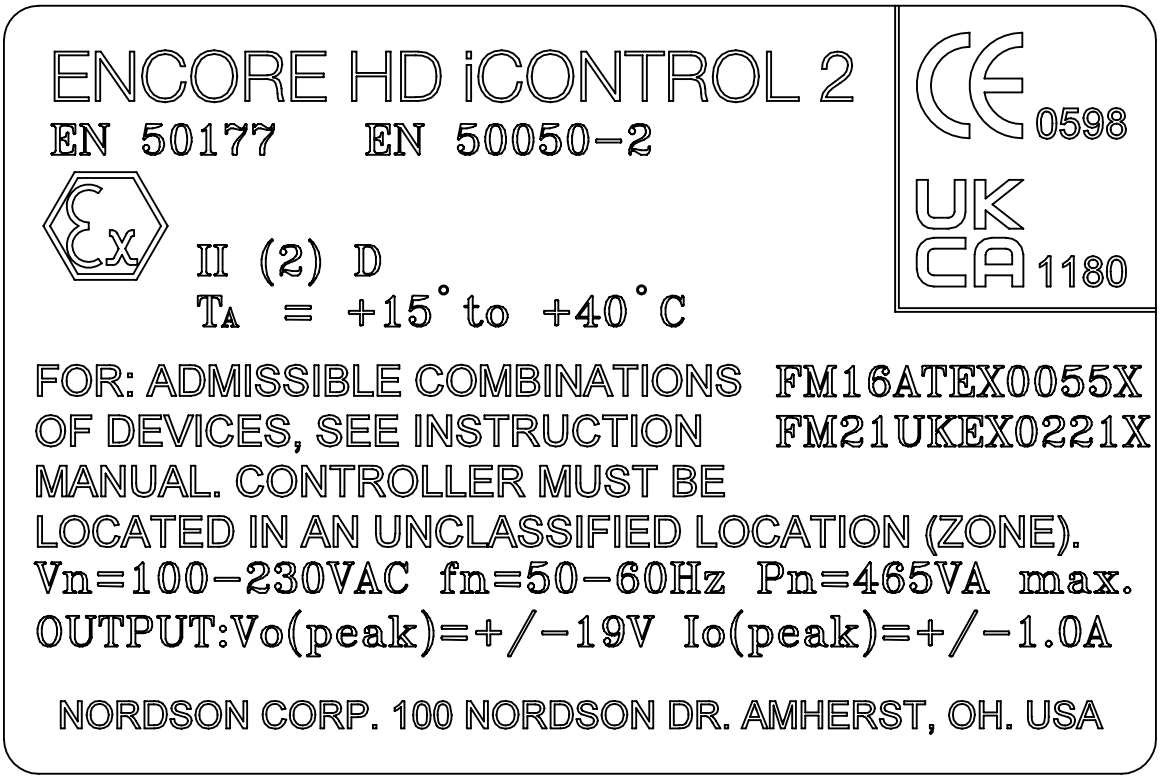


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Figure 2-4 Label for Approval (Main and Auxiliary Cabinets)

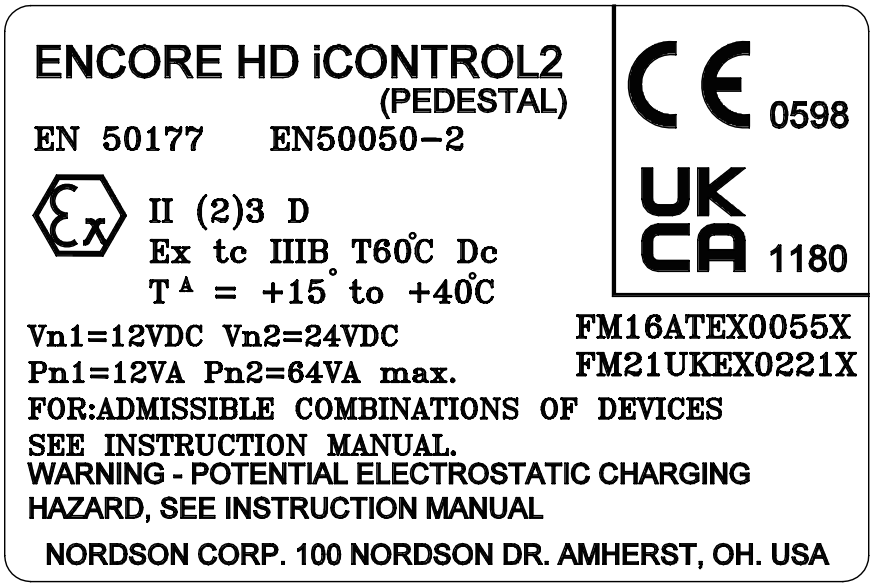

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Figure 2-5 Label for Approval (Pedestal Cabinet)

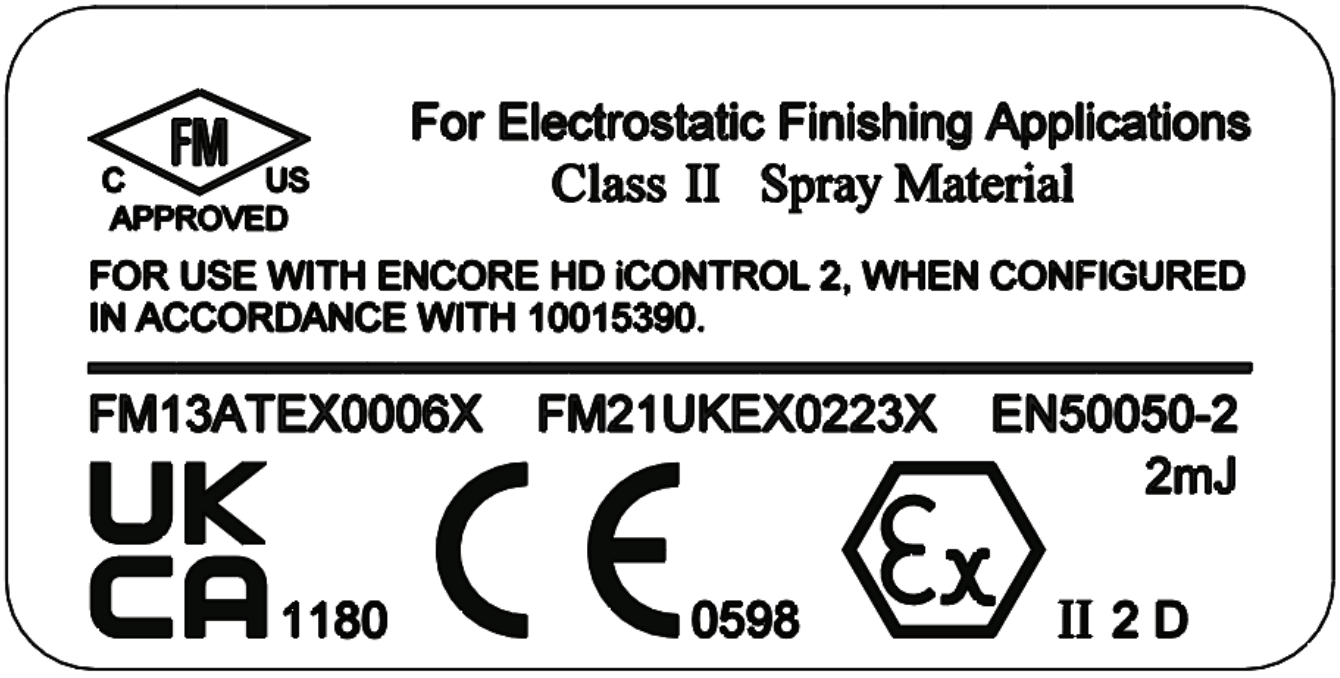

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Figure 2-6 Label for FM Approval (On Main, Auxiliary, and Pedestal Cabinets)

Console Dimensions

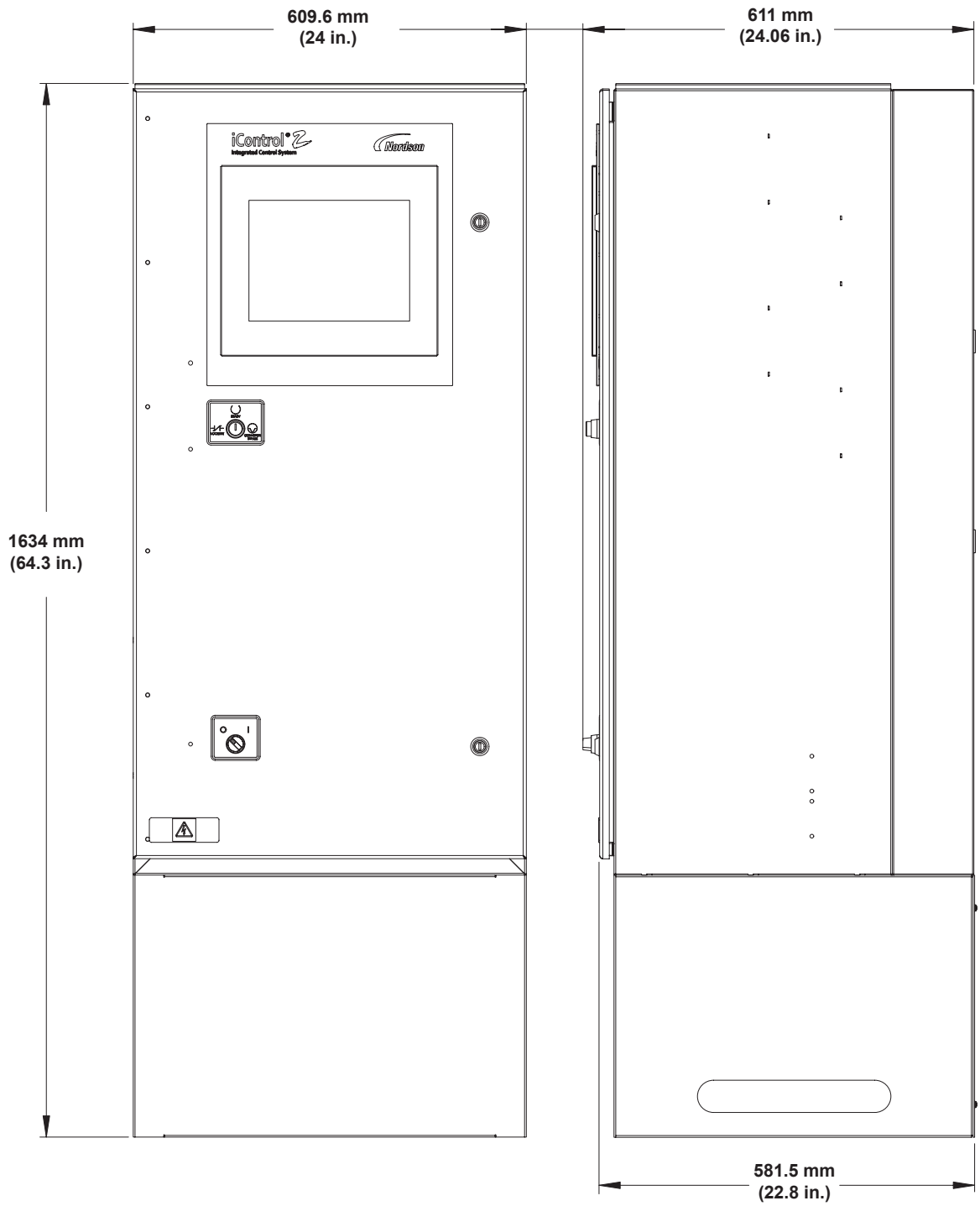


Figure 2-7 Console Dimensions

Pedestal Dimensions

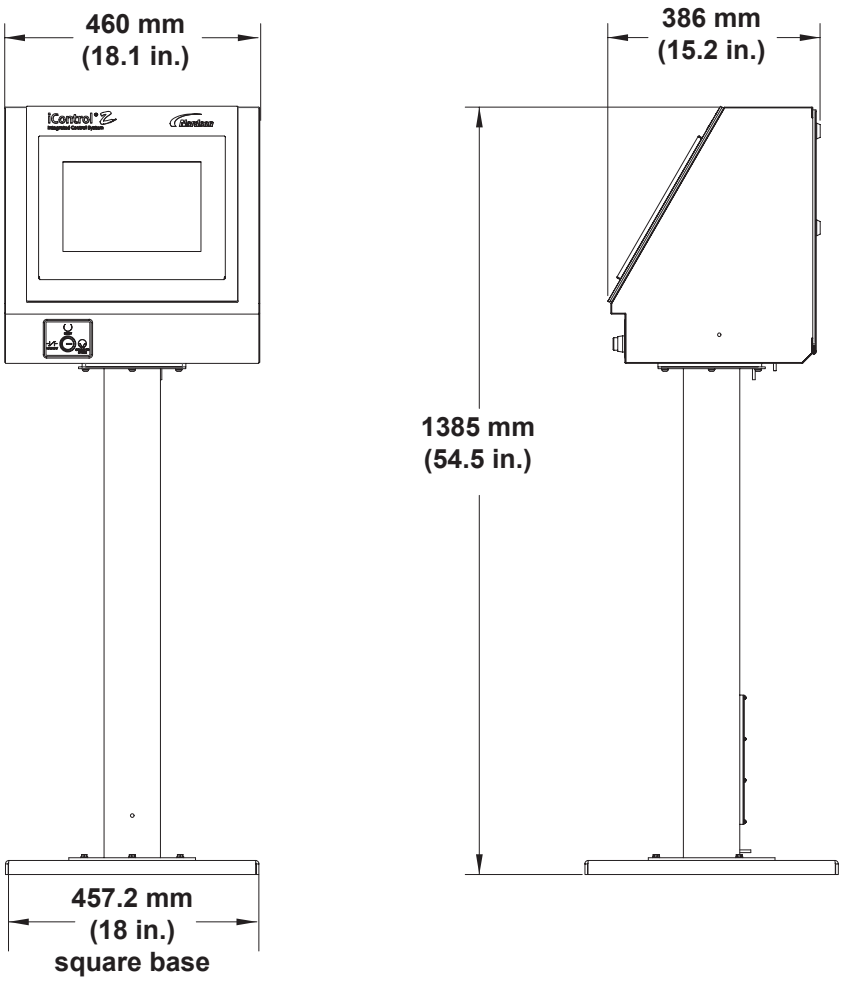


Figure 2-8 Pedestal Dimensions

Approved Program and User Data Cards

CompactFlash card capacity: 512 Mb minimum − Type I CompactFlash only.

NOTE: Retail CompactFlash refers to devices available at camera, computer, and electronic retail shops. Retail flash has a rating of 30,000 to 600,000 write cycles at a maximum of 75°C (167°F) and may experience a shorter overall life.

Industrial CompactFlash refers to rated devices only available through an electronics parts supplier and online sources that sell CompactFlash with an industrial temperature rating for use in Embedded Systems. Industrial flash has a rating of 2,000,000 write cycles and an increased temperature range to 85°C (185°F).

NOTE: Both the Program and Data cards should be the same size and from the same manufacturer. If they are not of the same size, the system may not boot properly.

NOTE: The SwissBit 2 Gb is the only validated card for Rev 2 Arbor PC, which requires a minimum of a 2 Gb CompactFlash.

Validated cards:

- Dane−Elec − retail to 512 Mb
- Kingston Technology − retail to 4 Gb
- PNY − retail to 2 Gb
- SanDisk − retail to 2 Gb, industrial to 1 Gb
- SanDisk − industrial 4 Gb or larger (must be used in pairs)
- Silicon Systems − industrial 512 Mb
- Smart Modular Technologies − industrial to 1 Gb
- SMC Numonyx − industrial to 1 Gb
- SwissBit − industrial 2 Gb
- Transcend − industrial 512 Mb
- Toshiba − retail to 2 Gb Incompatible cards:
- LEXAR − any
- Type II Compact Flash − any (cards will not fit in card slot)

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 stated in this manual.

Introduction

iControl 2 systems are configured for each customer's application and requirements. The equipment supplied with the system varies depending on the type of installation (new, upgrade, or retrofit) and the equipment furnished by the customer. Therefore, this section provides only basic installation information. Detailed information is contained in the system wiring diagrams, plan views, and other documentation furnished by Nordson application engineering.

Once all hardware is installed and wired and the system is powered up, the operator interface is used to configure and operate the system. Refer to the *iControl Operator Interface* manual for configuration and recipe (preset) instructions.

WARNING: Use dust-tight conduit connectors or strain reliefs rated IP6x in all iControl 2 console, pedestal, junction box, and electrical panel knockouts. Installation must be done according to code and care must be taken to maintain the dust-tight integrity of the enclosures.

NOTE: Only the pedestal can be installed inside the hazardous zone. The main and auxiliary consoles must be installed outside the zone.

System Connections

Connection Diagrams

See Figure 3-1 System Interconnect Cable Connections. The main console, auxiliary console, pedestal, part ID junction box, and system electrical panel are fitted with receptacles for interconnect cable connections.

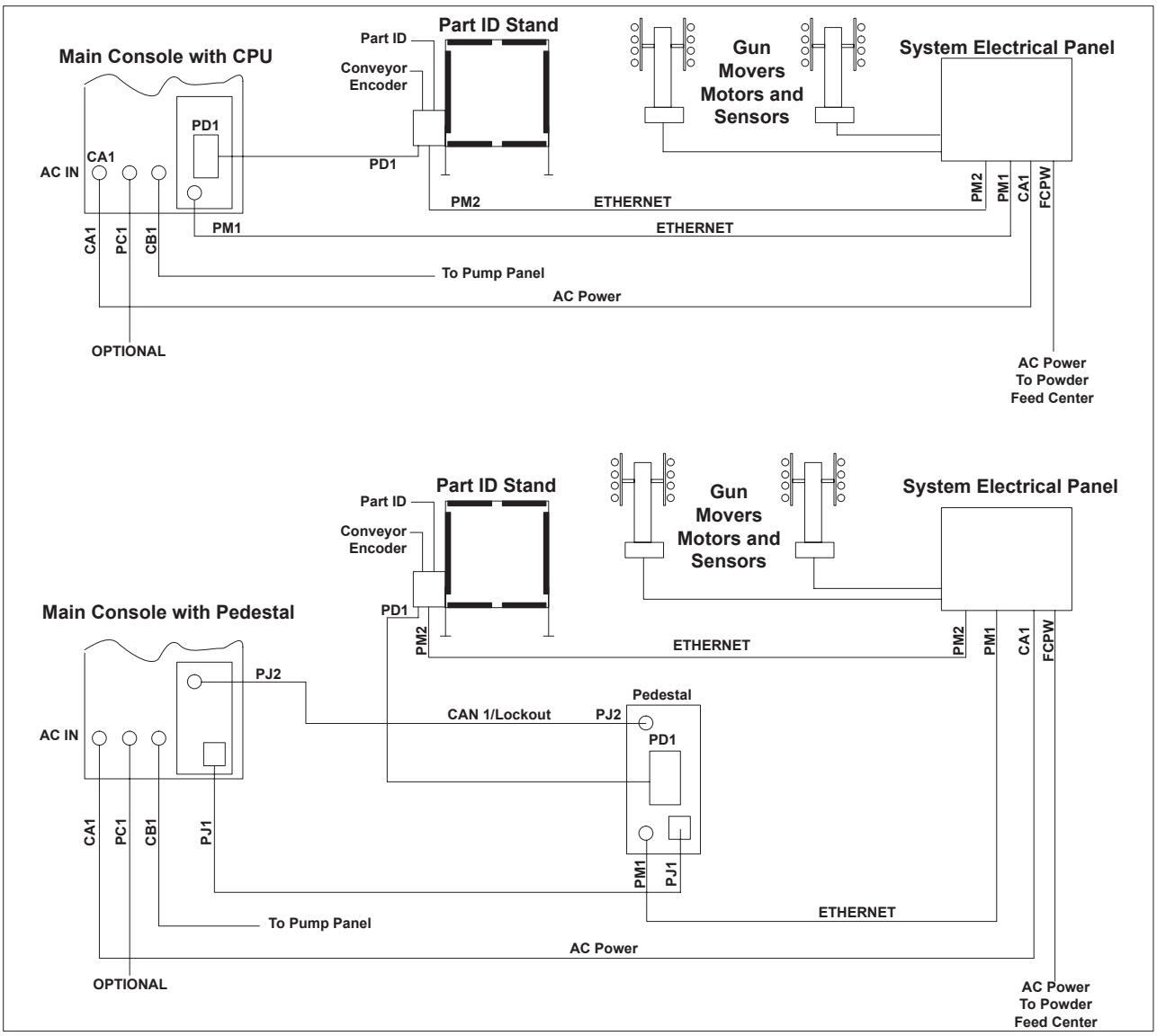


Figure 3-1 System Interconnect Cable Connections

Interconnect Cables

Refer to the Parts section for cable part numbers.

Table 3-1 System Interconnect Cables

Cable	Function
PD1	Discrete signals for zones 1−8, part ID 1−8, trigger banks 1 and 2, trigger select, conveyor encoder A, plus +24Vdc to power the scanner controllers or photocells.
PM1	Ethernet signals for spray gun mover control and for powder feed center color change sequence.
PM2	Ethernet signals from analog scanners for spray gun mover control.
PJ1	Signals between pedestal and console: • +12 and +24V to pedestal • Conveyor run • Remote lockout • Spray Gun power OK • Keyswitch lockout • Keyswitch bypass • Remote manual enable • Alarm
PJ2	CAN network and lockout signals between pedestal and console.
CA1	AC power from the system electrical panel.
CB1	CAN network to pump panels.
PC1	Optional connection for remote signals for the following functions: • Manual enable • Remote lockout • Alarm relay

Electrical Connections

See Figure 3-2.

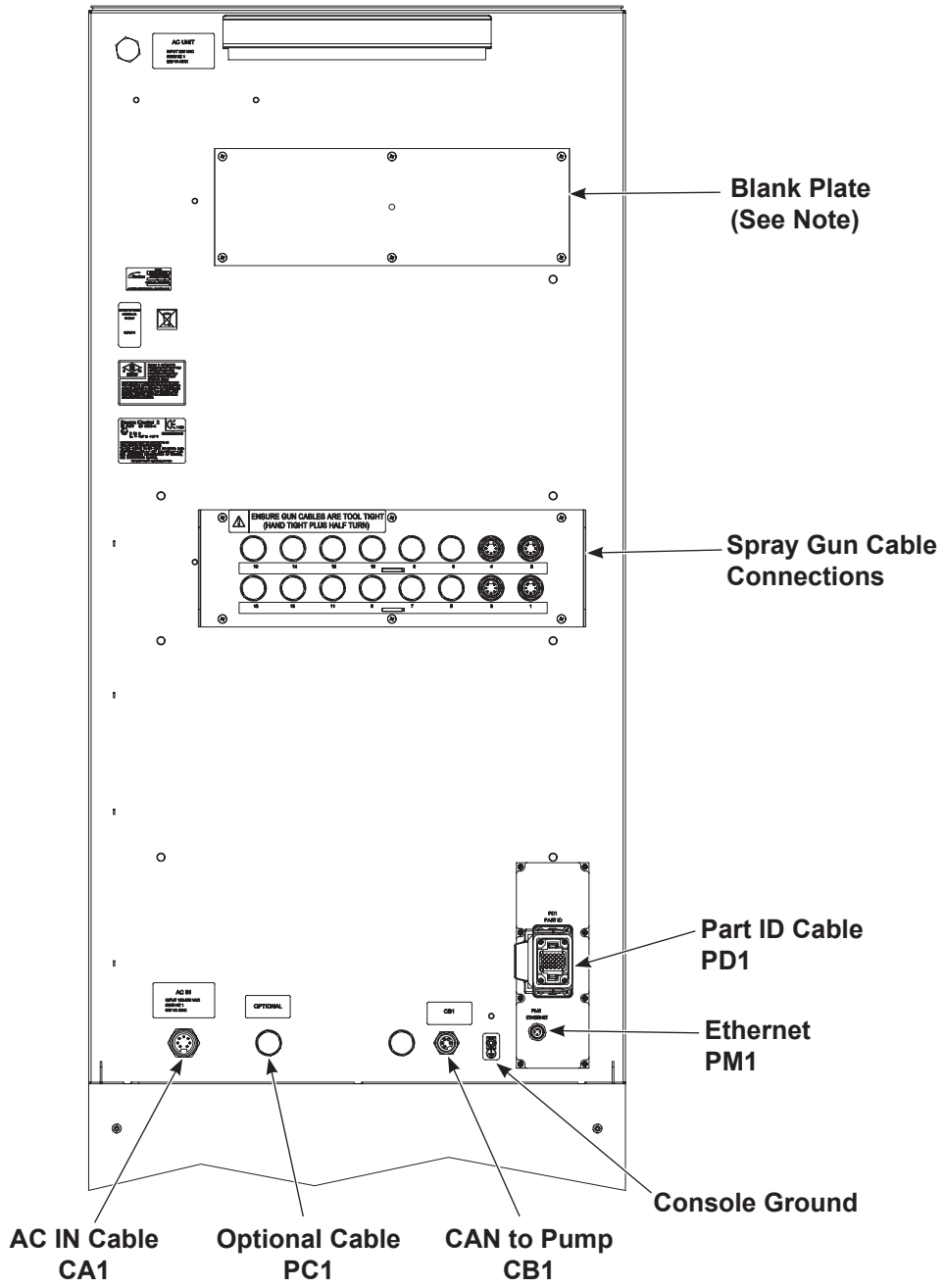


Figure 3-2 Console Rear Panel (Cover Removed)

NOTE: For systems with more than 16 spray guns, blank plate replaced with spray gun cable connections.

CAN Network Connections and Settings

The iControl console communicates with the manual spray gun controllers and pump control cards through a CAN network. See Figure 3-3 for connections. Make sure each cable shield is connected on one end only.

NOTE: The termination jumper must be installed on W1 pins 1 and 2 on the last pump control card in the last pump cabinet on the feed center.

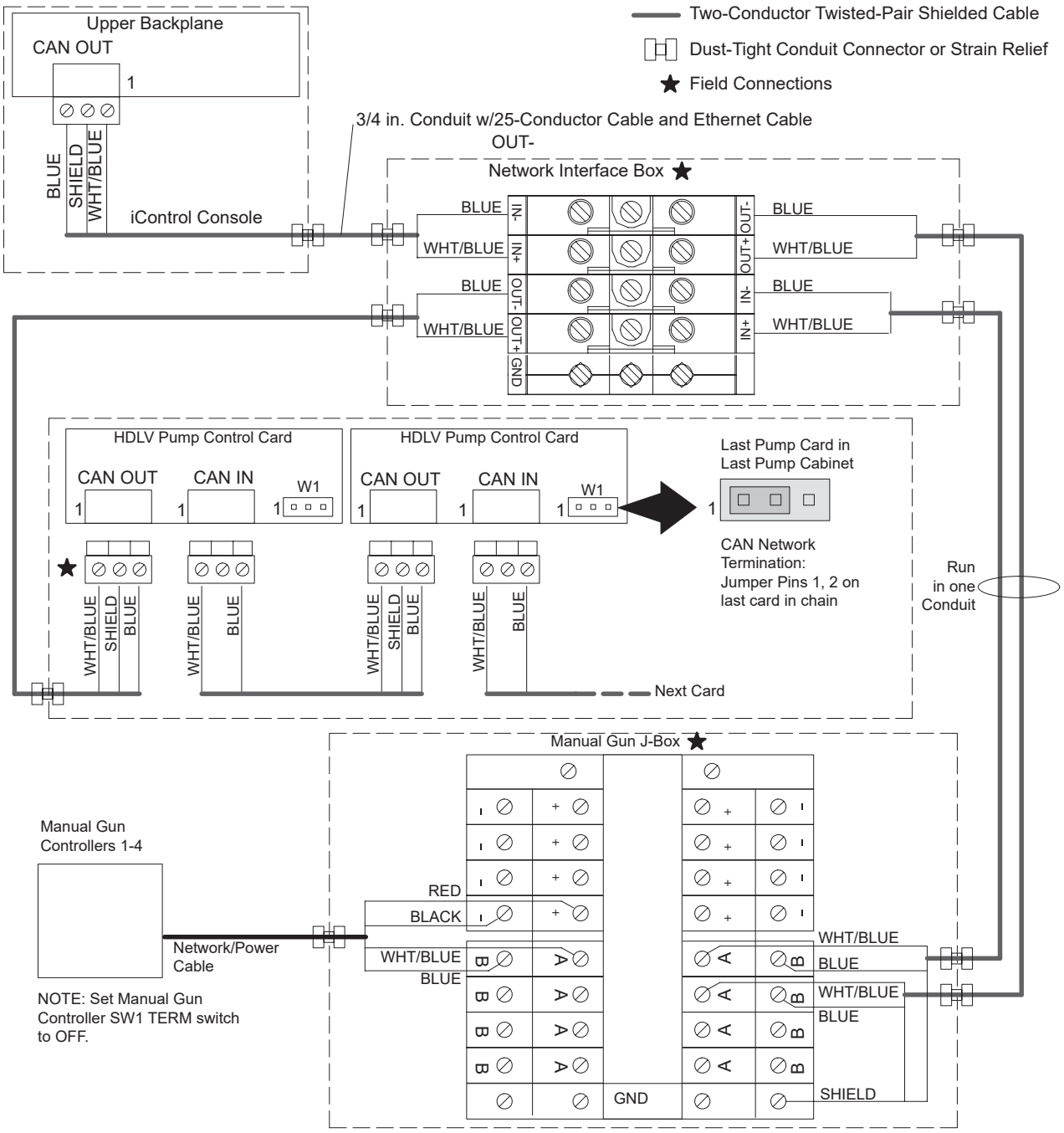


Figure 3-3 CAN Network Cable Connections

iControl Console CAN Address and Termination Settings

The backplane address dipswitches are set at the factory:

1. Network terminator switch SW1-3 is set to CONTINUOUS for both backplanes.
2. Network address switches SW1-1 and 2 are set to Spray Guns 1−16 for the lower backplane and to 17−32 for the upper backplane (if used).

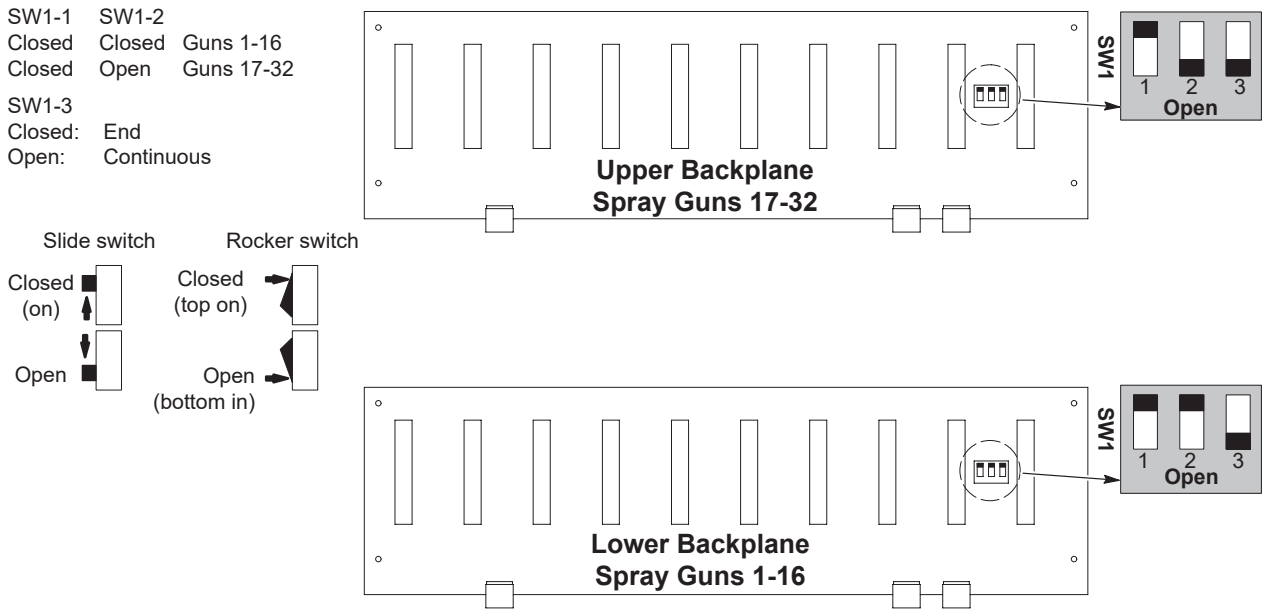


Figure 3-4 System Interconnect Cable Connections

Manual Spray Gun Controller Addresses

The manual spray gun controller addresses are set through software. Each controller must have a unique address. Up to four manual spray guns can be included in a system. Refer to the *Prodigy Manual Spray Gun Controller* manual for instructions.

NOTE: For each HDLV pump choosen to supply powder to a manual spray gun, the operator must enter the pump calibration numbers into the spray gun controller. Refer to the *Prodigy Manual Spray Gun Controller* manual for instructions.

Manual Spray Gun Controller Termination

Manual spray gun controllers are shipped with their CAN termination switch set to ON. For each manual spray gun controller in the system:

1. Open the controller enclosure and locate SW1 on the controller interface board.
2. Set the TERM switch on SW1 to OFF.

Pump Control Card Addresses

Refer to the *Prodigy HDLV Pump Manifold and Circuit Board* manual for instructions on setting the control card address and spray gun type switches.

The termination jumper must be installed on W1 pins 1 and 2 on the last pump control card in the last pump cabinet on the feed center.

NOTE: The calibration numbers for the HDLV pumps supplying powder to the automatic spray guns must be entered into the iControl configuration. Refer to the *iControl Operator* Interface manual for instructions.

Relay Board

See Figure 3-5.

Pin	Function	Pin	Function
J1 − AC/DC Signals		J7 − Low Voltage Connections	
1	Conveyor +	1	+12V PC Supply
2	Conveyor −	2	Common PC Supply
3	Lockout +	3	+24V PC Supply
4	Lockout −	4	+24V PC Supply
5	Alarm Relay 250V 1A	5	+24V PC Supply
6	Alarm Relay 250V 1A	6	Common PC Supply
7		7	Common PC Supply
J2 − Low Voltage External Connections		8	Common PC Supply
1	Manual Enable +	9	Keyswitch Conveyor Bypass
2	Manual Enable −	10	Keyswitch Lockout
3	Gun Power OK +	11	Main Backplane Lockout − (P2−4)
4	Gun Power OK −	12	Main Backplane Lockout − (P2−3)
J4 − Low Voltage PC Connections		13	AUX Backplane Lockout − (P2−4)
1	Conveyor Interlock Signal (19HI)	14	AUX Backplane Lockout − (P2−3)
2	Conveyor Interlock Signal Common	15	Alarm Input +24 (P2−5)
3	Manual Enable (18HI)	16	Alarm Input Sig (P2−6)
4	Manual Enable Common	17	Lockout NUIO −
5	Gun Power OK (17HI)	18	Lockout NUIO +
6	Gun Power OK Common		
7	Lockout Signal (16HI)		
8	Lockout Common		
9	Alarm Input from PC +		
10	Alarm Input from PC –		

LED	Description	State	Function
1	Manual Enable	ON	Only ON when using multiple booth systems
		OFF	Normal state for single booth system.
2	Gun Power	ON	Indicates proper power for the spray guns
		OFF	Improper power to the spray guns. Check wiring.
3	+12 Vdc Power	ON	12 Vdc source is functioning properly.
		OFF	12 Vdc source not functioning properly. Check wiring, relay board, and power supply.
4	+24 Vdc Power	ON	24 Vdc source is functioning properly.
		OFF	24 Vdc source not functioning properly. Check wiring, relay board, and power supply.
5	Conveyor	ON	Conveyor run signal present, or keyswitch is in bypass mode.
		OFF	Conyeyor run signal not present. Check signal.
6	Lockout	ON	Keyswitch is in ready position or bypass.
		OFF	In lockout mode.
7	Alarm	ON	Indicates fault. See system fault screen.
		OFF	No faults present.

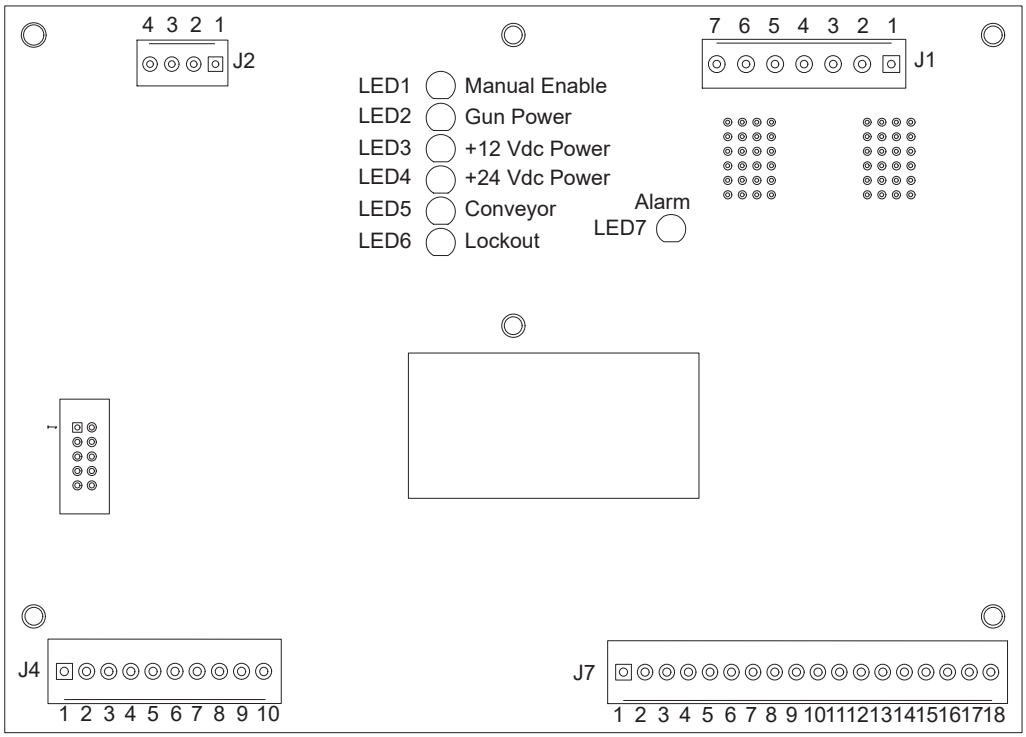


Figure 3-5 Relay Board

Power Connections

The console power cable plugs into the AC IN receptacle on the rear of the console. The cable is routed to the system electrical panel and connected to a terminal block.

CAUTION: The 120-watt 24 Vdc power supply mounted on the DIN rail at the bottom of the console is not autosensing. It is set at the factory for 230V. If supplying 110V to the iControl 2 console, the power supply must be switched to 110V. If switching from 110V to 230V in the future, the power supply MUST be switched to 230V before connecting power to the console.

Table 3-2 lists the connections required for both main and auxiliary consoles.

Console Power Cable Connections

Table 3-2 Console Power Cable Connections

Main Console Power Cable Connections		
Wire Color	**Pin**	**Function**
Whit/Blk	1	Conveyor run AC common
Black	2	Non-interlocked AC
White	3	Non-interlocked AC common
Red	4	Interlocked AC
Orange	5	Conveyor run AC
Blue	6	Interlocked AC common
Green	7	Ground
Auxiliary Console Power Cable Connections		
Wire Color	**Pin**	**Connection**
Black	2	Interlocked AC (same as main console Red connection)
White	3	Interlocked AC common (same as main console Blue connection)
Green	1	GND

Grounding

WARNING: Consoles and all conductive equipment in the spray area MUST be connected to a true earth ground. Use the provided ground cables to ground the consoles. Mount junction boxes and control panels to grounded stands or the booth base. Failure to observe this caution could result in severe shocks to personnel, fire, or explosion.

Proper grounding of all conductive components of a powder coating system provides both shock and electrostatic discharge protection for both operators and sensitive electronic equipment. Many system components (booth, collector, color modules, control consoles, and conveyor) are connected both physically and electrically. It is important that the proper grounding methods and equipment are used when installing and operating the system.

PE (Protective Earth) Grounding

PE grounding is required on all conductive metal electrical enclosures in a system. PE grounding is provided by a ground conductor wire bonded to a true earth ground. PE grounding protects operators from electrical shock by providing a path to ground for electrical current if a conductor contacts an electrical enclosure or other conductive component. The ground conductor wire carries the electrical current directly to ground and short circuits the input voltage until a fuse or circuit breaker interrupts the circuit.

The sole purpose of the green/yellow ground wires bundled with the AC input power cable is to protect personnel from a shock. They must be used for PE grounding only. These ground wires do not protect equipment against electrostatic discharge.

Electrostatic Grounding

Electrostatic grounding protects electronic equipment from damage caused by electrostatic discharges (ESD). Some electronic components are so sensitive to ESD that a person can deliver a damaging static discharge without feeling even a mild shock.

Proper electrostatic grounding is mandatory in an electrostatic powder coating system. Powder spray guns generate electrostatic voltages up to 100,000 V. It does not take long for ungrounded system components to build up an electrical charge strong enough to damage sensitive electronic components when discharged.

Electrostatic discharges occur at very high frequencies, around 100 MHz. An ordinary ground conductor does not conduct such high frequencies well enough to prevent damage to electronic components. Special flat-braided cables are provided with Nordson powder coating equipment to protect against ESD.

Spray Gun Current Path

See Figure 3-6. All electrical circuits need a complete path for current to make its way back to the source. Electrostatic spray guns emit current (ions) and therefore require a complete circuit. Some of the current emitted by the spray gun is attracted to the spray booth, but most is attracted to the grounded parts moving through the booth. The current attracted to the parts flows through the part hangers to the conveyor and to the building ground, back to the controller through a ground braid and back to the spray gun through the spray gun driver board. The current attracted to the booth is returned through the booth ground to the controller and back to the spray gun.

It is very important to provide a complete circuit for the spray gun current. A break in the circuit conductors (conveyor, booth, braided ground cables, controller) can cause voltage to build up on the conductors up to the maximum output of the spray gun voltage multiplier (up to 100 kV). The voltage will eventually discharge in a high frequency arc, which can cause damage to the controller electronics (spray gun driver board and power supply).

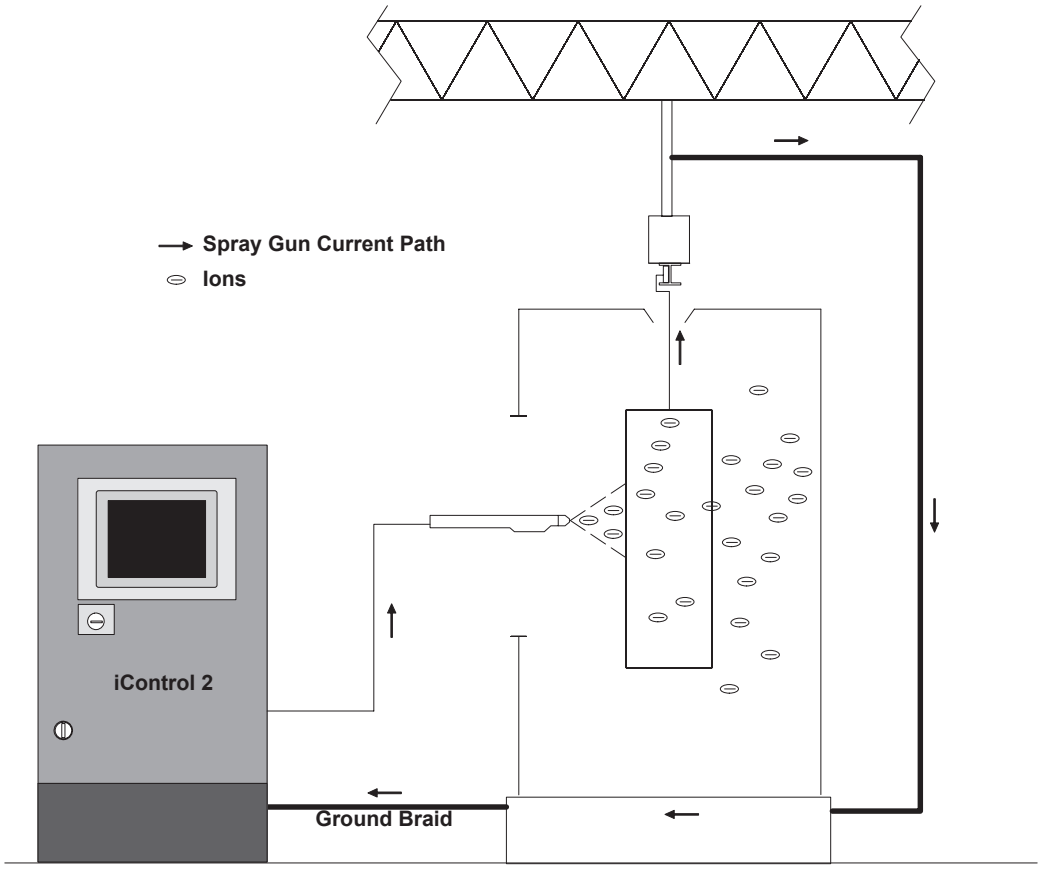


Figure 3-6 Electrostatic Current Path

ESD Ground Procedures and Equipment

The best protection against ESD is to keep the ground braids as short as possible and connect them to a central point on the booth base as shown in the Star diagram. Under normal conditions making Star connections is not a problem, but in some systems, such as roll-on/roll-off booths, the ground braids required for a Star connection are too long to be effective against ESD. In this case, a Daisy Chain ground configuration is acceptable.

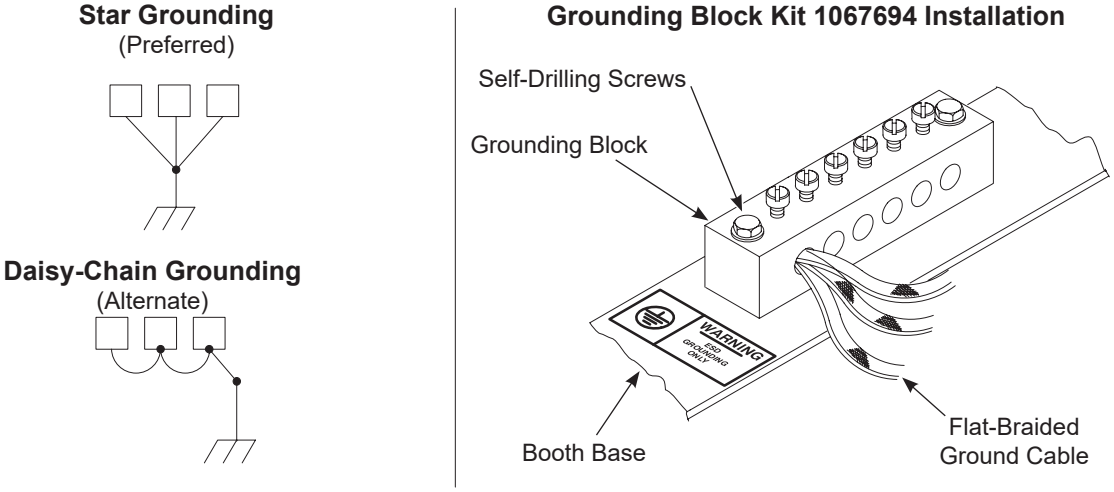


Figure 3-7 ESD Grounding Procedures and Equipment

Always use the special flat-braided copper ESD ground cables furnished with all Nordson spray gun controllers to ground them. The ESD ground cables should always be attached to the booth base, not to a panel, enclosure, or other component bolted to the base. Keep the cables as short as possible. If using a grounding block kit, make sure the block is installed directly to the base with the included self-drilling screws.

An ESD grounding block kit is available for connecting the ground braids to the booth base. The kit contains two 6-position grounding blocks, fasteners, terminals, and 15 meters (50 feet) of braided ground cable. If additional kits are required, order:

1067694 Kit, ground bus bar, ESD, 6-position, with hardware

Encoder, Photoeye, and Scanner Connections

The PD1 cable carries the encoder, discrete part ID and zone input, trigger bank1 and 2, and trigger select signals from the Photoeye Junction Box (PEJB) to the I/O board in the iControl 2 console or pedestal. If these inputs are shared by a second booth then an additional cable is supplied.

Table 3-3 lists the PD1 cable connections to be made at the terminal strip in the junction box. Refer to the drawings at the back of this manual for the terminal block connections.

NOTE: Refer to the system plan views when locating the part ID stand and mounting the photoeyes or scanners.

Part ID Cable Connections

The PD1 cable plugs into the receptacle on the back of the console or bottom of the pedestal. Use a liquid-tight cord grip to bring the cable into the PEJB.

Connect the cable to the terminal block in the PEJB, using Table 3-3.

Table 3-3 Part ID Cable PD1 Pinouts, Wire Colors, and Functions

Pin Number	Wire Color	Function
1	Black	Zone 1
2	Brown	Zone 2
3	Red	Zone 3
4	Orange	Zone 4
5	Yellow	Zone 5
6	Green	Zone 6
7	Blue	Zone 7
8	Violet	Zone 8
9	Gray	Part ID bit 1
10	White	Part ID bit 2
11	White/Black	Part ID bit 3
12	White/Brown	Part ID bit 4
13	White/Red	Part ID bit 5
14	White/Orange	Part ID bit 6
15	White/Yellow	Part ID bit 7
16	White/Green	Part ID bit 8
17	White/Blue	Trigger Bank 0
18	White/Violet	Trigger Bank 1
19	White/Gray	Trigger Select
20	White/Black/Brown	Encoder A
21	White/Black/Orange	spare
22	White/Black/Yellow	spare
23	White/Black/Green	spare
24	White/Black/Red	+24 Vdc
N/C	White/Black/Blue	––

Using Trigger Banks

For information on how to use Trigger Banks, see *Using Zone Inputs for Direct Triggering* in the iControl 2 Software Manual. The customer must bring additional wiring into the junction box and wire them to terminals 17, 18, and 19. Note that the factory default configuration for these inputs is sinking. If a sourcing configuration is required, refer to *Switching Inputs to Sourcing* on the following page.

Switching I/O Inputs to Sourcing

Inputs to I/O card are configured as sinking. 24 Vdc is applied to all HI terminals. To switch the inputs to sourcing:

1. Disconnect all wires from the I/O card LO terminals, except terminal 24. Do not remove the blue and white wires from terminals 24 HI and 24 LO.
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.
6. At the PEJB, connect the red wire to the (−) terminal.

Photoeye Junction Box

The PEJB houses a 24 Vdc power supply, terminal block, and scanner controllers. The box is typically mounted on the legs of the part ID stand. The part ID cable and the encoder, conveyor interlock, and photoeyes or discrete scanner controllers are wired directly to the terminal block as shown in the junction box drawing.

Power Requirements

The junction box contains a 30 watt, 24−28 Vdc power supply. It requires 120−240 Vac, 1 PH, 50/60 Hz, 2A.

Conveyor Encoder Connections

Bring the encoder cable into the junction box through a cord grip at one of the unused knockouts. Wire the cable to the encoder and the junction box terminal strip as shown on the junction box drawing in Section 7.

Photoeye Connections

Connect SO cable to the photoeyes and junction box terminal block as shown on the drawing. Route the cables into the junction box through dust-tight cord grips.

Scanner Cable Connections

See Figure 3-8. The PEJB and scanner junction boxes are shipped with the scanner cables pre-wired to the junction boxes. The scanner controllers are programmed at the factory according to the system order specifications.

Refer to the system plan views when locating the part ID stand and scanners or photoeyes. The scanners must be mounted with the cable ends oriented as shown.

Discrete Scanner Connections

- Single-Zone Scanner: SCNR1 cables to scanner.
- Dual-Zone Scanners: SCNR1 cables to upper scanner, SCNR2 cables to lower scanner.
- Part ID Scanner and Zone Scanner: SCNR1 cables to zone scanner, SCNR2 cables to part ID scanner.

NOTE: The part ID scanner or photoeyes must be located so that the iControl 2 system receives the part ID before the leading edge of the part breaks the zone scanners or photoeyes.

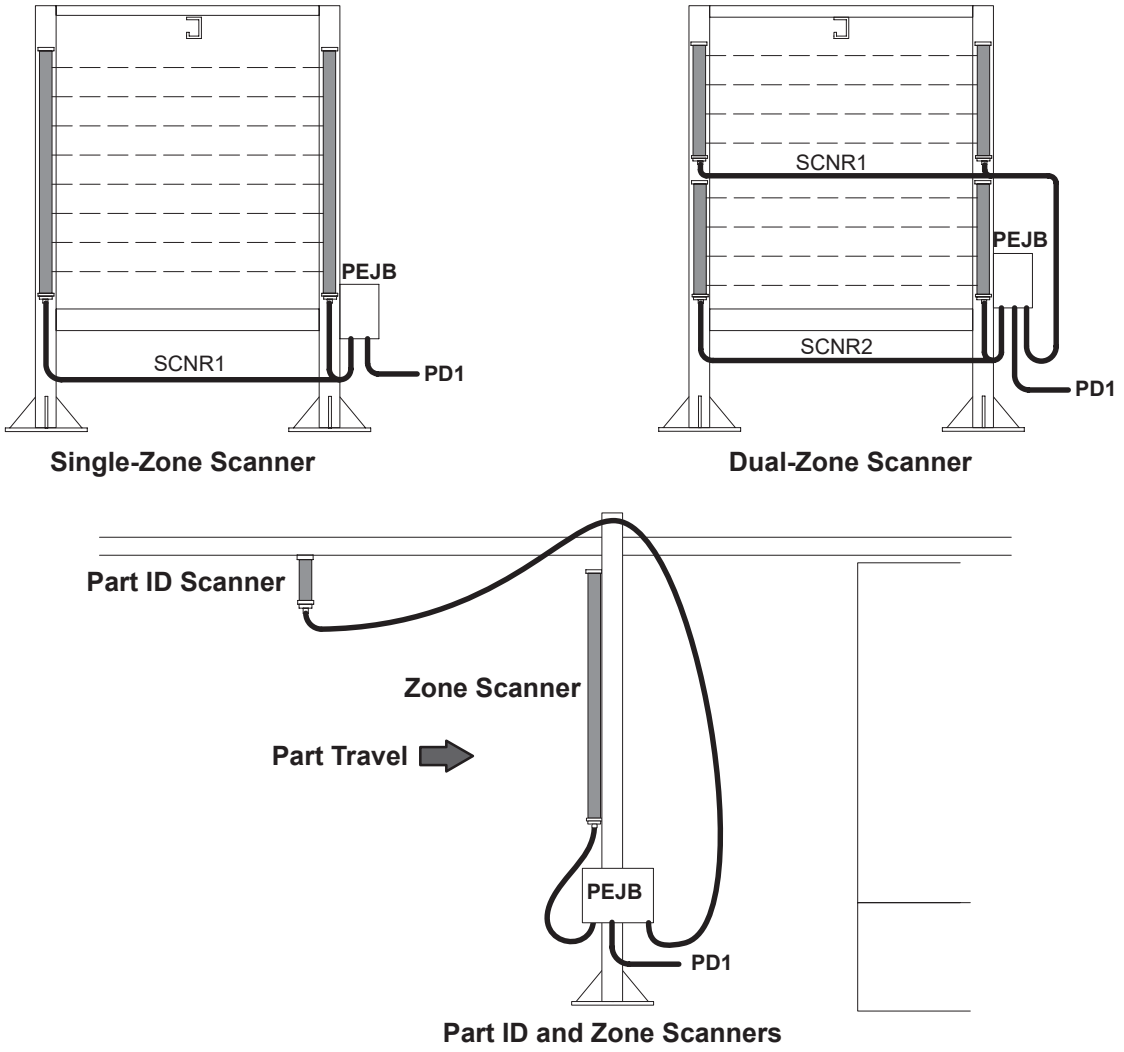


Figure 3-8 Zone and Part ID Scanner Cable Connections (Typical)

Analog Scanner Connections

See Figure 3-9. If the system includes in/out positioners or reciprocators, then an analog scanner junction box is added to the part ID stand to house the analog scanner controllers. The controllers are powered by the 24 Vdc power supply in the PEJB.

The analog scanners are mounted on the stand to detect the part width for positioners, and height for reciprocators. The scanners must be mounted with the cable ends oriented as shown. Connect the scanner cables (BSCE, BSCR, SCNR1) from the junction box to the scanners as shown.

NOTE: Horizontal dual scanners must be mounted so that they do not see the conveyor. If using a single horizontal scanner, the scanner controller must be programmed to ignore the conveyor.

Maximum Emitter/Receiver Separation:

6 meters (20 ft) if scanner is less than 1.22 meters (4 ft) long
4.6 meters (15 ft) if scanner is greater than 1.22 meters (4 ft) long

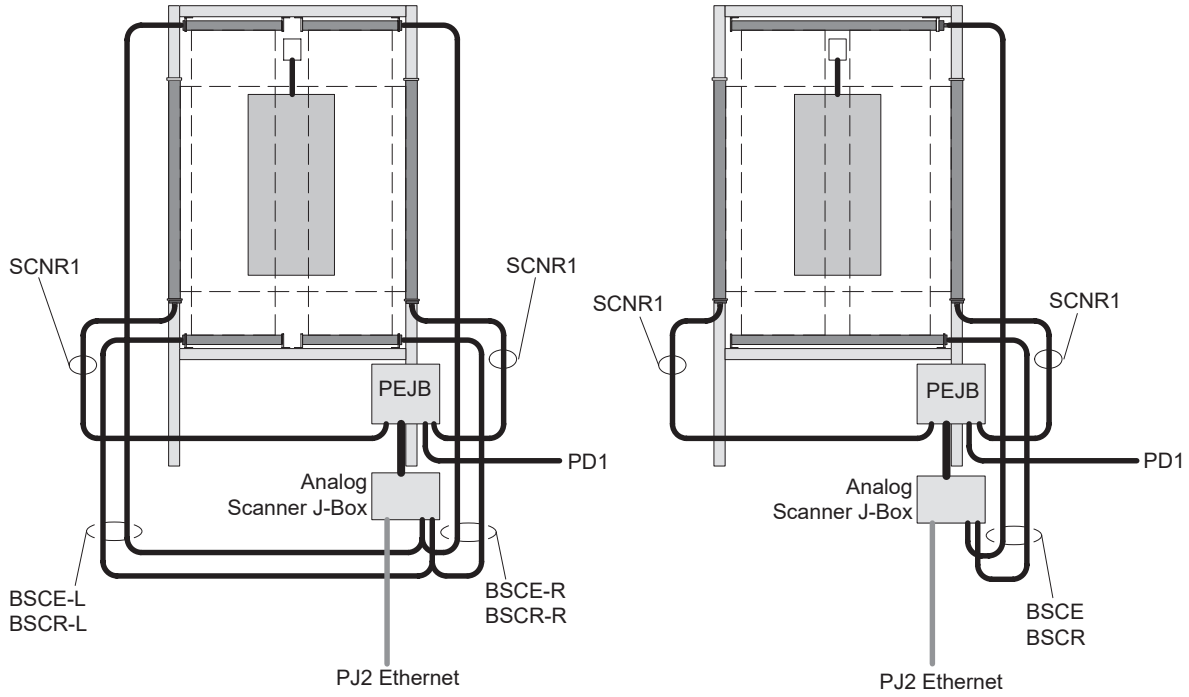


Figure 3-9 System Wiring − In/Out Positioner Scanner Connections

Customer-Supplied Part ID System Connections

Refer to Table 3-3 on page 3-14. Use the part ID terminals on the PEJB to connect a customer-supplied part ID system to the iControl 2 console. The eight inputs are used based on the settings made in the Photoeye Configuration screen. Refer to the iControl Operator Interface manual for configuration instructions.

Ethernet Network Connections

Connection Diagram

The Ethernet network allows the iControl 2 system to communicate with the spray gun mover PLCs and the analog scanner controllers through a network switch in the Main Electrical Control Panel. The Ethernet cables are M12 D-coded 4-pole cables with connectors on each end.

NOTE: Do not connect any device to this network that is not approved by Nordson Technical Support or Engineering.

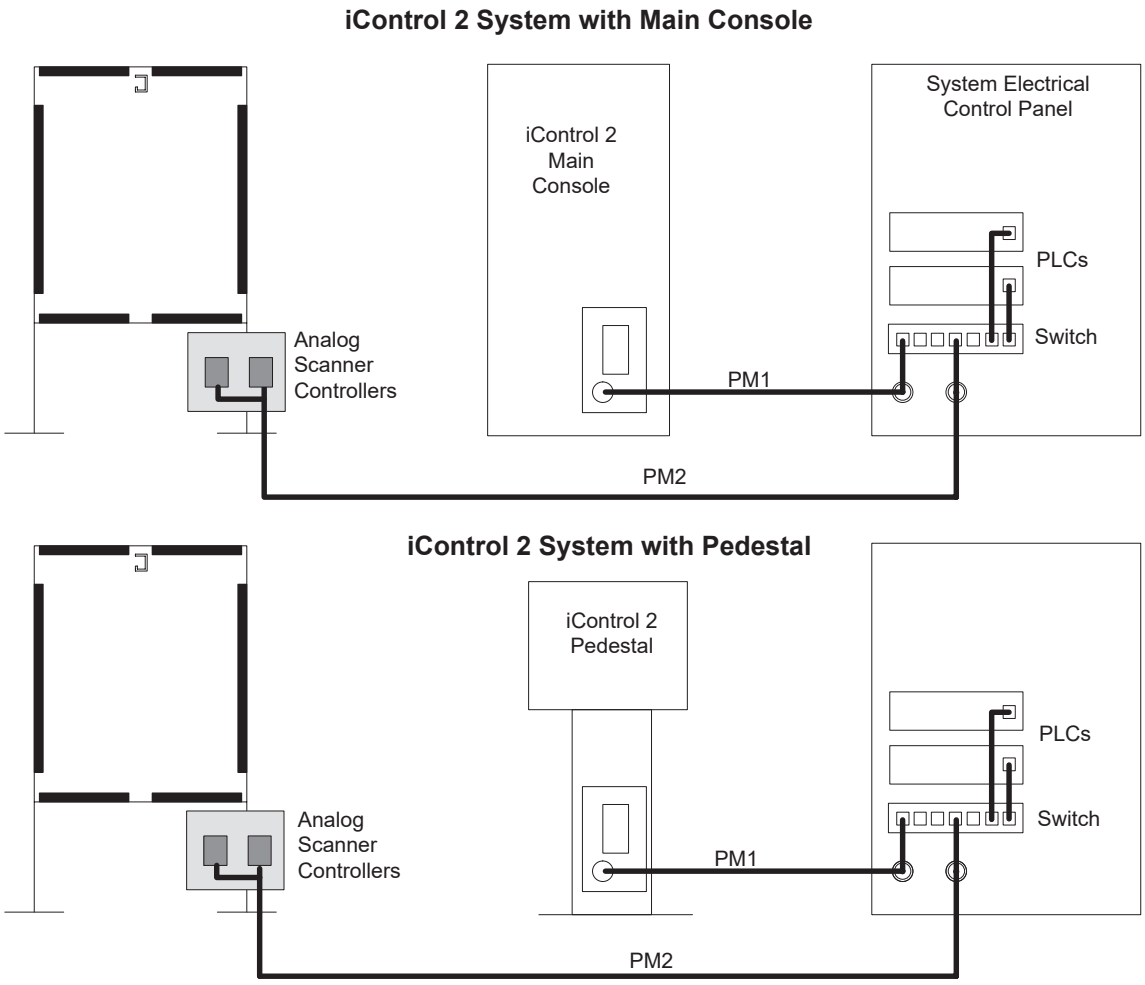


Figure 3-10 Ethernet Connections

MAC Addresses

Record the MAC addresses and functions for each Ethernet node in the analog scanner junction box and main electrical control panel, or any other panels, as they will be needed when configuring the iControl 2 software.

The MAC addresses are on the node labels, in the form 0:30:DE:0:33:C8. Each PLC node can control two positioners, a positioner/reciprocator combination, or two reciprocators.

Spray Gun Cable Connections

See Figure 3-11. Connect the automatic spray gun cables to the receptacles on the rear panel of the iControl 2 console. Connect spray gun 1 cable to receptacle 1, spray gun 2 cable to receptacle 2, and so on.

Odd Number of Spray Guns

iControl 2 systems are sold configured for an even number of spray guns. Each spray gun controller card in the console controls two spray guns. If the system is configured for an odd number of spray guns, the fault LED on the card with only one spray gun connected will light.

NOTE: The unused spray gun must be the highest even-number spray gun. For example, if there is an 8-spray gun system, then number 8 must be the unused spray gun. The spray gun card receptacles are labeled on the circuit boards as A (odd-number spray gun) and B (even-number spray gun).

Included in the bag with the console keys is a bulkhead seal and jumper. The jumper disables the spray gun not detected fault LED on the spray gun card.

Cap the unused cable receptacle with the bulkhead seal, then open the console door and unplug the receptacle harness from the spray gun card. Install the jumper in the card receptacle.

Refer to the *Parts* section for seal and jumper part numbers.

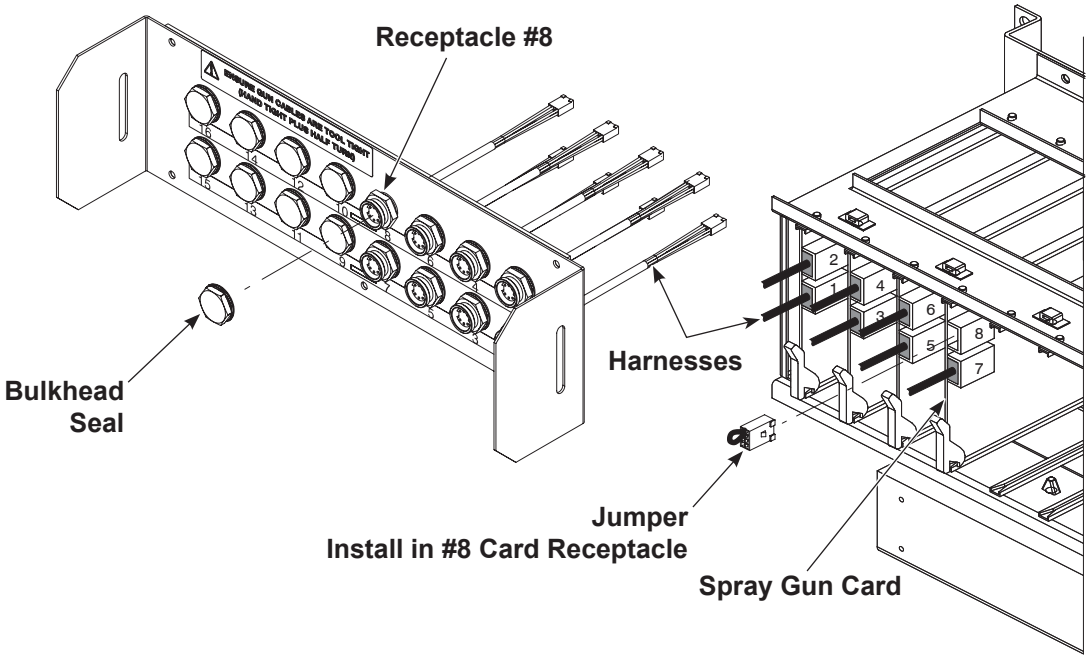


Figure 3-11 Seal and Jumper Installation − Example Showing 8-Spray Gun System Using Seven Spray Guns

Program and User Data Cards

The iControl 2 program and user configuration and preset data are stored on two 128 Mb or larger CompactFlash (CF) cards. These cards function as removable hard drives. The iControl 2 consoles are shipped with these cards installed.

NOTE: The Rev 2 Arbor PC requires a minimum of a 2 Gb CompactFlash.

CAUTION: The CompactFlash cards CANNOT be hot-swapped. Shut down the iControl 2 program and operating system, then turn off the iControl 2 console before removing the cards. Removing the cards while power is on could corrupt the data on the cards and damage the cards.

CAUTION: Never turn off console power without first shutting down the iControl 2 program and operating system. Doing so could corrupt the system software. Refer to *Program Shutdown in the iControl Operator Interface* manual for the shutdown procedure.

The CompactFlash card slots are on the side on the PC. The Program card must be installed in Slot 1, and the Data card is installed in Slot 2.

The iControl 2 program can be updated by installing a new program card.

NOTE: To remove a card, press on the eject button, then pull the card out of the slot.

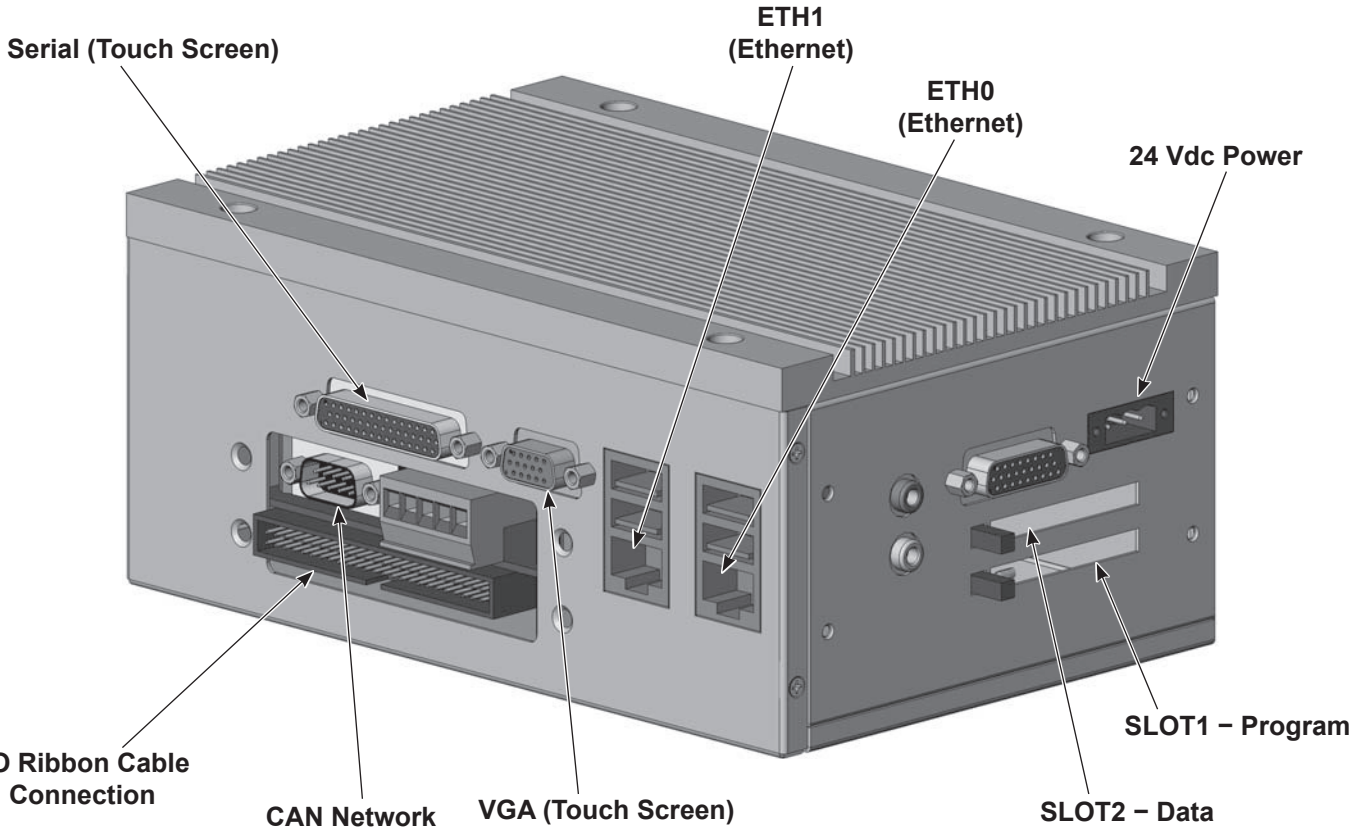


Figure 3-12 iControl 2 Program and User Data Card Slots

In addition to the configuration data, up to 255 presets per spray gun can be stored on one data card. Additional cards provide virtually unlimited number of presets. To back up a data card, use the Data Backup function. This copies the data to a blank card. Refer to *Data Backup* in the *iControl Operator Interface* manual for instructions.

NOTE: Not all CompactFlash cards are the same. When additional cards are purchased, make sure they are from a Nordson-approved manufacturer and are 128 Mb or greater. For approved CF cards, refer to *Specifications* in the *Description* section of this manual or contact your Nordson controls engineer or Nordson Technical Support.

Touch Screen Calibration

The touch screen is calibrated at the factory before the system is shipped. The touch screen calibration values are stored on the program card. If installing a new program card that has never been used before, there will be no calibration file on the card. The system will automatically start the calibration procedure.

Follow the calibration instructions on the screen exactly by using the targets on the touch screen. When the calibration procedure is complete, touch the iControl 2 button to start the **iControl 2** software.

Refer to *Troubleshooting* for a complete description of the calibration procedure and instructions on calibration.

System Upgrades

iControl 2 systems can be upgraded by:

- installing a new program flash card with updated software.
- adding additional spray guns to an existing console.
- adding an auxiliary console.
- adding an air conditioner to the console to keep the electronics cool.

Certain upgrades require updates to the spray gun control card and iFlow module firmware. These upgrades should only be done by a Nordson representative.

Optional Air Conditioner Installation and Operation

See Figure 3-13 and Figure 3-14. An optional air conditioner that mounts on top of the console is available for field installation. The air conditioner requires 200−250 Vac, 50/60 Hz. Refer to *Miscellaneous Kits* in the *Parts* section for the AC kit part number.

WARNING: Shut down the iControl 2 system and disconnect power at a disconnect switch ahead of the console before installing the air conditioner kit.

1. Shut down the iControl 2 system and disconnect power.
2. Open the console door and disconnect the small fan mounted on the top cover from the top left iFlow module by either cutting the wires or removing the plug and pushing the pins out.
3. Disconnect the ground strap from the top cover plate.
4. Remove the top cover plate and gasket from the console. Keep the M5 serrated nuts for re-use.
5. Remove the plug, conduit seal, and conduit nut from the top/right corner of the back wall of the console.
6. Remove the 3/8 NPT plug from the coupling at the bottom inside of the console and install the two barbed fittings into the coupling, one on top and one on the underside.
7. Install the terminal block on the studs located in the upper right inside corner of the console back wall, using the two M5 nuts.
8. Install the new cover plate and gasket on top of the console, using the M5 serrated nuts removed in step 4. The plate can be rotated 180 degrees as desired to change the orientation of the A/C unit. The two slots in the cover plate must match up with the center opening and the two outlet vents in the bottom of the A/C unit.
9. Connect the console ground strap to the closest ground stud on the new cover plate.
10. Install the A/C unit on the new cover plate according to the manufacturer's instructions, using the fasteners provided with the unit.
11. Install the drain kit provided with the air conditioner according to the manufacturer's instructions. Terminate the drain tubing on the upper barbed fitting installed in step 2. Connect tubing (customer-supplied) from the lower barbed fitting to a floor drain.
12. Connect the A/C power cord to the terminal block as shown.
13. Route the AC power cord through a dust-tight cord grip or conduit connector into the console and connect it to the terminal block as shown.
14. Use the wiring harness included in the kit to connect the terminal block relay to the iControl 2 400W power supply as shown. This prevents the A/C unit from running unless the iControl 2 console is turned on.

Filter: To clean the AC unit intake filter, remove the screw from the grille and slide the grille up.

Thermostat: The digital readout on the front of the unit, below the grille, displays the internal temperature. To access the thermostat, remove the grille and filter.

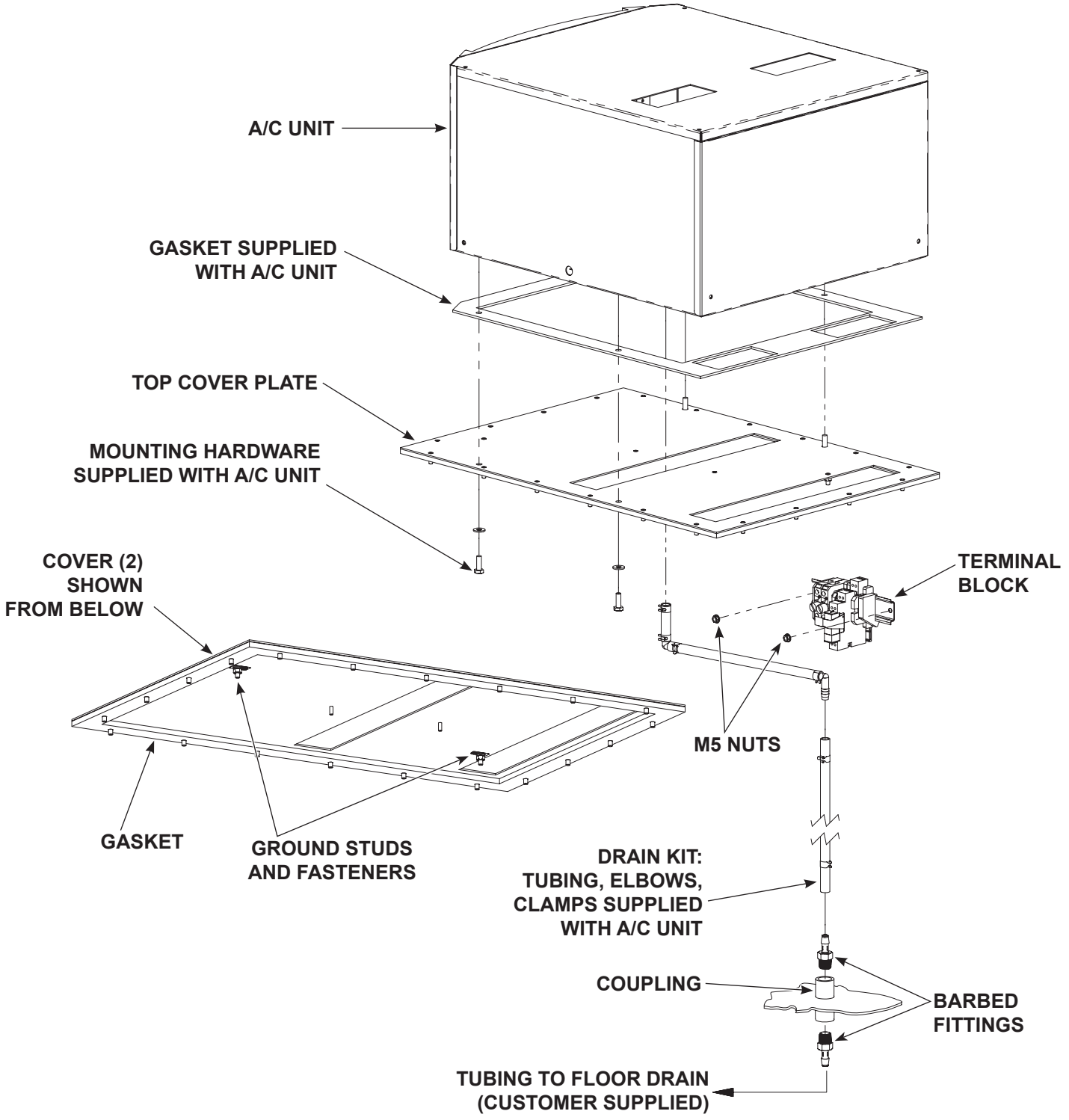


Figure 3-13 Optional Air Conditioner Mechanical Installation

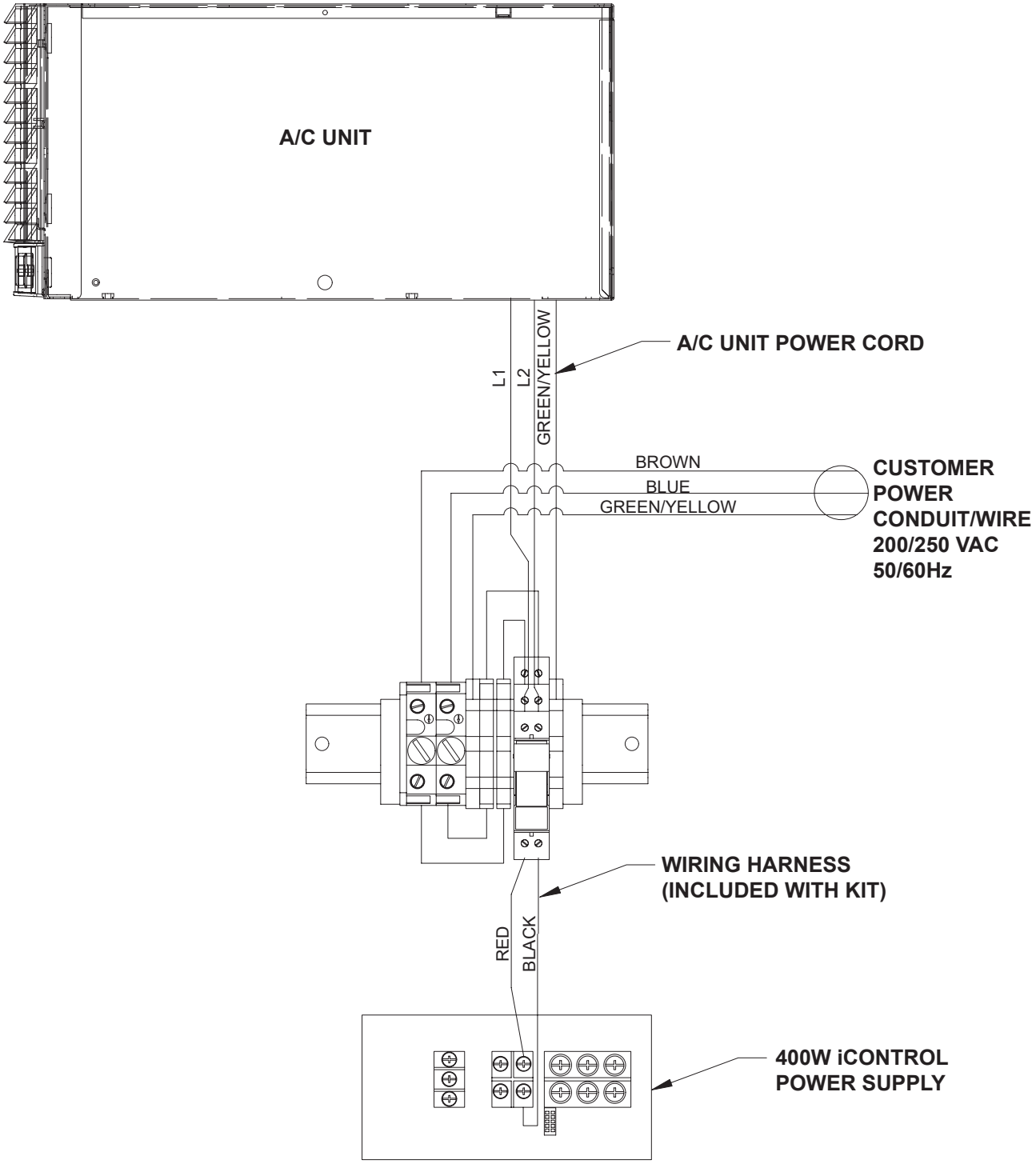


Figure 3-14 Optional Air Conditioner Electrical Wiring Diagram

Section 4

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 2 program and operating system on the program card. Refer to *Program Shutdown* in the *Configuration* section of the *iControl Operator Interface* manual for the shutdown procedure.

NOTE: If the troubleshooting procedures in this section do not solve your problem, contact the Nordson Industrial Coating Systems Customer Support Center at (800) 433−9319 or your local Nordson representative.

Error Codes and Alarm Messages

Table 4-1 Error Codes and Messages

Code	Message Text	Description	Refer to Page
NA = Not currently applicable * - Code may differ on early software releases			
10x	**CAN and Node State**		
101	CAN bus fault detected	N/A	page 4-7
102	CAN receive buffer overflow	Host CAN interface receive too much data and could not process it quickly enough	page 4-7
103	Message timeout	Remote CAN device did not respond to a direct response in the allotted time.	page 4-7
104	Went offline	Remote CAN device is no longer online	page 4-7
105	Returned to online	Remote CAN device returned to service	page 4-7
106	Communication error	Host CAN interface detected a communication error	
107	BUS−OFF	255 bad CAN messages received	
108	Warning Limit exceeded	127 bad CAN messages received	
109	Bit error	Dominant bit not detected in 5 data bits	
110	Form error	Fixed format data field contains illegal bits	
111	Stuffing error	Recessive bit not detected in 5 data bits	
112	Other error	Other errors not listed as Bit, Stuff, or Form	
113	CAN Transmit Buffer overflow	Host CAN interface did not transmit data quickly enough	
20x	**Application**		
201	Conveyor input not detected	Not implemented, future release	
202	Encoder not detected	Not implemented, future release	
203	Zone photoeye stuck on	Not implemented, future release	
204	Flag photoeye stuck on	Not implemented, future release	
205	Application setup	Not implemented, future release	
206	System in lockout	Not implemented, future release	
30x	**Electrostatic Controller (Spray Gun Card)**		
301	Micro-Amp fault detected	Micro-amp value out of range.	page 4-8
302	Over-current fault detected	Over-current detection.	page 4-8
303	Feedback fault detected	No micro-amp feedback detected.	page 4-8
304	Open circuit detected	No multiplier load detected.	page 4-8
305	Short circuit detected	Multiplier drive circuit shorted.	page 4-8
306	Internal hardware fault detected	Internal DSP fault.	page 4-9
308	Spray gun not detected	Spray gun not connected to system.	page 4-9

Continued...

Code	Message Text	Description	Refer to Page
5xx	**Remote Device Node**		
Electrostatic Node (Spray Gun Card)			
531	System Heartbeat lost	Spray gun card lost heartbeat message.	page 4-9
532	5/24 Volt power	Spray gun card power detection failure.	page 4-9
533	Error writing to internal EEPROM	Error saving data to spray gun card on-board EEPROM.	page 4-9
534	Error reading from internal EEPROM	Error reading data from spray gun card on-board EEPROM.	page 4-9
535	Node address changed from last power-up	The saved address does not match the current address for the spray gun card. Sending a reset command will clear this state.	page 4-9
536	Internal database version changed − resetting to defaults	An update to the database was detected and the current data is no longer valid.	page 4-9
537	Preset out of range	The preset sent to the spray gun card was out of range.	page 4-9
538	Trigger ON message received − controller in lockout	Spray gun card was commanded to trigger while in lockout.	page 4-9
Pump Controller			
571	System heartbeat lost	Check circuit board connections.	
572	5/24 volt power	Check circuit board connections.	
573	Error writing to internal EEPROM	Hardware error. Replace card.	
574	Error reading to internal EEPROM	Hardware error. Replace card.	
575	Node address changed from last power up	Saved address does not match current address. Address switches were changed. Informational message only.	
576	Internal database version changed − resetting to defaults	An update to the database was detected and the current data is no longer valid. Informational message only, operation should not be affected.	
577	Preset out of range	The preset sent to the remote device was out of range. Check preset settings and reset as required.	
701	Pattern servo fault	The solenoid resistance was not detected or incorrect when the device was not triggered. When the solenoid is not energized, the resistance of the solenoid is checked by the system. These faults are generated if no resistance is detected, or the correct resistance is not detected. Check the proportional valve wiring connections. Check the solenoid operation. Replace the valve if the solenoid is bad.	

Continued...

Code	Message Text	Description	Refer to Page
702	Pump servo fault	The solenoid resistance was not detected or incorrect when the device was not triggered. When the solenoid is not energized, the resistance of the solenoid is checked by the system. These faults are generated if no resistance is detected, or the correct resistance is not detected. Check the proportional valve wiring connections. Check the solenoid operation. Replace the valve if the solenoid is bad.	
705	Powder low PWM	Pump air flow less than commanded value. Check for obstruction in pump air flow control valve. Clean valve as described in pump manifold manual.	
706	Pattern low PWM	Pattern air flow less than commanded value. Check for obstruction in pattern air flow control valve. Clean valve as described in pump manifold manual.	
707	Powder high PWM	Powder air flow more than commanded value. Check output of flow regulator (center regulator in pump panel) − should be 85 psi. Check for kinked or blocked powder delivery tubing. Check for blocked pump flow air servo valve.	
708	Pattern high PWM	Pattern air flow more than commanded value. Check output of flow regulator (center regulator in pump panel) − should be 85 psi. Check for kinked or blocked powder delivery tubing. Check for blocked pattern flow air servo valve.	
80x	**User Interface**		
801	Backup operation failure*	Not implemented, future release	
802	Database compare failure*	Not implemented, future release	
803	Copy program failed to start*	Not implemented, future release	
804	Compare program failed to start*	Not implemented, future release	
805	Spray gun trigger error*	Not implemented, future release	
806	Flow/pump trigger error*	Not implemented, future release	

Continued...

Code	Message Text	Description	Refer to Page
90x	**Ethernet Networking**		
901	I/O error	Ethernet I/O communication failure.	page 4-14
902	POrt or socket open error	The Ethernet connection failed to open for service.	page 4-14
903	Serial port already open	The Ethernet connection is already open and received an open command.	page 4-14
904	TCP/IP connection error	Unable to connect to remote device.	page 4-14
905	TCP/IP connection was closed by remote peer	Remote device closed the I/O connection.	page 4-14
906	Socket library error	The socket library returned error status.	page 4-14
907	TCP Port already bound	Requested TCP port is in use by another application.	page 4-14
908	Listen failed	The local system cannot detect activity on the Ethernet network.	page 4-14
909	File descriptors exceeded	Too many connections are open.	page 4-14
910	No permission to access serial or TCP port	The program requesting the Ethernet resource does not have permission to do so.	page 4-14
911	TCP Port not available	The requested port is busy or otherwise not available.	page 4-15
917	Checksum error	Data packets were received with errors.	page 4-15
918	Invalid frame error	Data packets were received with errors.	page 4-15
919	Invalid reply error	Data packets were received with errors.	page 4-15
920	Reply time-out	A reply to a request was not received in time.	page 4-15
921	Modbus exception response	An illegal Modbus command was detected.	page 4-15
925	Illegal Function exception response	An illegal function call was detected.	page 4-15
926	Illegal Data Address exception response	An illegal address was detected.	page 4-15
927	Illegal Data Value exception response	An illegal data value was detected.	page 4-15
928	Slave Device Failure exception response	The slave device returned an exception.	page 4-15

Continued...

Code	Message Text	Description	Refer to Page
100x, 110x	**Positioner**		
1001	E-Stop OPEN	The E-Stop circuit is open.	page 4-16
1002	Encoder failure	The encoder is not responding when motion is commanded or is responding with defective signals.	page 4-16
1003	Motor Protector	The motor protector is open.	page 4-17
1004	Motion Controller	The motion controller indicates a failure.	page 4-17
1005	Forward Contactor	The forward contactor did not engage.	page 4-17
1006	Reverse Contactor	The reverse contactor did not engage.	page 4-17
1007	Forward End of Travel Limit	The machine is at the forward end of travel limit.	page 4-18
1008	Reverse End of Travel Limit	The machine is at the reverse end of travel limit.	page 4-18
1112	Positioner not in ready state for Color Change	The positioner has not reached the proper location for color change.	page 4-18
200x, 210x	**Reciprocator**		
2001	E-Stop Open	The E-Stop circuit is open.	page 4-23
2002	Encoder failure	The encoder is not responding when motion is commanded or is responding with defective signals.	page 4-23
2003	Motor Protector	The motor protector is open.	page 4-24
2004	Motion Controller	The motion controller indicates a failure.	page 4-24
2005	Forward Contactor	The forward contactor did not engage.	page 4-24
2006	Reverse Contactor	The reverse contactor did not engage.	page 4-24
2007	Forward End of Travel Limit	The machine is at the forward end of travel limit.	page 4-25
2008	Reverse End of Travel Limit	The machine is at the reverse end of travel limit.	page 4-25
2101	Part size less than minimum	The part detected is too small. The reciprocator will attempt to stroke at the minimum length.	page 4-25
2102	Lead spray gun not defined − using spray gun 1	The lead spray gun on the reciprocator is not defined.	page 4-25
2103	Trail spray gun not defined − using spray gun 1	The trailing spray gun on the reciprocator is not defined.	page 4-25
2104	Trail spray gun less than lead − trail = lead	The trailing spray gun number is less than the lead spray gun number.	page 4-25
2105	Pattern width not set − using 12 inches (305 mm)	The pattern width has not been set using default.	page 4-25
2106	Vertical scanner not configured − recip mode 1 invalid	A vertical scanner is required for variable stroke operation.	page 4-25
2107	Speed calculated less than minimum	The speed of the reciprocator is less than the minimum value allowed.	page 4-26

Continued...

Code	Message Text	Description	Refer to Page
2108	Speed calculated greater than maximum	The speed of the reciprocator is greater than the maximum value allowed.	page 4-26
2113	Reciprocator not in ready state for Color Change	The reciprocator is not in the proper position for color change.	page 4-26
300x	**Watchdog**		
3100	Positioner Watchdog fault	The remote Ethernet device did not respond with a watchdog signal in 1 second.	page 4-18
3200	Reciprocator Watchdog fault	The remote Ethernet device did not respond with a watchdog signal in 1 second.	page 4-26
410x	**Color Change**		
4109	Clean cycle aborted arch clean operation − waiting on park release	Clean cycle detected an abort − waiting for user to press park to release.	page 4-18
4110	Clean cycle aborted by user action − park release detected	Clean cycle aborted by user − part release was detected.	page 4-18
4111	Clean cycle aborted detected machine lockout/ watchdog	A machine malfunction aborted the cleaning operation.	page 4-18

CAN Network Errors

Table 4-2 CAN Network Messages

Error Code	Message	Cause/Correction
101	CAN bus fault detected	Hardware error. Check the CAN cable for shorts. If the cable is good, replace the CAN card.
102	CAN receive buffer overflow	Host CAN interface received too much data and could not process it quickly enough. Reboot the system.
103	Message timeout	Remote CAN device did not respond to a direct request in the allotted time. Check the spray gun card or iFlow card.
104	Went offline	Normal operational message. The user will see this message if the booth exhaust fan is shut off, which removes power from spray gun cards, or if the spray gun card is disconnected, or if the iFlow module is disconnected from the CAN network.
105	Returned to online	Normal operational message. No action required.
107	Communications errors	These error messages indicate that communications on the iControl 2 CAN bus may be having problems. Troubleshooting should include verification of all CAN cable connections and grounding, and spray gun cable connections and continuity. CAN errors can also be caused by individual spray gun cards or the iControl 2 PC to CAN card interface. These errors do not indicate a specific device failure as all devices are in parallel on the CAN bus.
108		
109		
110		
111		
112		
113		

Spray Gun Card Troubleshooting

Refer to Figure 4-1 and Table 4-3 and Table 4-4. Use the fault codes on the Spray Gun Control screens, the fault messages on the Alarm screen, and the LEDs on the spray gun control cards to diagnose problems with the spray gun control cards.

Spray Gun Card Error Codes and Fault Codes

These faults, except for E16, will activate the alarm relay.

Table 4-3 Spray Gun Card Error and Fault Codes

Error Code	Message	Fault Code	Meaning/Correction
301	Micro-Amp fault detected	–	Micro-amp value out of range.
302	Over-current fault detected	E15	Over-current detected. Clear the fault, unplug the cable from the spray gun and trigger the spray gun. • If the fault changes to E7, check the resistance of the multiplier as described in the spray gun manual. • If the fault code stays E15, check the continuity of the cable as described in the spray gun manual.
303	Feedback fault detected	E3	Micro-amp feedback not detected. Check the spray gun current with no parts in front of the spray gun. If the current is 105 μA, check for a short circuit of the current feedback wires in the spray gun cable: Unplug the cable from the spray gun and trigger the spray gun. • If the fault stays E3, replace the cable. • If the fault changes to E7, check the resistance of the multiplier as described in the spray gun manual.
304	Open circuit detected	E7	Spray gun cable or multiplier open circuit. If the current display is 1 μA or less, check the multiplier cable and electrode assembly for loose connections. • If the connections are secure, check the multiplier with an ohmmeter as described in the spray gun manual. • If the multiplier reading is acceptable, check for a defective cable as described in the spray gun manual.
305	Short circuit detected	E8	Spray gun cable or multiplier short circuit. Unplug the cable from the spray gun and trigger the spray gun. • If the fault changes to E7, check the resistance of the multiplier as described in the spray gun manual. • If the fault code stays E8, check the continuity of the cable as described in the spray gun manual.

Continued...

Error Code	Message	Fault Code	Meaning/Correction
306	Internal hardware failure	E11	Internal DSP fault in gun control card. 1. Turn off the power to the system. 2. Unplug the cable from the back of the spray gun. 3. Turn on the power to the system. If the fault code changes to E7 (open circuit), the card is working correctly. Check the spray gun multiplier. If the fault code remains at E11, replace the spray gun control card.
308	Gun not detected	E16	Spray gun not connected to system. Check the spray gun cable connections and make sure the spray gun card is seated securely into the backplane. This is a normal indication if power to cards is removed, such as when the booth exhaust fan is shut off.
531	System heartbeat lost	–	Check circuit board connections.
532	5/24 volt power	–	Check circuit board connections.
533	Error writing to internal EEPROM	–	Hardware error. Replace card.
534	Error reading to internal EEPROM	–	Hardware error. Replace card.
535	Node address changed from last power up	–	Saved address does not match current address. Address switches were changed. Informational message only.
536	Internal database version changed − resetting to defaults	–	An update to the database was detected and the current data is no longer valid. Informational message only, operation should not be affected.
537	Preset out of range	–	The preset sent to the remote device was out of range. Check preset settings and reset as required.
538	Trigger ON message received − controller in lockout	–	The card was commanded to trigger but the system is locked out. Trigger ON commands will be ignored until the system is returned to the Run state.

Spray Gun Card LEDs

See Figure 4-1. Use the card LEDs to help diagnose problems.

Table 4-4 Spray Gun Card LEDs

LED	Color	Function	Correction
Fault	Red	Lights when a fault is detected (communication, spray gun cable, RAM, or hardware).	If two spray guns are not connected to the card this LED will light. If you have an odd number of spray guns in the system, unplug the unused harness and install the jumper plug shipped with the console. (Refer to *Odd Number of Spray Guns* below or the Installation section.) Make sure the card is seated in the backplane. Open the Alarm screen and clear all faults. Replace the card if the malfunction cannot be corrected.
Status	Green	Flashing (heartbeat) when communicating properly with system.	If the status LED is not flashing, make sure the card is seated in the backplane. Turn console power off and on. Replace the card if the other spray gun control cards have heartbeats.
Gun Limit B (even-numbered spray gun	Yellow	Lights if over-current protection circuit triggered due to high current draw from spray gun drive circuit.	Refer to the corrections for Fault Code E15 in Table 4-3.
Gun Limit A (odd-numbered spray gun)			
Power	Green	Lights when power (5 volts) is applied to the board).	If the card has no power, make sure it is properly seated in the backplane and the locking tab is working correctly. Replace the card if the other spray gun control cards have power.

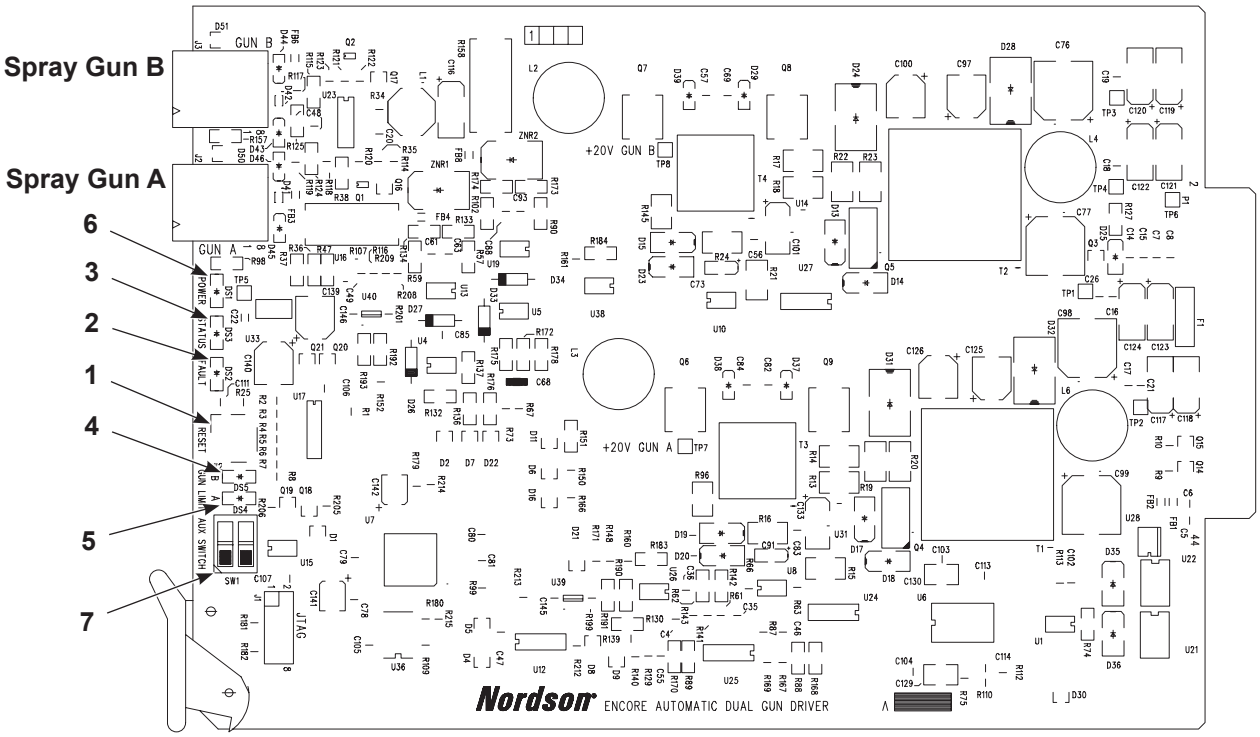


Figure 4-1 Spray Gun Control Card LEDs and Switches

1. Reset switch (reboots the on-board processor)
2. Fault LED (red)
3. Status LED (green)
4. Spray Gun Limit B LED (yellow)
5. Spray Gun Limit A LED (yellow)
6. Power LED (green)
7. SW1 (2 position DIP switch for future use)

Air Flow Re-Zero Procedure

Perform this procedure if the iControl spray gun control screens are indicating pattern air flow when a spray gun is off and no air is actually flowing. This procedure re-zeros the pump control cards to eliminate false air flow indications.

Before performing a re-zero procedure:

- Make sure the air pressure being supplied to the pump cabinet is higher than the minimum 5.86 bar (85 psi).
- Each pump circuit board in the pump cabinet controls two pumps and the pattern air for two spray guns. Make sure no air is flowing through the pumps, around the pump control manifold gaskets, or from around any of the solenoid valves on the manifold. Re-zeroing boards when leaks are present in the control manifolds will result in additional errors.

Re-Zero Procedure

See Figure 4-2. For each pump board that is being re-zeroed:

1. Disconnect the pattern air tubing controlled by the pump board from the output fittings on the rear panel of the pump cabinet.
2. Plug the output fittings.
3. Record the board number and address settings of SW1 for each pump board.
4. Set each address switch to zero.
5. Turn off the power to the pump cabinet, wait five seconds, then turn the power back on.
6. Press and hold the TEST button on each pump board until the red fault light turns on. Release the TEST button and wait for the red fault light to turn off.
7. Move the SW1 address switches back to their original positions.
8. Turn off the power to the pump cabinet, wait five seconds, then turn the power back on.
9. Remove the plugs from the pattern air output fittings and re-connect the pattern air tubing.
10. At the iControl console, check each spray gun control screen that was previously indicating air flow when the spray gun was off. No air flow should be indicated.

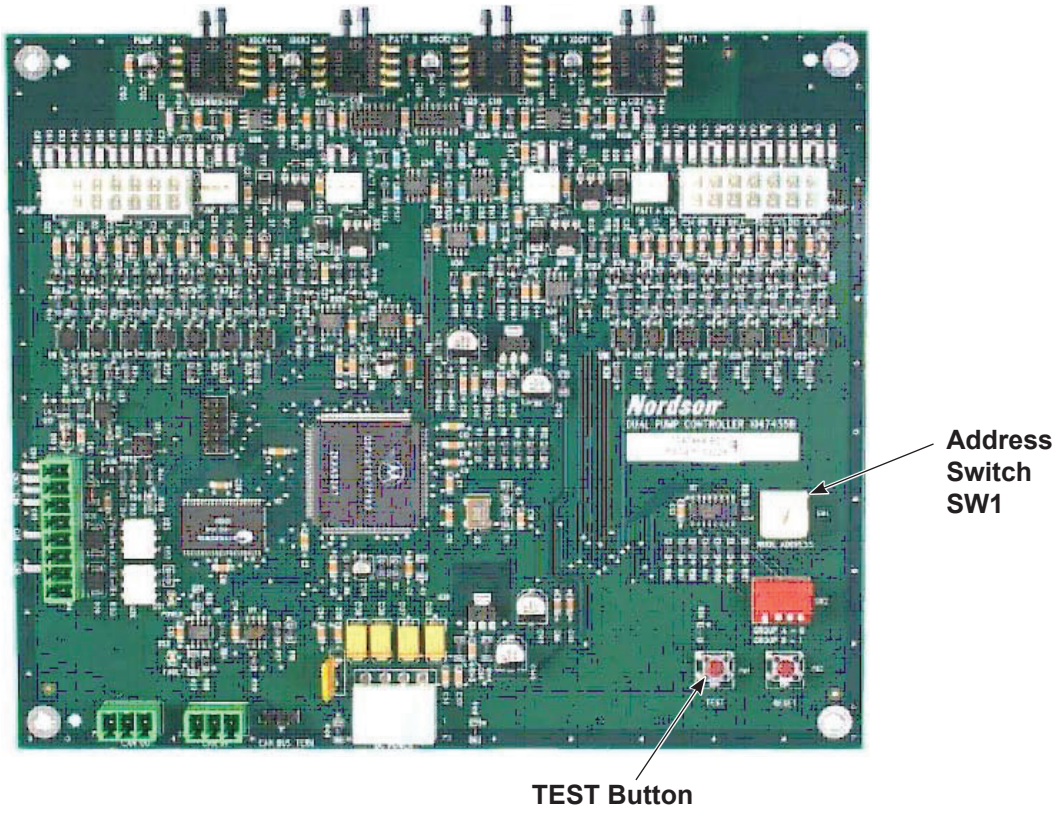


Figure 4-2 Dual Pump Control Board

Ethernet Network Troubleshooting

All Ethernet Network faults will activate the alarm relay. Use the fault messages on the Alarm screen along with this table to diagnose and correct Ethernet network problems. Use the Network Status and Node Configuration screens to diagnose problems with the remote nodes.

Table 4-5 Ethernet Network Troubleshooting

Error Code	Message/Condition	Meaning/Correction
901	I/O error	Check Ethernet wiring. Remote node could be disconnected from network or turned off.
902	Port or socket open error	Programming error. Contact Nordson technical support.
903	Serial port already open	Programming error. Contact Nordson technical support.
904	TCP/IP connection error	Check Ethernet wiring. Remote node could be disconnected from network or turned off.
905	TCP/IP Connection closed by remote peer fault (any remote node fault)	Ethernet network communication with the remote node has been lost. This fault may be a normal response to removing electrical power from the remote node. If the remote node is an in/out positioner or reciprocator and communication is lost while operating in Auto mode, the machine will move to the Park position. Check the Network Node Status screen. If communication is lost the node icon should turn red. If no nodes are red, check the Network Node Configuration screen to find the device associated with the faulted node IP address. **If multiple node faults are displayed:** Check the electrical power supply to all faulted nodes. Check the Ethernet switch in the main electrical control panel for electrical power and proper operation. The switch power LED should be lit and the network connection LEDs should be flashing. Replace the switch if necessary. Check the network cable and connections between the Ethernet switch and the iControl 2 PC. **If a single node fault is displayed:** Check the electrical power to the remote node. Check network cables and connections between the remote node and the Ethernet switch in the main electrical control panel.
906	Socket library error	Programming error. Contact Nordson technical support.
907	TCP port already bound	Programming error. Contact Nordson technical support.
908	Listen failed	Programming error. Contact Nordson technical support.
909	File descriptors exceeded	Programming error. Contact Nordson technical support.
910	No permission to access serial or TCP port	Programming error. Contact Nordson technical support.

Continued...

Error Code	Message/Condition	Meaning/Correction
911	TCP port not available	Programming error. Contact Nordson technical support.
917	Checksum error	Noise in network. Check for loose connections or Ethernet cables routed parallel to high voltage or VFDs.
918	Invalid frame error	Noise in network. Check for loose connections or Ethernet cables routed parallel to high voltage or VFDs.
919	Invalid reply error	Noise in network. Check for loose connections or Ethernet cables routed parallel to high voltage or VFDs.
920	Reply time-out	Noise in network. Check for loose connections or Ethernet cables routed parallel to high voltage or VFDs.
921	Modbus exception response	Programming error or remote hardware error. Check PLC functions.
925	Illegal Function exception response	Programming error or remote hardware error. Check PLC functions.
926	Illegal Data Address exception response	Programming error or remote hardware error. Check PLC functions.
927	Illegal Data Value exception response	Programming error or remote hardware error. Check PLC functions.
928	Slave Device Failure exception response	Programming error or remote hardware error. Check PLC functions.
−	Watchdog Fault (any remote node controller fault)	Control program in PLC is not running, or controller has no program installed. **NOTE:** This fault may be a normal response to removing electrical power from the remote node. Check the PLC mode selection switch. The switch should be in the run (up) position. Replace the PLC. The replacement must be pre-programmed or a program must be downloaded and installed in the field. Contact Nordson Industrial Coating Systems Customer Support for details.
−	Operation was successful	Normal operation. No action required.
−	Illegal argument error	Programming error. Contact Nordson technical support.
−	Illegal state error	Programming error. Contact Nordson technical support.
−	Evaluation expired	Programming error. Contact Nordson technical support.
−	I/O error class	Programming error. Contact Nordson technical support.
	Fieldbus protocol error class	Programming error. Contact Nordson technical support.

In/Out Positioner Troubleshooting

Use the fault messages on the Alarm screen with this table to diagnose and correct in/out positioner or reciprocator problems. Refer to *Ethernet Network Troubleshooting* on page 4-14 if the fault messages indicate a communications problem (Watchdog fault or TCP/IP communications fault).

Each fault message displayed on the iControl 2 screen is accompanied by a device and number identifier. The identifier indicates the faulted machine (for example, IN/OUT Positioner #1, Reciprocator #2). When the fault condition is corrected or cleared, the fault message will indicate a returned-to-normal status.

For all in/out positioner faults, the alarm relay contacts open to signal an alarm condition. Use the alarm relay to activate an external alarm. Refer to Console Power Cable Connections in the Installation section for more information.

In/Out Positioner Error Code Troubleshooting

Table 4-6 In/Out Positioner Error Code Troubleshooting

Error Code	Message	Meaning/Correction
1001	E-Stop Open	Determine why E-Stop button on system electrical control panel or a remote panel was pressed and correct if necessary. Reset E-stop button when clear to do so.
1002	Encoder Failure Fault	In/out positioner or reciprocator not moving. Mechanical, motor, or motor controller failure. Change in/out positioner or reciprocator operating mode to Manual and check for proper forward and reverse (up and down) motion. If only one direction of movement, check motor control circuits. If no motion, check the following: Check the positioner carriage to make sure it moves properly. Make sure that • the anti-tip device is adjusted properly • a carriage wheel bearing has not failed • no obstructions are preventing motion. Check the pulleys, belts, or other mechanical link connecting the gear reducer to the spray gun moving carriage. If the gear reducer is not rotating but the motor is, replace the reducer. If the drive motor is not rotating, check the motor circuit protection, motor wiring, motor controller, and motor control circuits. This fault must be reset from the iControl 2 alarm screen.

Continued...

Error Code	Message	Meaning/Correction
1003	Motor Protector	Circuit protector limiting current to the in/out positioner or reciprocator motor has failed. Check mechanical components of in/out positioner for proper operation. Lubricate, repair, or replace components as needed. Check motor electrical circuit between protector and motor. Repair or replace wiring, terminals, or motor control components as needed. Reset circuit protector after corrections have been made.
1004	Motion Controller Fault	Motor speed controller “ready for operation” feedback signal has failed (if applicable) Check the status display on the motor speed controller for fault indications. Status can only be displayed while power is applied. Cycling power to the controller will generally reset the fault condition. Determine the probable cause based on the controller fault status information. Correct the problem causing the fault or replace the controller if necessary.
1005	Forward Contactor	Auxiliary contact on the motor forward contactor or similar control circuitry did not operate when the in/out positioner was commanded to move forward. Check control circuit and devices that command the motor for proper operation. Repair or replace components as needed. This fault must be reset from the iControl 2 alarm screen.
1006	Reverse Contactor Fault	Auxiliary contact on the motor reverse contactor or similar control circuitry did not operate when the in/out positioner was commanded to move in reverse. Check control circuit and devices that command the motor for proper operation. Repair or replace components as needed. This fault must be reset from the iControl 2 alarm screen.
		The in/out positioner or reciprocator position feedback encoder is not putting out pulses. **NOTE:** If an encoder fails, an in/out positioner will move to the reverse limit position. A reciprocator will stop. Check all encoder mechanical and electrical connections. Make sure the encoder is powered. Check pulse output from the encoder. Replace encoder if necessary. This fault must be reset from the iControl 2 alarm screen.

Continued...

Error Code	Message	Meaning/Correction
1007 1008	Forward or Reverse End-of-Travel Limit fault	In/out positioner color change cycle takes too long (Automatic color change system). During an automatic color change cycle the positioner is commanded to make both forward and reverse moves. This fault occurs if the positioner did not reach the limit in a set amount of time (20 seconds for forward and 75 seconds for reverse). For a 1007 Forward fault: Check for an obstruction to forward motion. Check the operation of the forward limit switch. For a 1008 Reverse fault: Check for an obstruction to reverse motion. Check the operation of the reverse limit switch. If there is no obstruction and the reverse limit switch is good, increase the motion speed slightly.
1112	Positioner not in ready state for color change Positioner code: 1112	In/out positioner not in Manual or Auto mode. Color change cycle cannot start unless in/out positioner is in Manual or Auto mode. Set in/out positioner mode to Manual or Auto.
3100	Positioner Watchdog fault	The positioner controller did not respond with a watchdog signal in 1 second. Check the Ethernet cable connections and the positioner controller.
4109	Clean cycle aborted Arch clean operation waiting on Park release (Euro color change only)	During a SpeedKing booth cleaning cycle, an in/out positioner has moved off its reverse limit switch or the limit switch has failed. All in/out positioner reverse limit switches must be engaged for iControl 2 system to send “OK for Cleaning Arch” signal. Check in/out positioners for position, check limit switches and replace failed switch.
4110	Clean cycle aborted by user action − Park release detected (Euro color change only)	Park button touched causing color change cycle to abort. Touching the Park button to abort the color change cycle is a normal function. If the button was mistakenly touched before the cycle ended, the cycle must be restarted from the beginning.
4111	Clean cycle aborted detected machine lockout/ watchdog fault (Euro color change only)	Communication with in/out positioner or reciprocator controller lost during color change cycle. Check the iControl 2 alarm log for Watchdog or TCP/IP faults. Refer to *Ethernet Network Troubleshooting* on page 4-14.

Other In/Out Positioner Troubleshooting

Table 4-7 Other In/Out Positioner Troubleshooting

Problem	Possible Cause	Corrective Action
No movement from in/out positioner in response to move command	A fault has occurred preventing operation.	Check the iControl 2 alarm log. Identify the fault and review the fault troubleshooting information in this table.
	Configuration lockout applied to in/out positioner.	Check the In/Out Positioner control screen for the lockout indicator. Lockout is applied from the Configuration screens.
	iControl 2 lockout applied to spray guns, in/out positioners, and reciprocators.	This is a normal condition unless a failure has occurred. Refer to *Photoeye, Encoder, and Interlock Troubleshooting* in this section.
	Remote disable applied to in/out positioner controller. No status display on iControl 2 screens.	If Nordson USA ColorMax system: Disable action is applied by a remote system control panel keyswitch. In the Disable position, the keyswitch opens the disable input circuit at the in/out positioner controller. No corrective action is required unless the keyswitch Normal position does not allow motion. Refer to your system drawings for circuit details. If not Nordson USA ColorMax system: Apply jumper to force On the remote disable input. Refer to system drawings for jumper application.
No in/out positioner response when Auto mode selected	A fault has occurred preventing Auto operation.	Check iControl 2 alarm screen. Identify the fault and correct. Review the related faults and corrections listed in this table.
	iControl 2 in/out positioner configuration settings have not been completed.	Refer to *Network Configuration and In/Out Positioner Configuration* in the iControl 2 Operator Interface manual. Make sure all required settings have been made and are correct. Refer to the in/out positioner/reciprocator control panel drawings and make sure all connections have been made correctly.

Continued...

Problem	Possible Cause	Corrective Action
Auto mode is selected, homing has completed, but no auto positioning response from in/out positioner	Auto hold action has been applied to the in/out positioner.	The in/out positioner is forced to the Retract position (refer to in/out positioner configuration setting). This is a normal and temporary occurrence when the iControl 2 system does not know the status of the parts on the conveyor between the in/out positioner scanner and the in/out positioner. This condition occurs when the iControl 2 console is powered up or rebooted and part tracking (shift register) information is lost. Auto positioning will commence when parts identified by the in/out positioner scanners arrive at the in/out positioner. Manual positioning is allowed during this period.
	Booth interlock has opened (booth exhaust fan shut down).	The booth exhaust fan has been turned off. The in/out positioner moves to the Park position (refer to in/out positioner configuration settings) if the Auto mode is selected. The in/out positioners can be operated manually while the booth fan is off.
	In/Out Positioner scanner not responding to parts passing by on the conveyor.	Conveyor encoder not sending pulses to the iControl 2 system. Refer to *Photoeye, Encoder, and Conveyor Interlock Troubleshooting* on page 4-30. In/Out Positioner scanners not detecting parts: Check scanner input values on the Input Status screen. Refer to the *Monitoring Operation* section of the iControl 2 Operator Interface manual. Check for scanner remote node communication failure on the Network Node Status screen and Node Configuration screens. Refer to *Ethernet Network Troubleshooting* in this section. Check for electrical power at the scanner controllers. Check for a voltage signal, 0−10 Vdc = length of scanner (0 = maximum), from the scanner controller to the analog input module. Refer to the Analog Scanner Junction Box drawings in this manual. If a voltage signal is read at the analog input module, and there is no problem with the Ethernet network connections to the controller node, then replace the analog input module.
	In/Out Positioner preset set to Fixed.	Normal operating scenario. Position change will only occur when a new part appears at the in/out positioner.

Continued...

Problem	Possible Cause	Corrective Action
Auto mode is selected, in/out positioner stays at the reverse limit position	Refer to Problem “Auto mode is selected, homing has completed, but no auto positioning response from in/out positioner.“	
	Park/Clean and Retract position values set too high.	Set the Park/Clean and Retract position values to less than reverse limit switch position value. If the values are greater, the in/out positioner will stop at the reverse limit switch and generate a fault condition during normal operation. **NOTE:** If the in/out positioner is an analog version, then the Reverse Limit value must equal the position at the reverse limit switch.
In/Out Positioner “jumps” back to a stop after moving to a new position	In/Out Positioner Hysteresis value too small.	Open In/Out Positioner Configuration screen and increase the Hysteresis value. The hysteresis value is the allowable over- or under-shoot distance from the target position. If the in/out positioner is within this distance of the desired position when it stops, the iControl 2 system will not move it again to the target position. If the value is not large enough, the in/out positioner will over- or under-shoot its destination and then “jump” back to it (called hunting). A typical setting is 0.5 − 0.7 inches depending on the in/out positioner speed setting.
In/Out Positioner actual travel distance does not match value shown on iControl 2 screens	In/Out Positioner position calibration not completed, or in/out positioner forward or reverse limit switch moved since last position calibration.	In/Out Positioner calibration involves moving the in/out positioner to a stop at the forward limit switch and then within 60 seconds moving it to the reverse limit switch. This sets zero at the forward limit switch and a reverse limit reference at the reverse limit switch. Calibration is performed during in/out positioner configuration, but can be performed at any time while in Manual mode. If the physical position of either limit switch has been changed, then positioning will be incorrect. You must recalibrate the in/out positioner if you move the limit switches. **NOTE:** The first time Auto mode is selected after in/out positioner power up, the in/out positioner moves to the reverse limit switch (home) and acquires a reverse reference value. This value is used to reset the in/out positioner position for Auto operations.

Continued...

Problem	Possible Cause	Corrective Action
In/Out Positioner actual travel distance does not match value shown on iControl 2 screens *(continued)*	Incorrect encoder resolution entered on in/out positioner configuration screen.	**NOTE:** Encoder resolution can only be entered or changed by a Nordson representative. Verify encoder resolution (number of pulses output for one inch of travel) and enter that value on the in/out positioner configuration screen. If the number is not know and cannot be mechanically calculated, then a trial and error method can be attempted. Perform this procedure from the in/out positioner configuration screen: 1. Manually move the in/out positioner to the forward limit (zero position). 2. Reverse the in/out positioner slightly off the limit, record the displayed position value, and apply reference marks to the in/out positioner and base. 3. Manually move the in/out positioner in reverse, almost but not all the way to the reverse limit (the greater the distance the more accurate the calculated resolution will be). 4. Use your reference marks to measure the distance moved and compare the measured distance to the displayed position value. 5. The ratio of these two values is used to calculate a new encoder resolution. If the displayed position value is greater than the measured distance, then increase the encoder resolution. If the displayed position value is less than the measure value, then decrease the resolution.
	Mechanical failure in connection of in/out positioner encoder to machine motion.	Check the mechanical components and connections linking the encoder ro ation to the movement of the in/out positioner.

Reciprocator Troubleshooting

Use the fault messages on the Alarm screen with this table to diagnose and correct reciprocator problems. Refer to *Ethernet Network Troubleshooting* on page 4-14 if the fault messages indicate a communications problem (Watchdog fault or TCP/IP communications fault).

Each fault message displayed on the iControl 2 screen is accompanied by a device and number identifier. The identifier indicates the faulted machine (for example, IN/OUT Positioner #1, Reciprocator #2). When the fault condition is corrected or cleared, the fault message will indicate a returned-to-normal status.

For all in/out positioner faults, the alarm relay contacts open to signal an alarm condition. Use the alarm relay to activate an external alarm. Refer to C*onsole Power Cable Connections* in the *Installation* section for more information.

Reciprocator Error Code Troubleshooting

Table 4-8 Reciprocator Error Code Troubleshooting

Error Code	Message	Correction
2001	E-Stop Open	Determine why E-Stop button on system electrical control panel or remote panel was pressed and correct if necessary. Reset E-stop button when clear to do so.
2002	Encoder Failure Fault	In/out positioner or reciprocator not moving. Mechanical, motor, or motor controller failure. Change in/out positioner or reciprocator operating mode to Manual and check for proper forward and reverse (up and down) motion. If only one direction of movement, check motor control circuits. If no motion, check the following: Check the positioner carriage to make sure it moves properly. Make sure that • the anti-tip device is adjusted properly • a carriage wheel bearing has not failed • no obstructions are preventing motion. Check the pulleys, belts, or other mechanical link connecting the gear reducer to the spray gun moving carriage. If the gear reducer is not rotating but the motor is, replace the reducer. If the drive motor is not rotating, check the motor circuit protection, motor wiring, motor controller, and motor control circuits. This fault must be reset from the iControl 2 alarm screen.

Continued...

Error Code	Message	Correction
2003	Motor Protector	Circuit protector limiting current to the in/out positioner or reciprocator motor has failed. Check mechanical components of in/out positioner for proper operation. Lubricate, repair, or replace components as needed. Check motor electrical circuit between protector and motor. Repair or replace wiring, terminals, or motor control components as needed. Reset circuit protector after corrections have been made.
2004	Motion Controller Fault	Motor speed controller “ready for operation” feedback signal has failed (if applicable). Check the status display on the motor speed controller for fault indications. Status can only be displayed while power is applied. Cycling power to the controller will generally reset the fault condition. Determine the probable cause based on the controller fault status information. Correct the problem causing the fault or replace the controller if necessary.
2005	Forward Contactor	Auxiliary contact on the motor forward contactor or similar control circuitry did not operate when the in/out positioner was commanded to move forward. Check control circuit and devices that command the motor for proper operation. Repair or replace components as needed. This fault must be reset from the iControl 2 alarm screen.
2006	Reverse Contactor Fault	Auxiliary contact on the motor reverse contactor or similar control circuitry did not operate when the in/out positioner was commanded to move in reverse. Check control circuit and devices that command the motor for proper operation. Repair or replace components as needed. This fault must be reset from the iControl 2 alarm screen.
		The in/out positioner or reciprocator position feedback encoder is not putting out pulses. **NOTE:** If an encoder fails, an in/out positioner will move to the reverse limit position. A reciprocator will stop. Check all encoder mechanical and electrical connections. Make sure the encoder is powered. Check pulse output from the encoder. Replace encoder if necessary. This fault must be reset from the iControl 2 alarm screen.

Continued...

Error Code	Message	Correction
2007 2008	Forward or Reverse End-of-Travel Limit fault	Auto mode is selected and the reciprocator has engaged the forward (upper) or reverse (lower) end-of-travel limit sensor. Select Manual mode and move the reciprocator off the limit, then re-select Auto mode. Check the configured soft top and bottom limits. Make sure they do not allow travel to the limit sensors. Adjust the configured reciprocator Turn-Around Offset (Nordson only) to ensure that the limit sensors are not engaged. Check reciprocator encoder wiring. If signals switched position tracking will be reversed. Typically only seen on initial startup or if encoder is replaced. Reciprocator encoder has failed. Refer to Encoder Failure fault.
		Spray gun carriage has fallen to the reverse limit as a result of a mechanical failure. Check belts, pulleys, bearings, etc. for proper operation. Refer to reciprocator manual. This fault must be reset from the iControl 2 Alarm screen.
		Spray gun carriage has slowly drifted or was moved to the top or bottom of stroke. Incorrect counterweight to neutralize the weight of the spray guns and spray gun carriage. Refer to reciprocator manual. This fault must be reset from the iControl 2 Alarm screen.
2101	Part size less than minimum	Default or preset settings define a stroke length less than the minimum 4 in. Change default or preset settings, or if parts are small consider turning off reciprocators for batch.
2102	Lead gun not defined – using gun 1	Lead spray gun number not entered in reciprocator configuration. Enter number for lead spray gun in reciprocator configuration.
2103	Trail gun not defined – using gun 1	Trail spray gun number not entered in reciprocator configuration. Enter number for trail spray gun in reciprocator configuration.
2104	Trail gun less than lead – trail = lead	Lead and trail spray gun numbers not entered correctly in reciprocator configuration. Correct spray gun number entries in reciprocator configuration. Lead spray gun number must be lower than trail spray gun number.
2105	Pattern width not set – using 12 inches	No value for pattern width entered in reciprocator configuration. Enter value for pattern width in reciprocator configuration.
2106	Vertical scanner not configured − reciprocator mode 1 invalid	Reciprocator set for variable stroke mode, no part size data available. A part size, as seen by a vertical scanner or customer PLC, is required for variable mode. If no part size data is available, set reciprocator to a fixed mode.

Continued...

Error Code	Message	Correction
2107	Speed calculated less than minimum	Default or preset settings for variable mode resulting in speed less than minimum. Minimum speed is 15 ft/min. Change default or preset settings. Part may be too small to use variable mode, change to a fixed mode.
2108	Speed calculated greater than maximum	Default or preset settings for variable mode or fixed with conveyor synchronization resulting in speed faster than maximum. Change the default or preset settings or reduce the conveyor speed.
1112	Positioner not in ready state for color change	In/out positioner not in Manual or Auto mode. Color change cycle cannot start unless in/out positioner is in Manual or Auto mode. Set in/out positioner mode to Manual or Auto.
2113	Reciprocator not in ready state for color change	Reciprocator not in Auto mode. Color change cycle cannot start unless reciprocator is in Auto mode. Set reciprocator mode to Auto.
3200	Reciprocator Watchdog fault	The reciprocator controller did not respond with a watchdog signal in 1 second. Check the Ethernet cable connections and the reciprocator controller.

Other Reciprocator Troubleshooting

Table 4-9 Other Reciprocator Troubleshooting

Problem	Cause	Correction
No movement from reciprocator in response to move command	A fault has occurred preventing operation.	Check the iControl 2 alarm log. Identify the fault and review the fault troubleshooting information in this table.
	Configuration lockout applied to reciprocator.	Check the Reciprocator control screen for the lockout indicator. Lockout is applied from the Configuration screens.
	iControl 2 lockout applied to spray guns, in/out positioners, and reciprocators.	This is a normal condition unless a failure has occurred. Refer to *Photoeye, Encoder, and Interlock Troubleshooting in this section.*

Continued...

Problem	Cause	Correction
No movement from reciprocator in response to move command *(continued)*	Remote disable applied to reciprocator controller. No status display on iControl 2 screens.	If Nordson USA ColorMax system: Disable action is applied by a remote system control panel keyswitch. In the Disable position, the keyswitch opens the disable input circuit at the controller. No corrective action is required unless the keyswitch Normal position does not allow motion. Refer to your system drawings for circuit details. If not Nordson USA ColorMax system: Apply jumper to force On the remote disable input. Refer to system drawings for jumper application.
No reciprocator response when Auto mode selected	A fault has occurred preventing Auto operation.	Check iControl 2 alarm screen. Identify the fault and correct. Review the related faults and corrections listed in this table.
	iControl 2 reciprocator configuration settings have not been completed.	Refer to *Network Configuration and Reciprocator Configuration* in the iControl 2 Operator Interface manual. Make sure all required settings have been made and are correct.
Reciprocator changes direction before or after the programmed turn-around position in Auto mode	Turn-around offset not set correctly.	An error close to ± 1/2 in. of the set turn-around position is normal. Before making adjustments to the offset setting, make sure the encoder resolution is correct. Refer to *Reciprocator Configuration* in the iControl 2 Operator Interface manual.
	Incorrect reciprocator encoder resolution entered.	The accuracy of the displayed position versus the actual position of the reciprocator is determined by the configured encoder resolution. Check the encoder resolution value.
Reciprocator does not display 0.0 position after the homing process	Reciprocator has overtraveled the position slightly before coming to a stop	This is normal. The position displayed after homing is the actual position. During homing, the 0.0 position is set at the forward limit, then the reciprocator moves down 1 inch before stopping. The stop action produces the overtravel.

Continued...

Problem	Cause	Correction
Reciprocator measured travel position does not match the value shown on the reciprocator control panel or configuration screen	Reciprocator not homed.	Touch the Home button and wait for the homing sequence to finish, then check the position accuracy. The displayed position will not be correct until the reciprocator is homed.
	Incorrect reciprocator encoder value entered.	The accuracy of the displayed position versus the actual position of the reciprocator is determined by the configured encoder resolution. Check the encoder resolution value.
	Belt or chain drive sprocket slipping.	Make sure the drive sprocket is securely connected to the gear reducer output shaft.
Reciprocator does not move in response to move command	Refer to condition “No movement from reciprocator in response to move command.”	
	Mechanical failure, drive or chain belt not engaging drive sprocket, or drive sprocket slipping.	The position value changes but the reciprocator does not move. This can occur because the encoder is connected directly to the gear reducer output shaft. Check the drive belt and sprocket.
	Incorrect reciprocator speed controller parameters.	Speed controller parameters must be set to specified values in order to respond correctly to signals from reciprocator controller.
No reciprocator response when Auto mode selected	Refer to condition “No reciprocator response when Auto mode selected.”	
	Auto cycle delay in progress	A 5 second delay occurs when Auto mode is selected. During the delay a warning beeper should sound.
	An end-of-travel limit switch is engaged.	Check the iControl 2 Alarm log. Identify the fault and review the fault troubleshooting information.
	Invalid reciprocator stroke settings.	Speed controller parameters must be set to accept commands from the reciprocator controller.
Reciprocator “jumps” back to a stop after moving to a new position	Reciprocator Hysteresis value too small.	Open Reciprocator Configuration screen and increase the Hysteresis value. The hysteresis value is the allowable over- or under-shoot distance from the target position. If the reciprocator is within this distance of the desired position when it stops, the iControl 2 system will not move it again to the target position. If the value is not large enough, the reciprocator will over- or under-shoot its destination and then “jump” back to it (called hunting). A typical setting is 0.5 − 0.7 inches depending on the reciprocator speed setting.

Other Fault Messages and Conditions

Table 4-10 Other Fault Messages and Conditions

Message or Condition	Cause/Correction
Message: Too many (few) control nodes found	The number of spray gun cards/iFlow modules does not match the number of spray guns setting in Guns Configuration screen (System Configuration). This could be a normal condition if you have an odd number of spray guns in your system. The red Fault LED on the spray gun card will light if two spray guns are not connected to the card.
Message: Failure reading database	No data or configuration displays on screens. User data card missing, defective, or wrong size. Replace the card. Compact Flash adapter failure. Replace the adapter.
Condition: iControl 2 screen partially boots up. Screen is blank except for possible text display, or screen displays “Hit ESC for .altboot...”	Program card is missing, blank, or defective. Replace the card. Program card in wrong adapter slot. Insert the program card in the outer slot. Compact Flash adapter failure. Replace the adapter. No power to Compact Flash adapter. Check the power cable and connection to the adapter. Check the ribbon cable connections to the Compact Flash adapter and PC. Replace the ribbon cable if necessary. (Standard 40-pin IDE cable, not available from Nordson.)
Condition: Pickoff value is reset to smaller number after entry	The maximum pickoff length is 4096 inches (104038.4 mm). With the keypad you can enter a number larger than the maximum, but when you save your entry the value will be automatically reduced to the maximum value.
Condition: Inconsistent lead and lag timing for auto gun triggering or moving	Conveyor encoder pulse rate is too fast. Maximum is 10 Hz (10 pulses/second). Some pulses are not being detected. Reduce the conveyor speed or change the encoder-to-conveyor linkage to reduce the pulse frequency.
Condition: Lockout message does not display when keyswitch turned to lockout position, or lockout cannot be canceled by turning keyswitch to another position	Booth exhaust fan is off (turning off switched power to the console), or remote lockout is on. If the exhaust fan is turned off before turning the switch to Lockout, then lockout cannot be activated. If the fan is turned off after the switch is turned to Lockout, then lockout cannot be canceled. Turn fan on to correct. If the remote lockout is on, turn it off. Remote lockout is activated by a customer-supplied switching device connected to the remote lockout relay in the console.
Condition: iControl 2 screen is locked up (no response)	Cycle console power. If the condition persists, the program card is corrupted. Obtain and install another program card. Refer to Touch Screen Calibration when installing new program cards.
Condition: Air flow when gun is not triggered on	iFlow module requires re-zeroing. Re-zero the iFlow module as described on page 4-12. iFlow module proportional valve or solenoid valve stuck open. Refer to the Repair section for instructions on cleaning the proportional valves. Solenoid valves must be replaced if they do not close.

Photoeye, Encoder, and Interlock Troubleshooting

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

Table 4-11 Photoeye, Encoder, and Interlock Troubleshooting

Inputs	I/O Board Terminals	Troubleshooting
Zone Photoeyes	1 − 8	Photoeyes are set 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 scanners or Inputs from customer Part ID system	9 −16	Photoeyes and scanners are set for breaklight. When a flag passes in front of the photoeyes, 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	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 spray guns will not be triggered.
Relays (DIN rail)	−	The conveyor interlock relay LED lights when the conveyor is running. 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.
All	1−24	Input LEDs should indicate as described above. If none of the LEDs will turn on, then check the following screens: Zone and Part ID Inputs: Open the Input Status screen. Inputs should display as lighted indicators. Encoder: On the Main screen, if the encoder is providing a signal then the conveyor speed should be greater than zero. Conveyor Input: On the Main screen, if the conveyor is running then the conveyor indicator should be green. If the input indicators on the Main and Input Status screens are lit but the I/O board LEDs are not, then: Check the dipswitch and jumper settings on the I/O board (see Figure 7-4 for the settings). If settings are correct, replace the I/O board and ribbon cable. A new cable is shipped with the I/O board. **WARNING:** Always turn console power off before changing jumper and dipswitch settings on circuit boards. If ribbon cable is not keyed, make sure the colored trace in the ribbon cable is aligned with pin 1 at both connectors. If the conveyor interlock LED (24) on the I/O board is operating correctly and all or some of LEDs 1−20 are responding erratically, then check the I/O board inputs common voltage. For sinking inputs, +24 Vdc is applied to all HI terminals on the board as inputs common.

Touch Screen Troubleshooting

Touch Screen Calibration

The touch screen is calibrated at the factory. If changing a program card or the iControl 2 PC, or if having problems touching screen components accurately, recalibrate the screen.

The touch screen calibration values are stored on the program card. If you install a program card that has not been used before, there will be no calibration file on the card. The system will automatically start the calibration procedure.

NOTE: If installing a program card that was previously used on another iControl 2 console, performing the *Calibration with a Mouse* procedure on the following page MUST be done to calibrate the touch screen.

Normal Calibration

Calibrating the touch screen can be done at any time. To start a normal calibration, start the Program Shutdown procedure. When the operating system shutdown prompt appears on the screen, touch the Cancel button, then touch the CAL button.

Follow the calibration instructions on the screen exactly, using your finger to touch the targets. When you have completed the calibration procedure, touch the iControl 2 button to start the iControl 2 software.

Problems During Calibration

Failure to follow the calibration instructions exactly: Unable to touch the center **Completion** button and exit the calibration procedure. If this happens, stop and wait until the procedure times out. Then, repeat the procedure and complete it correctly. After completing the calibration procedure, touch the **iControl 2** button to start the iControl 2 software.

If console power is shut off during the calibration procedure: The calibration file on the program card will be corrupted. On power up, you will not be able to touch the CAL button to start the calibration procedure. If this happens, perform the *Calibration with a Mouse* procedure.

Calibration with a Mouse

WARNING: Do not spray powder while the console door is open. Shut off the booth exhaust fan to remove switched power from the console and prevent spray gun operation while performing this procedure. Failure to observe this warning could create a hazardous condition and could result in personal injury or property damage.

Use this procedure to recalibrate the touch screen if unable to touch the CAL button or the buttons on the iControl 2 screens, or if installing a program card previously used in another iControl 2 console.

1. Turn off the iControl 2 console power.
2. Open the iControl 2 console door and connect a USB mouse to the iControl 2 PC.
3. Turn on power and allow the operating system to load. The CAL button is displayed on the touch screen before the iControl 2 software loads.
4. Use the mouse to move the cursor to the CAL button and click on it. The touch screen calibration procedure starts.

NOTE: If the CAL button was missed, allow the iControl 2 software to load, then, if possible, open the System Configuration screen and touch the Program Shutdown button. When the operating system shutdown prompt appears on the screen, touch the Cancel button, then the CAL button. If unable to touch any buttons on the screen, then cycle the console power and try again (go back to Step 1).

5. Once the calibration procedure starts, USE YOUR FINGER, NOT THE MOUSE, to touch the calibration targets, following the instructions on the screen carefully. When you have completed the calibration procedure, touch the iControl 2 button to start the iControl 2 software.
6. Test the touch screen calibration, then perform a program shutdown, turn off console power, and disconnect the mouse. Close the iControl 2 cabinet door before restarting the system.

No Touch Screen Display

Check the following:

- Check the power LED on the front bezel below the screen. If the LED is not lit then the PC is not powered up.
- Make sure the system power switch is on.
- Make sure the video and serial cables between the PC and the touch screen is connected.

Have an electrician check the following:

- Console fuses on the DIN rail, at the incoming power terminals
- Unswitched power connections to the fuse blocks
- Power supply to the console
- 12 Vdc supply to the touch screen
- 24 Vdc supply to the PC

Touch Screen Failure

WARNING: Do not spray powder with the iControl 2 console door open unless the console opening, the door, and all externally connected devices are out of the hazardous area surrounding any opening of the spray booth. The hazardous area extends three feet outward from an opening and continues in a three foot arc from the edge of an opening. Failure to observe this warning could create a hazardous condition and could result in personal injury or property damage.

Screens Display, but Touch Function Does Not Work

If the mouse pointer on the screen does not move to wherever screen was touched, or nothing happens buttons are touched, or the touch screen cannot be calibrated, then the touch screen has failed. Replace the iControl 2 PC.

Temporary Fix: Connect a USB mouse to the iControl 2 PC. You should now be able to use the mouse to point and click on screen buttons and data fields. Replace the iControl 2 PC as soon as possible.

No Display

If the PC has power but nothing displays on the screen, then the screen has failed. You must replace the iControl 2 PC.

Temporary Fix: Shut off console power and connect a VGA monitor, keyboard, and mouse to the PC ports. Turn console power on. If the boot screens and iControl 2 screens display on the VGA monitor, you can use the mouse to click on buttons and select fields and use the keyboard to enter and change values. Replace the iControl 2 PC as soon as possible.

Section 5
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 2 program and operating system on the program card. Refer to *Program Shutdown in the Configuration* section of the *iControl Operator Interface* manual for the shutdown procedure.

WARNING: Hazardous voltages exist within the iControl 2 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 console or pedestal that can be repaired by the customer except for the iFlow modules.

Refer to the pneumatic and wiring diagrams in Section 7 for connections.

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

Spray Gun Control Card Removal/Installation

Replacing a Spray Gun Control Card

WARNING: Do not remove spray gun control cards from the card cage while they are powered. Either shut off console power or shut off the booth exhaust fan so that the interlock will remove power from the spray gun control cards. Failure to observe this warning could result in damage to the cards.

CAUTION: Do not turn off console power without first performing a program shutdown. Doing so could corrupt the iControl 2 program and operating system on the program card. Refer to *Program Shutdown in the Configuration* section of the *iControl Operator Interface* manual for the shutdown procedure.

CAUTION: The spray 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 2 enclosure or other ground. Handle the cards only by their top and bottom edges.

See Figure 5-1. Spray gun control cards (2) are installed in the card cage from left to right. Each card controls two spray guns: the bottom receptacle is the odd spray gun number; the top receptacle is the even spray gun number.

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

To install a new card, slide the card into the slots in the card cage and seat the card's finger board firmly into the connector slot on the backplane (6). Push the locking tab up to lock the card into the card cage. Connect the spray gun harness to the two receptacles on the card.

Adding Spray Guns

If the console has an odd number of spray guns, it is possible to add another spray gun without adding another spray gun control card. If the console has an even number of spray guns less than 16, add more spray guns by installing a new spray gun control card in an unused slot. Refer to *System Upgrades* in the Installation section for more information on adding spray guns to an existing system.

For either scenario, open the Guns and Consoles configuration screen, increase the number of spray guns, and reboot the system before the new spray guns will be recognized.

NOTE: Cards are installed in the card cage from left to right. Spray guns are numbered from left to right and bottom to top.

Replacing A Card

If replacing an existing card, turn off the booth exhaust fan first, then replace the card. When turning on the booth exhaust fan, the green watchdog LED should blink. Since the card ID has changed, the red fault LED on the card will light and a fault message will appear on the Alarm screen. To reset the fault LED, open the Alarm screen and touch the Clear All Faults button.

Spray Gun Connector Configuration on Card

17	19	21	23	25	27	29	31
18	20	22	24	26	28	30	32
2	4	6	8	10	12	14	16
1	3	5	7	9	11	13	15

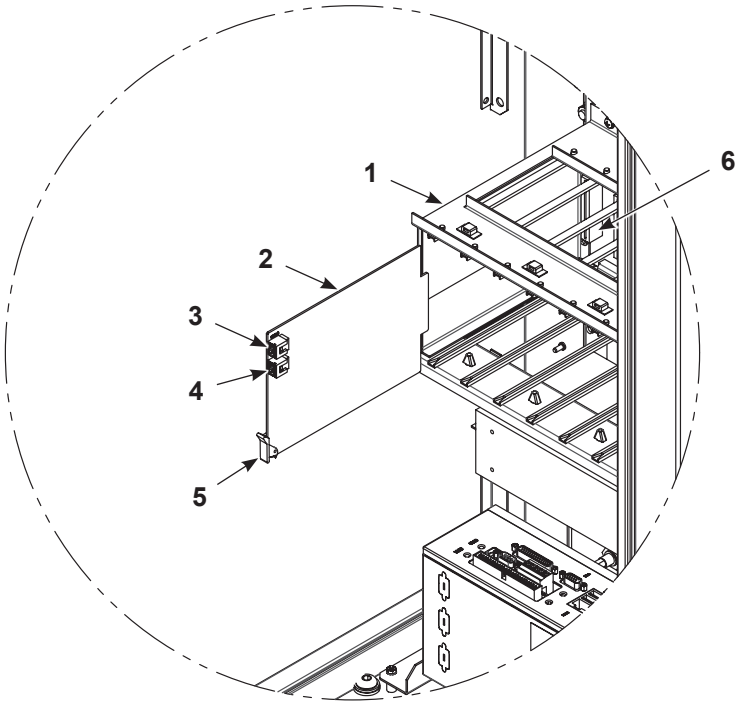


Figure 5-1 Spray Gun Control Card Replacement

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

Ribbon Cable Connections

CAUTION: Plugging in a ribbon cable the wrong way may damage the cable or the circuit boards when power is applied. Reversing the ribbon cable polarity of the cable from the iControl 2 computer to the I/O card will cause catastrophic failure of the PC I/O card. Make sure the cables are connected correctly.

The ribbon cables are keyed so that they can only be plugged in one way. If the cables are not keyed, replace them as soon as possible with keyed cables. I/O card replacements are shipped with a new cable.

The ribbon cables have a red or blue trace that designates the pin 1 side of the cable. Plug the cables into the circuit boards with the tracer aligned with pin 1 on the board. Pin 1 is designated by a 1 printed on the I/O board and a square on the computer.

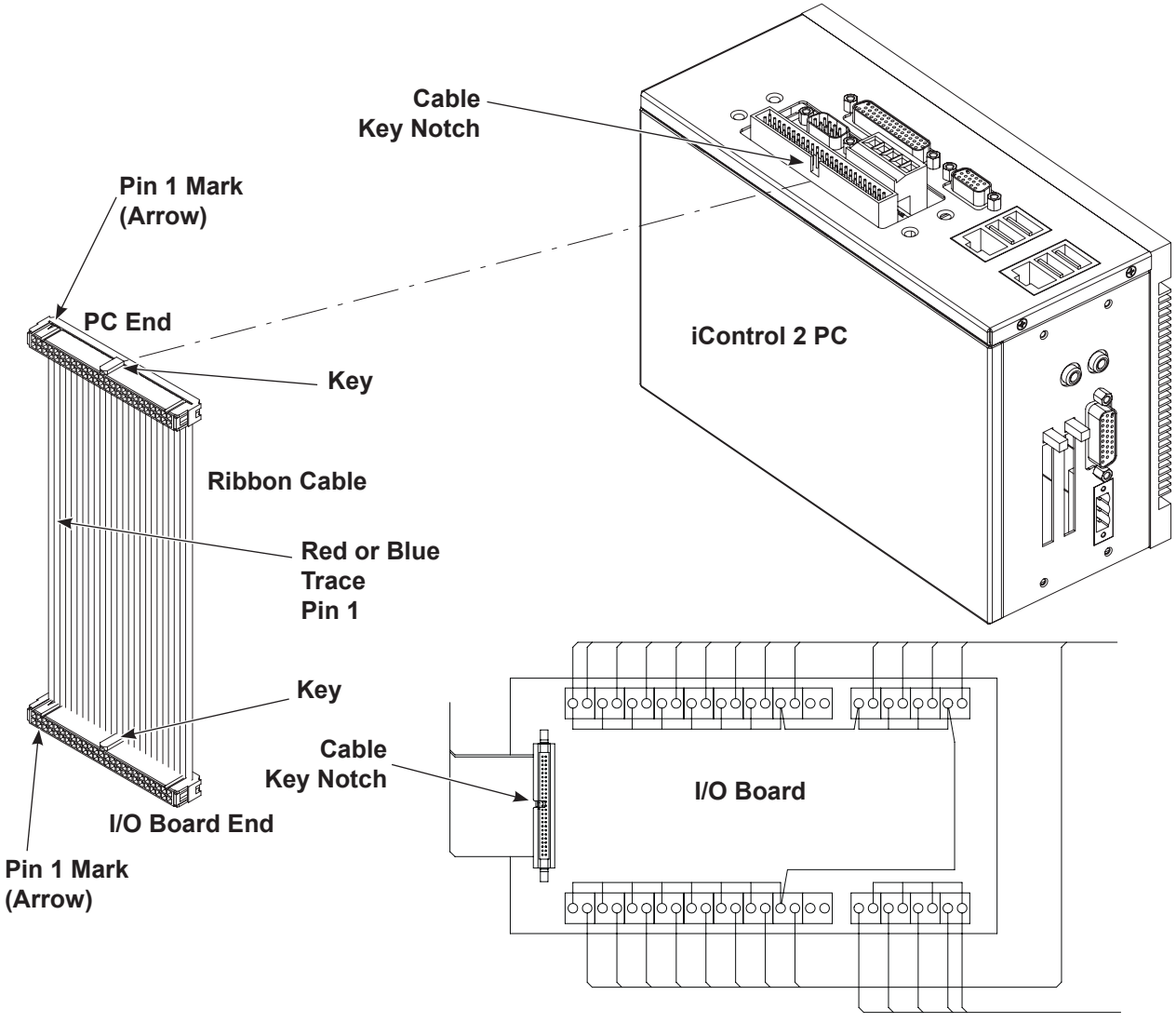


Figure 5-2 PC−I/O Board Ribbon Cable Connections

Touch Screen Replacement

NOTE: Gaskets are glued to the console and pedestal around the display opening. Do not damage or remove these gaskets as that will destroy the dust-tight integrity of the enclosure and void agency approvals.

1. Power off the iControl 2 system.
2. Disconnect the video cable, touch screen serial cable, and power cable harness from the back of the old touch screen unit and set aside.

See Figure 5-3.

3. Remove the mounting nuts (3) from the mounting clamp (2) and set aside.
4. Install the replacement touch screen (1) onto the mounting clamp (2) and tighten all mounting nuts (3) to 2.5 N•m (22 in-lb).

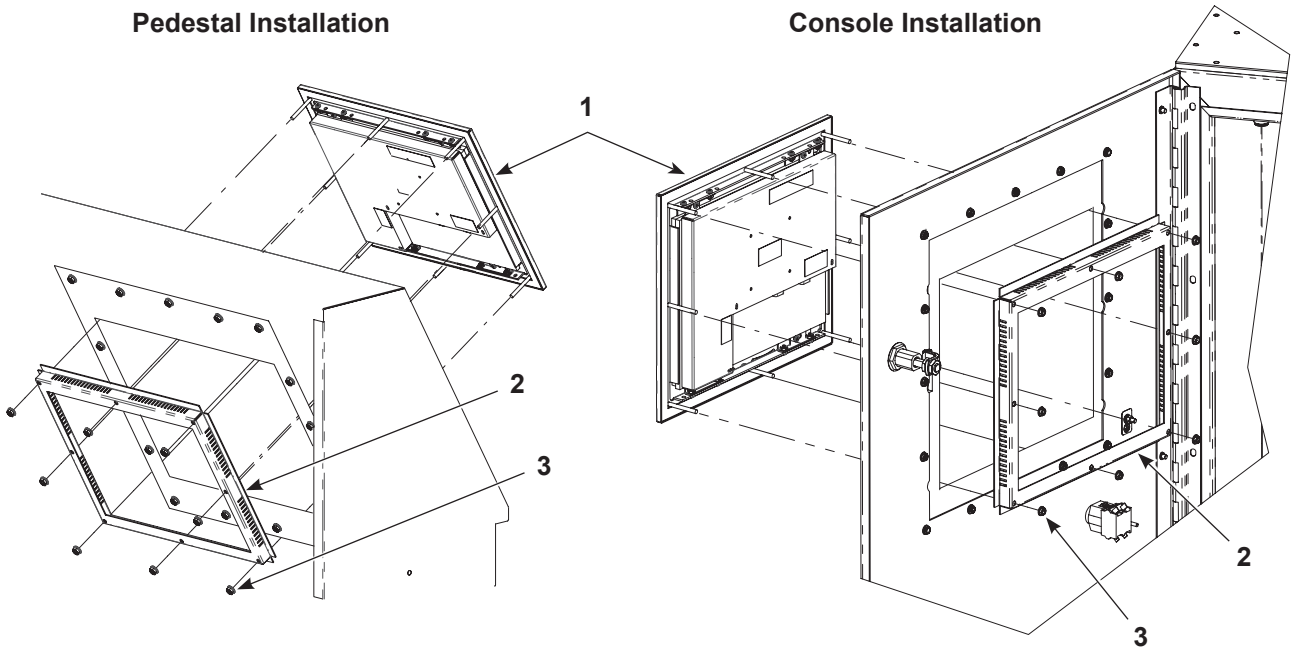


Figure 5-3 Touch Screen Replacement

1. Touch screen
2. Mounting clamp
3. Mounting nut

Touch Screen Replacement *(contd)*

See Figure 5-4.

4. Connect the touch screen serial cable to the touch screen serial port (6) the same way as the original.
5. Connect the video cable to the touch screen video cable port (5).
6. Connect the power cable harness (7) to the touch screen terminal block (4), as shown.

NOTE: The touch screen is calibrated at the factory. If changing the program card, replacing the iControl 2 PC, or having problems touching screen components accurately, recalibrate the screen using the Touch Screen Calibration instructions in the *Encore iControl 2 Integrated Control System* manual.

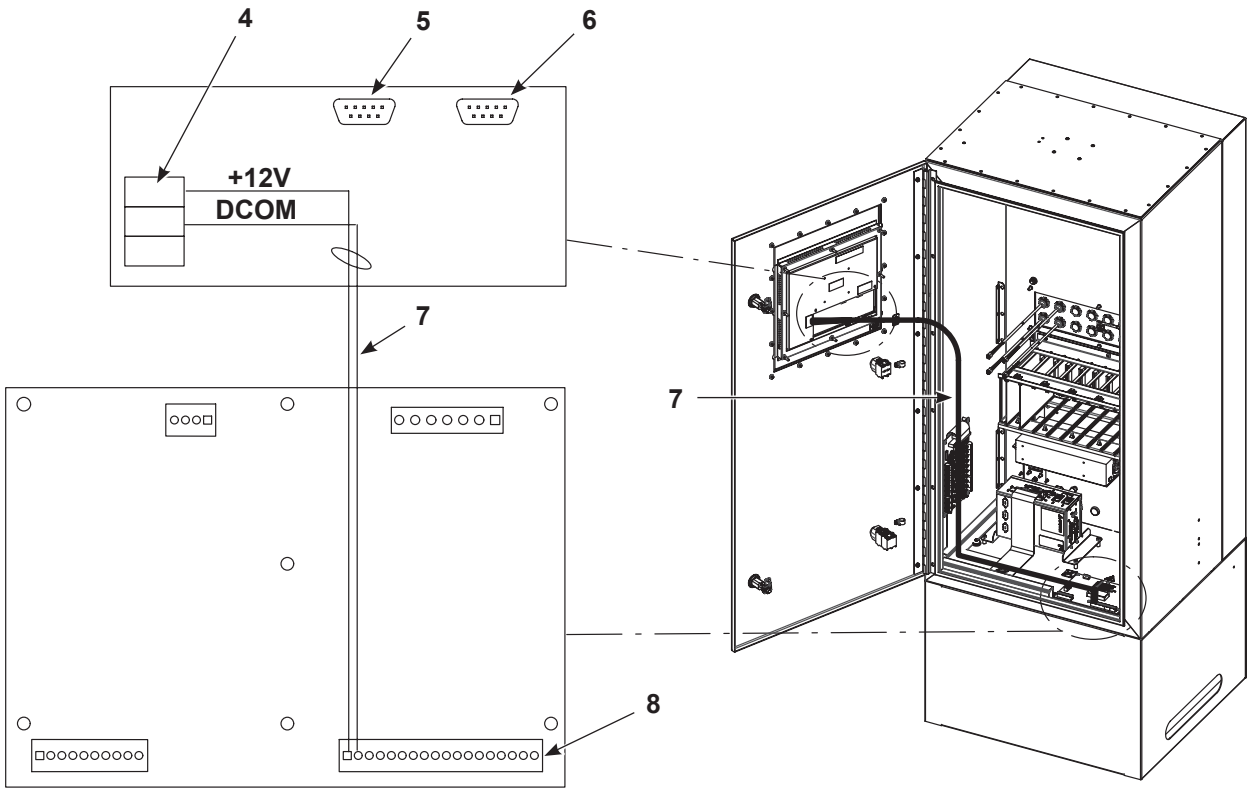


Figure 5-4 Touch Screen Connections

4. Touch screen terminal block
5. Video port
6. Touch screen serial port
7. Power cable harness
8. Relay board terminal block

Section 6
Parts

Introduction

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

iControl 2 Controllers

Part	Description	Note
Main Consoles		
1609712	CONTROLLER, Encore HD, iControl 2, 4 gun, main console	
1609713	CONTROLLER, Encore HD, iControl 2, 6 gun, main console	
1609714	CONTROLLER, Encore HD, iControl 2, 8 gun, main console	
1609715	CONTROLLER, Encore HD, iControl 2, 10 gun, main console	
1609716	CONTROLLER, Encore HD, iControl 2, 12 gun, main console	
1609717	CONTROLLER, Encore HD, iControl 2, 14 gun, main console	
1609718	CONTROLLER, Encore HD, iControl 2, 16 gun, main console	
1609719	CONTROLLER, Encore HD, iControl 2, 18 gun, main console	
1609720	CONTROLLER, Encore HD, iControl 2, 20 gun, main console	
1609721	CONTROLLER, Encore HD, iControl 2, 22 gun, main console	
1609722	CONTROLLER, Encore HD, iControl 2, 24 gun, main console	
1609723	CONTROLLER, Encore HD, iControl 2, 26 gun, main console	
1609724	CONTROLLER, Encore HD, iControl 2, 28 gun, main console	
1609725	CONTROLLER, Encore HD, iControl 2, 30 gun, main console	
1609726	CONTROLLER, Encore HD, iControl 2, 32 gun, main console	
Main Consoles with Pedestal		
1609727	CONTROLLER, Encore HD, iControl 2, 4 gun, main console with pedestal	
1609728	CONTROLLER, Encore HD, iControl 2, 6 gun, main console with pedestal	
1609729	CONTROLLER, Encore HD, iControl 2, 8 gun, main console with pedestal	
1609730	CONTROLLER, Encore HD, iControl 2, 10 gun, main console with pedestal	
1609731	CONTROLLER, Encore HD, iControl 2, 12 gun, main console with pedestal	
1609732	CONTROLLER, Encore HD, iControl 2, 14 gun, main console with pedestal	
1609733	CONTROLLER, Encore HD, iControl 2, 16 gun, main console with pedestal	
1609734	CONTROLLER, Encore HD, iControl 2, 18 gun, main console with pedestal	
1609735	CONTROLLER, Encore HD, iControl 2, 20 gun, main console with pedestal	
1609736	CONTROLLER, Encore HD, iControl 2, 22 gun, main console with pedestal	

Continued...

Part	Description	Note
Main Consoles with Pedestal (cont...)		
1609737	CONTROLLER, Encore HD, iControl 2, 24 gun, main console with pedestal	
1609738	CONTROLLER, Encore HD, iControl 2, 26 gun, main console with pedestal	
1609739	CONTROLLER, Encore HD, iControl 2, 28 gun, main console with pedestal	
1609740	CONTROLLER, Encore HD, iControl 2, 30 gun, main console with pedestal	
1609741	CONTROLLER, Encore HD, iControl 2, 32 gun, main console with pedestal	
Auxiliary Consoles		
1609742	CONTROLLER, Encore HD, iControl 2, 4 gun, auxiliary console	
1609743	CONTROLLER, Encore HD, iControl 2, 6 gun, auxiliary console	
1609744	CONTROLLER, Encore HD, iControl 2, 8 gun, auxiliary console	
1609745	CONTROLLER, Encore HD, iControl 2, 10 gun, auxiliary console	
1609746	CONTROLLER, Encore HD, iControl 2, 12 gun, auxiliary console	
1609747	CONTROLLER, Encore HD, iControl 2, 14 gun, auxiliary console	
1609748	CONTROLLER, Encore HD, iControl 2, 16 gun, auxiliary console	
1609749	CONTROLLER, Encore HD, iControl 2, 18 gun, auxiliary console	
1609750	CONTROLLER, Encore HD, iControl 2, 20 gun, auxiliary console	
1609751	CONTROLLER, Encore HD, iControl 2, 22 gun, auxiliary console	
1609752	CONTROLLER, Encore HD, iControl 2, 24 gun, auxiliary console	
1609753	CONTROLLER, Encore HD, iControl 2, 26 gun, auxiliary console	
1609754	CONTROLLER, Encore HD, iControl 2, 28 gun, auxiliary console	
1609755	CONTROLLER, Encore HD, iControl 2, 30 gun, auxiliary console	
1609756	CONTROLLER, Encore HD, iControl 2, 32 gun, auxiliary console	

Interconnect Cables

Part	Description	Note
1603260	CABLE INTERCONNECT, CB1, 15 meter, iControl 2 (to pump panel)	A
1603261	CABLE INTERCONNECT, PJ2, 15 meter, iControl 2 (Aux to Pedestal)	
1603262	CABLE INTERCONNECT, PJ2, 30 meter, iControl 2 (Aux to Pedestal)	
1603657	CABLE INTERCONNECT, CA1, 10 meter, Plug-N-Spray	B
1603665	CABLE INTERCONNECT, PM1, 10 meter, Plug-N-Spray	C
1603282	CABLE INTERCONNECT, Ethernet, male/female, 10 meter	D
1603256	HARNESS, interconnect, PJ1, iControl 2 with pedestal, 15 meter (Aux to Pedestal)	
1602711	HARNESS, interconnect, PJ1, iControl 2 with pedestal, 30 meter (Aux to Pedestal)	
1602871	HARNESS, part ID, PD1, iControl 2 (Main Console to part ID Junction Box)	E
1603103	CABLE, AC power, 10 meter, auxiliary, iControl	F
1604310	CABLE, interconnect, CA1, 15 meter, Plug-N-Spray	G
1604311	CABLE, interconnect, CA1, 15 meter, Plug-N-Spray, auxiliary	H

NOTE:
A. CAN Network − Main Console or Auxiliary Console (CB1) to pump panel.
B. Power − Main Electrical Control Panel to Main Console (CA1).
C. Ethernet − Main Electrical Control Panel to Main Console (PM1).
D. Ethernet − Main Electrical Control Panel to Part ID Junction Box (PM2).
E. Power and Signals − Main Console to Part ID Junction Box (PD1).
F. Power − Main Electrical Control Panel to Auxiliary Console (CA1).
G. Extended length replacement for 1603657.
H. Extended length replacement for 1603103.

Main/Auxiliary Console Parts

See Figure 6-1 for the location of the parts listed in this table:

Item	Part	Description	Quantity	Note
1	939122	SEAL, conduit fitting, blue	AR	
2	984526	NUT, lock, 1/2 in. conduit	AR	
3	334800	PLUG, 1/2 in. Pipe, 1 in. hex	AR	
4	1609937	PLATE, blanking, cable gland, iControl 2 HD	AR	A

NOTE: A. Not used on systems with over 16 spray guns.

AR: As Required

Continued...

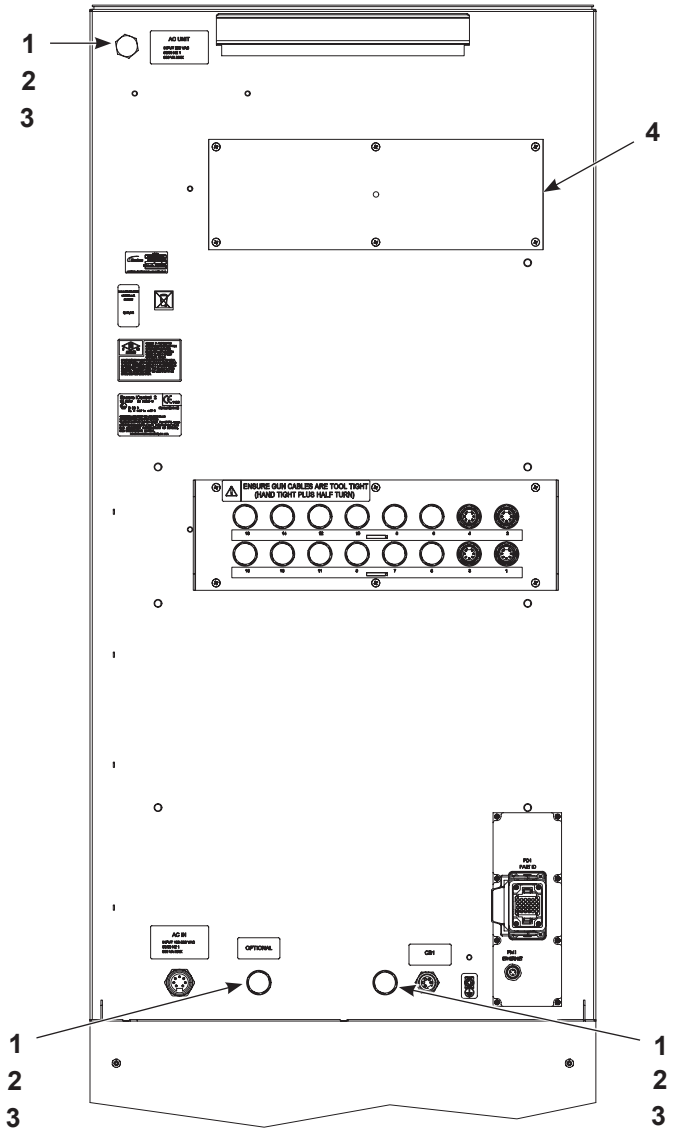


Figure 6-1 Main and Auxiliary Console Parts − Rear View (1 of 3)

Main/Auxiliary Console Parts *(contd)*

See Figure 6-2 for the location of the parts listed in the this table:

Item	Part	Description	Quantity	Note
5	1609938	FAN ASSEMBLY, iControl 2 HD	1	
6	−−−−−−	GASKET, control cabinet, iControl 2	1	
7	1608095	KIT, iControl 2, display, touch screen w/ cable	1	A, D
7A	−−−−−−	GASKET, bezel, iControl	1	A
8	1602710	RECEPTACLE 8-POSITION, gun, 0.4 m	1	B
9	−−−−−−	JUMPER, gun ID, odd number	1	C
10	1000594	SWITCH, keylock, 3-position	1	A
11	1000595	CONTACT BLOCK, 1-N.O. And 1-N.C. contact	1	A
12	1610643	PANEL, sub main control, iControl HD 2	AR	
13	1107144	KIT, Encore dual gun driver PCA	AR	B
14	1098442	POWER SUPPLY, 400W, +24V, +/−12V, +5V, 5 slot	1	
15	−−−−−−	CPU, Arbor, iControl 2, Rev 2	1	A, E
16	−−−−−−	KIT, software, iControl	1	A
16A	−−−−−−	• MEMORY, programmed, iControl	1	
16B	1034281	• MEMORY, Compact Flash (blank, for user data)	1	
17	334806	SWITCH, round, 2-position, 90 degree	1	
18	288806	CONTACT BLOCK, 2-N.O. contacts	2	
19	−−−−−−	ASSEMBLY, module, digital input, iControl 2	1	A
20	1602718	• CABLE, ribbon, iControl 2	1	A

NOTE: A. If using pedestal, these items will be located in the pedestal.

B. One card drives two automatic spray guns. One receptacle is used for each gun.

C. Plug into unused gun card receptacle when gun is not used. Prevents the fault LED from lighting when an odd number of guns is connected to the card.

D. Both the long and short power cable harnesses are provided in the touch screen installation kit. Use the long power cable harness for console installations.

E. When replacing Arbor PC, order kit 1612971, which includes a Rev 2 Arbor PC and new programmed CompactFlash.

AR: As Required

Continued...

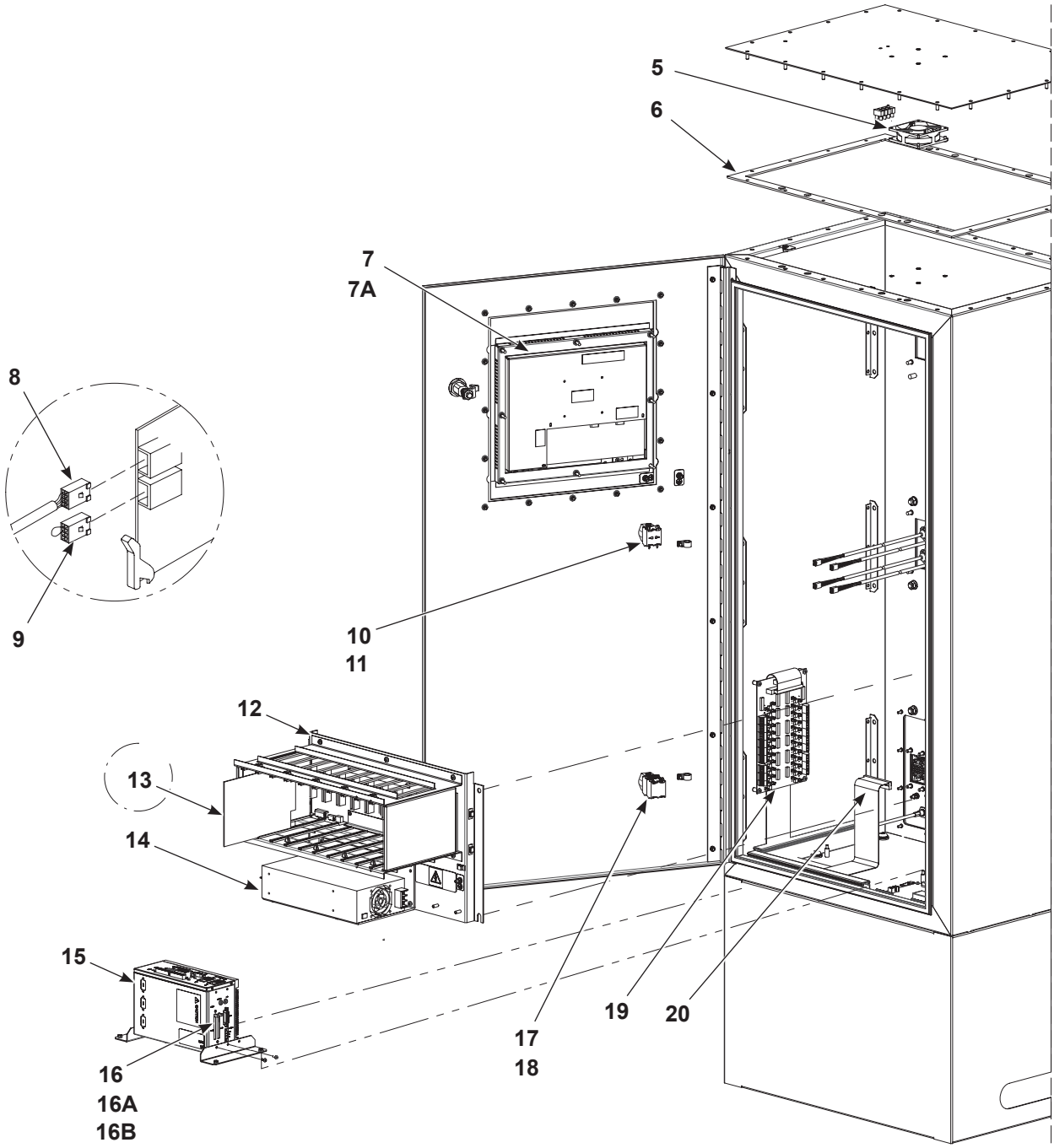


Figure 6-2 Main and Auxiliary Console Parts − Internal Components (2 of 3)

Main/Auxiliary Console Parts *(contd)*

See Figure 6-3 for the location of the parts listed in the this table:

Item	Part	Description	Quantity	Note
21	1603591	PCA, relay board, iControl 2	1	
22	1609757	POWER SUPPLY, DIN, 115/230 Vac, 24 Vdc, 120 W	1	
23	1609928	TERMINAL BLOCK, AC/DC convertor and fuse	1	
23A	------	• FUSE, 4A, fast-acting, 250 V, 5 x 2	2	
23B	------	• FUSE, 10A, fast-acting, 250 V	2	
24	334805	FILTER, line, RFI, power, 10A	2	A
NS	240976	CLAMP, ground, with wire	1	
NOTE: A. One line filter used in auxiliary console.				

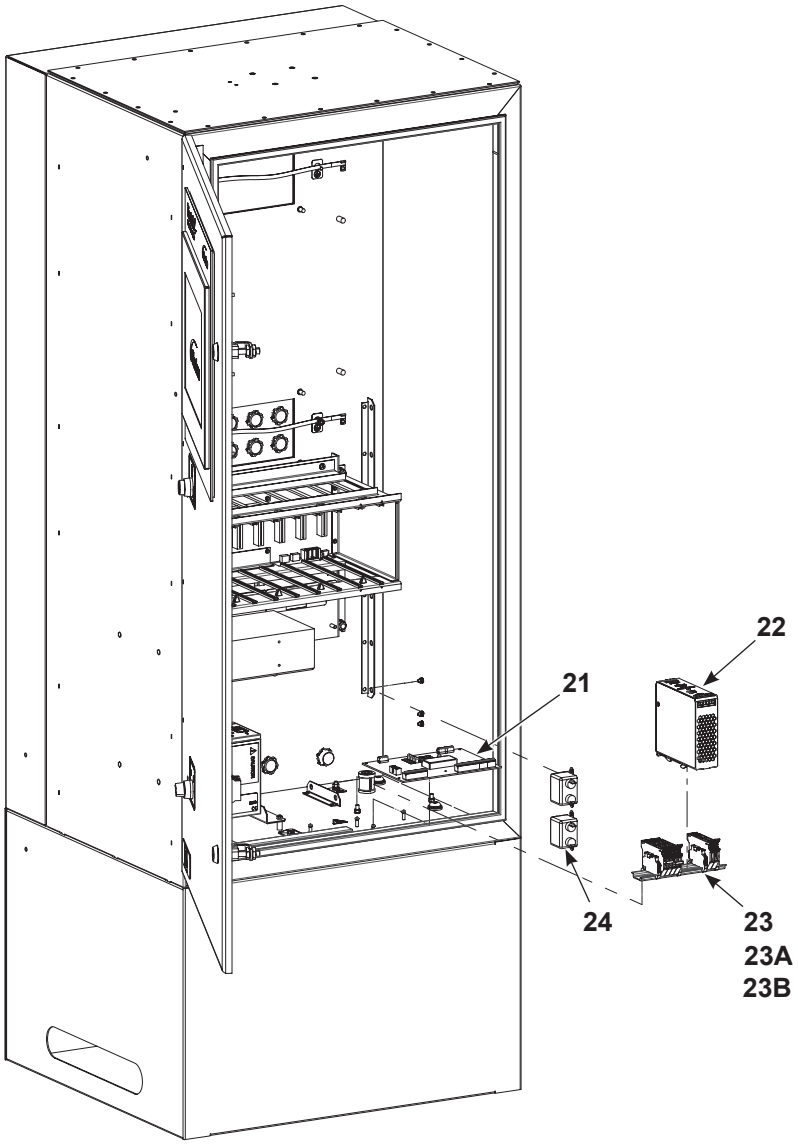


Figure 6-3 Main and Auxiliary Console Parts − Internal Components (3 of 3)

Pedestal Parts

See Figure 6-4 for the parts listed in this table:

Item	Part	Description	Quantity	Note
1	1608095	KIT, iControl 2, display, touch screen w/ cable	1	A
2	1000594	SWITCH, keylock, 3-position	1	
3	1000595	CONTACT BLOCK, 1-N.O. And 1-N.C. contact	1	
4	1602873	ASSEMBLY, module, digital input, iControl 2 pedestal	1	
5	1602967	TERMINAL BLOCK, pedestal, iControl 2	1	
6	------	CPU, Arbor, iControl 2, Rev 2	1	B
6A	------	MEMORY, programmed, iControl	1	
6B	1034281	MEMORY, compact flash (blank, for user data)	1	

NOTE: A. Both the long and short power cable harnesses are provided in the kit. Use the short power cable harness for pedestal installations.

B. When replacing Arbor PC, order kit 1612971, which includes a Rev 2 Arbor PC and new programmed CompactFlash.

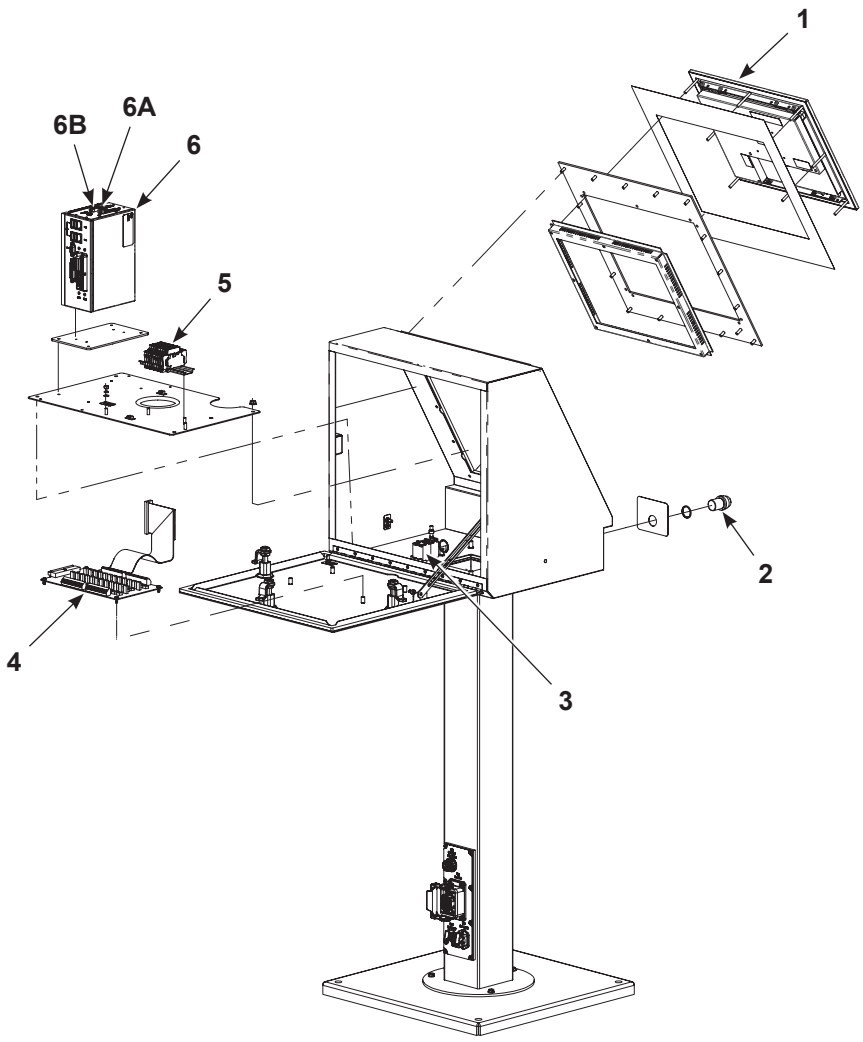


Figure 6-4 Pedestal Parts

Options

Miscellaneous Kits

Part	Description	Note
1603093	Kit, air conditioner, iControl 2	

Conveyor Encoder

Part	Description	Note
1074261	ENCODER, 24 PPR, w/cable	

Photocells and Scanners

Part	Description	Note
1037969	PHOTOCELL, wire goods	
131473	SENSOR, opposed mode emitter (Banner SM31E)	
131486	SENSOR, opposed mode receiver (Banner SM31R)	
170730	PHOTOCELL, retroreflective	
321158	CONTROLLER, analog, mini-array	A
321159	CONTROLLER, discrete, mini-array	A
321160	SENSOR, light emitter, 6 in., 3/4 in.beam spacing, 8 beam	
321161	SENSOR, light receiver, 6 in., 3/4 in.beam spacing, 8 beam	
321162	SENSOR, light emitter, 12 in., 3/4 in.beam spacing, 16 beam	
321163	SENSOR, light receiver, 12 in., 3/4 in.beam spacing, 16 beam	
321164	SENSOR, light emitter, 18 in., 3/4 in. beam spacing, 24 beam	
321165	SENSOR, light receiver, 18 in., 3/4 in. beam spacing, 24 beam	
339739	SENSOR, light emitter, 24 in., 3/4 in. beam spacing, 32 beam	
339740	SENSOR, light receiver, 24 in., 3/4 in. beam spacing, 32 beam	
339741	SENSOR, light emitter, 30 in., 3/4 in. beam spacing, 40 beam	
339742	SENSOR, light receiver, 30 in., 3/4 in. beam spacing, 40 beam	
339743	SENSOR, light emitter, 36 in., 3/4 in. beam spacing, 48 beam	
339744	SENSOR, light receiver, 36 in., 3/4 in. beam spacing, 48 beam	
339745	SENSOR, light emitter, 42 in., 3/4 in. beam spacing, 56 beam	
339746	SENSOR, light receiver, 42 in., 3/4 in. beam spacing, 56 beam	
339747	SENSOR, light emitter, 48 in., 3/4 in. beam spacing, 64 beam	
339748	SENSOR, light receiver, 48 in., 3/4 in. beam spacing, 64 beam	
339749	SENSOR, light emitter, 60 in., 3/4 in. beam spacing, 80 beam	
339750	SENSOR, light receiver, 60 in., 3/4 in. beam spacing, 80 beam	
339751	SENSOR, light emitter, 72 in., 3/4 in. beam spacing, 96 beam	
339752	SENSOR, light receiver, 72 in., 3/4 in. beam spacing, 96 beam	
NOTE: A. Requires custom programming to match the application. Contact Nordson customer support.		

Photocell and Scanner Cables

Part	Description	Note
−−−−−−	SOW cable, 18−4	
321155	CABLE, scanner, 15 ft.	
321156	CABLE, scanner, 25 ft.	
321157	CABLE, scanner, 50 ft.	
343207	CABLE, scanner rated, 15 ft.	
347230	CABLE, input, 5 wire, 6 meter, male	

Section 7
Drawings

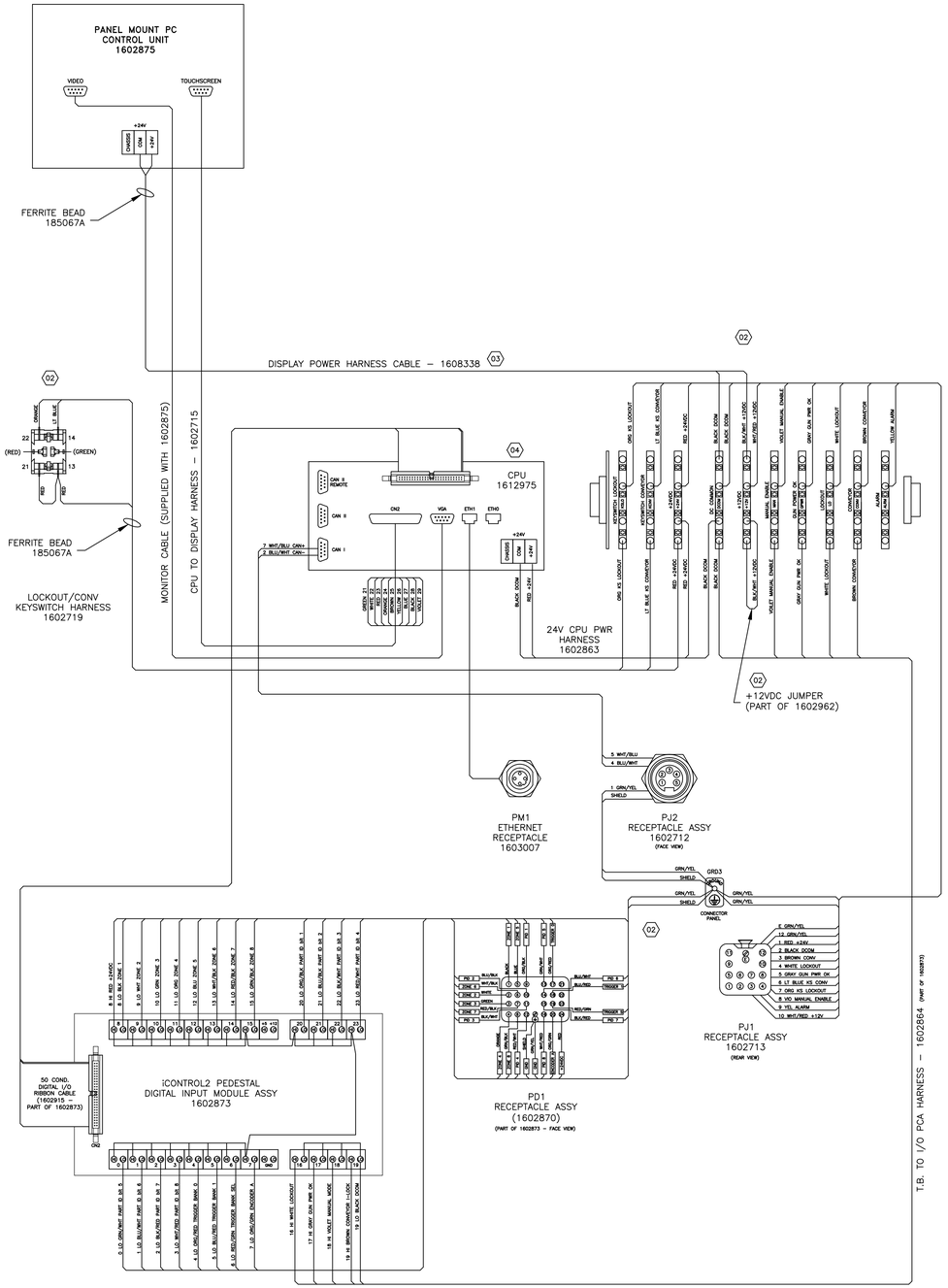
Refer to the following foldout wiring diagrams and schematics for the main and auxiliary consoles.

NOTE: Visit Nordson eManuals for a high-resolution view of the wiring diagrams and schematics. Go to http://emanuals.nordson.com for electronic version of the manual for *Encore HD iControl 2 Integrated Control System* manual.

Number	Description
10015536	iControl 2 Wiring Diagram (16 spray guns or less)
10015537	iControl 2 Wiring Diagram with Pedestal and Auxiliary (16 spray guns or less)
10012146	iControl 2 Pedestal Wiring Diagram
10012177	iControl 2 with Pedestal System Schematic

MATERIAL NO. 10012146 REVISION 04

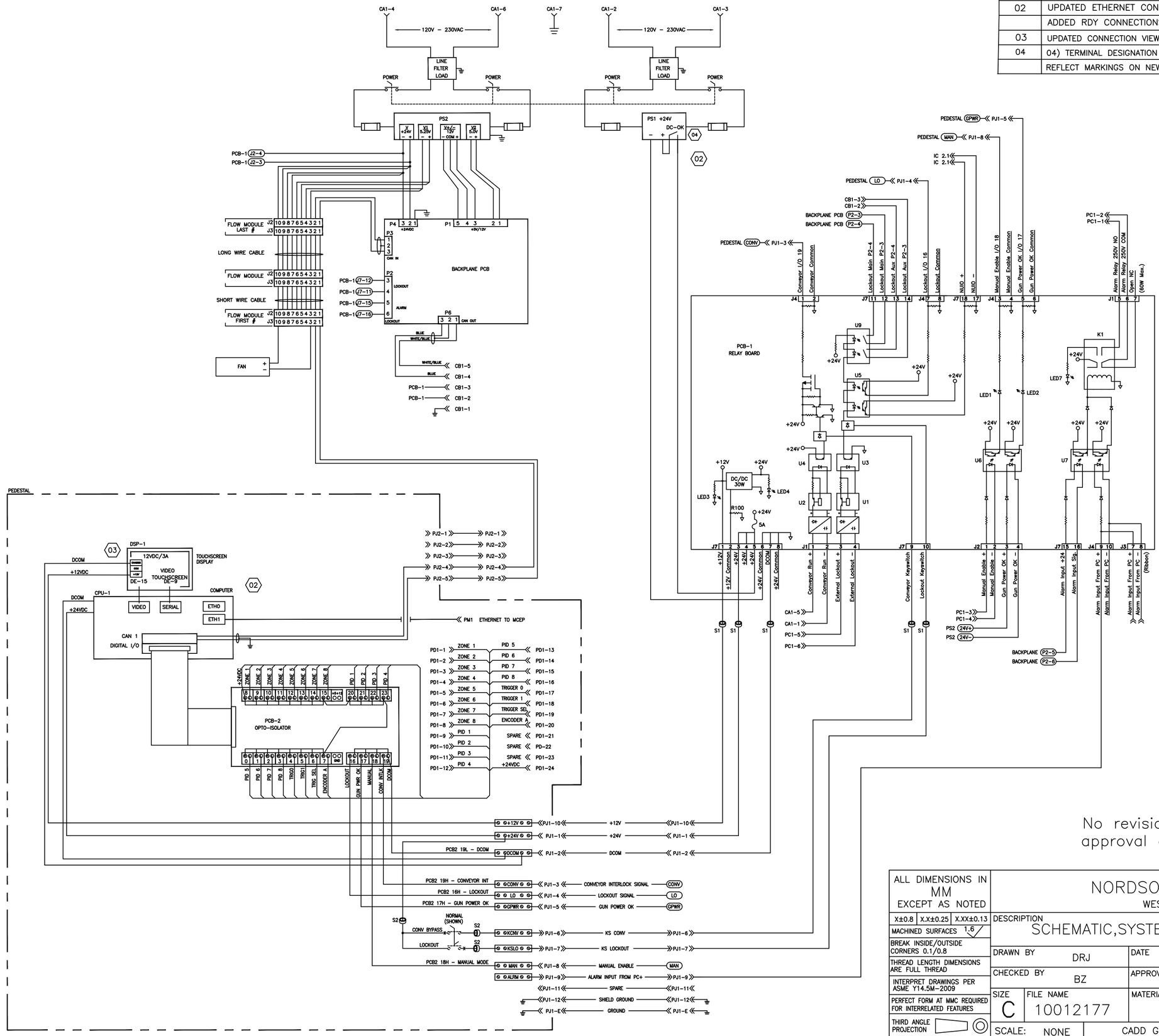
ZONE	CHG LET	REVISION	BY	CHK	ECR NO.	DATE
	00	PRELIMINARY.	DRJ			29JAN13
	01	RELEASED FOR PRODUCTION.	DRJ	BZ	PE603028	26MAR13
	02	ROTATED LOCKOUT/BYPASS CONTACT BLOCK;	DRJ	BZ	PE603484	20JAN14
		REV'D GND & TERMINAL BLOCK CONNECTIONS				
		TO ACTUAL BUILD; ADDED +12VDC JUMPER.				
	03	WAS 1609621	MP	DU	PE604341	29JUL15
C-5	04	04) CPU P/N WAS 1602868	MHH	MM	PE605652	06FEB18



CRITICAL
No revisions permitted without
approval of the proper agency

ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145	
X±0.8 | X.X±0.25 | X.XX±0.13	DESCRIPTION	WIRING DIAGRAM,ICONTROL2 PEDESTAL
MACHINED SURFACES 1.6		
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY DRJ	DATE 29JAN13 / RELEASE NO. PE603028
THREAD LENGTH DIMENSIONS ARE FULL THREAD	CHECKED BY BZ	APPROVED BY BZ
INTERPRET DRAWINGS PER ASME Y14.5M-2009	SIZE D	FILE NAME 10012146 / MATERIAL NO. 10012146 / REVISION 04
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES		
THIRD ANGLE PROJECTION	SCALE: NONE	CADD GENERATED DWG. / SHEET 1 OF 1

CHG LET	REVISION	BY	CHK	ECR NO.	DATE
00	PRELIMINARY.	DRJ			01FEB13
01	RELEASED FOR PRODUCTION.	DRJ	BZ	PE603028	26MAR13
02	UPDATED ETHERNET CONNECTORS ON CPU;	DRJ	BZ	PE603484	23JAN14
	ADDED RDY CONNECTIONS ON PS1.				
03	UPDATED CONNECTION VIEW	MP	DU	PE604341	29JUL15
04	04) TERMINAL DESIGNATION ON PS1 REVISED TO	DC	DLU	PE-100329	03MAY18
	REFLECT MARKINGS ON NEW POWER SUPPLY.				



CRITICAL
No revisions permitted without approval of the proper agency

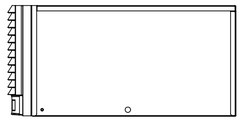
ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145	
X±0.8 X.X±0.25 X.XX±0.13	DESCRIPTION SCHEMATIC,SYSTEM,ICONTROL2 W/PEDESTAL	
MACHINED SURFACES 1.6		
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY DRJ	DATE 01FEB13
THREAD LENGTH DIMENSIONS ARE FULL THREAD	CHECKED BY BZ	APPROVED BY BZ
INTERPRET DRAWINGS PER ASME Y14.5M–2009		RELEASE NO. PE603028
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES	SIZE C / FILE NAME 10012177	MATERIAL NO. 10012177 / REVISION 04
THIRD ANGLE PROJECTION	SCALE: NONE	CADD GENERATED DWG. / SHEET 1 OF 1

MATERIAL NO. 10012177 REVISION 04

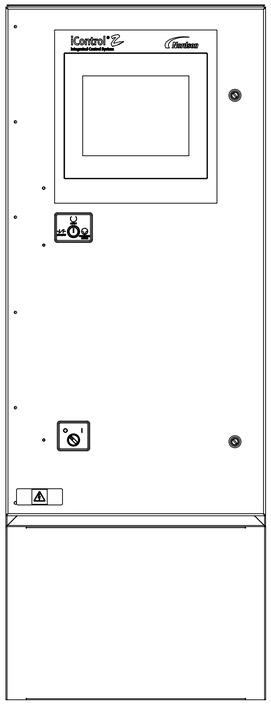
MATERIAL NO. 10015390 REVISION 02

ZONE	REV	DESCRIPTION	BY	CHK	RELEASE NO.	DATE
	01	RELEASED	MP	BF	PE604589	18AUG16
	02	ADDED 1624523 TO CHART	TAL	CG	PE-107163	07MAY24

AIR CONDITIONING UNIT
1603093

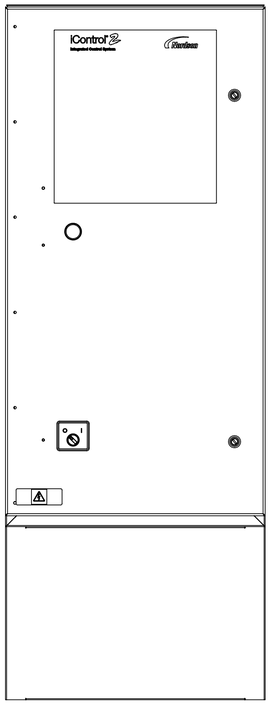


MAIN CONSOLE



1609712 CONT,ENCORE HD,ICONTROL 2,4G,MAIN CONSL
1609713 CONT,ENCORE HD,ICONTROL 2,6G,MAIN CONSL
1609714 CONT,ENCORE HD,ICONTROL 2,8G,MAIN CONSL
1609715 CONT,ENCORE HD,ICONTROL 2,10G,MAIN CONSL
1609716 CONT,ENCORE HD,ICONTROL 2,12G,MAIN CONSL
1609717 CONT,ENCORE HD,ICONTROL 2,14G,MAIN CONSL
1609718 CONT,ENCORE HD,ICONTROL 2,16G,MAIN CONSL
1609719 CONT,ENCORE HD,ICONTROL 2,18G,MAIN CONSL
1609720 CONT,ENCORE HD,ICONTROL 2,20G,MAIN CONSL
1609721 CONT,ENCORE HD,ICONTROL 2,22G,MAIN CONSL
1609722 CONT,ENCORE HD,ICONTROL 2,24G,MAIN CONSL
1609723 CONT,ENCORE HD,ICONTROL 2,26G,MAIN CONSL
1609724 CONT,ENCORE HD,ICONTROL 2,28G,MAIN CONSL
1609725 CONT,ENCORE HD,ICONTROL 2,30G,MAIN CONSL
1609726 CONT,ENCORE HD,ICONTROL 2,32G,MAIN CONSL

AUXILIARY CONSOLE



1609742 CONT,ENCORE HD,ICONTROL 2,4G,AUX
1609743 CONT,ENCORE HD,ICONTROL 2,6G,AUX
1609744 CONT,ENCORE HD,ICONTROL 2,8G,AUX
1609745 CONT,ENCORE HD,ICONTROL 2,10G,AUX
1609746 CONT,ENCORE HD,ICONTROL 2,12G,AUX
1609747 CONT,ENCORE HD,ICONTROL 2,14G,AUX
1609748 CONT,ENCORE HD,ICONTROL 2,16G,AUX
1609749 CONT,ENCORE HD,ICONTROL 2,18G,AUX
1609750 CONT,ENCORE HD,ICONTROL 2,20G,AUX
1609751 CONT,ENCORE HD,ICONTROL 2,22G,AUX
1609752 CONT,ENCORE HD,ICONTROL 2,24G,AUX
1609753 CONT,ENCORE HD,ICONTROL 2,26G,AUX
1609754 CONT,ENCORE HD,ICONTROL 2,28G,AUX
1609755 CONT,ENCORE HD,ICONTROL 2,30G,AUX
1609756 CONT,ENCORE HD,ICONTROL 2,32G,AUX

ENCORE HD iCONTROL 2

THE FOLLOWING CONTROLLERS ARE SUITABLE FOR UNCLASSIFIED LOCATIONS

1609712 CONT,ENCORE HD,ICONTROL 2,4G,MAIN CONSL
1609713 CONT,ENCORE HD,ICONTROL 2,6G,MAIN CONSL
1609714 CONT,ENCORE HD,ICONTROL 2,8G,MAIN CONSL
1609715 CONT,ENCORE HD,ICONTROL 2,10G,MAIN CONSL
1609716 CONT,ENCORE HD,ICONTROL 2,12G,MAIN CONSL
1609717 CONT,ENCORE HD,ICONTROL 2,14G,MAIN CONSL
1609718 CONT,ENCORE HD,ICONTROL 2,16G,MAIN CONSL
1609719 CONT,ENCORE HD,ICONTROL 2,18G,MAIN CONSL
1609720 CONT,ENCORE HD,ICONTROL 2,20G,MAIN CONSL
1609721 CONT,ENCORE HD,ICONTROL 2,22G,MAIN CONSL
1609722 CONT,ENCORE HD,ICONTROL 2,24G,MAIN CONSL
1609723 CONT,ENCORE HD,ICONTROL 2,26G,MAIN CONSL
1609724 CONT,ENCORE HD,ICONTROL 2,28G,MAIN CONSL
1609725 CONT,ENCORE HD,ICONTROL 2,30G,MAIN CONSL
1609726 CONT,ENCORE HD,ICONTROL 2,32G,MAIN CONSL

1609742 CONT,ENCORE HD,ICONTROL 2,4G,AUX
1609743 CONT,ENCORE HD,ICONTROL 2,6G,AUX
1609744 CONT,ENCORE HD,ICONTROL 2,8G,AUX
1609745 CONT,ENCORE HD,ICONTROL 2,10G,AUX
1609746 CONT,ENCORE HD,ICONTROL 2,12G,AUX
1609747 CONT,ENCORE HD,ICONTROL 2,14G,AUX
1609748 CONT,ENCORE HD,ICONTROL 2,16G,AUX
1609749 CONT,ENCORE HD,ICONTROL 2,18G,AUX
1609750 CONT,ENCORE HD,ICONTROL 2,20G,AUX
1609751 CONT,ENCORE HD,ICONTROL 2,22G,AUX
1609752 CONT,ENCORE HD,ICONTROL 2,24G,AUX
1609753 CONT,ENCORE HD,ICONTROL 2,26G,AUX
1609754 CONT,ENCORE HD,ICONTROL 2,28G,AUX
1609755 CONT,ENCORE HD,ICONTROL 2,30G,AUX
1609756 CONT,ENCORE HD,ICONTROL 2,32G,AUX

1603093 KIT, AIR CONDITIONING UNIT

THE APPLICATOR AND CABLES ARE SUITABLE FOR CLASS II, DIV 1, GROUP F & G HAZARDOUS (CLASSIFIED) LOCATION OR ZONE 21 (EU):

GUNS:

1606969 GUN, BAR MT, ENCORE HD AUTO
1606970 GUN, TUBE MT, AUTO, 5FT ENCORE HD
1606985 GUN, TUBE MT, AUTO, 5FT PVC ENCORE HD
1606971 GUN,TUBE MT,AUTO, 6FT ENCORE HD
(02) 1624523 APPLICATOR,AUTO,ENCORE,GEN3

OPTIONS:

1604084 EXTENSION,SPRAY,90 DEG,ENCORE
1609048 POWER SUPPLY,100KV,POSITIVE,ENCORE

CABLES:

1097537 CABLE,AUTO,ENCORE,8M
1097539 CABLE,AUTO,ENCORE,12M
1097540 CABLE,AUTO,ENCORE,16M
1601344 CABLE,EXTENSION,ENCORE AUTO,4M

CRITICAL
No revisions permitted without approval of the proper agency

ALL DIMENSIONS IN MM EXCEPT AS NOTED
X±0.8 X.X±0.25 X.XX±0.13
MACHINED SURFACES 125
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8
THREAD LENGTH DIMENSIONS ARE FULL THREAD
INTERPRET DRAWINGS PER ASME Y14.5-2009
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES
THIRD ANGLE PROJECTION

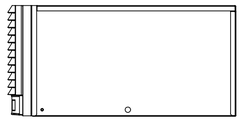
NORDSON CORPORATION
WESTLAKE, OH, U.S.A. 44145

DESCRIPTION: REF DWG,APPROVED EQUIPMENT,iCONTROL 2 HD
DRAWN BY: MCP | DATE: 19MAY16 | RELEASE NO.: PE604589
CHECKED BY: BF | APPROVED BY: MCP
SIZE: D | FILE NAME: 10015390 | MATERIAL NO.: 10015390 | REVISION: 02
SCALE: 1:7 | CADD GENERATED DWG. | SHEET 1 OF 2

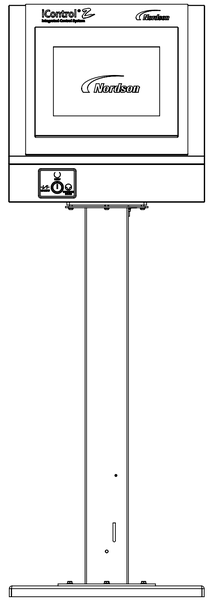
MATERIAL NO.	REVISION
10015390	02

ZONE	REV	DESCRIPTION	BY	CHK	RELEASE NO.	DATE
		SEE SHEET 1 FOR REVSION HISTORY				

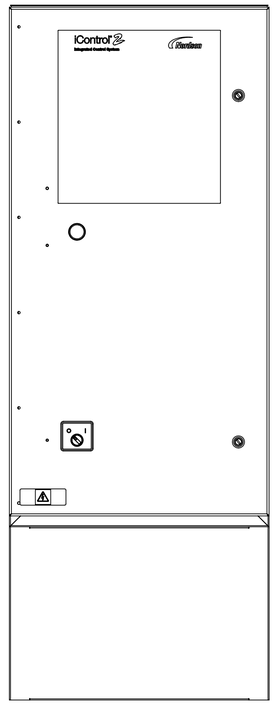
AIR CONDITIONING UNIT
1603093



MAIN CONSOLE W/ PEDESTAL



1602910 PEDESTAL ASSEMBLY,ENCORE HD,ICONTROL 2



1609728 CONT,ENCORE HD,ICONTROL 2,4G,MAIN W/PED
1609728 CONT,ENCORE HD,ICONTROL 2,6G,MAIN W/PED
1609729 CONT,ENCORE HD,ICONTROL 2,8G,MAIN W/PED
1609730 CONT,ENCORE HD,ICONTROL 2,10G,MAIN W/PED
1609731 CONT,ENCORE HD,ICONTROL 2,12G,MAIN W/PED
1609732 CONT,ENCORE HD,ICONTROL 2,14G,MAIN W/PED
1609733 CONT,ENCORE HD,ICONTROL 2,16G,MAIN W/PED
1609734 CONT,ENCORE HD,ICONTROL 2,18G,MAIN W/PED
1609735 CONT,ENCORE HD,ICONTROL 2,20G,MAIN W/PED
1609736 CONT,ENCORE HD,ICONTROL 2,22G,MAIN W/PED
1609737 CONT,ENCORE HD,ICONTROL 2,24G,MAIN W/PED
1609738 CONT,ENCORE HD,ICONTROL 2,26G,MAIN W/PED
1609739 CONT,ENCORE HD,ICONTROL 2,28G,MAIN W/PED
1609740 CONT,ENCORE HD,ICONTROL 2,30G,MAIN W/PED
1609741 CONT,ENCORE HD,ICONTROL 2,32G,MAIN W/PED

ENCORE HD iCONTROL 2

THE FOLLOWING CONTROLLERS ARE SUITABLE FOR UNCLASSIFIED LOCATIONS

1609727 CONT,ENCORE,ICONTROL 2 HD,4G,MAIN W/PED
1609728 CONT,ENCORE,ICONTROL 2 HD,6G,MAIN W/PED
1609729 CONT,ENCORE,ICONTROL 2 HD,8G,MAIN W/PED
1609730 CONT,ENCORE,ICONTROL 2 HD,10G,MAIN W/PED
1609731 CONT,ENCORE,ICONTROL 2 HD,12G,MAIN W/PED
1609732 CONT,ENCORE,ICONTROL 2 HD,14G,MAIN W/PED
1609733 CONT,ENCORE,ICONTROL 2 HD,16G,MAIN W/PED
1609734 CONT,ENCORE,ICONTROL 2 HD,18G,MAIN W/PED
1609735 CONT,ENCORE,ICONTROL 2 HD,20G,MAIN W/PED
1609736 CONT,ENCORE,ICONTROL 2 HD,22G,MAIN W/PED
1609737 CONT,ENCORE,ICONTROL 2 HD,24G,MAIN W/PED
1609738 CONT,ENCORE,ICONTROL 2 HD,26G,MAIN W/PED
1609739 CONT,ENCORE,ICONTROL 2 HD,28G,MAIN W/PED
1609740 CONT,ENCORE,ICONTROL 2 HD,30G,MAIN W/PED
1609741 CONT,ENCORE,ICONTROL 2 HD,32G,MAIN W/PED

1603093 KIT, AIR CONDITIONING UNIT

THE APPLICATOR AND CABLES ARE SUITABLE FOR CLASS II, DIV 1, GROUP F & G HAZARDOUS (CLASSIFIED) LOCATION OR ZONE 21 (EU):

1602910 PEDESTAL ASSEMBLY,ENCORE HD,ICONTROL 2

GUNS:

1606969 GUN, BAR MT, ENCORE HD AUTO
1606970 GUN, TUBE MT, AUTO, 5FT ENCORE HD
1606985 GUN, TUBE MT, AUTO, 5FT PVC ENCORE HD
1606971 GUN,TUBE MT,AUTO, 6FT ENCORE HD
1624523 APPLICATOR,AUTO,ENCORE,GEN3

02

OPTIONS:

1604084 EXTENSION,SPRAY,90 DEG,ENCORE
1609048 POWER SUPPLY,100KV,POSITIVE,ENCORE

CABLES:

1097537 CABLE,AUTO,ENCORE,8M
1097539 CABLE,AUTO,ENCORE,12M
1097540 CABLE,AUTO,ENCORE,16M
1601344 CABLE,EXTENSION,ENCORE AUTO,4M

CRITICAL

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ALL DIMENSIONS IN MM EXCEPT AS NOTED X±0.8 X.X±0.25 X.XX±0.13 MACHINED SURFACES BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8 THREAD LENGTH DIMENSIONS ARE FULL THREAD INTERPRET DRAWINGS PER ASME Y14.5-2009 PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES THIRD ANGLE PROJECTION	NORDSON CORPORATION WESTLAKE, OH, U.S.A. 44145		
	DESCRIPTION: REF DWG,APPROVED EQUIPMENT,iCONTROL 2 HD		
	DRAWN BY: MCP	DATE: 19MAY16	RELEASE NO.: PE604589
	CHECKED BY: BF	APPROVED BY: MCP	
	SIZE: D	FILE NAME: 10015390	MATERIAL NO.: 10015390 REVISION: 02
	SCALE: 1:7	CADD GENERATED DWG.	SHEET 2 OF 2

ZONE	CHG LET	REVISION	BY	CHK	ECR NO.	DATE
	01	RELEASED	MCP	MCP	PE604589	11JUL16
B-5	02	02) SHT.1&2-CPU P/N WAS 1602868	MHH	MM	PE605652	06FEB18
	03	03) POWER SUPPLY 1609757 UPDATED	DC	DLU	PE-100329	03FEB18
		PICTORIALLY; CORRECTED DESCRIPTION OF				
		HARNESS 1609927; REMOVED REVISION				
		HISTORY (SHEET 2).				
	04	CORRECTED P/N AND COLOR 1608107;	NM	CG	PE-104630	15OCT21
		FIXED FUSE LABEL; ADDED JUMPER;				
		P/N ERROR FIX 248458 TO 246458				
		ADDED JUMPER/SWITCH SETTINGS TABLE				
B-4	05	UPDATED RELAY BOARD P/N TO 1605755	BB		PE-104849	03FEB22
		FROM 1603070				
B-4	06	CORRECTED RELAY BOARD P/N TO	BB		PE-104936	17FEB22
		1605755 FROM 1605575				

WIRING FOR 16 OR LESS GUNS

FAN 1609938

FAN TERMINAL BLOCK 933736

PWS TO FAN TERMINAL BLOCKS– 1609929

SW1

DETAIL A

(SET SW1 ON ALL FLOW MODULES AS SHOWN)

04 CONFIGURED SWITCH SETTINGS

AIR CONDITIONER 1603092

TERMINAL BLOCK ASSY 1075693

iCONTROL2 AIR CONDITIOER KIT 1603093

1602716 – 24V HARNESS

PANEL MOUNT TOUCH SCREEN 1602875

VIDEO

TOUCHSCREEN

LOCKOUT / BYPASS

KEYLOCK SWITCH 1000594

CONTACT BLOCK 1000595

GUN CONTROL PANEL (INSIDE VIEW OF CABINET REAR)

0.4M 8 POS GUN RECEPTACLE 1602710

DUAL GUN DRIVER 1099048 GUNS 1 & 2 — TO J1 OF 1023939

DUAL GUN DRIVER 1099048 GUNS 3 & 4 — TO J2 OF 1023939

DUAL GUN DRIVER 1099048 GUNS 5 & 6 — TO J3 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER 1099048 GUNS 7 & 8 — TO J4 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER 1099048 GUNS 9 & 10 — TO J5 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER 1099048 GUNS 11 & 12 — TO J6 OF 1023939

DUAL GUN DRIVER 1099048 GUNS 13 & 14 — TO J7 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER 1099048 GUNS 15 & 16 — TO J8 OF 1023939 (AS REQ'D)

DETAIL A

iCONTROL BACKPLANE – 1023939

+5V, +12V, –12V POWER HARNESS 1098445

24V POWER HARNESS 1027138

400W POWER SUPPLY 1098442

SUB PANEL ASSEMBLY 1610643

ALARM HARNESS – 1602699

GUN PWR OK HARNESS – 1603008

50 COND. DIGITAL I/O RIBBON CABLE (1602718 PART OF 1602872)

iCONTROL2 DIGITAL INPUT MODULE ASSY 1602872

NET / POWER 1 1609930

FOR USE W/16 OR LESS GUNS

(FACE VIEW)

SEE NOTE 1

RELAY PCA TO I/O PCA HARNESS – 1602965 (PART OF 1602872)

PD1 RECEPTACLE ASSY (1602869) (PART OF 1602872 – FACE VIEW)

PM1 ETHERNET RECEPTACLE 1603006

CAN 1 HARNESS– 1609935

02 CPU 1612975

RELAY BOARD 1605755 06

PC1 INTERLOCK/OPTIONS

CA1 AC PWR RECEPTACLE ASSY 1609926 (FACE VIEW)

FILTERS 334805

FILTER TO POWER SWITCH 1609927

FUSE BLOCKS TO GUN CARDS 1609932

TERMINAL BLOCK 1609928

HARNESS 1609927

120W P.S. 1609757

PWS TO RELAY PCA 1609927

PWS TO FAN 1609929

POWER SWITCH TO FUSE BLOCKS 1609927

SWITCH – 334806

CONTACT BLOCKS – 288806

24V CPU PWR HARNESS – 1602717

LOCKOUT/CONV. KEYSWITCH HARNESS – 1602697

DISPLAY POWER HARNESS – 1608107

MONITOR CABLE (SUPPLIED WITH 1602875)

CPU TO DISPLAY HARNESS – 1602715

(1602715)

(MONITOR CABLE)

(1602965)

(1608107)

(1602697)

(1609929)

PWS TO FAN 1609929

04

TOP COVER

4IN JUMPER 246458

CABINET

DISPLAY PANEL

DOOR

12IN JUMPER 1034207

GUN PANEL 1–16

CONNECTOR PANEL

GUN PANEL BLANK

REAR COVER

PLINTH

GROUND JUMPERS DETAIL

CRITICAL

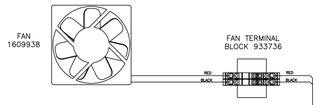
No revisions permitted without approval of the proper agency

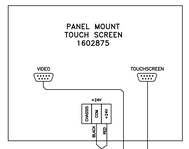
ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145	
X±0.8 X.X±0.25 X.XX±0.13	DESCRIPTION	
MACHINED SURFACES 1.6	WIRING DIAGRAM,ENCORE HD,ICONTROL2,MAIN	
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY MCP	DATE 11JULY16
THREAD LENGTH DIMENSIONS ARE FULL THREAD	CHECKED BY TAR	APPROVED BY MCP
INTERPRET DRAWINGS PER ASME Y14.5M–2009	SIZE E	FILE NAME 10015536
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES	MATERIAL NO. 10015536	REVISION 06
THIRD ANGLE PROJECTION	SCALE: NONE	CADD GENERATED DWG.
	RELEASE NO. PE604589	SHEET 1 OF 2

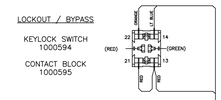
MATERIAL NO. 10015536 REVISION 06

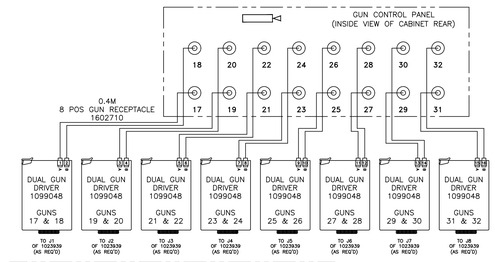
CHG LET	REVISION	BY	CHK	ECR NO.	DATE
03	(SEE SHEET 1 FOR REVISION HISTORY)				

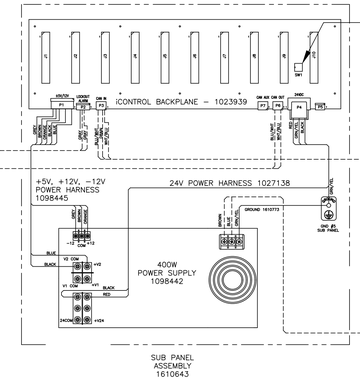
WIRING FOR 17 OR MORE GUNS

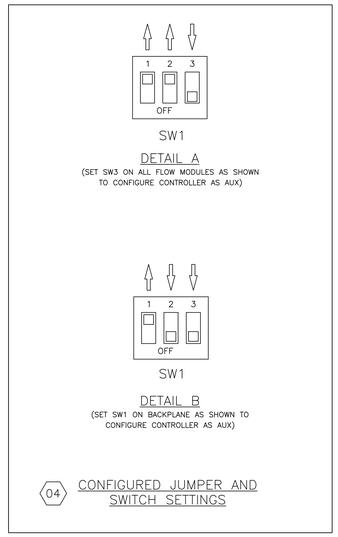


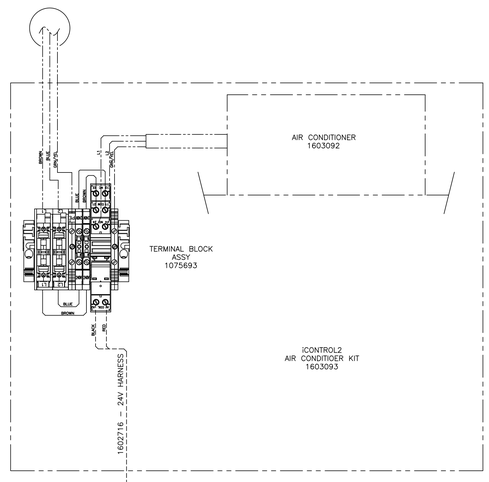


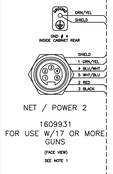


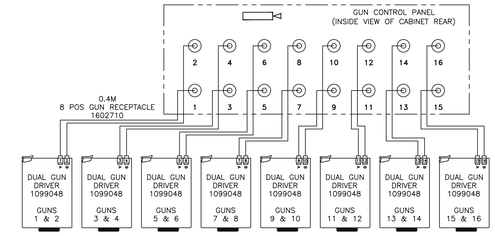


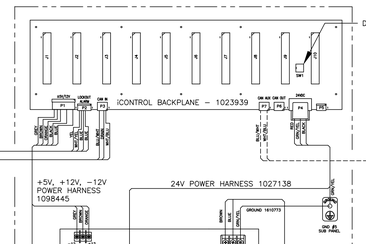


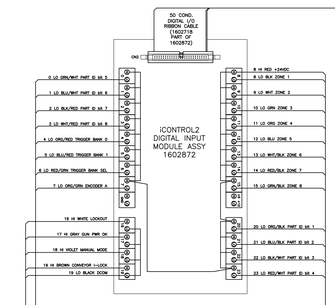


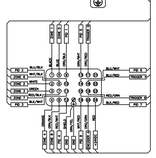


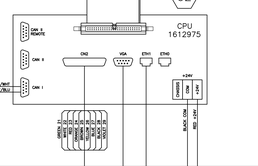


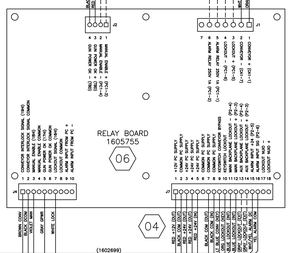


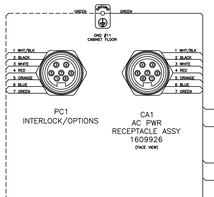


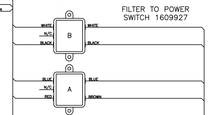


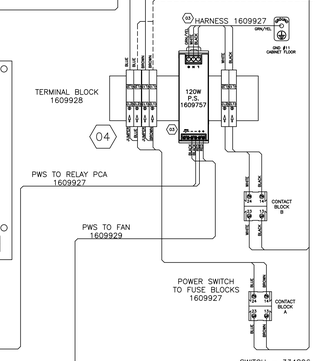












LOCKOUT/CONV. KEYSWITCH HARNESS – 1602697
DISPLAY POWER HARNESS – 1608107
MONITOR CABLE (SUPPLIED WITH 1602875)
CPU TO DISPLAY HARNESS – 1602715
ALARM HARNESS – 1609934
PWS TO FAN TERMINAL BLOCKS– 1609929
RELAY PCA TO I/O PCA HARNESS – 1602965 (PART OF 1602872)
ALARM HARNESS – 1602869
CAN 1 HARNESS– 1609935
CAN 2 HARNESS– 1609936
FUSE BLOCKS TO GUN CARDS 1609933
(1602715)
(MONITOR CABLE)
(1602965)
(1608107)
(1602697)
(1609929)
(1603006)
(1602899)
24V CPU PWR HARNESS – 1602717
PWS TO FAN 1609929

CRITICAL
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ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145		
X±0.8 X.X±0.25 X.XX±0.13	DESCRIPTION WIRING DIAGRAM,ENCORE HD,ICONTROL2,MAIN		
MACHINED SURFACES 1.6	DRAWN BY MCP	DATE 11JULY16	RELEASE NO. PE604589
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	CHECKED BY TAR	APPROVED BY MCP	
THREAD LENGTH DIMENSIONS ARE FULL THREAD	SIZE E	FILE NAME 10015536	MATERIAL NO. 10015536 REVISION 06
INTERPRET DRAWINGS PER ASME Y14.5M–2009	SCALE: NONE	CADD GENERATED DWG.	SHEET 2 OF 2
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES			
THIRD ANGLE PROJECTION			

MATERIAL NO. 10015536 REVISION 06

WIRING FOR 16 OR LESS GUNS

CHG LET	REVISION	BY	CHK	ECR NO.	DATE
01	RELEASED	MCP		PE604589	11JUL16
02	02) POWER SUPPLY 1609757 UPDATED	DC	DLU	PE-100329	07MAY18
	PICTORIALLY; CORRECTED DESCRIPTION				
	OF HARNESS 1609927; REMOVED				
	REVISION HISTORY (SHEET 2).				
03	P/N RECEPTACLE ASSY CHANGED FROM	NM	CG	PE-104630	20OCT21
	1602707 TO 1602705; P/N JUMPER				
	ERROR FIXED 248458 TO 246458				
	ADDED JUMPER/SWITCH SETTING TABLE				
04	CORRECTED THE RELAY BOARD P/N TO	BB		PE-104849	03FEB22
	1605755 FROM 1603070				
05	CORRECTED THE RECEPTACLE ASSY.,	BB		PE-104936	17FEB22
	FAN, AND SUB PANEL ASSY. P/N.				
06	SPECIFIED LOCATIONS OF CONFIGURED	SMT		PE-105054	31MAR22
	SWITCH SETTINGS IN PG1-DETAIL A, &				
	PG2-DETAIL A & B.				
07	CHANGED PJ2 RECEPTACLE ASSEMBLY	DS	TR	PE-105518	01DEC22

FAN 1609938 (05)

FAN TERMINAL BLOCK 933736

PWS TO FAN TERMINAL BLOCKS – 1609929

SW1

DETAIL A

(SET SW1 ON BACKPLANE AS SHOWN TO CONFIGURE CONTROLLER AS AUX)

(06)

(03) CONFIGURED SWITCH SETTINGS

AIR CONDITIONER 1603092

TERMINAL BLOCK ASSY 1075693

ICONTROL2 AIR CONDITIONER KIT 1603093

1602716 – 24V HARNESS

GUN CONTROL PANEL (INSIDE VIEW OF CABINET REAR)

0.4M 8 POS GUN RECEPTACLE 1602710

DUAL GUN DRIVER GUNS 1 & 2 — TO J1 OF 1023939

DUAL GUN DRIVER GUNS 3 & 4 — TO J2 OF 1023939

DUAL GUN DRIVER GUNS 5 & 6 — TO J3 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER GUNS 7 & 8 — TO J4 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER GUNS 9 & 10 — TO J5 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER GUNS 11 & 12 — TO J6 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER GUNS 13 & 14 — TO J7 OF 1023939 (AS REQ'D)

DUAL GUN DRIVER GUNS 15 & 16 — TO J8 OF 1023939 (AS REQ'D)

DETAIL A

ICONTROL BACKPLANE – 1023939

+5V, +12V, –12V POWER HARNESS 1098445

24V POWER HARNESS 1027138

400W POWER SUPPLY 1098442

NET / POWER 1 1609930 FOR USE W/16 OR LESS GUNS (FACE VIEW) SEE NOTE 1

ALARM HARNESS – 1602699

SUB PANEL ASSEMBLY 1610643 (05)

1603008

PC1 INTERLOCK/OPTIONS

CA1 AC PWR RECEPTACLE ASSY 1609926 (FACE VIEW) (05)

FILTERS 334805

FILTER TO POWER SWITCH 1609927

FUSE BLOCKS TO GUN CARDS 1609932

RELAY BOARD 1605755 (05)

HARNESS 1609927

120W P.S. 1609757

PWS TO FAN 1609929

POWER SWITCH TO FUSE BLOCKS 1609927

CONTACT BLOCK B

CONTACT BLOCK A

P.S. TO RELAY PCA – 1609927

SWITCH – 334806
CONTACT BLOCKS – 288806

PJ2 RECEPTACLE ASSY 1610444 (X1) (X7) (FACE VIEW)

PJ1 RECEPTACLE ASSY 1602708 (REAR VIEW)

(1602708)

(1602899)

(1609929)

TOP COVER

4IN JUMPER 246458

CABINET

DISPLAY PANEL

DOOR

12IN JUMPER 1034207

GUN PANEL 1–16

CONNECTOR PANEL

18IN JUMPER 1007123

REAR COVER

PLINTH

GROUND JUMPERS DETAIL

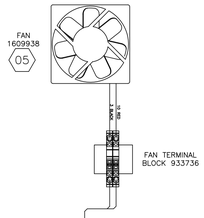
CRITICAL
No revisions permitted without approval of the proper agency

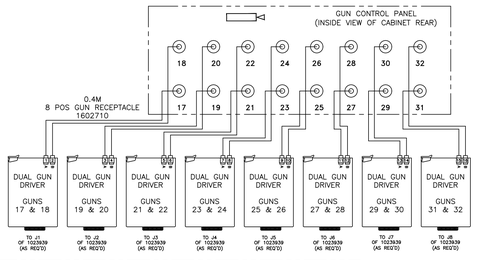
ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145		
X±0.8 X.X±0.25 X.XX±0.13	DESCRIPTION	WIRING DIAGRAM,HD,ICONTROL2 W/PED/AUX	
MACHINED SURFACES 125			
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY MCP	DATE 11JULY16	RELEASE NO. PE604589
THREAD LENGTH DIMENSIONS ARE FULL THREAD	CHECKED BY TAR	APPROVED BY MCP	
INTERPRET DRAWINGS PER ASME Y14.5M–2009	SIZE E	FILE NAME 10015537	MATERIAL NO. 10015537 REVISION 07
PERFECT FORM AT MMC REQUIRED FOR INTERELATED FEATURES	SCALE: NONE	CADD GENERATED DWG.	SHEET 1 OF 2
THIRD ANGLE PROJECTION			

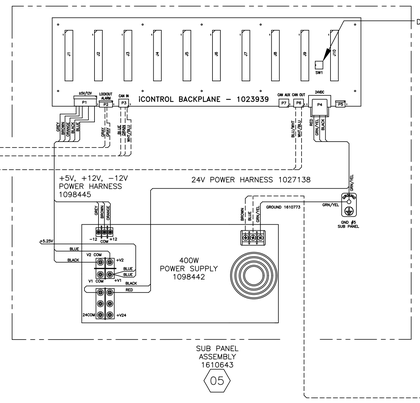
MATERIAL NO. 10015537 REVISION 07

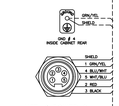
CHG LET	REVISION	BY	CHK	ECR NO.	DATE
W	(SEE SHEET 1 FOR REVISION HISTORY.)				

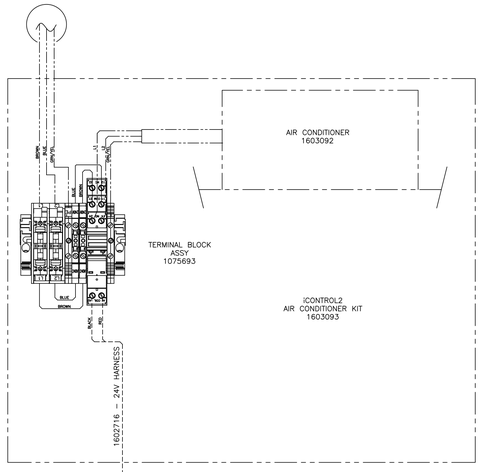
WIRING FOR 17 OR MORE GUNS

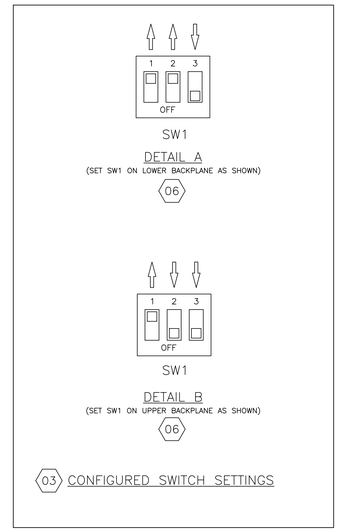


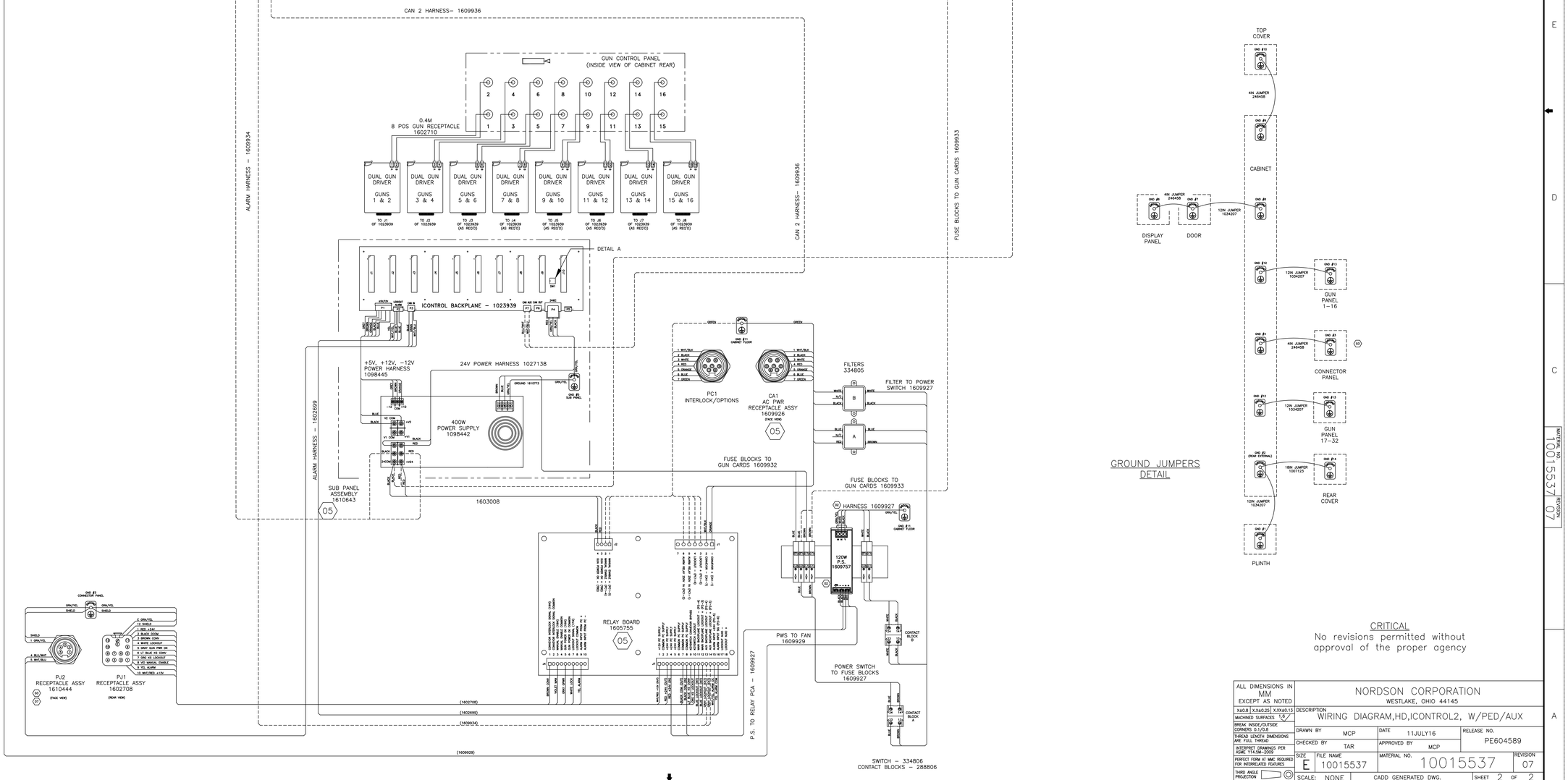












CRITICAL
No revisions permitted without approval of the proper agency

ALL DIMENSIONS IN MM EXCEPT AS NOTED	NORDSON CORPORATION WESTLAKE, OHIO 44145		
XX±0.8 | XX±0.25 | XX±0.13	DESCRIPTION WIRING DIAGRAM,HD,ICONTROL2, W/PED/AUX		
MACHINED SURFACES 1.6			
BREAK INSIDE/OUTSIDE CORNERS 0.1/0.8	DRAWN BY MCP	DATE 11JULY16	RELEASE NO. PE604589
THREAD LENGTH DIMENSIONS ARE FULL THREAD	CHECKED BY TAR	APPROVED BY MCP	
INTERPRET DRAWINGS PER ASME Y14.5M–2009	SIZE E	FILE NAME 10015537	MATERIAL NO. 10015537 REVISION 07
PERFECT FORM AT MMC REQUIRED FOR INTERRELATED FEATURES	SCALE: NONE	CADD GENERATED DWG.	SHEET 2 OF 2
THIRD ANGLE PROJECTION			

MATERIAL NO. 10015537 REVISION 07

EU DECLARATION of CONFORMITY

Product: Encore HD Automatic Powder Spray System

This Declaration is issued under the sole responsibility of the manufacture.

Models: Encore HD Automatic Applicator and Encore HD iControl 2

Description: This high density, automatic electrostatic powder spray system includes applicator, control cable and associated controllers. These controls are available in a 4 - 32 applicator control cabinets as a main console with a pc and display or an auxiliary console without the pc or display. There is an optional Pedestal unit for remote mounting of the display within the hazardous zone or classified area.

Applicable Directives:
2006/42/EC - Machinery Directive
2014/30/EU - EMC Directive
2014/34/EU - ATEX Directive

Standards Used for Compliance:

EN/ISO12100 (2010)	EN60204-1 (2018)	EN61000-6-3 (2007)
EN60079-0 (2018)	EN50050-2 (2013)	EN61000-6-2 (2005)
EN60079-31 (2014)	EN50177 (2012)	EN55011 (2016)

Type of Protection:
- Ambient Temperature: +15ºC to +40ºC
- Ex II 2 D / 2mJ = Auto Applicators
- Ex II (2) D = Main Console and Auxiliary Console Controllers
- Ex II (2) 3 D = Optional Pedestal

ATEX Product Certificates:
- FM13ATEX0006X (Applicators) (Dublin, Ireland)
- FM16ATEX0055X (Controllers) (Dublin, Ireland)

ATEX Quality System Certificate
- 0598 SGS Fimko Oy (Helsinki, Finland)

Date: **10Oct2024**

Jeremy Krone
Engineering Manager
Industrial Coating Systems
Amherst, Ohio, USA

Nordson Authorized Representative in the EU
Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich-Hertz-Straße 42-44
D-40699 Erkrath

UK DECLARATION of CONFORMITY

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Applicable Directives:
Supply Machinery Safety 2008
Equipment & Protective Systems Intended for use in Potentially Explosive Atmosphere Regulation 2016
Electromagnetic Compatibility Regulation 2016

Standards Used for Compliance:

EN/ISO12100 (2010)	EN60204-1 (2018)	EN61000-6-3 (2007)
EN60079-0 (2018)	EN50050-2 (2013)	EN61000-6-2 (2005)
EN60079-31 (2014)	EN50177 (2012)	EN55011 (2016)

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- Ex II 2 D / 2mJ = Auto Applicators
- Ex II (2) D = Main Console and Auxiliary Console Controllers
- Ex II (2) 3 D = Optional Pedestal

ATEX Product Certificates:
- FM21UKEX0223X (Applicators) (Maidenhead, Berkshire, UK)
- FM21UKEX0221X (Controllers) (Maidenhead, Berkshire, UK)

ATEX Quality System Certificate
- SGS Baseefa NB 1180 (Buxton, Derbyshire, UK)

Date: 10Oct2024

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

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