

## Introduction

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 of a system's 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 green/yellow ground wires bundled with the AC input power cable are used only for PE grounding and their sole purpose is to protect personnel from a shock. These ground wires do not protect 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 volts. It does not take long for ungrounded system components to build up an electrical charge strong enough to damage sensitive electronic components when discharged.

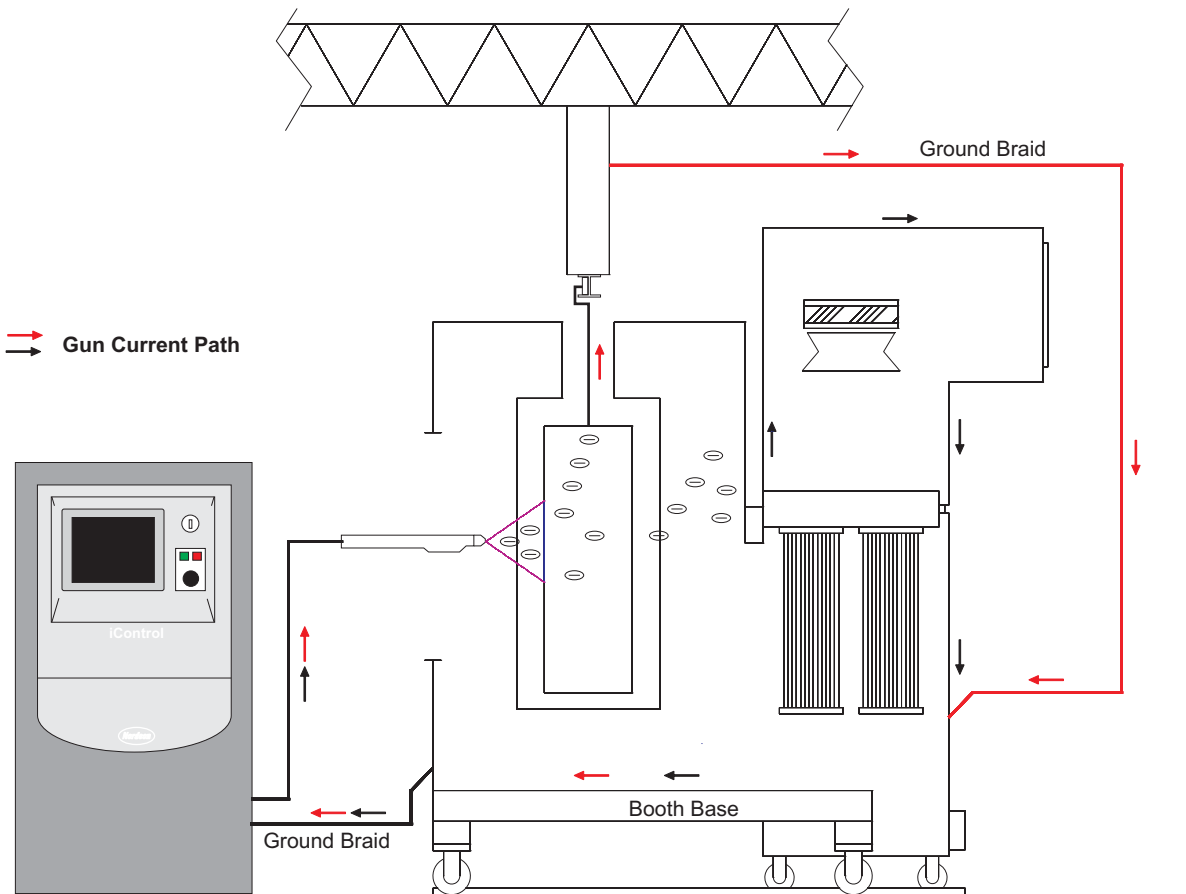
Electrostatic discharges occur at very high frequencies, around 100 megahertz. An ordinary ground conductor does not conduct such high frequencies well enough to prevent damage to electronic components. Special flat braided cables are provided with your Nordson powder coating equipment to protect against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

## Gun Current Path

Refer to Figure 1. All electrical circuits need a complete path for current to make its way back to the source (circle=circuit). 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 gun driver board. The current attracted to the booth is returned through the booth ground to the controller and back to the gun.

It is very important to provide a complete circuit for the 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 and cause damage to the controller electronics (gun driver board and power supply).

Figure 1 Gun 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 as the following page. 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.

Always use the special flat braided copper cables furnished with all Nordson spray gun controllers to ground them to the booth base. Keep the cables as short as possible.

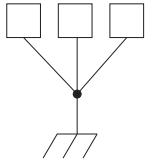
An ESD grounding block kit is available for connecting the ground braids to the booth base. The kit contains two 6-position grounding blocks, fasteners, terminals, and 15 meters (50 feet) of braided ground cable. If additional kits are required, order:

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

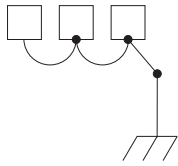
The illustrations on the following pages show use of the grounding blocks and the recommended installation locations on Nordson powder coating booths.

### ESD Ground Configurations

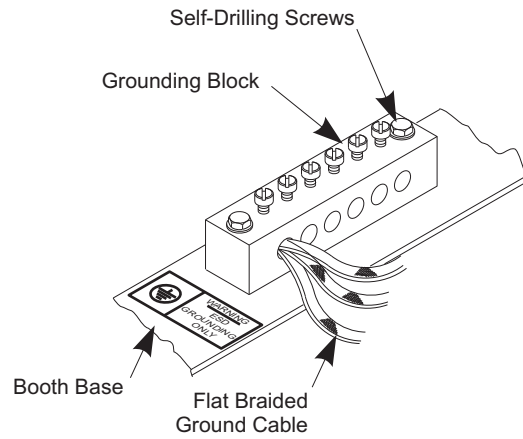
Star Grounding  
(Preferred)



Daisy Chain Grounding  
(Alternate)



### ESD Grounding Block

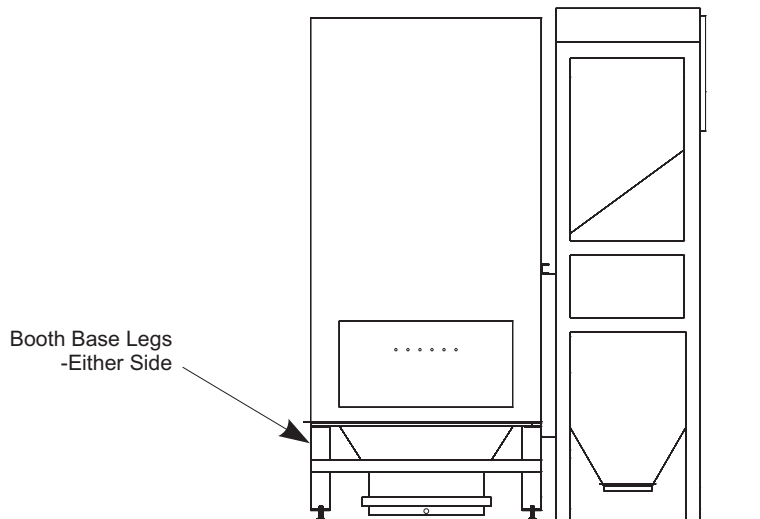


## Recommended ESD Ground Locations - Nordson Powder Coating Booths

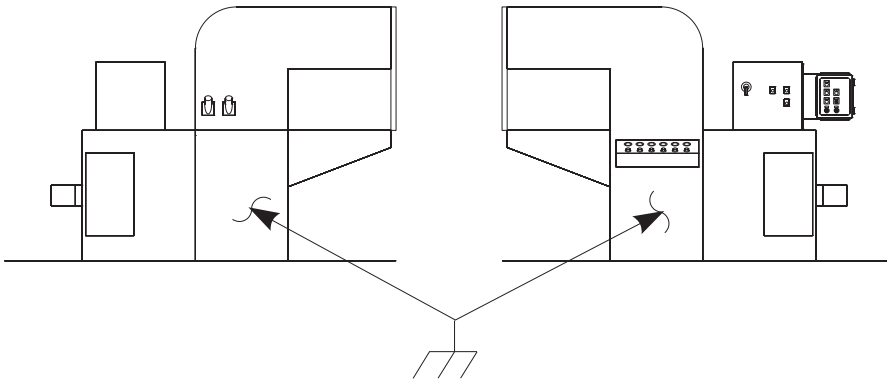
ESD ground cables should always be attached to the welded booth base, not to a panel, enclosure, or other component bolted to the base. If using a grounding block kit, make sure the block is installed directly to the welded base with the included self-drilling screws.

The following illustrations show the recommended locations for installing grounding blocks.

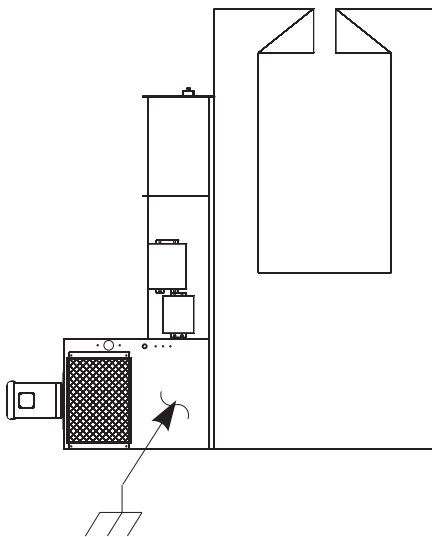
### 504 Booth (Typical)



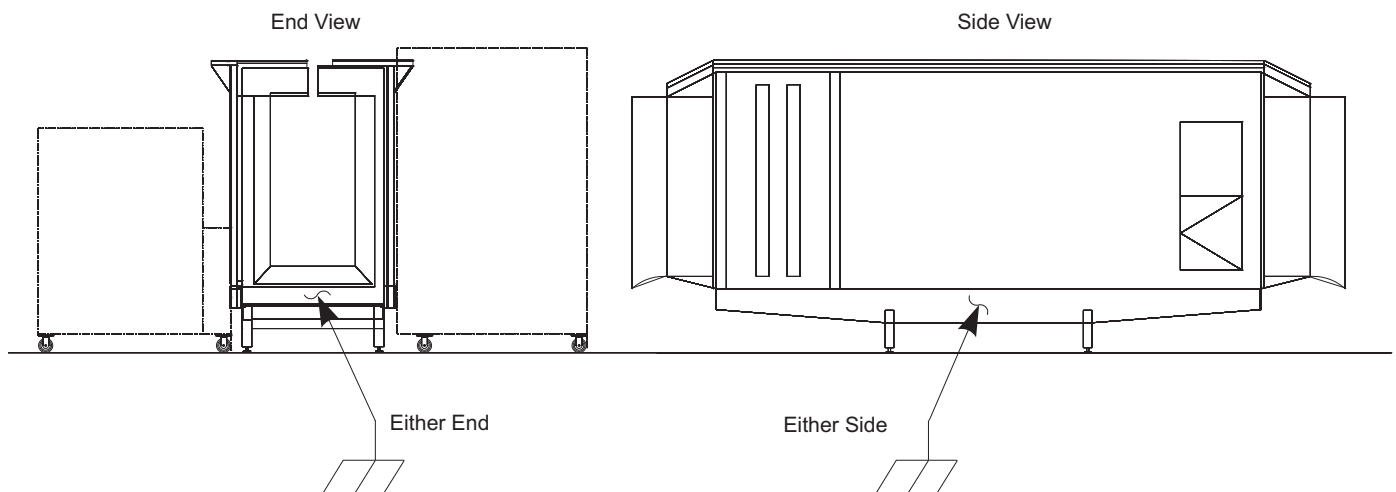
## 902 Booth (Typical)



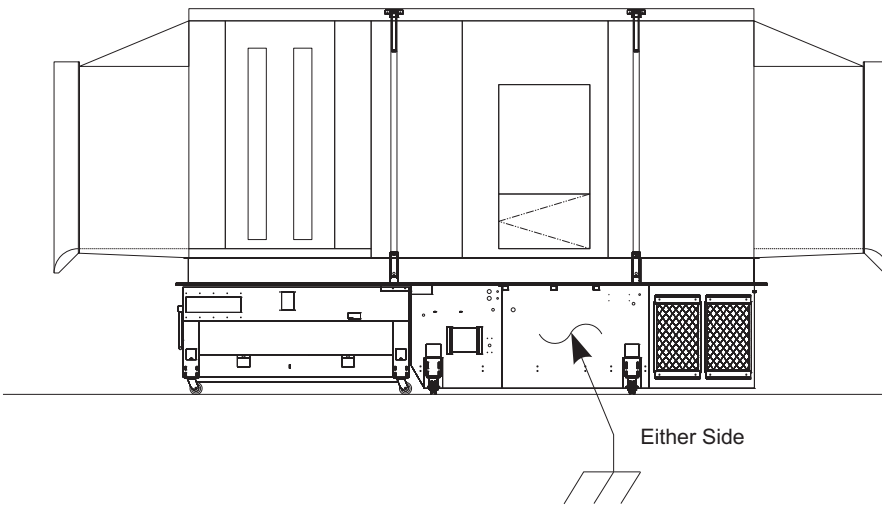
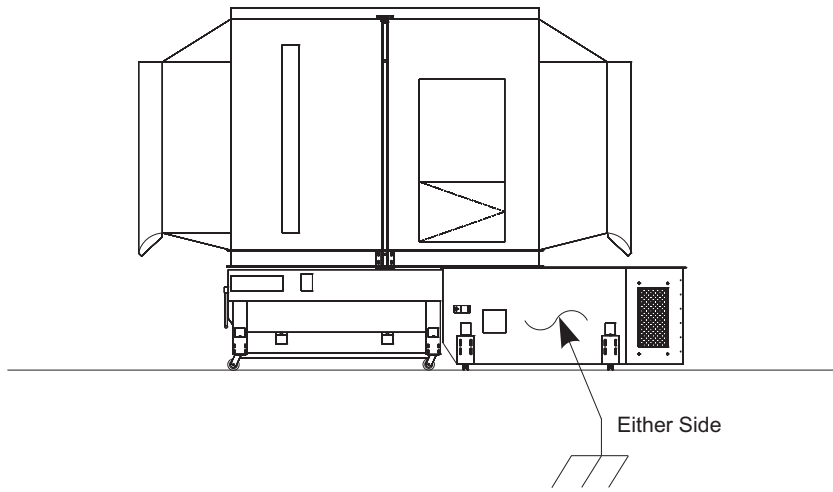
## Econo-Coat® Booth (Typical)



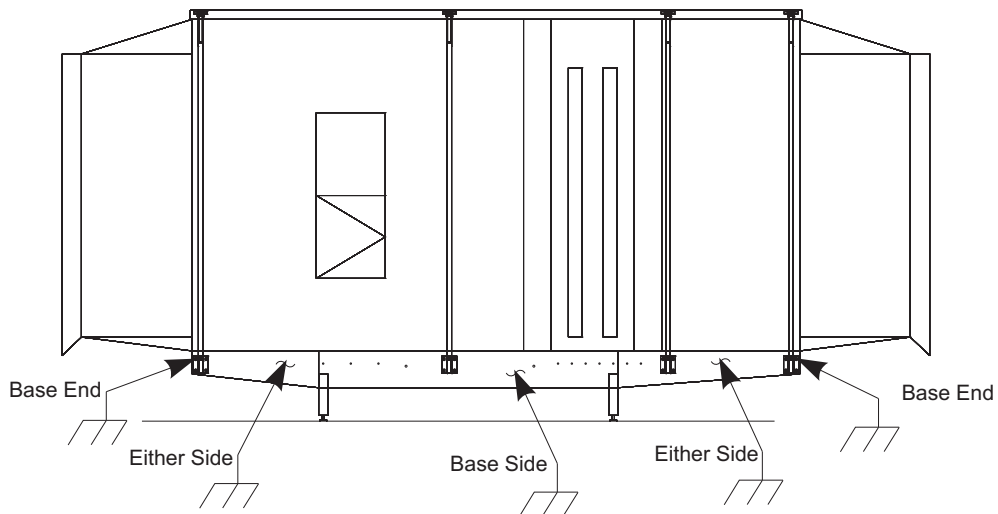
## Cyclo-Kinetic® Booth (Typical)



Horizon® 200 and 400 Booths (Typical)

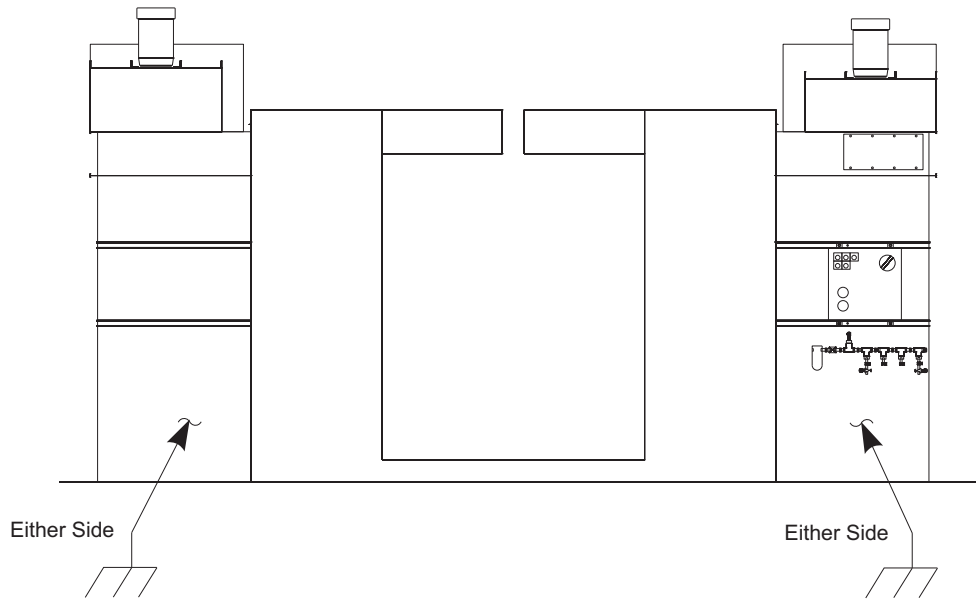


Excel Booth (Typical)

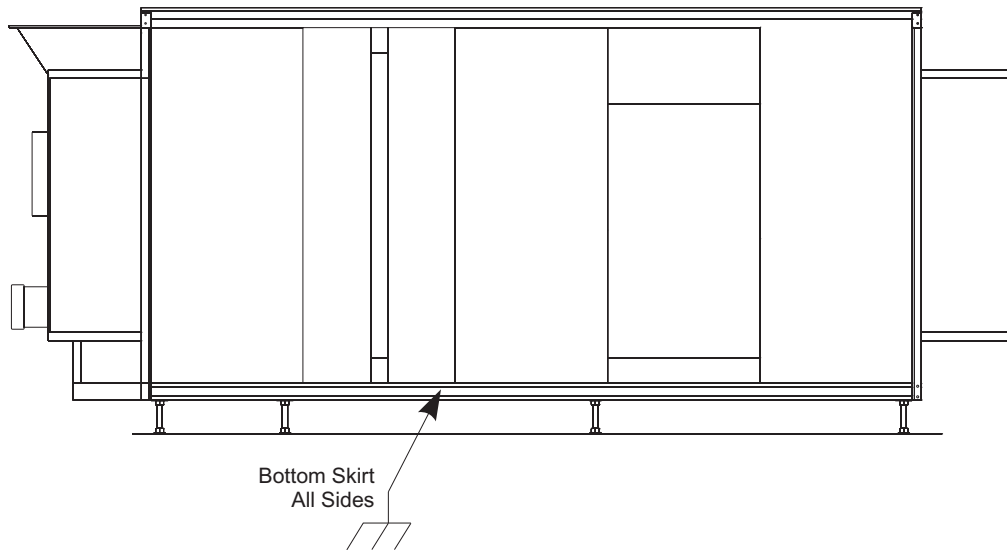


# Powder Coating System Grounding

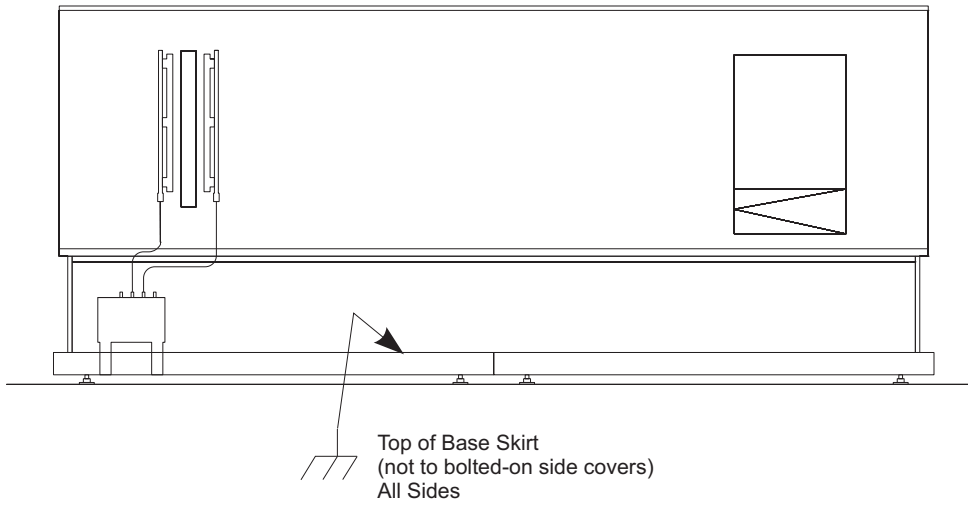
## FCM (Fixed Color Module) Batch Booths (Typical)



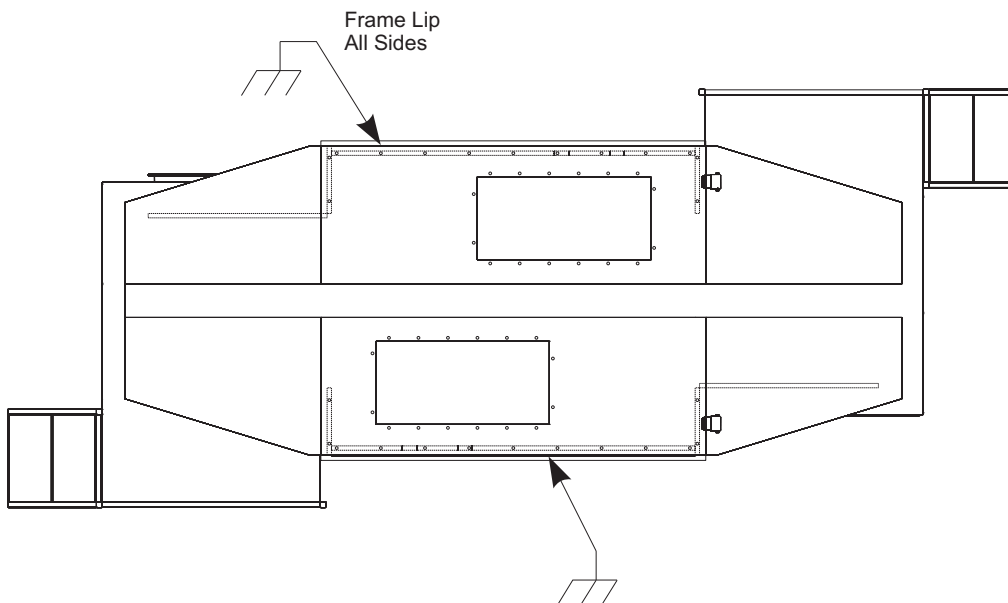
## RCM (Removable Color Module) Batch Booths (Typical)



ColorMax® Booths (Typical)



Cube Booth (Typical)





Issued 3/06  
Nordson, the Nordson logo, Excel 2000, Horizon, ColorMax, Econo-Coat, and Cyclo-Kinetic are registered trademarks of Nordson Corporation.  
© Nordson Corporation 2006  
All Rights Reserved