Powder Pilot HD

Customer Product Manual
Part 7156953D
Issued 03/19

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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NORDSON DEUTSCHLAND GMBH

Contact Us

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Change Record

Revision	Date	Change
D	12.02.2020	PART NUMBER UPDATES FOR TOUCH SCREENS

EC DECLARATION OF CONFORMITY
ACCORDING TO CE DIRECTIVE 2006/42/ EC ANNEX II A

DESCRIPTION	Controls for Powder-Systems Family/ Models: PowderPilot HD
APPLICABLE DIRECTIVES	CEE 2006/42 (Machinery) and following amendments CEE 2004/108 Electromagnetic Compatibility Directive CEE 2006/95 EEC Low Voltage Directive
STANDARDS USED TO VERIFY COMPLIANCE	EN 60204-1 VDE 0113-1
MARKING OF PRODUCT	CE

The equipment delivered is generally intended to be part of a powder coating system, and cannot be operated on its own.
In order to be in full compliance with the CE machinery directive and its amendments, the customer is obliged to respect the applicable regulations for his system upon incorporation of the equipment in the plant and before starting operation.

We hereby declare that the product specified conforms to the directives and standards described above and that it has been provided with a CE label. Provided the product is installed and operated in line with Nordson's manuals its operation is safe.

Kai Flockenhaus,
Manager - Procurement & Process,
ICS Europe Industrial Coating Systems Europe
Nordson Deutschland GmbH

Erkrath, 01st August 2014

Glossary of Technical Terms

AFC Mode – Automatic Feedback Current – lets the operator set maximum current micro amps (µA) output from the spray gun to prevent excess charging of sprayed powder.

Assist Air – Conveying air supply to aid the powder movement through the powder tubing

CAN (CAN bus) – Controller Area Network. Control system communication method

Card(s) – Printed circuit board assembly

DIP Switch – *Dual Inline Packaged Switch*. A manual electric switch used to configure the controllers function.

ESD – Electrostatic Discharge

Feedback – Actual live values for KV & Air volume currently delivered by the system

Foldback – Built–in safety feature that is activated if the powder coating gun tries to pull more than 100 micro amps. During Foldback the KV is automatically reduced to protect the circuit board.

Gateway – Converts Profinet to CAN bus. Allows the PPHD (Profinet) to communicate with gun control system (CAN bus)

Gun – Powder application device

Hard Purge – Mains air pressure purge pulses. Used to thoroughly clean the powder tubing internally

HMI – Human Machine Interface (Touch Screen)

IPC – Industrial Personal Computer

KV – Kilo Volts of static charge produced by the gun

KV Card – Circuit board to control the electrostatic charge voltage to the powder gun

KV Rack – Chassis holding all KV Cards

LED – Light Emitting Diode

Lap – How many times the effective fan width passes over a certain point

Mover or Gun Mover – Generic term for Reciprocator and/or Z–Axis machine

Node – Connection point of KV Card or Pump Control Card, to the network

PPHD – Powder Pilot High Density

Recip / **Reciprocator** – Vertical (Y axis) gun mover

Soft Purge – Initial stage of purge cleaning process. Used to gently clear the bulk of powder from powder tubing prior to Hard Purge.

Z–Axis – Horizontal mover that drives the reciprocator carrying the guns, in and out of the booth at 90 degrees to conveyor direction.

Powder Pilot® HD

Safety

Read and follow these safety instructions. Tasks and equipment-specific warnings, cautions and instructions are included in the equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

Qualified Personnel

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

Intended Use

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

Some examples of unintended use of equipment include

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

Regulations and Approvals

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

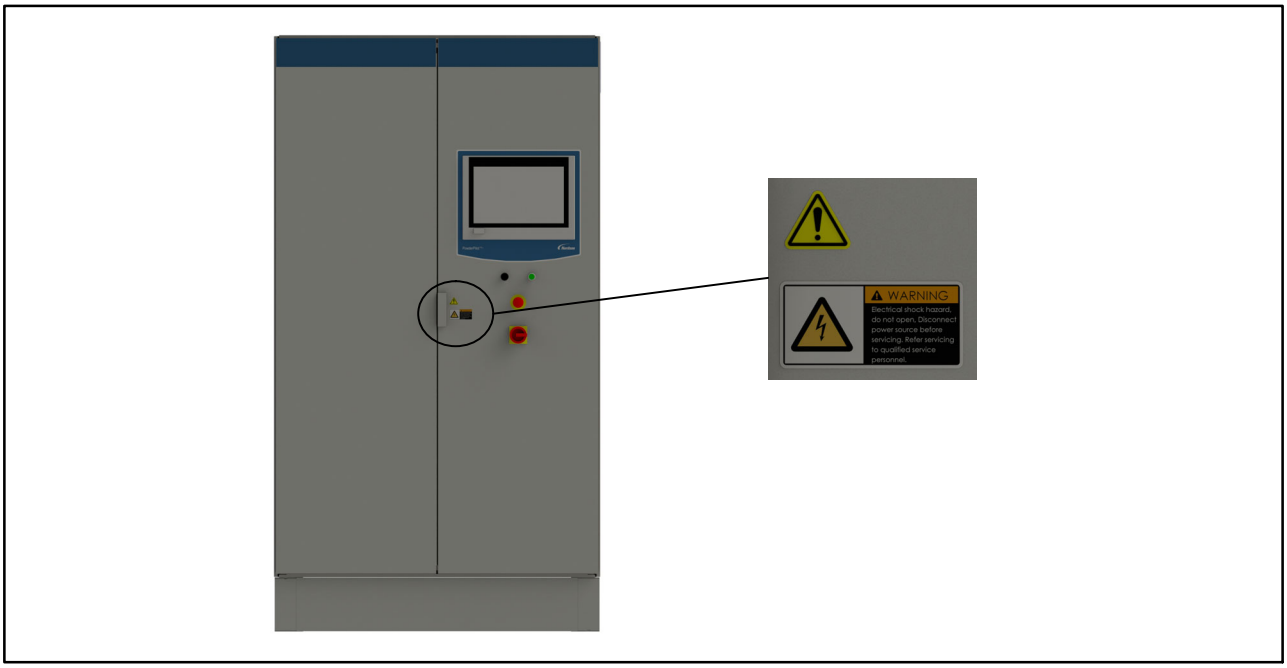
All phases of equipment installation must comply with all federal, state, and local codes.

Personal Safety

To prevent injury, follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- Obtain and read 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.

WARNING: Disconnect power before carrying out maintenance.



Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material SDS for guidance.
- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Grounding

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

Grounding inside and around the booth openings must comply with EN50050−2, EN50177, EN16985, 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.

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.

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 welded 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 welded 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

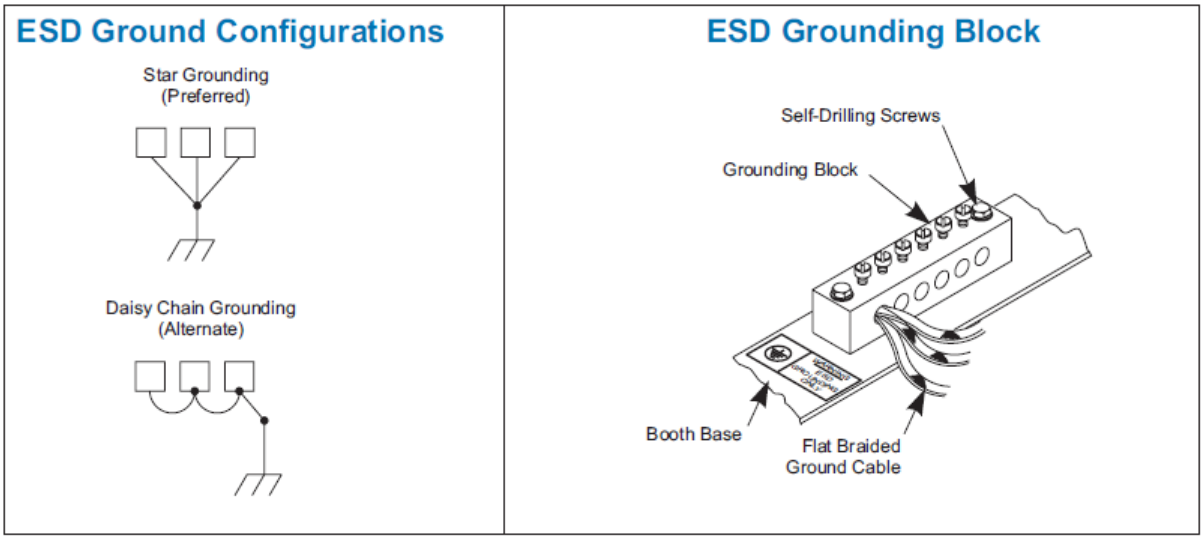


Figure 1 **ESD Ground Procedures and Equipment**

Gun Current Path

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 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).

Action in the Event of a Malfunction

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

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

Disposal

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

Description

The Nordson PowderPilot® HD is an intuitive control system, with software and hardware specifically designed for automated powder coating systems. It delivers precision digital control for your paint line for easy access to all powder application and booth operating parameters.

The spray control system is based around a combination of Soft−PLC, Hard−PLC and an Industrial PC, providing Human−Machine Interface (HMI). The soft PLC program simulates a physical PLC.

The Soft−PLC controls the following:

- Powder Booth Functions
- Spectrum HD Feed Centre Control
- Color change Process
- Part detection and tracking
- Gun triggering and set point commands
- Horizontal & Vertical Gun Mover control and position commands

Hard PLC provides 3 main functions

- Digital I/O interface
  - Transmitting digital and analogue input signals up to the soft PLC
  - Receiving and acting on digital output commands from the soft PLC
- Powder Spray Gun Control
  - Receives powder spray gun trigger and set point commands from the soft PLC and deals with the interface required to transmit this data to the guns' gateway.
- Horizontal & Vertical Gun Mover Control
  - Receives run and position commands from the soft PLC and drives the movers ensuring the set points requested are maintained.

The 15" touch screen is used for all interactions between the operator and the machine. The control panel is fitted with an Emergency Stop push−button, a Reset push−button and a klaxon unit.

This manual describes in detail, the operation required to control the plant via the HMI. It also provides detailed operating instructions for the Spectrum HD GenII Feed Centre.

NOTE: The Nordson Powder Pilot HD is a bespoke control system and is always designed according to customer requirements. Technical support is available from your local Nordson Representative.

Console dimensions

The Powder Pilot HD is available with and without booth controls.

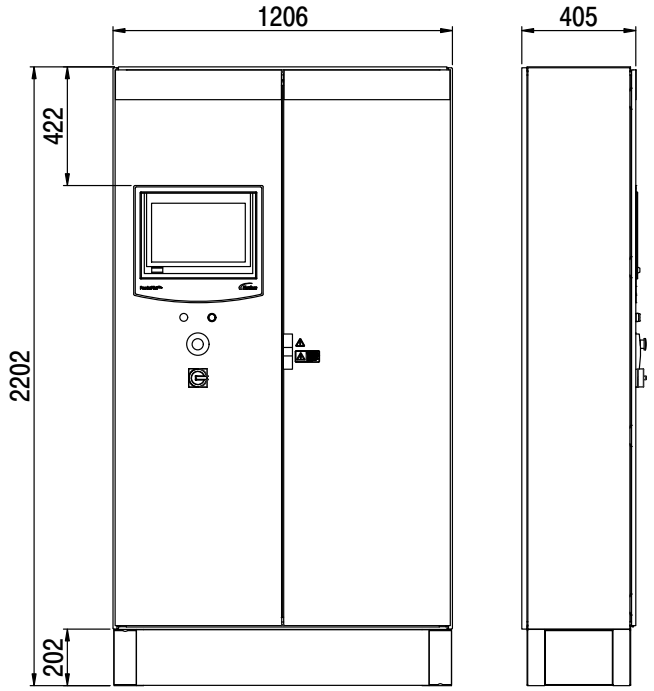


Figure 2 **PPHD with booth controls**

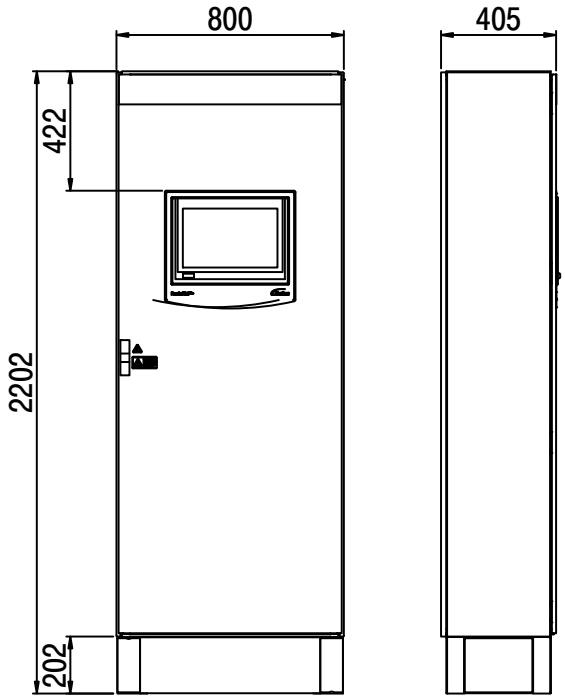


Figure 3 **PPHD without booth controls**

Specifications

Electrical supply	400VAC – 50Hz – 3 phase
Rated Power	20kVA (system specific)
Panel environmental rating	IP54
The panel must located outside of the hazardous areas / zones	
Operating environment	
Temperature	+15°C – +40°C
Humidity	5 to 95% non–condensing
Application capacity	Max 24 powder spray guns

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

PPHD 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 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.

System Connections

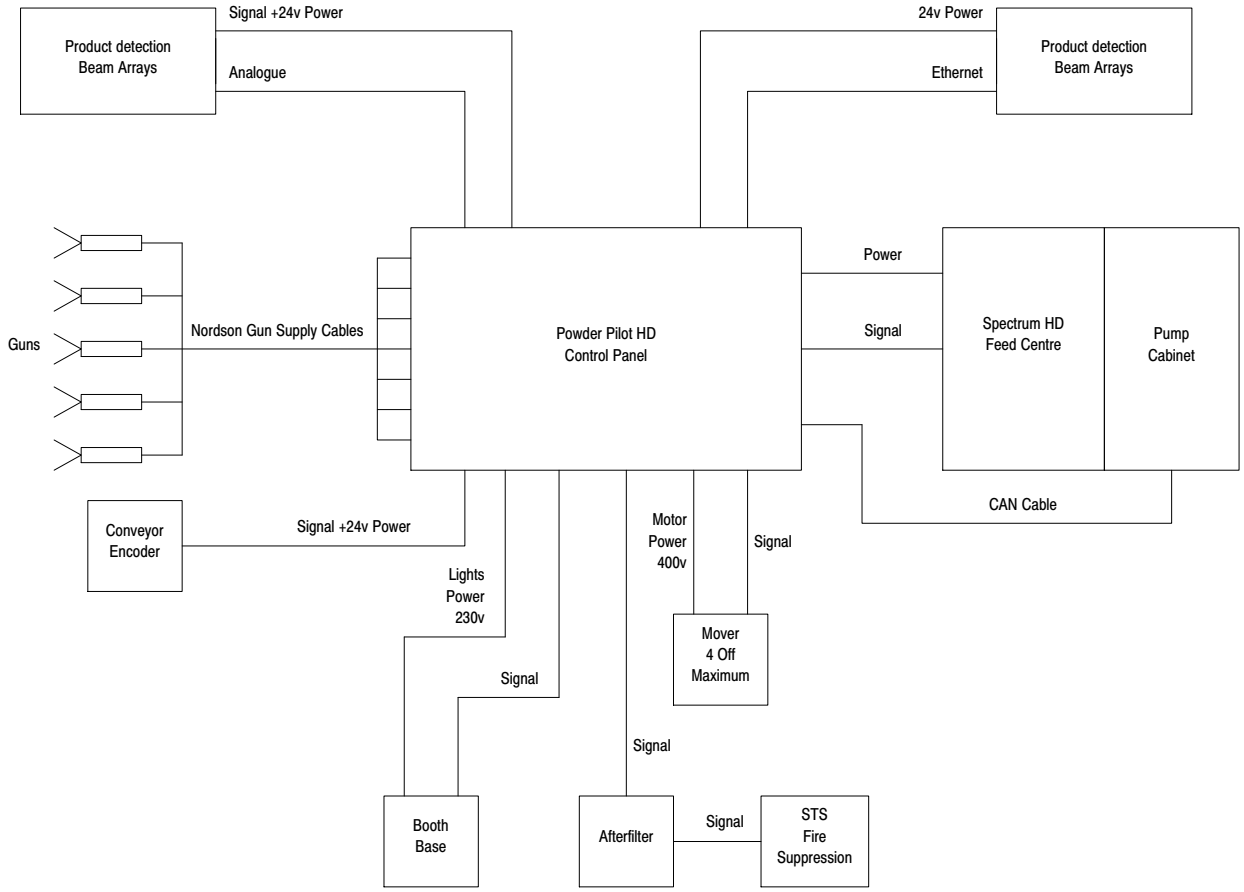


Figure 4 **System Connections Layout**

CAN Network Connections

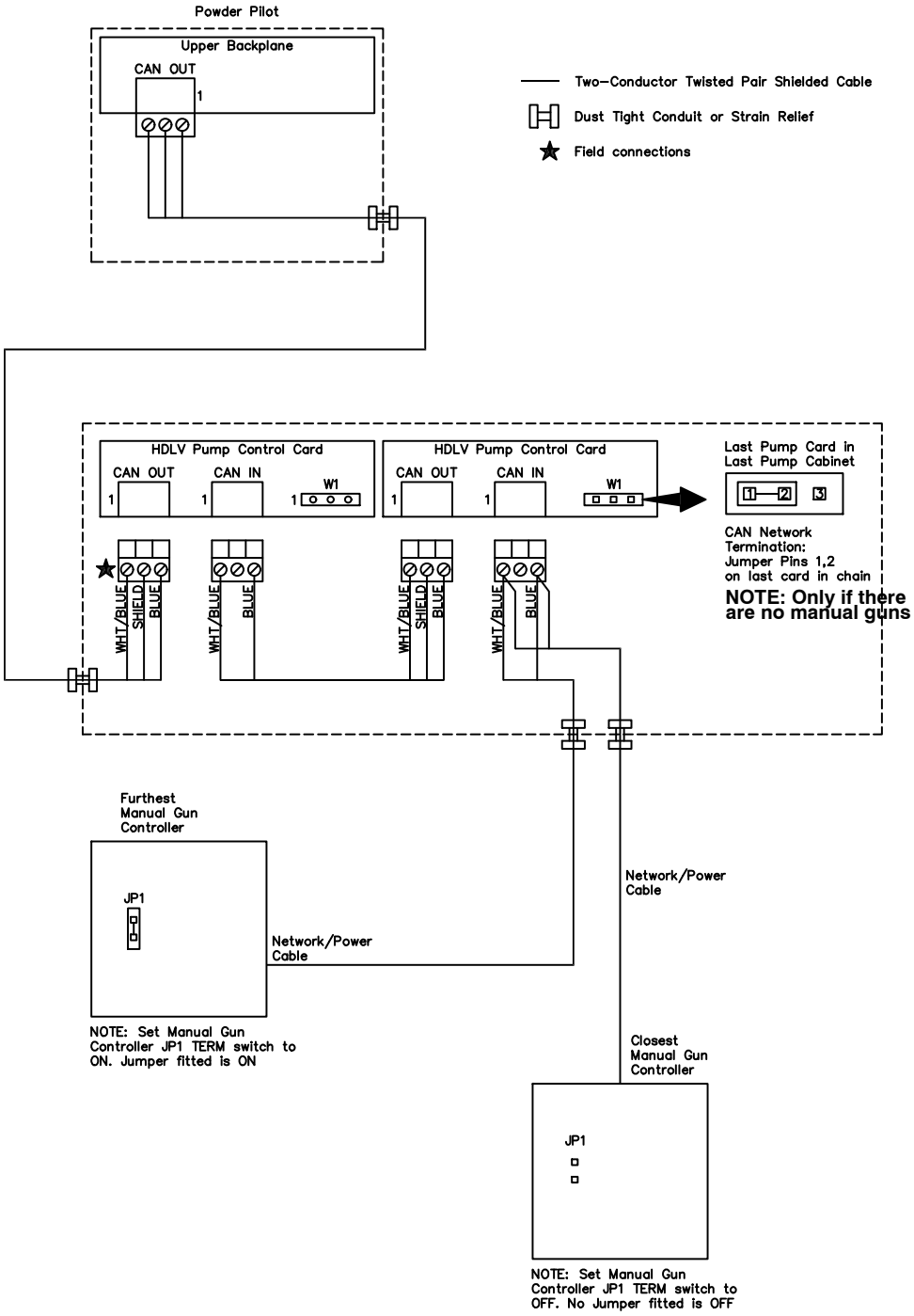


Figure 5 **CAN Network Connections Layout**

The PPHD communicates with the manual spray gun controllers and pump control cards through a CAN network. Make sure each cable shield is connected on one end only.

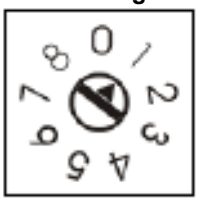
NOTE: The termination jumper must be installed on W1 pins 1 and 2 on the last pump control card in the last pump cabinet on the feed centre. If the system is fitted with manual guns and controllers, configure as shown above. Jumper fitted to JP1 means it's ON, no jumper means it's Off.

Pump Card DIP Switch Settings

Network Switch Settings
(32–Gun Automatic System)

Use the following guidelines to set switches SW1 and SW2 on each HD pump circuit board.

SW1 Settings



SW1 identifies the sequential node address of the circuit board.

Each circuit boardcontrols 2 pumps. Refer to the following chart and Figure 8 for a description on how to set SW1

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

SW2 Settings

SW2 identifies the pump panel address and the type of gun (manual or automatic) that is controlled by the circuit board. See below.

Switch	Position
1	Down: Panels 1 and 2 (Guns 1–16) Up: Panels 3 and 4 (Guns 17–18)
2	Down (not used)
3	Down (not used)
4	Down: Automatic Guns Up: Manual Guns

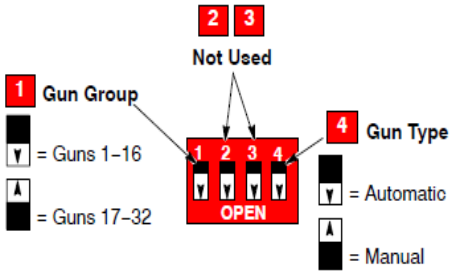


Figure 6 **Pump Card DIP Switch Settings**

Pump Card

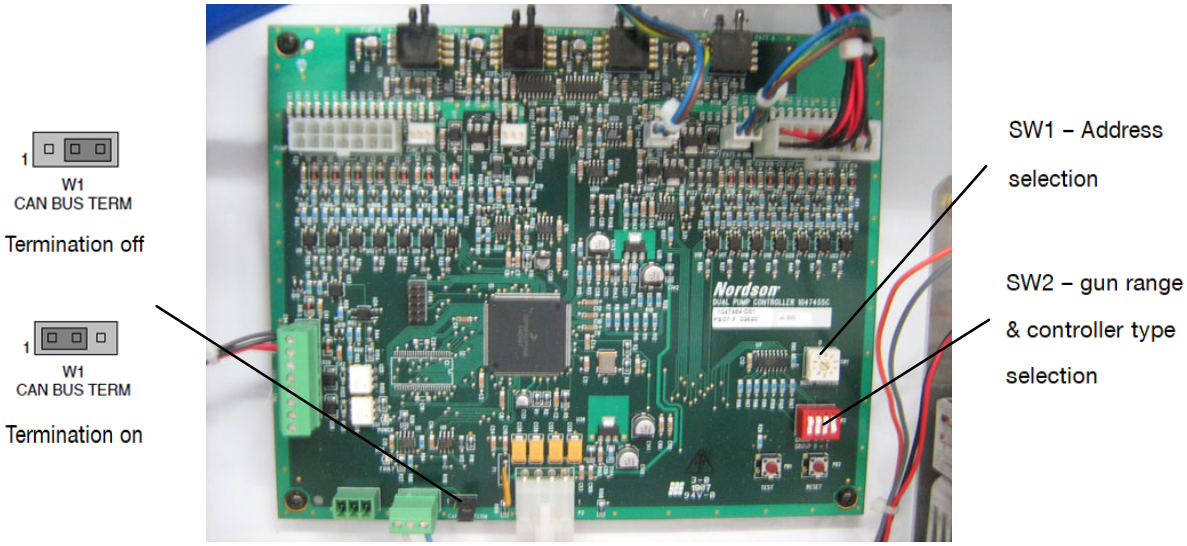
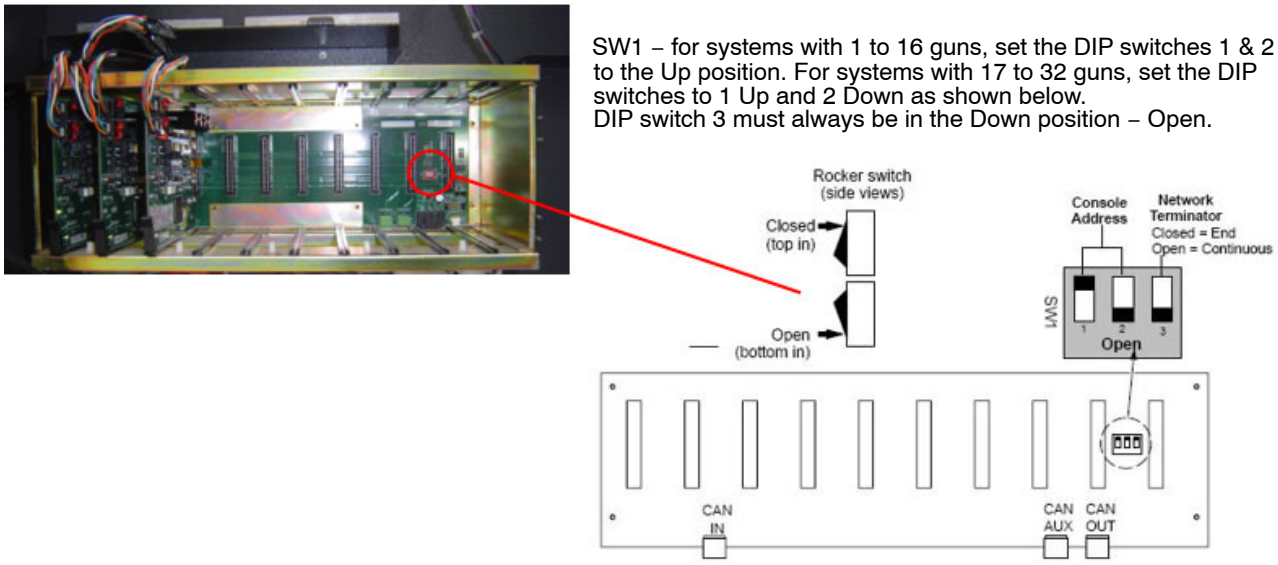


Figure 7 **Pump Card Identification**

CAUTION: Do not confuse the word **TERM**, that is screen printed on the circuit board, as being the terminate position, it is not!

Gun Control DIP Switch Setting

The gun control system has several groups of DIP switches that need to be set.
The Gun Control Cards, also known as the KV rack, are located in the main control panel and has switches that are set as follows:



SW1 – for systems with 1 to 16 guns, set the DIP switches 1 & 2 to the Up position. For systems with 17 to 32 guns, set the DIP switches to 1 Up and 2 Down as shown below.
DIP switch 3 must always be in the Down position – Open.

Figure 8 **Gun Control DP Switch Location**

Profinet Gateway

The gateway is located in slot 9 of the KV rack and should have its switches set as follows:

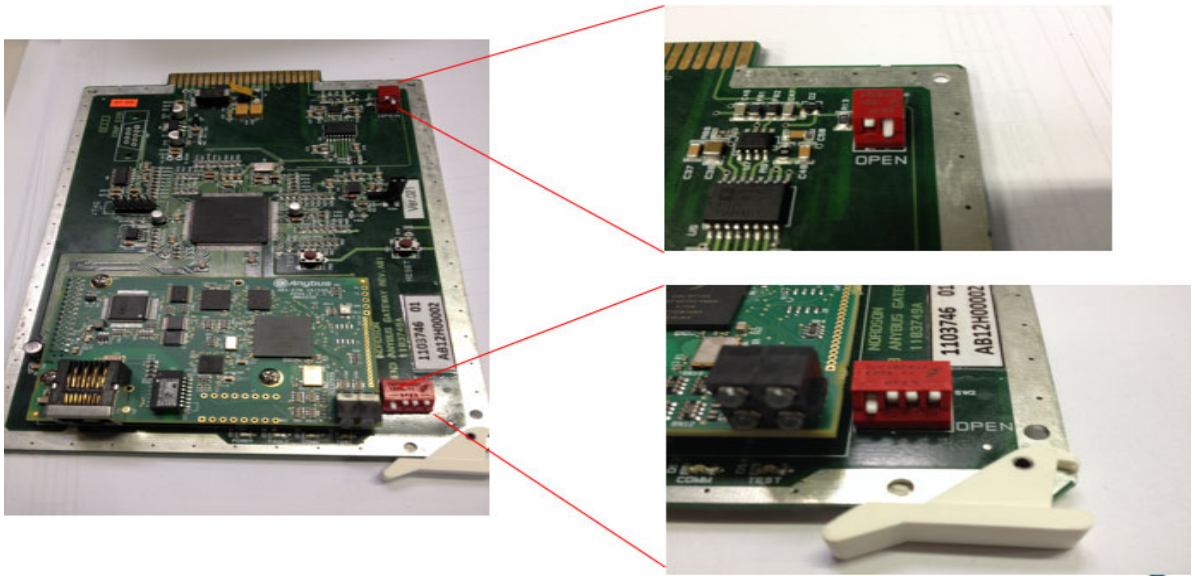


Figure 9 **Profinet Gateway**

Signals To / From PPHD

Nordson to customer

NAME	DESCRIPTION	CONTACT	DETAILS
Stop conveyor	This is a volt free normally open contact that closes when we want the conveyor to stop	N/O	This signal is used to stop the conveyor if the booth doors are closed and product is detected entering the booth. It will also stop the conveyor if the Z−axis are not detected as moving on command.
Booth running	This is a volt free normally open contact that closes when the booth is running	N/O	This signal is used to indicate the booth is running without any alarms.
Booth fault	This is a volt free normally open contact that closes when the booth is in fault.	N/O	This signal is used to indicate the booth is running, but has an alarm.
Emergency stop button	This comprises of 2 volt free normally closed contacts that open when the booth emergency stop button is pressed.	2 x N/C	This signal can be used to emergency stop a third party system.
Filter running without fault	This is a volt free normally open contact that closes when the after filter is running.	N/O	This signal is used to indicate that the after filter is running without any faults.

Customer to Nordson

NAME	DESCRIPTION	CONTACT	DETAILS
Stop conveyor	This is a volt free normally open contact that closes when we want the conveyor to stop	N/O	This signal is used to stop the conveyor if the booth doors are closed and product is detected entering the booth. It will also stop the conveyor if the Z−axis are not detected as moving on command.

NOTE: The above signals are for standard systems. If you have a customised system the signals could vary and will be shown in the electrical diagrams provided with your system documentation.

Operation

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

Start−up sequence

First of all, ensure that the system is safe to start

1. Power−up the PPHD control panel (A) via the isolator located on the front of the panel door

2. Power−up the after filter control panel (B) via the isolator located on the front of the panel door

3. Ensure the emergency stop button is pulled out on the PPHD control panel and also on the after filter panel

4. Press the Control Reset push−button on the PPHD control panel

Safety circuits will now energise and after a short delay, the main screen will be displayed on the operator panel

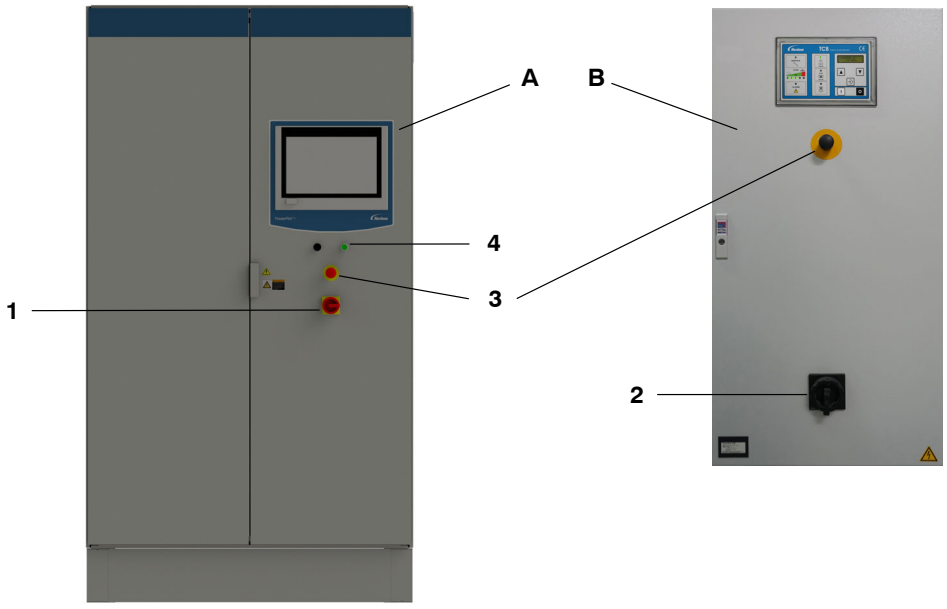


Figure 10 **Start−up buttons identification**

Booth Control Main Screen *(standard)*

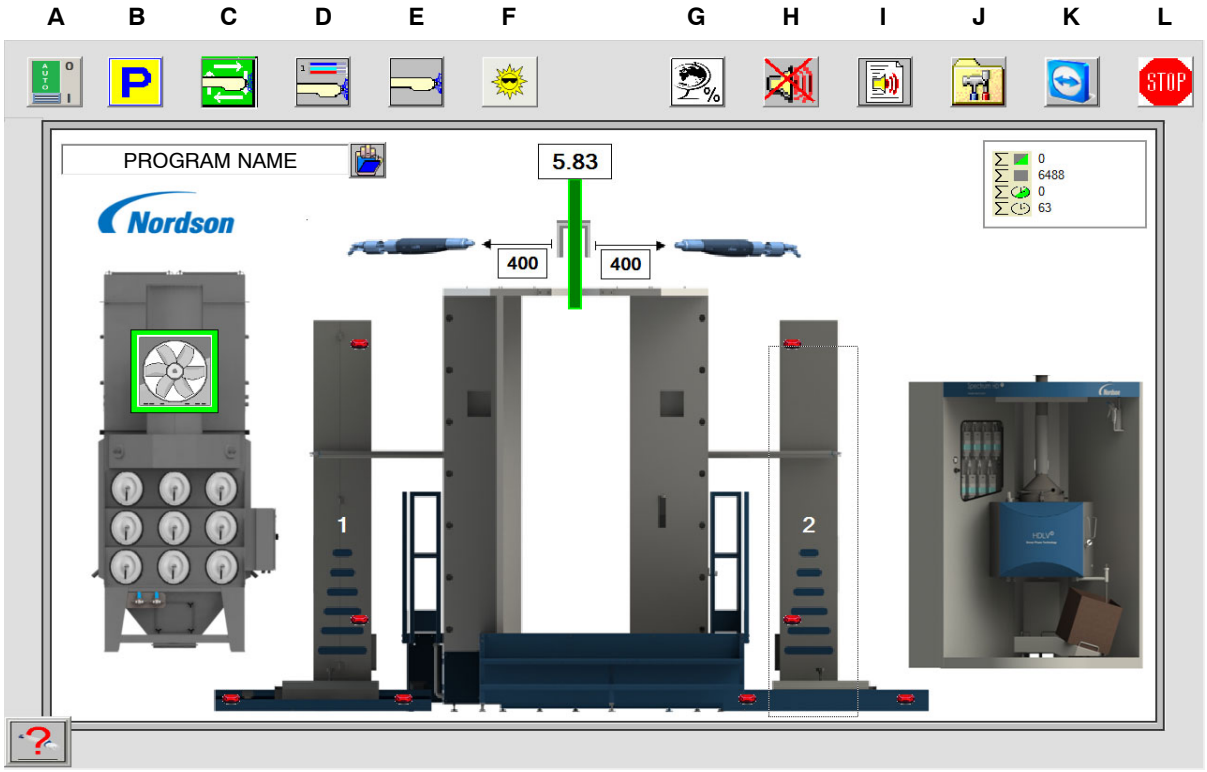


Figure 11 **PPHD Home Screen**

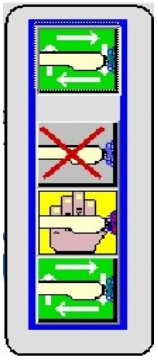
NOTE: Unless otherwise stated, all on screen values are in mm

Buttons

A – Auto Stop – Stops the booth and spray systems

B – Park – Stops the gun movers and returns them to the preset Park position

C – Guns Auto/Manual – Toggles the state of the gun between Auto – Manual – Off. To select the desired mode, press this button and a list of 3 buttons will appear to select from. Press the mode required and the list will disappear again.



Off – Guns will not trigger

Manual – Guns will trigger always, regradless of part detection

Auto – Guns will only trigger when the product is in front of them and the conveyor is running

D – Gun Feedback & Setpoint Displays – Displays the gun set point and actual feedback screens. All set points and running spray values for each gun are displayed here.

E – Gun Spray Control **–** Displays the gun spray control page. From here, the gun's flow, atomising pressures and KV can be adjusted as well as gaining access to the gun's positional dimension control.

F – Booth Lights – Turns the booth lights on or off. Each subsequent press of this button toggles the lights state between on and off.

G – Gun Pressure Offset Adjustment – Reveals a pop up window to control the percentage offset that can be applied to all the powder and pattern air set points.

Modifies the percentage offset applied to all gun powder output settings

Modifies the percentage offset applied to all gun pattern air settings

Applying a value of 20 for example, will increase all gun settings by 20% from their existing set points.
Applying a value of –20 for example, will decrease all gun settings by 20% from their existing set points.

H – Mute – Any fault that occurs with the system will sound an audible Klaxon alarm to attract the operators' attention to the fault. Pressing this key silences the alarm. The yellow light within the light stack will continue to illuminate until the fault is cleared.

I – Alarm Summary – All faults are logged with a time & date of when they occurred. Pressing this button will display an alarm log showing a brief description of the fault and its current status. If the status shows as **K**, then the alarm is active. If the alarm is listed with a status of K(G), the alarm is cleared.

J – Configuration – Takes you to the configuration screen. The booth system parameters can be adjusted from here.

NOTE: This screen is only adjusted occasionally and by authorised personnel only. Therefore, this screen has been password protected.

K – Teamviewer – Opens the Teamviewer client to allow remote access of the IPC.

L – Shut Down – Opens the button tree, see below: (used during system update)

Shuts down the IPC (Industrial Personal Computer)

Cancels the shut down process

(Only for system update) Closes the Runtime software, but does not shut down the IPC. Returns to the Windows Desktop.

NOTE: Before switching off the system use this function to securely disable the soft–PLC and save all data stored in its memory.

WARNING: **Stay patient before switching off power, wait until the screen goes black – Failure to follow this process could result in corruption of the control software!**

Home Screen Elements

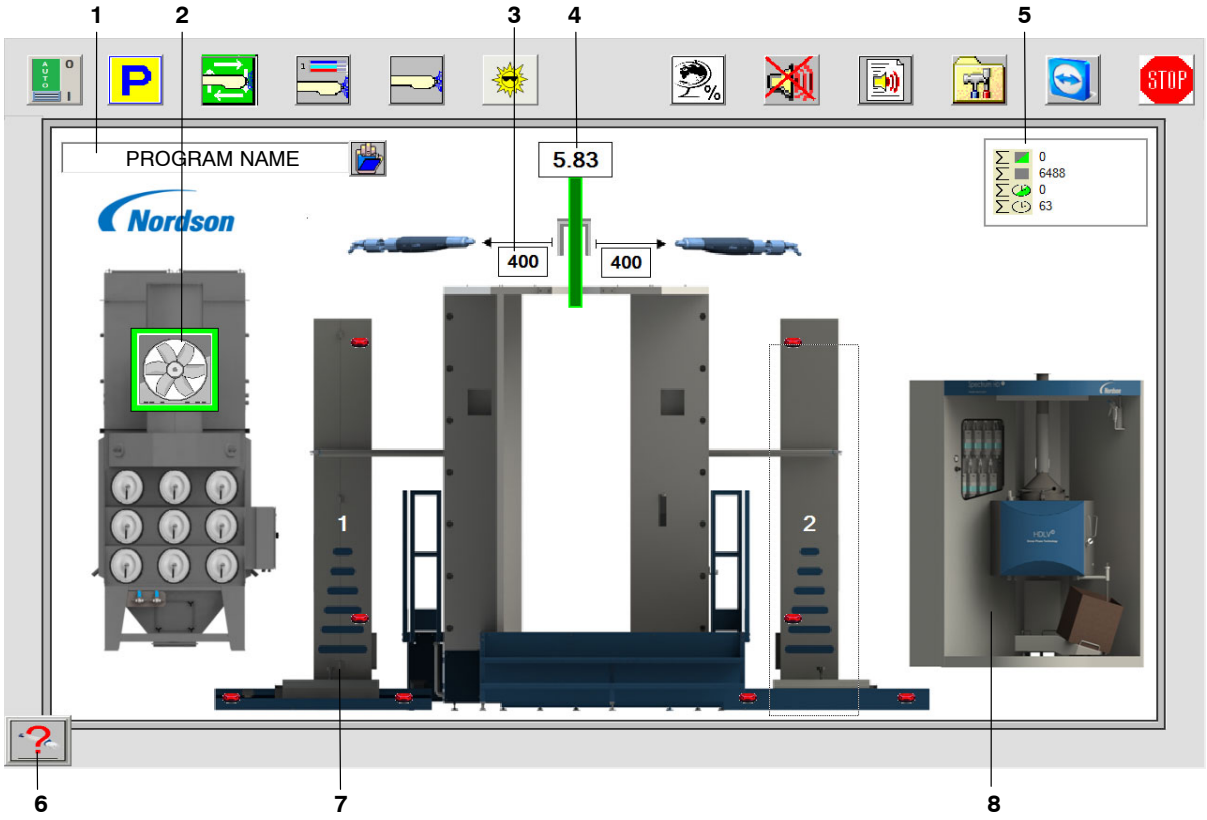


Figure 12 **Home Screen Elements**

1 – Program Control – This data entry field has two functions It shows the program name that is currently running in the system. It also allows the operator to create, delete, select & change programs.

2 – Fan Status – The colour indicates the current state of the extract fan. These are as follows:
Grey – Fan is stopped Green – Fan is running Flashing Red – Fan is in fault

3 – Gun to Part Distance – Sets the distance the gun will position itself away from the product regardless of product size. One entry for the guns on the left side of the booth and one for the guns on the right side.

4 – Conveyor Status / Speed – Displays the condition of the conveyor. When in static grey, the conveyor is stopped. When flashing two–tone green, the conveyor is running. A component will also appear hanging from the conveyor when the booth has product inside. The number displays the conveyor speed in metres / minute for indication purposes only.

5 – Production Data – These displays from top to bottom are:
Shift product count – This is the total number of products sprayed since the last reset.
Total product count – This is the total number of products sprayed since commissioning. Cannot be reset
Shift production hours – This is the total number of hours the system has sprayed for with the conveyor running since the last reset.
Total production hours – This is the total number of hours the system has sprayed for with the conveyor running since commissioning.

6 – Gun Fault Status – This button will display the gun fault screen where a more detailed fault code can be obtained for any gun. See next page.

7 – Gun Mover Control – Pressing on any of the 2 gun mover graphics on main window will open the configuration window of the corresponding gun mover.

8 – Spectrum^{HD} Feed Centre Control – Pressing this graphic switches the screen to the feed centre control section.

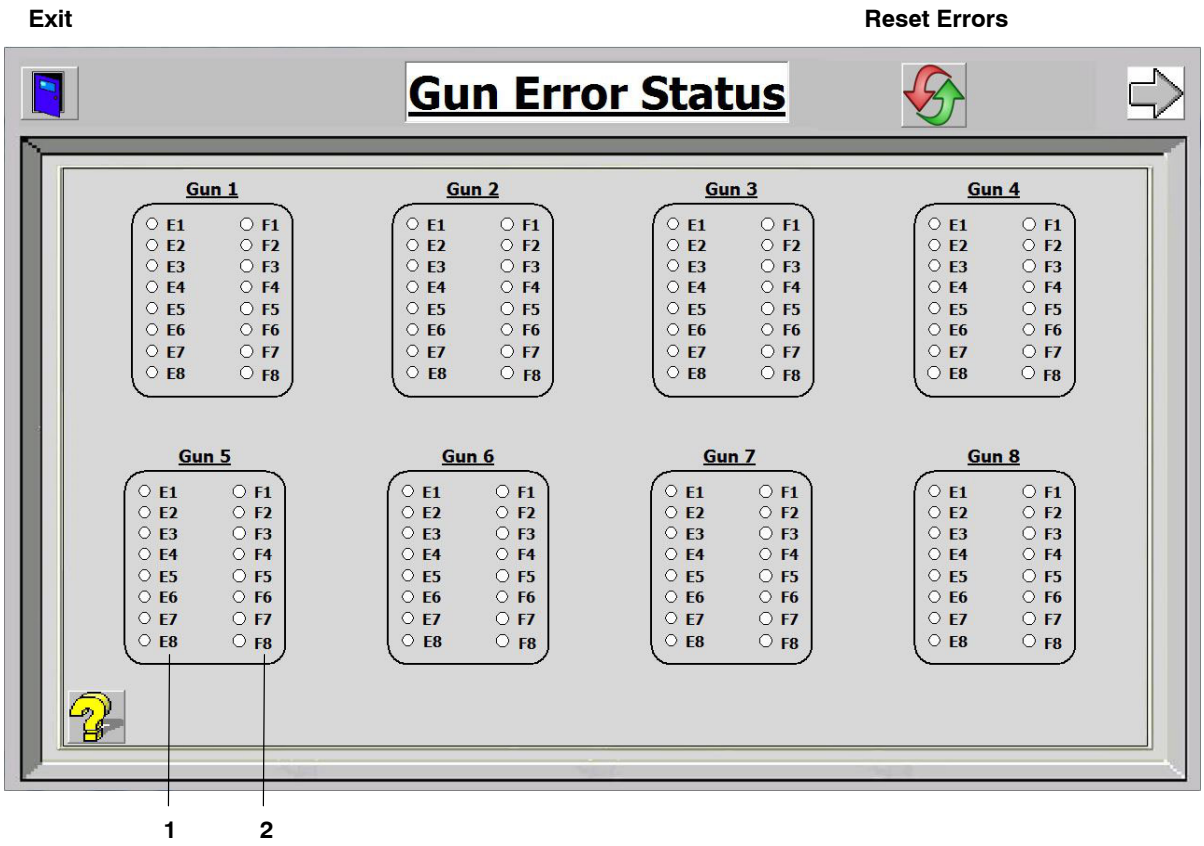


Figure 13 **Gun Error Status**

1 – KV Control Node Errors for Gun 5 – fault occurred on the electrostatic (KV) side of gun number 5

2 – Pump Control Node Errors for Gun 5 – fault occurred on pump side of gun number 5

If any of these “LED–symbols” are lit red, try to reset the fault by touching the reset button. If the problem persists, contact your Nordson representative.

The fault codes indicated are explained as follows

KV Card Faults		Pump Card Faults	
E1	uA has not reached alarm set point. This is used with Tribo guns where a low charge uA value is set for alarm	F1	Communication. The pump card has lost communication with the gateway
E2	Foldback. The gun is trying to draw more than 100uA	F2	No 24V. The 24V supply to the pump system has been lost
E3	Feedback. The uA feedback wire is broken in the gun cable	F3	General alarm. On for any other fault that cannot be detailed in this list
E4	Open circuit. The voltage multiplier is open circuit	F4	Reserved for future use
E5	Short circuit. The voltage multiplier is short circuit	F5	Powder air is higher than set point
E6	Hardware. The KV card itself has a fault	F6	Pattern air is higher than set point
E7	General alarm. On for any other fault that cannot be detailed in this list	F7	Powder air is lower than set point
E8	No 24V. The 24V supply to the KV rack has been lost	F8	Pattern air is lower than set point

Gun Mover Operation Window

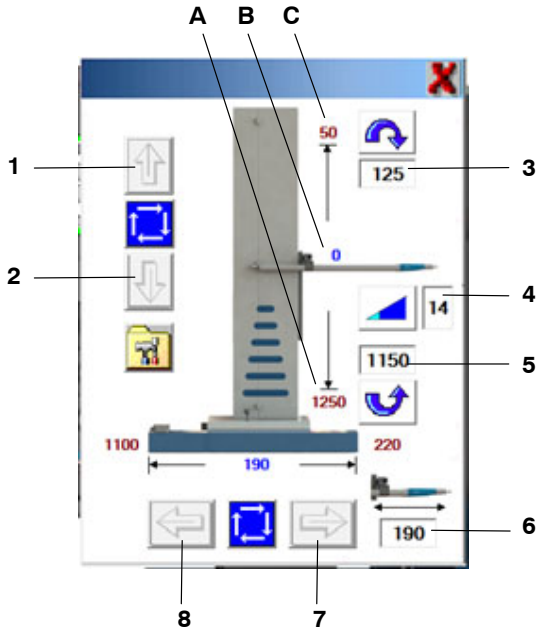


Figure 14 **Gun Mover Operation Window**

NOTE: Zero (0) position is the top of the automatic gun slot

1 – Manual up – Button to move the reciprocator up in manual mode

2 – Manual down – Button to move the reciprocator down in manual mode

3 – Recip top turn – Max distance in millimeters below ‘0’ position to which the reciprocator will travel

4 – Recip speed – Speed of reciprocator travel, in meters per minute

5 – Recip bottom turn – Max distance in millimeters below ‘0’ position to which the reciprocator will travel

6 – Z–Axis – Gun adjustment – This field displays the offset value that determines the actual distance of the guns from the conveyor line. E.g. if the gun is actually 500mm from the conveyor centre line, but the screen displays only 440mm, adding 60 to the adjust value will correct the position display.

NOTE: This value is set up during commissioning and should only be modified by authorised personnel. Therefore, this entry field has been password protected.

7 – Manual in – Button to move the Z–Axis forward towards the product in manual mode

8 – Manual out – Button to move the Z–Axis backwards away from the product in manual mode

A – Ultimate bottom limit allowed. Display measurement is down from the zero position.

B – Current position.

C – Ultimate top limit allowed. Display measurement is down from the zero position.

NOTE: Any value entered that is outside of the range set for A & C, will force the preset ultimate limit value.

Gun Mover Operation Window – with variable stroke & speed

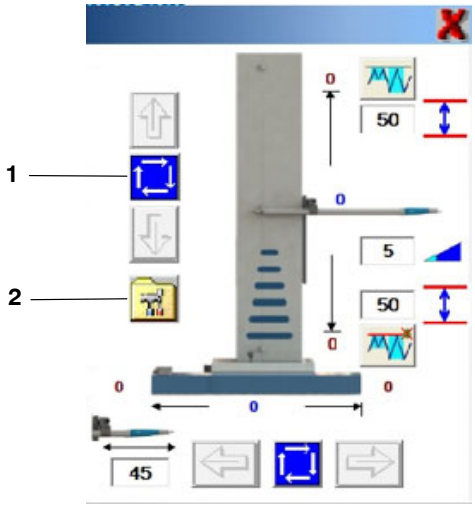


Figure 15 **Gun Mover with variable stroke and speed control**

1 – Mode selector – This button toggles between mover auto and manual control. In auto mode, (denoted by the symbol of white circular arrows on a blue background) the system controls the movers position and speed. In manual mode (denoted by the symbol of a hand on a yellow background), the movers can be manually moved by the operator, press and hold the arrows according to the desired direction.

2 – Tools button – When the tools button is pressed on this page, a configuration window opens to allow data input. See figure 16

NOTE: Several screens use the same Tools button to open configuration windows relevant to that component. A password will be required to access configuration windows.

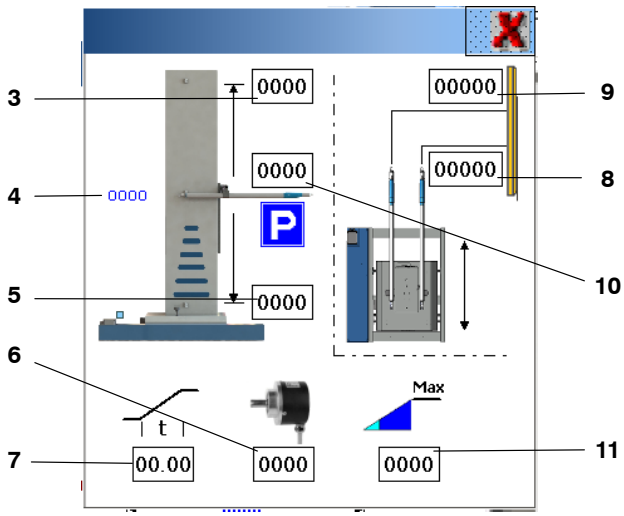


Figure 16 **Gun Mover Configuration Window (see next page)**

NOTE: Any factory settings shown in these sections could be tailored according to the system requirements during commissioning.

3 – Maximum upper limit – This field sets the highest position in millimeters, that the reciprocator can move up to. This is measured down from the zero point of the reciprocator.

This value is system specific

4 – Current position – This field displays the current reciprocator position, down from top limit switch.

5 – Maximum lower limit – This field sets the lowest position in millimeters, that the reciprocator can move down to. This is measured down from the top limit switch of the reciprocator.

This value is system specific

6 – Encoder resolution – This entry sets the number of pulses per millimeter of travel.

Factory setting is 26

7 – Deceleration time – This field sets the deceleration time that has been configured in the invertor drive unit. This value can be found at parameter P1121 in the invertor drive unit. This is set during commissioning and does not require further changes.

Factory setting is 0.5

8 – Pre move distance – This field sets the distance from the part detection to the point at which the z–axis will move the reciprocator to, where it must start to track around the work piece. A default value would be the distance from beam array to first gun on the reciprocator less 200mm. This would make the mover start to move around the work piece 200mm before it arrives at the first gun.

This value is system specific

9 – Post move distance – This field sets the distance from the part detection to the point at which the z–axis will move the reciprocator to, when it ends tracking around the work piece. A default value would be the distance from beam array to last gun on the reciprocator plus 200mm. This would make the mover go back to its wait position 200mm after the work piece has gone by.

This value is system specific

10 – Park position – The reciprocator will move the gun carriage to this point when the Park button is pressed.

11 – Maximum speed – Sets the maximum running speed the reciprocator carriage can achieve in meters per minute.

Factory setting is 50

Gun Set Point Status – *(button D on Booth Control Main Screen – page 16)*

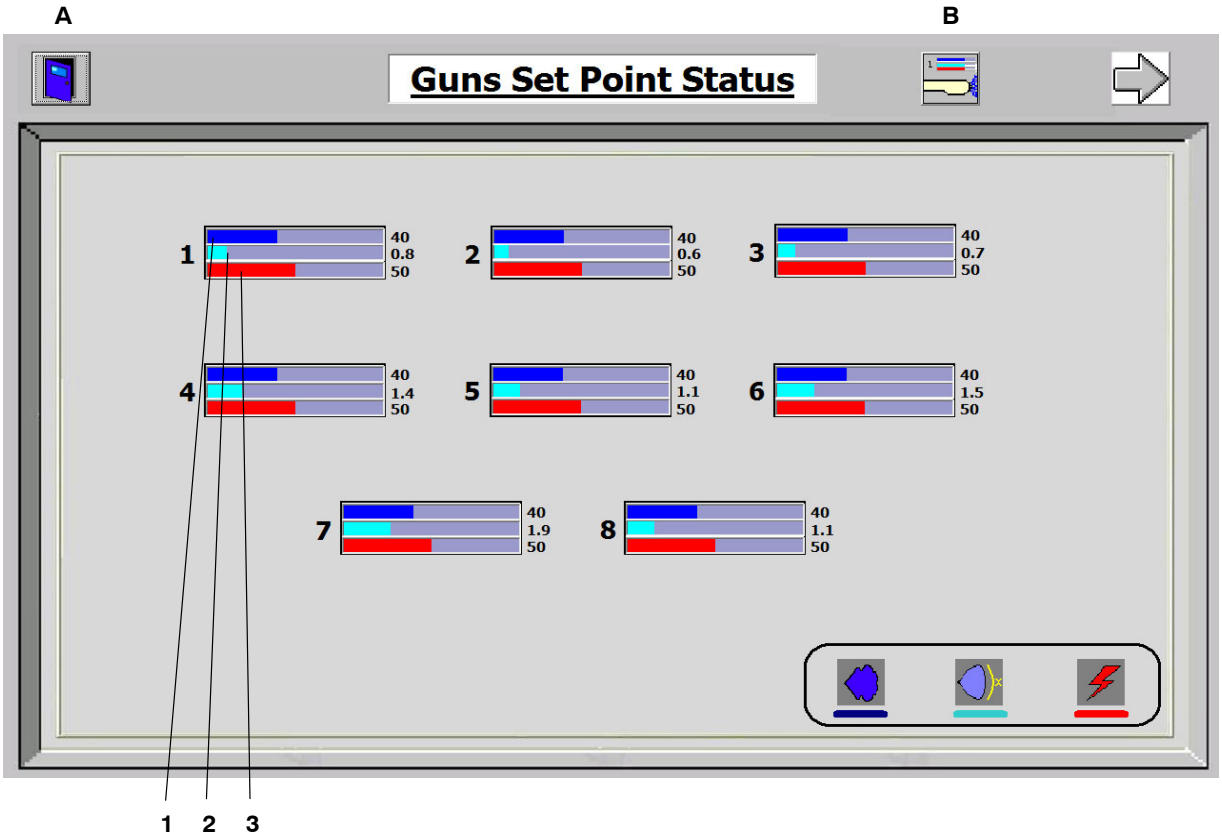


Figure 17 **Gun Set Point Status Screen**

A – Exit – This button exits the gun configuration screen and returns to the main screen.

B – Gun Feedbacks – This button displays the actual gun feedback screen as described below.

1 – Gun 1 Powder Setpoint – This bar displays the current powder set point output value applied to gun 1. Its units are displayed as a percentage value

2 – Gun 1 Pattern Air Setpoint – This bar displays the current pattern air set point value applied to gun 1. Its units are displayed in Standard Cubic Meters per Hour (SCMH).

3 – Gun 1 KV Setpoint **–** This bar displays the current voltage set point value applied to gun 1. Its units are displayed in Kilo Volts.

Gun Feedback **–** *(button B on Gun Setpoint Status – page 23)*

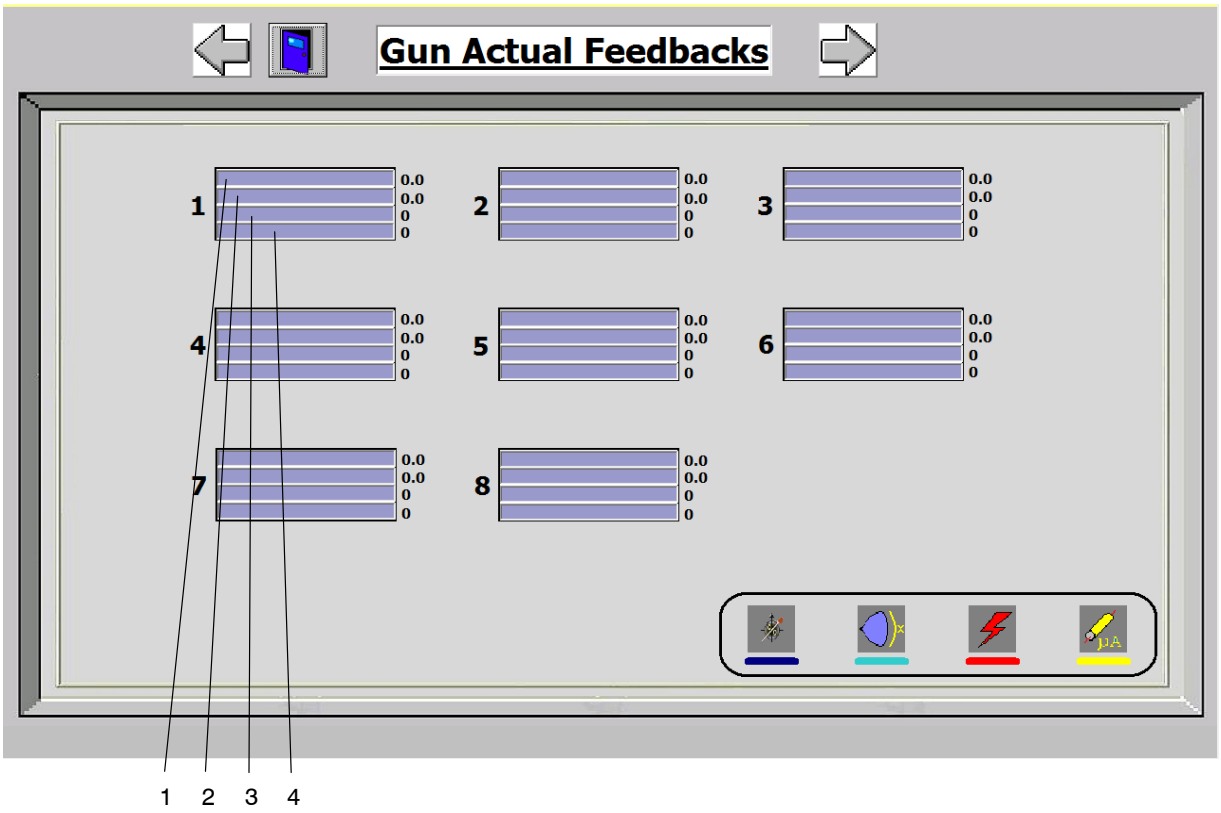


Figure 18 **Gun Feedback Screen**

1 – Gun 1 Assist Air Feedback – This bar displays the actual assist air value being generated currently by gun 7. Its units are displayed in Standard Cubic Meters per hour (SCMH).

2 – Gun 1 Pattern Air Feedback – This bar displays the actual pattern air value being delivered by that gun pump. Its units are displayed in Standard Cubic Meters per hour (SCMH).

3 – Gun 1 KV Feedback – This bar displays the actual KV value being generated currently by gun 1. Its units are displayed in Kilo Volts

4 – Gun 1 uA Feedback – This bar displays the actual micro Amps value being generated currently by gun 1.

Gun Spray Control – (button E on Booth Control Main Screen – page 16)

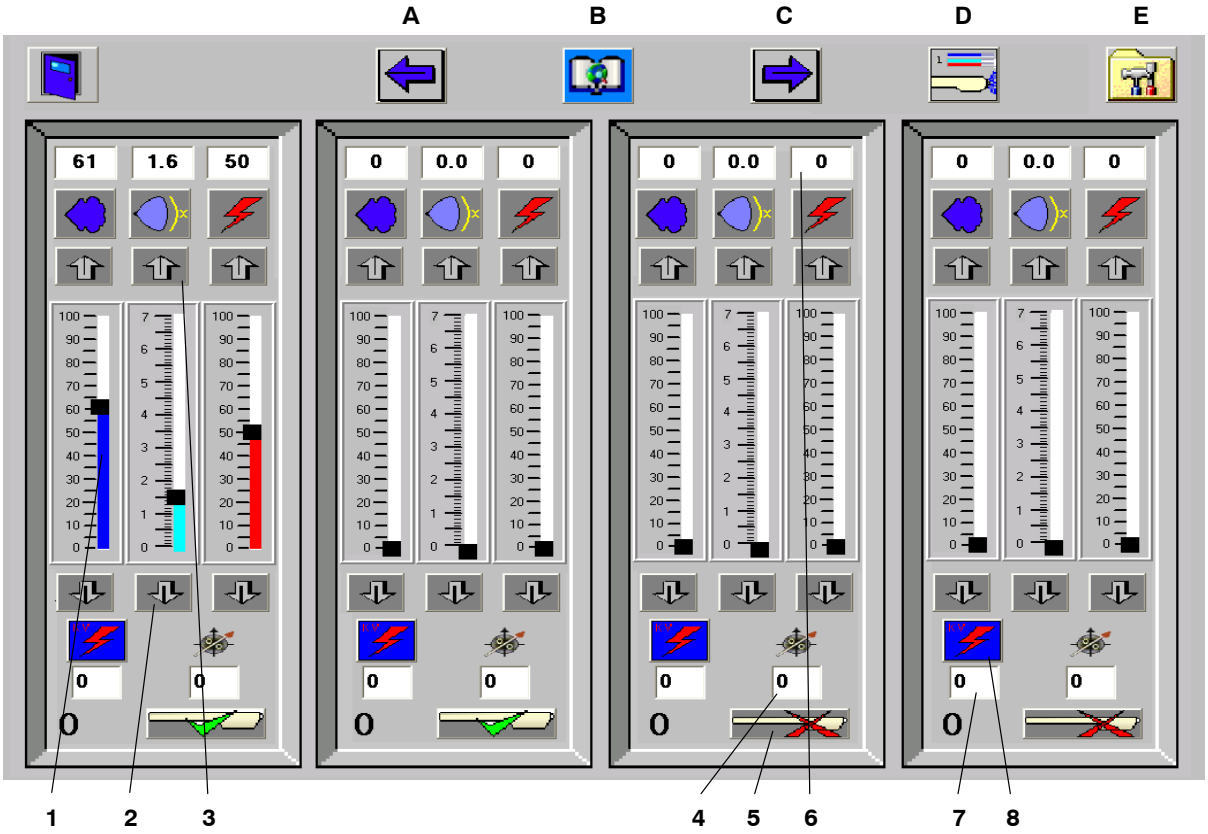


Figure 19 **Gun Spray Control Screen – displays in groups of 4 guns at a time**

A – Previous Guns – This button displays the previous set of four guns for set point adjustment

B – Group Setpoint Adjust – Allows the user to load set point to various groups of guns

C – Next Guns – This button displays the next set of four guns for set point adjustment.

D – Gun Feedback Display – Displays the guns actual feedback. Live spray values for each gun.

E – Gun Properties – This button displays the gun properties screen

1 – Powder Output Slider Control – This slider control sets the powder output for the gun entered as a percentage. To set, touch the button and slide up or down to desired set point.

2 – Pattern Air Decrement Control – This button decreases the pattern air flow value by 01 SCMH each time it is pressed. This is used for fine tuning the flows.

3 – Pattern Air Increment Control – This button increases the pattern air flow value by 01 SCMH each time it is pressed. This is used for fine tuning the flows.

4 – Assist Air Compensation – This displays the assist air compensation value.

5 – Gun Trigger Control – This button determines whether the gun will fire or not If a red cross is displayed, the gun will never fire If a green tick is displayed, the gun will fire when product is in front of it.

6 – Flow / KV Display – This displays the current gun SCMH / KV setting. It also allows direct entry of the SCMH or KV by touching the number and typing it into the keypad that will appear.

7 – Micro Amps Reading / Setpoint – This displays the gun micro amp reading when in standard KV mode, and becomes the micro amp set point input when in AFC mode

8 – KV / AFC Mode Selector – This button selects either standard KV mode or AFC mode for the gun. When displaying a flash bolt on a blue background, the gun is in KV mode. When displaying a turquoise background, the gun is in AFC mode.

Group Setpoint Adjust – *(button B on Gun Spray Control screen – page 25)*

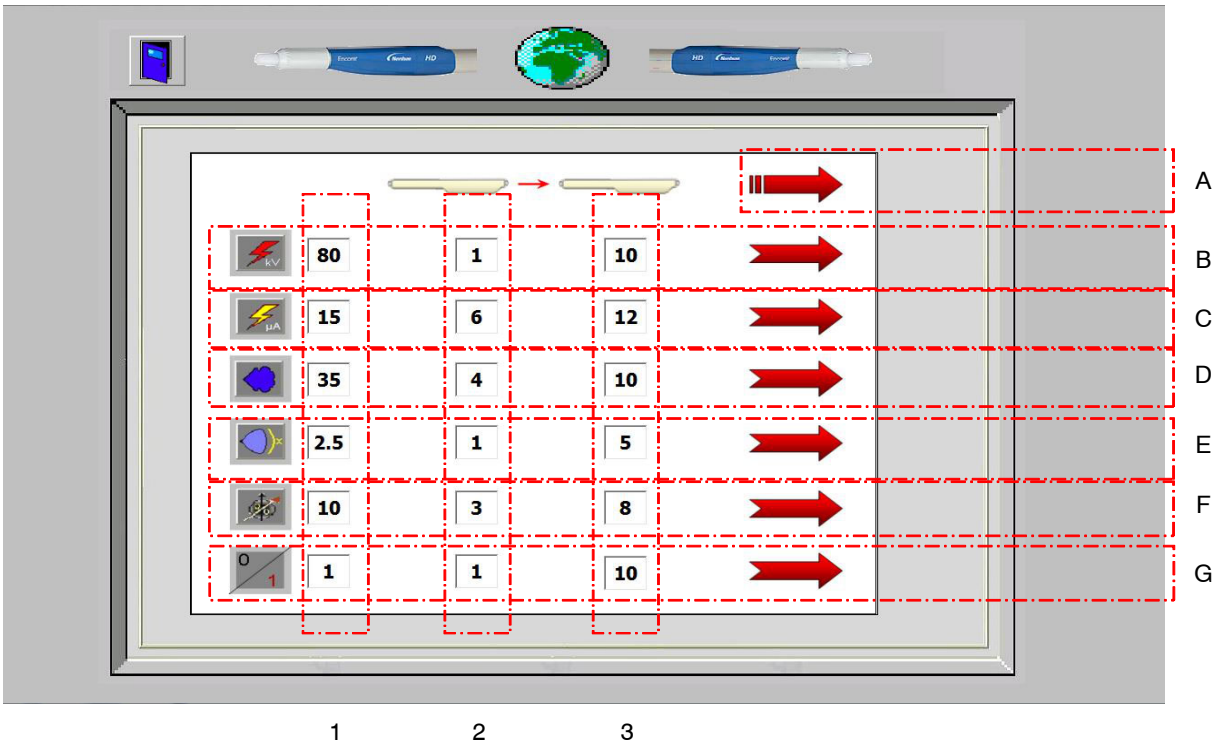


Figure 20 **Gun Setpoint Adjust Control Screen**

1 – Setpoint Values – this fields are used to enter the value of a specific set point.

2 – First Gun – the number of the first gun in a series of guns that Setpoint Value (1) will be loaded to.

3 – Last Gun – the number of the last gun in a series of guns that Setpoint Value (1) will be loaded to.

A – All Setpoints – touching this symbol will download all set points to the selected guns.

B – KV Setpoint – touching here will download and apply the KV set points to the selected guns.

C – µA Setpoint – touching here will download and apply the µA set points to the selected guns.

D – Powder Output – touching here will download and apply the Powder output set points to the selected guns.

E – Pattern Air – touching here will download Pattern Air set points to the selected guns.

F – Assist Air Compensation – touching here will download Assist air compensation values to the selected guns.

Program Control Screen

Touch the program name entry field as identified below (A) to display the Program Control Screen. This screen is used to create, edit, delete, upload and download programs.

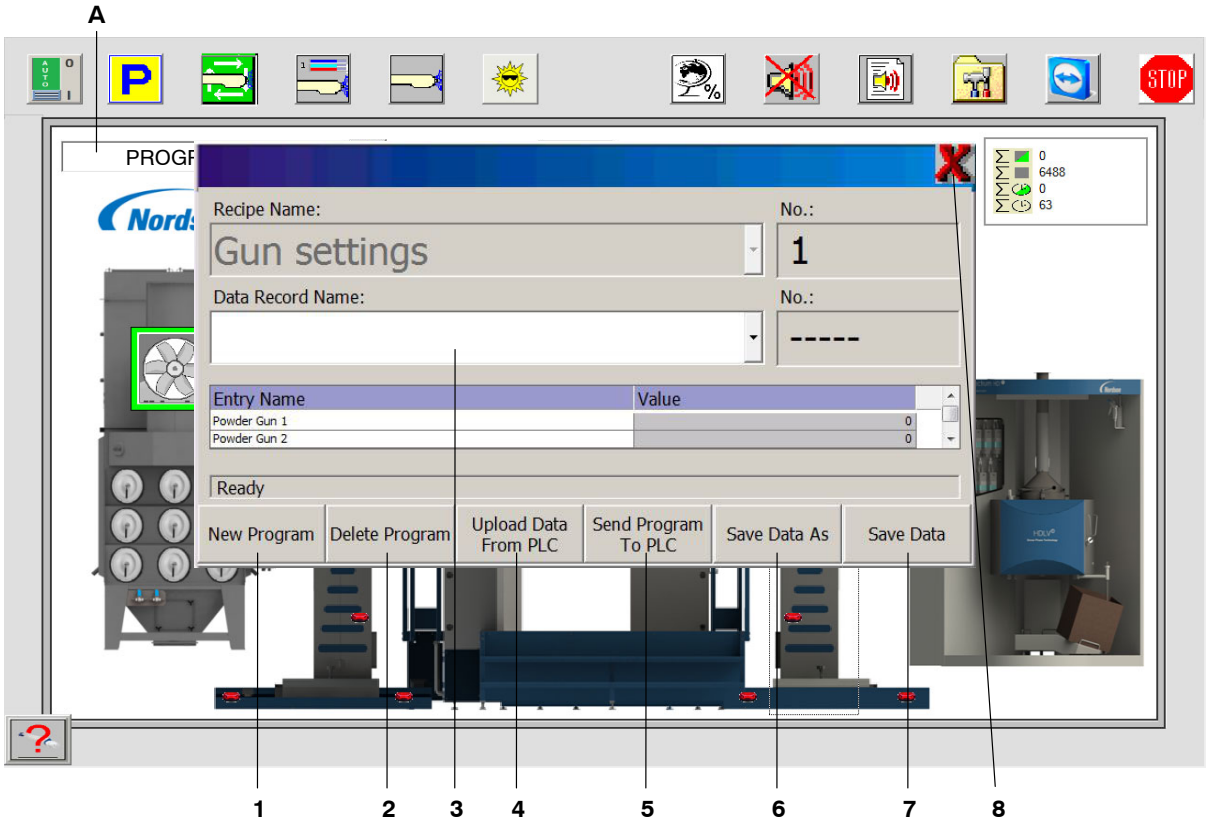


Figure 21 **Program Control Screen**

1 – New program – This button creates a new program folder into which gun settings etc can be stored. After pressing this button, touch the data record name window (3) to reveal a keyboard into which a new program name can be entered.

2 – Delete Program – This button deletes the program displayed in field 3.

3 – Data Record Name (program select) – Pressing this button will display the list of stored programs and allows one to be selected for action by touching it. It also displays the program that is currently active for editing or deleting.

4 – Upload Data From PLC – This button uploads the parameters currently running in the system to the program selected in the data record name (3).

5 – Send Program To PLC – This button downloads the program selected in the data record name to the PLC.

6 – Save Data As – This button saves the data stored in the program currently displayed, into a new program. When the Save Data As button (6) is pressed, the system will prompt for a name for this new program. Enter a name into the keypad that will appear on the screen followed by the enter key to confirm the save.

7 – Save Data – This button saves the data into the program name displayed in in the Data Record Name field.

8 – Exit – This button closes the program control pop up window and returns to the main screen.

Program Control Screen(contd)

See below for examples

To create a completely new program

- Press new program key 1. Touch the data record name window and enter the name of your new program into the keypad that will appear.
- Then press the upload data from PLC button (4) to move the parameters from the gun control pages into the program control area. The control box will then disappear and hashes (#) will be displayed in the program name window. This denotes that a new program has been created but not yet saved.
- Press the name window to reveal the program control window again. Then press the save data key (7) to store the uploaded parameters.

To load a program

- Press program selection key 3 and a list of all stored programs will appear.
- Touch the program to be loaded
- Press download key 5 to load and run this program.

To edit an existing program

- Load the program to be edited into the system using the method detailed above.
- Modify the gun control and spray parameters as required.
- Return to the main screen and press the program name window.
- Press program selection key 3 and a list of all stored programs will appear.
- Touch the program to be edited.
- Then press upload key 4 to load in the modified gun control parameters.
- Then press save key 7 to store the uploaded parameters.

Configuration Settings

Gun Configuration – (button E on the Gun Spray Control screen – page 25)

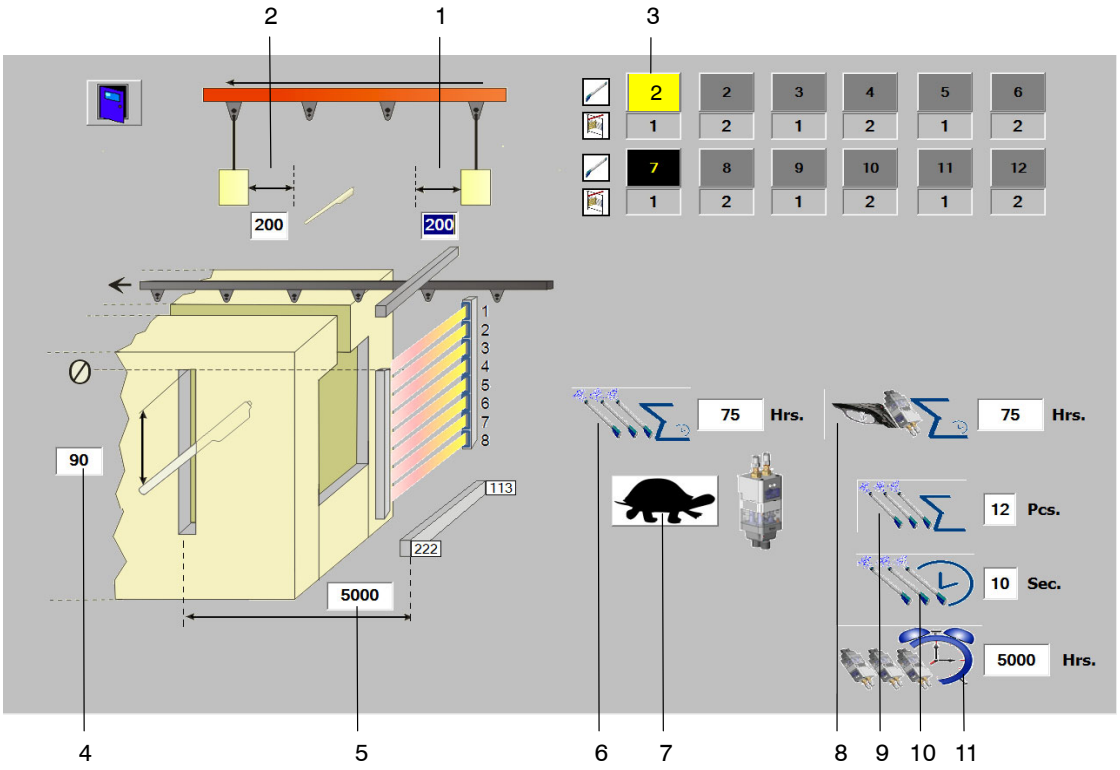


Figure 22 **Gun Configuration Screen**

1 – Before Spray – This value shows how many millimetres before the product arrives at the gun it will fire. Touch the value and a keypad will appear to adjust it.

Factory setting is 200

2 – After Spray – This value shows how many millimetres after the product has left that the gun will switch off. Touch the value and a keypad will appear to adjust it.

Factory setting is 200

3 – Gun Parameter Selection – These buttons select the guns parameters to be displayed and adjusted. The gun currently selected, will flash yellow.

4 – Vertical Distance – This value shows the distance between the gun at the top of its stroke, and the top of the booth slot in millimetres. Touch the value and a keypad will appear to adjust it.

This value is system specific

5 – Horizontal Distance – This value shows the distance between the gun and the beam array in millimetres Touch the value and a keypad will appear to adjust it.

This value is system specific

6 – Total Gun Hours – This displays the total hours that the gun has triggered for If the gun is replaced, this number can be reset by touching the display and entering zero into the keypad that will appear.

Factory setting is 75

7 – Fast pump mode selection – touching this symbol will toggle the pump mode between ***fast***  and ***slow***  normal pinch valve frequency.

NOTE: This is a global setting and will apply to all guns of the system

8 – Total Pump Hours – This displays the total hours that the pump has triggered for If the pump is serviced, this number can be reset by touching the display and entering zero into the keypad that will appear.

Factory setting is 75

9 – Total Guns – This value shows the total number of guns on the system

This value is system specific, enter quantity of guns

10 – Gun Prime Time – This value shows the time that the guns will fire for when the booth has been stood empty and the first product enters the booth. This value is entered in seconds.

Factory setting is 10

11 – Maintenance Alarm Time – This value shows the time after which an alarm will be displayed for any pump that has run for longer than it. This value is entered in hours.

Factory setting is 1000

Booth Configuration – *(button J on Booth Control Main Screen – page 16)*

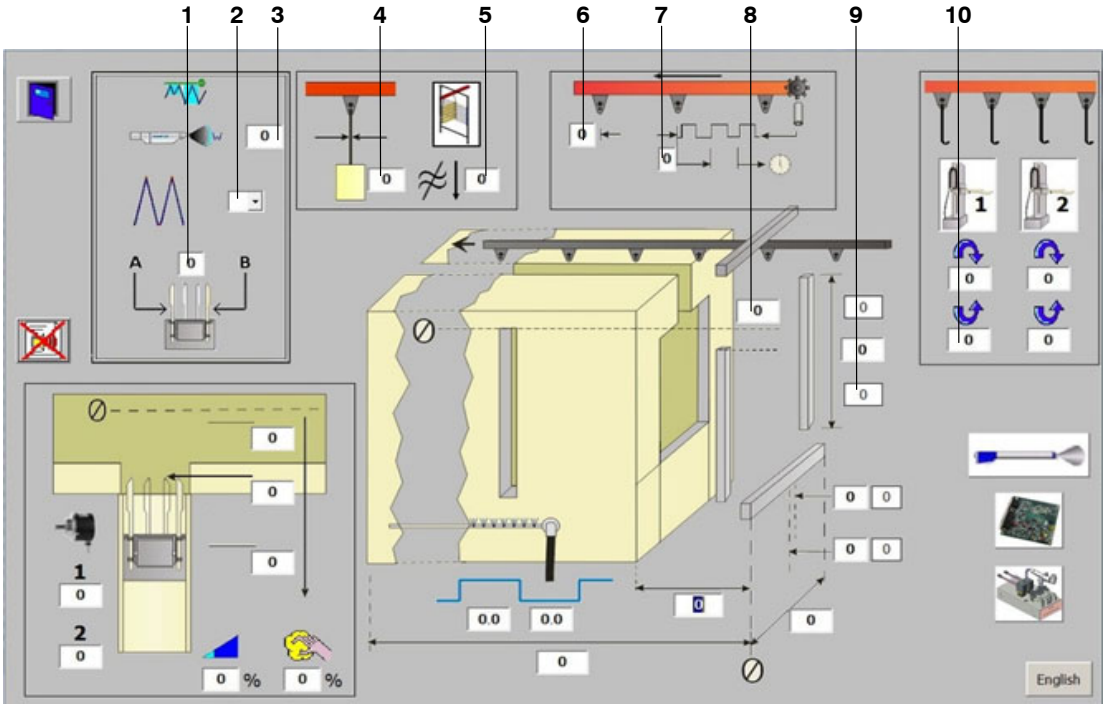


Figure 23 **Booth Configuration Screen (A)**

1 – Number Of Guns – This is the number of guns in horizontal setup, per reciprocator.

This value is system specific, enter the number of guns mounted in the horizontal plane

2 – Number Of Laps – this is a drag down menu to select number of vertical laps of spray(2,4,6..)

Factory setting is 2

3 – Spray Width – this is the width of the effective spray pattern of the gun, in millimeters.

Factory setting is 250

4 – Hanger Width – this is the width of the hanger in millimeters and will be ignored by the part detection.

Factory setting is 30

5 – Max. Difference – between 2 readings of the array to be judged as a part, above this will be treated as hanger.

Factory setting is 100

6 – Conveyor Index – Enter the number of millimeters the conveyor has travelled during one pulse from the conveyor encoder.

This value is system specific

7 – Conveyor Timeout – This is the number of seconds during which a pulse is not received from the encoder, that the conveyor is classed as stopped by the plc.

This value is system specific

8 – Distance between top of the gun slot and the upper edge of the beam array, in millimeters.

This value is system specific

9 – Reading of the analog vertical beam array for the lower edge of a part.

10 – Absolute length of the beam array in mm.

This value is system specific

Booth Configuration **–** *(button J on Booth Control Main Screen – page 16)(contd)*

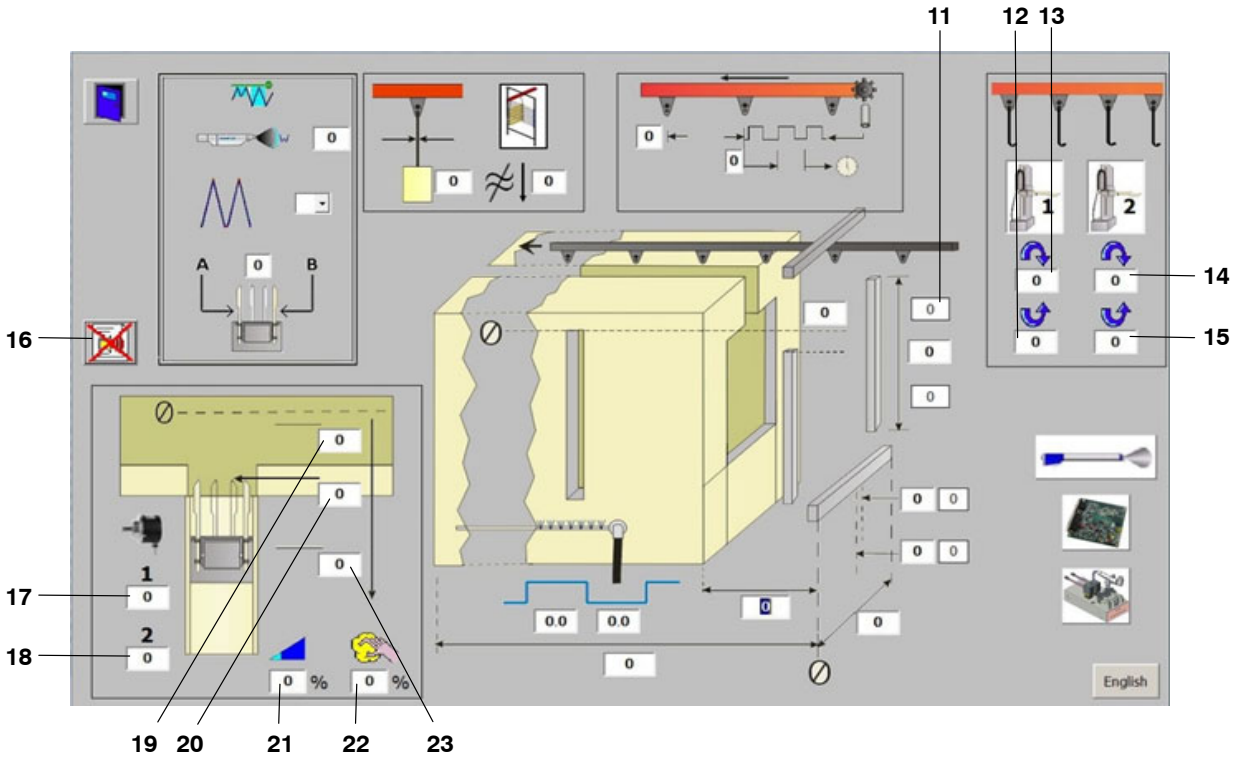


Figure 24 **Booth Configuration Screen (B)**

11 – Reading of the analog vertical beam array for upper edge of a part, in millimeters.

13 & 14 – Top Turn Dimension – The distance from where reciprocators change direction downwards when hanger is empty. (No object to be painted) When in variable stroke mode.

This value is system specific

12 & 15 – Bottom Turn Dimension – The distance from where reciprocators change direction upwards when hanger is empty. (No object to be painted) When in variable stroke mode.

This value is system specific

16 – Clear Alarm History – touching this button will clear the alarm listing on the alarm summary display.

17 & 18 – Z–Axis Encoder Resolution – encoder resolution of Z–Axis 1 & 2 are entered in pulses per mm.

Factory setting is 39 for each

19 – Z–Axis In – This is the ultimate In position that the Z–Axis will be allowed to go to.

This value is system specific

20 – Z–Axis Purge – This is the purge and park position for the Z–Axis.

This value is system specific

21 – Automatic Z–Axis Speed – This is the speed at which the Z–Axis will traverse during normal production mode. The value is entered as a percentage.

Factory setting is 9

22 – Clean Z–Axis Speed – This is the speed at which the Z–Axis will travel out during the external gun blow off phase of the cleaning cycle the value is entered as a percentage.

Factory setting is 4

23 – Z–Axis Out – This is the maximum out position that the Z–Axis will be allowed to go to.

This value is system specific

Booth Configuration – *(button J on Booth Control Main Screen – page 16)(contd)*

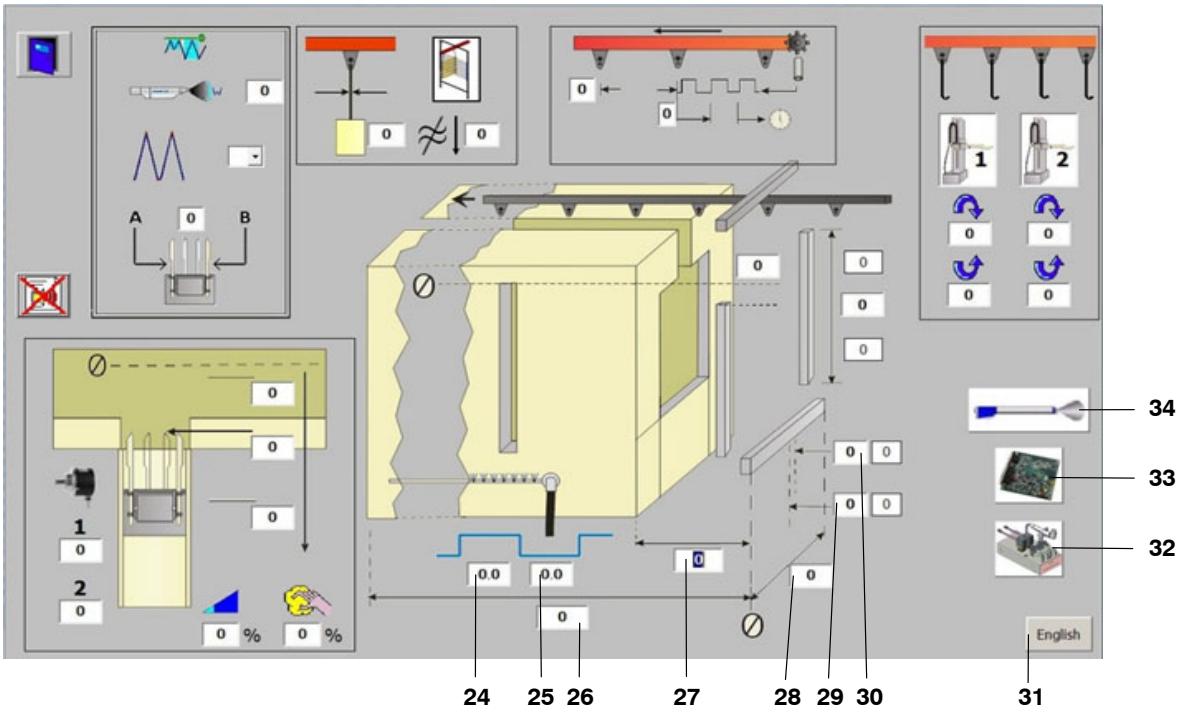


Figure 25 **Booth Configuration Screen (C)**

24 – Airwash On Time – This is the time in seconds that the booth air wash will be on for.

Factory setting is 0.5

25 – Airwash Off Time – This is the time in seconds that the booth air wash will be off for.

Factory setting is 10

26 – Booth End From Arrays – The distance in millimeters from the beam arrays to the end of the booth.

This value is system specific

27 – Booth Start To Arrays – The distance in millimeters from the beam arrays to the entrance of the booth.

This value is system specific

28 – Horizontal Array – This is the length of the horizontal beam array.

This value is system specific

29 – Dampen Near – This is the width of the conveyor track left of the center line. The display to the right of this entry is the actual left hand width in millimeters.

This value is system specific

30 – Dampen Far – This is the width of the conveyor track right of the center line. The display to the right of this entry is the actual right hand width in millimeters.

This value is system specific

31 – Language Selection – This button toggles the language between English and local language.

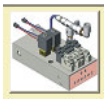
32 – Pump Card Calibration – this symbol is used to bring up the pump card calibration window as described separately.

33 – Firmware Version– this symbol is used to display firmware window showing firmware versions of KV and Pump cards.

34 – Purge Timing Configuration – this symbol is used to display the set up window for the purge timings used by the Spectrum^{HD} for cleaning of guns and hopper. Details are described separately.

Pump Controller Configuration – Read Constants

NOTE: The user has to select the correct group referring to the appropriate guns.

This screen appears after pressing button 32  on the Booth Configuration Screen – page 33.
Pump controller calibration values are displayed in groups of 4 guns on each page.

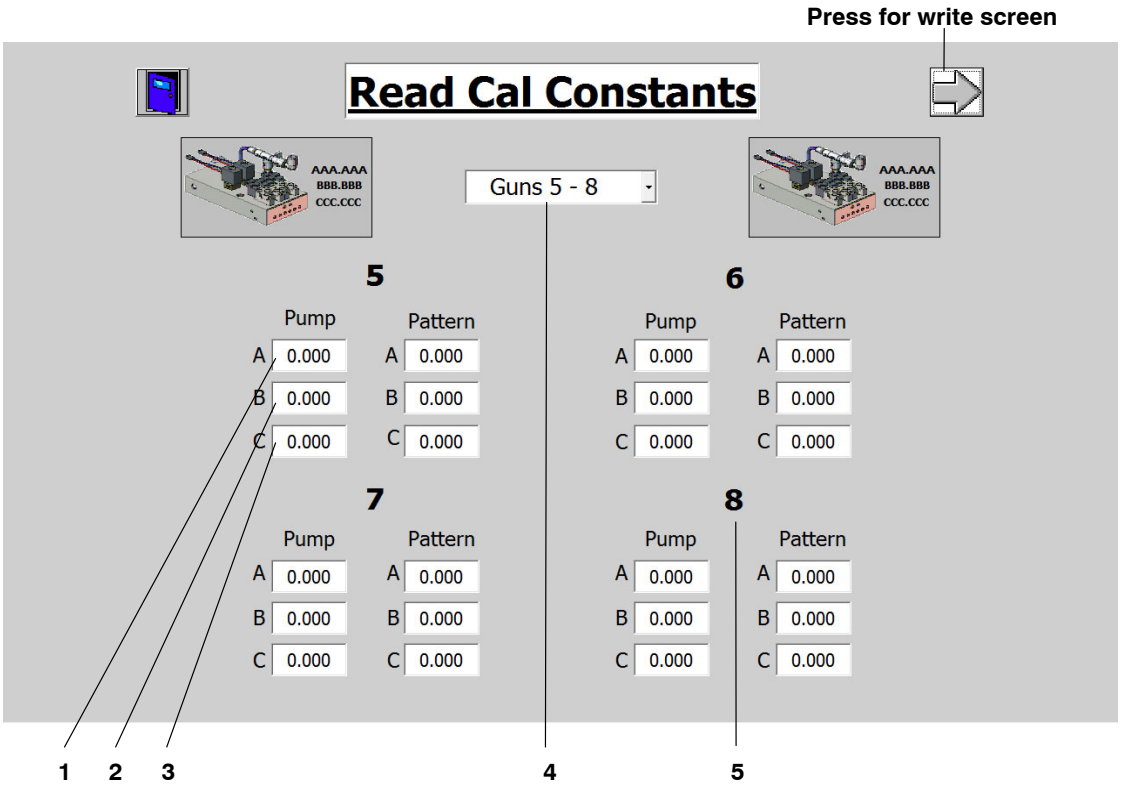


Figure 26 **Pump Controller Configuration – Read Screen**

1 – Pump Calibration Value A – Read the calibration value “A”

2 – Pump Calibration Value B – Calibration value “B” is always 0.

3 – Pump Calibration Value C – Read the calibration value “C”

4 – Gun Group – The actual group of guns is selected by using the pull down menu here.

5 – Gun Number – Calibration values for pump controller of gun number 4

NOTE: This screen is to compare the values stored in the PPHD match those printed on the pump manifold. For any inconsistencies go to the Write Constants screen – page 35
Any time a manifold is changed or replaced, the new values must be entered.

Pump Controller Configuration – Write Constants

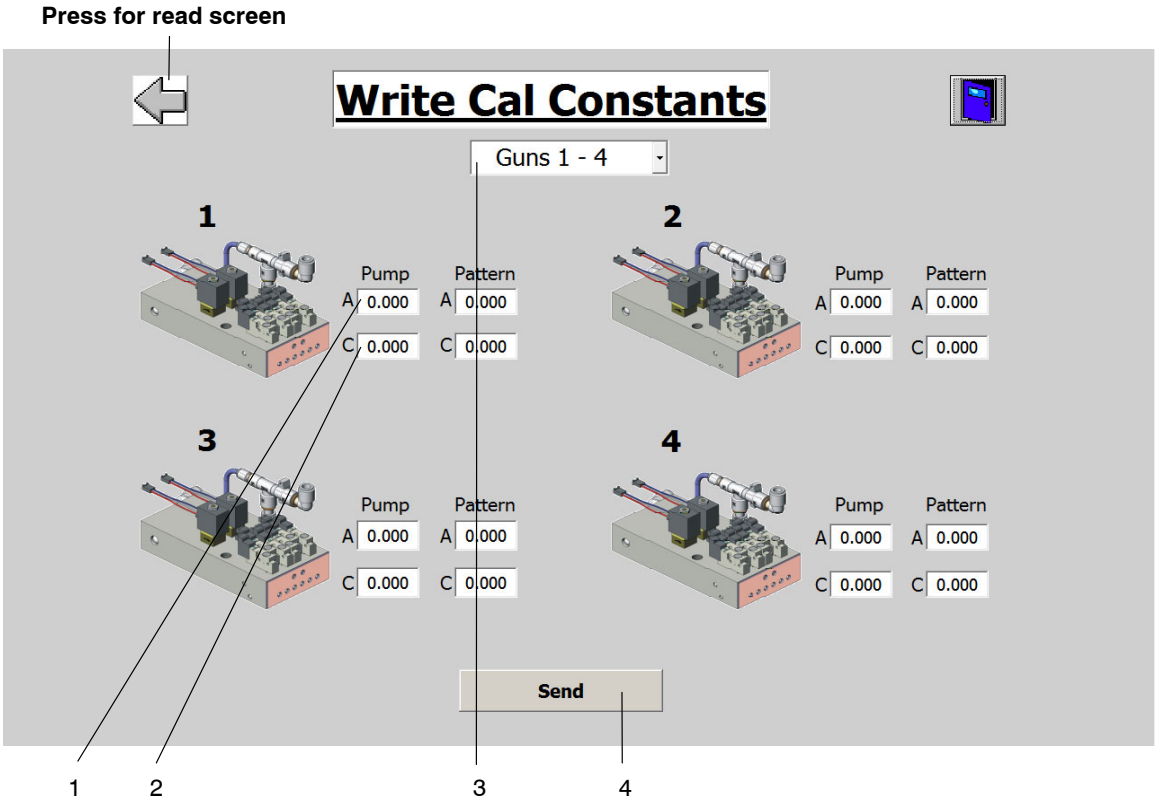


Figure 27 **Pump Controller Configuration – Write Screen**

1 – Pump Calibration Value A – Write the calibration value “A”

2 – Pump Calibration Value C – Write the calibration value “C”

3 – Gun Group – the actual group of guns is selected by using the pull down menu here.

4 – Send values to pump controllers – calibration values are sent to all 4 pump controllers selected on this page.

NOTE: Changes are only required after hardware changes to the manifolds or controller cards

Purge Timing Configuration

This screen appears after pressing button 34  on the Booth Configuration Screen – page 33, allowing the user to set up different times used during cleaning of the system.

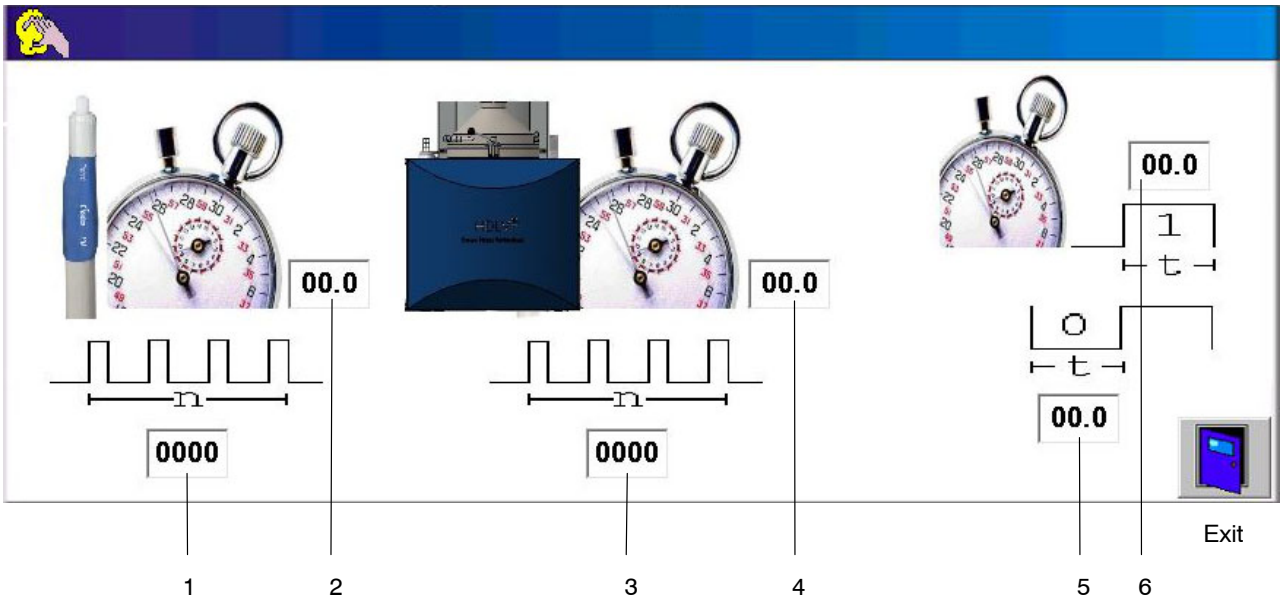


Figure 28 **Purge Timing Configuration Screen**

To purge the powder out of the lines, we have a 2 stage process. First we apply a soft air purge to help clear the majority of the powder from the powder hoses. Once the soft purge cycle is completed, we then apply the hard purge to clean the remaining powder as much as possible.

1 – Gun Pulses – specify the number of pulses for cleaning the gun.
Factory setting is 35

2 – Soft Purge Time – specify the time in seconds, for soft gun purging.
Factory setting is 9.0

3 – Hopper Pulses – specify the number of pulses for cleaning hopper.
Factory setting is 20

4 – Soft Purge Time Hopper – specify the time in seconds, for soft hopper purging.
Factory setting is 9.0

5 – Hard Purge Off Time – specify the off time in seconds, of the clean pulses.
Factory setting is 2.0

6 – Hard Purge On Time – specify the on time in seconds, of the clean pulses.
Factory setting is 0.7

NOTE: Depending on the powder, these settings can be changed if necessary

Firmware Version

The following screen appears after pressing button 33  on Booth Configuration Screen – page 33.

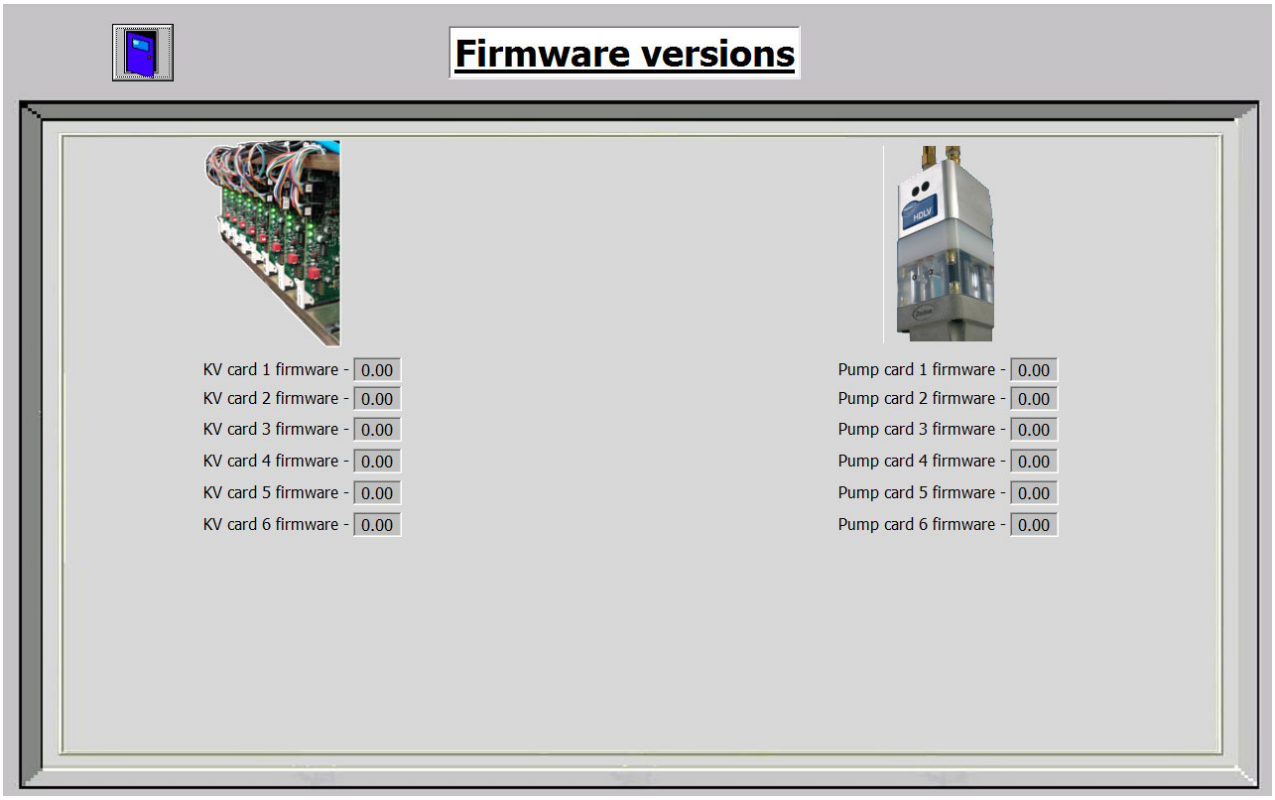


Figure 29 **Firmware Version Display**

This screen displays the firmware version currently loaded into the KV & Pump Card. These firmware versions may be required by your Nordson Service Representative to aid with fault finding.

Spectrum^{HD} Control (Standard)

Pressing button 8 on the Home Screen Elements page 18, brings you to this screen.

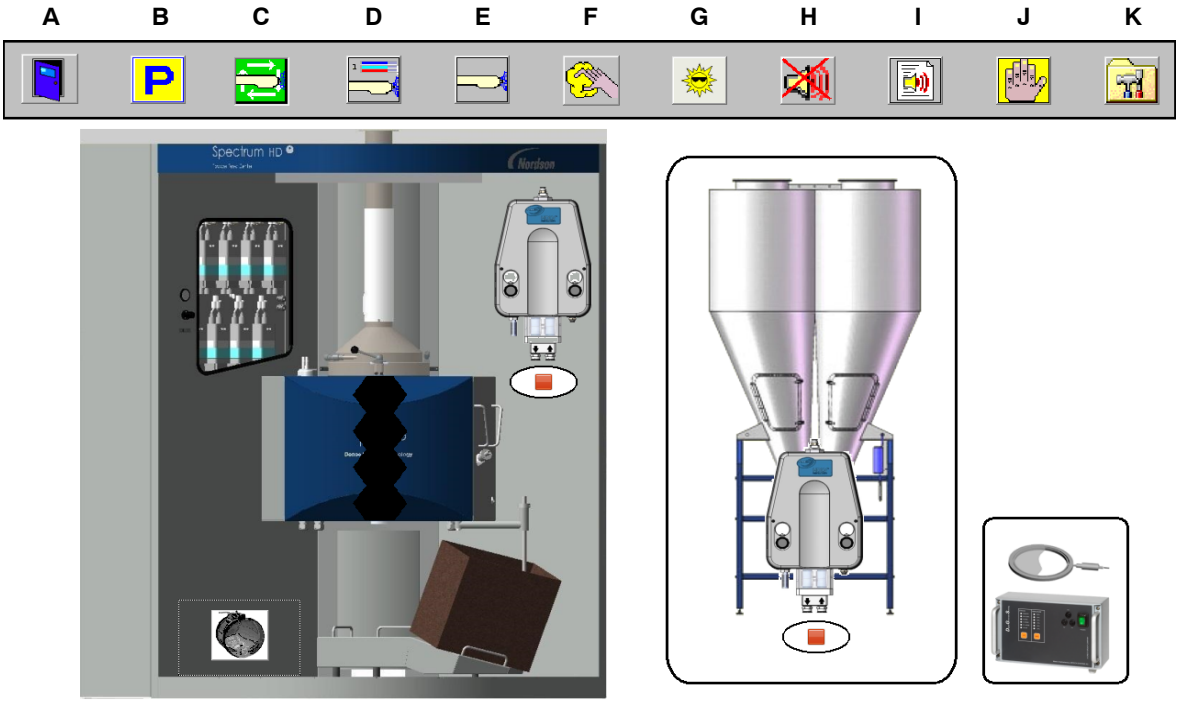


Figure 30 **Spectrum ^{HD} Control Screen**

A – Exit to booth control screen – This button takes the operator back to the booth control screen.

B, C, D, E, G, H, I – These are related to the same functions as on page 18 – Home Screen Elements.

F – Colour Change – Pressing this button initiates the colour change sequence, described in the section "Colour Change" of this manual – page 47.

J – Manual Operation – this button brings the user to the manual operation screen, described later on in this manual.

K – Spectrum^{HD} Configuration – pressing this button takes the operator to the configuration of the Spectrum^{HD} Feed Centre as described in the section "configuring the Spectrum^{HD}" of this manual.

Spectrum^{HD} Control (Standard)(contd)

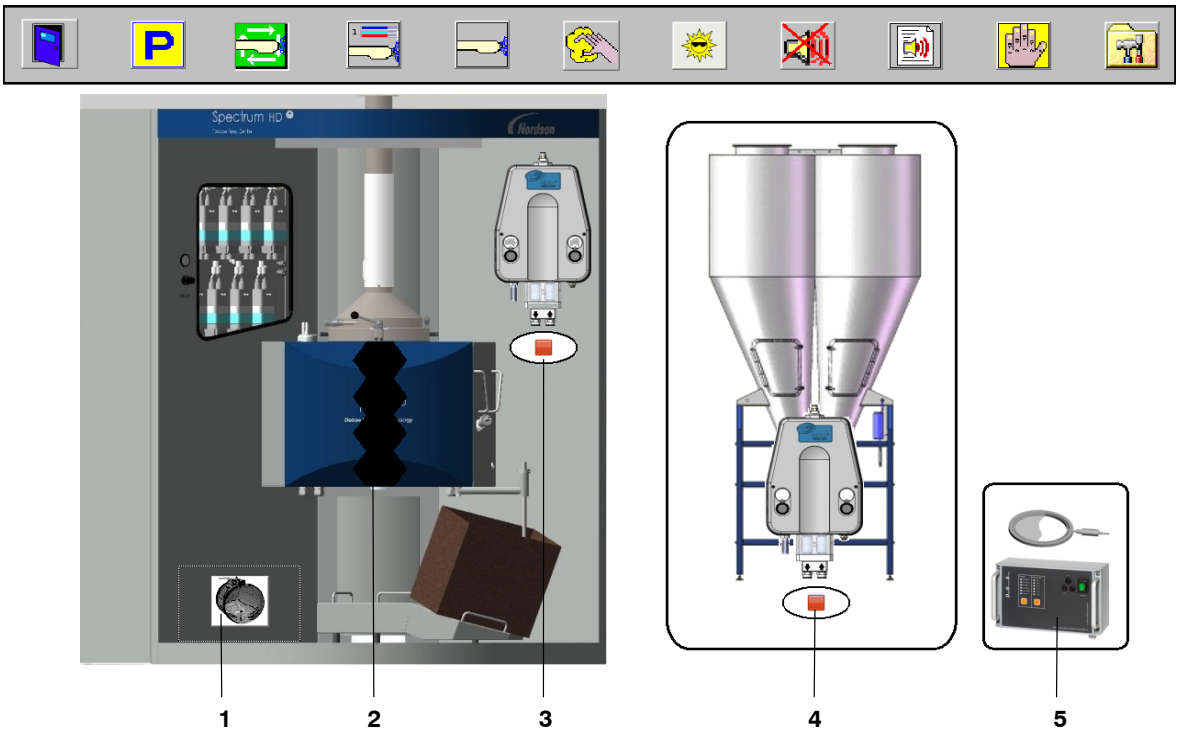
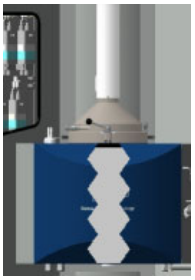


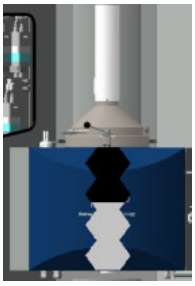
Figure 31 **Spectrum ^{HD} Control Screen**

1 – Damper Valve – Press this button to open & close lower main duct damper. Typically used for cleaning inside the enclosure outside of normal clean down routine.

2 – Powder Level Monitor – the cut out in the hopper is shown in 4 steps representing the actual powder level inside.

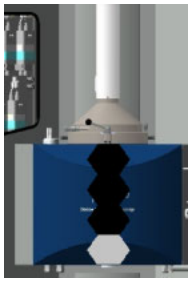


Powder level high, hopper full.

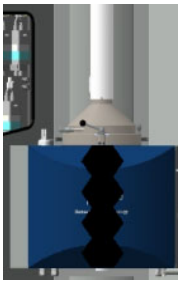


Powder level medium, this is the working level which the system maintains using the virgin pump only. The recycle pump runs all the time unless switched off or powder level is at high level**.**

Spectrum^{HD} Control (Standard)(contd)



Powder level low, this is the minimum level for the pumps to work properly. When the powder level drops below this, an alarm is raised to inform the operator about this issue.



Hopper empty, level probe doesn't detect powder. This can happen right after a colour change or when the system has just been started up.
In all other situations this is an Error due to lack of powder Operator interaction is urgently required.

3 & 4 – Fresh powder HDLV–transfer and reclaim pumps – this shows the status of the pump and allows the operator to enable or disable the pump by touching the pump symbol.

Pump running

Pump stopped

Spectrum^{HD} Control (Standard)(contd)

5 – Ultrasonic Sieve Settings – Allows sieve parameters to be adjusted. Button 5 can be found on page 39.

NOTE: Only to be adjusted by authorised personnel and is therefore password protected.

The Ultrasonic Sieve is parametrised using a program called SweepParam.

It is preloaded onto the Powder Pilot and is accessed from the Spectrum HD main control screen by pressing this button (5). The password will be needed to access it.

The SweepParam program will then display as follows:

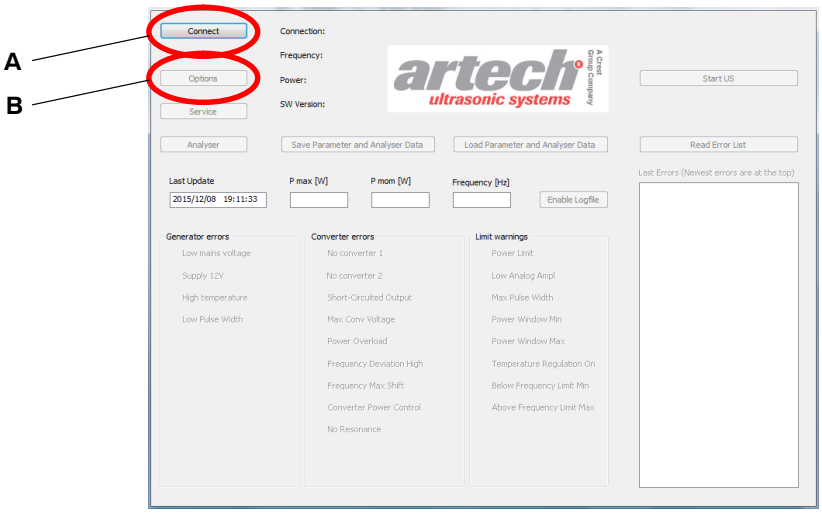


Figure 32 **Ultrasonic Sieve Parameter Setting Screen**

Press the “Connect” button – A. This toggles between Connect and Disconnect.

A pop up window will appear requesting the communication port, select COM1 then press “Connect again”.

Now press the “Options” button – B, to display the following screen: (ensure parameters shown below match your system screen)

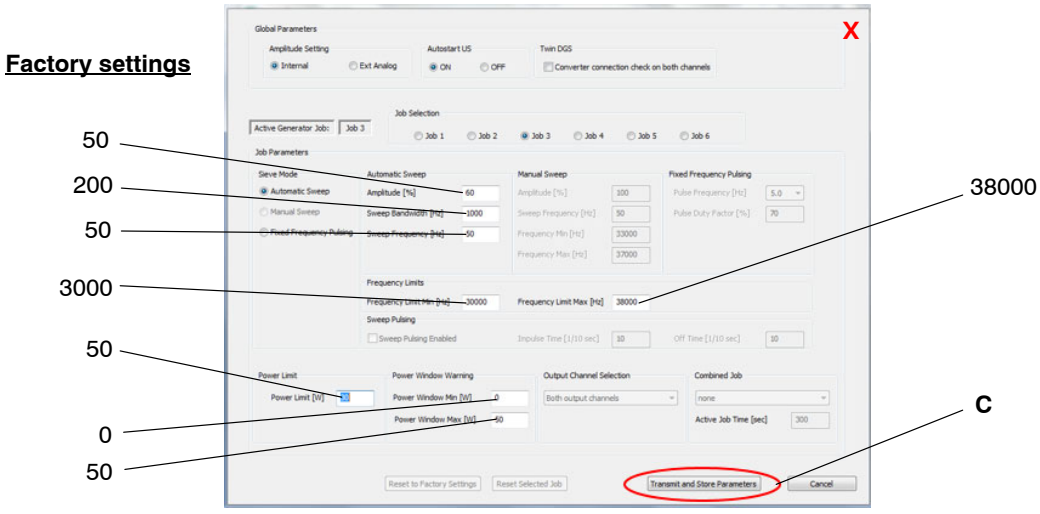


Figure 33 **Ultrasonic Sieve parameter setting screen**

Press the “Transmit and Store Parameters” (**C**) button to store the settings in the sieve controller.

Now press Cancel to return to the previous screen and then “Disconnect”.

Close the program down in the normal way using the red X top right of the screen.

Spectrum^{HD} Control (With Drum Unloader)

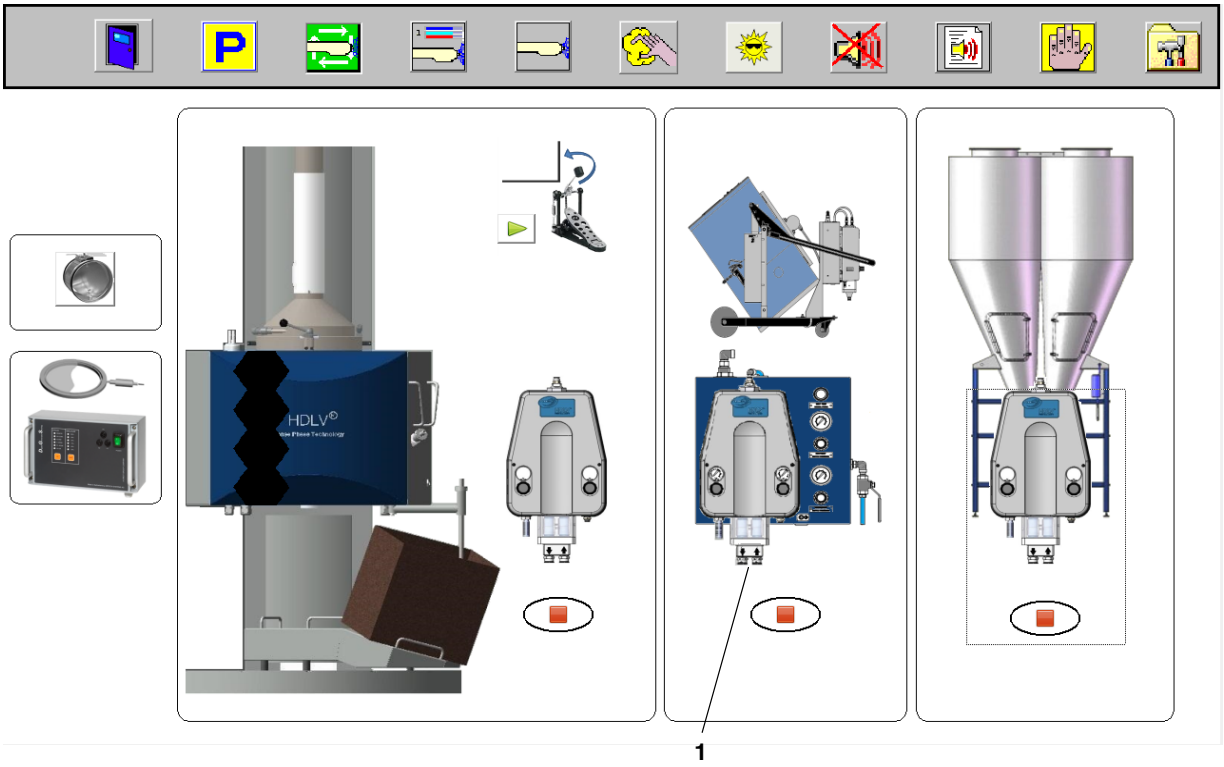


Figure 34 **Spectrum ^{HD} Control Screen (with Drum Unloader)**

1 – Drum Unloader Pump – this shows the status of the drum unloader pump and allows the operator to enable or disable the pump by touching the pump symbol.

Spectrum^{HD} Control (With Big Bag)

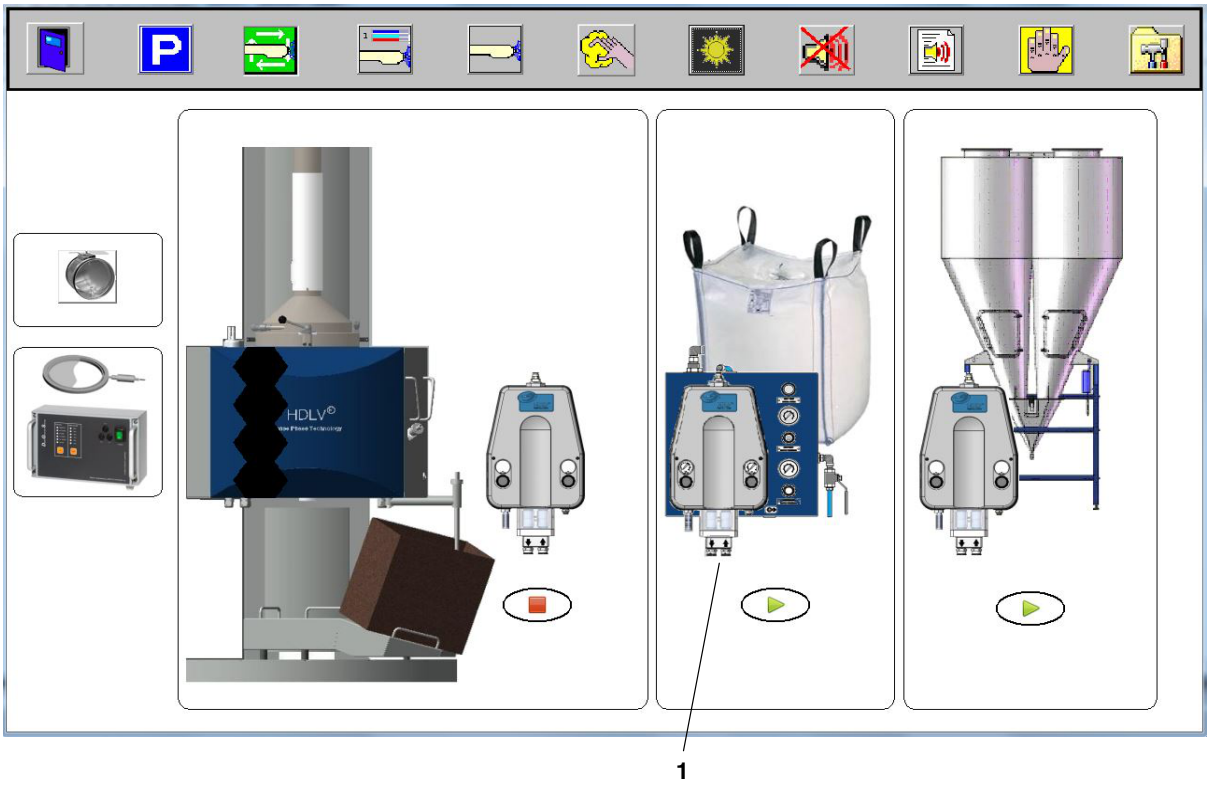


Figure 35 **Spectrum ^{HD} Control Screen (with Big Bag)**

1 – Big Bag Pump – this shows the status of the Big Bag pump and allows the operator to enable or disable the pump by touching the pump symbol.

Spectrum^{HD} Manual Control

Pressing button J  on the Spectrum^{HD} Control screen – page 38 – will display controls for manual operation of various devices of the feed centre.

NOTE: The operator takes full responsibility of his actions on the system. All automatic functions of the Spectrum^{HD} are inactive while on that screen.

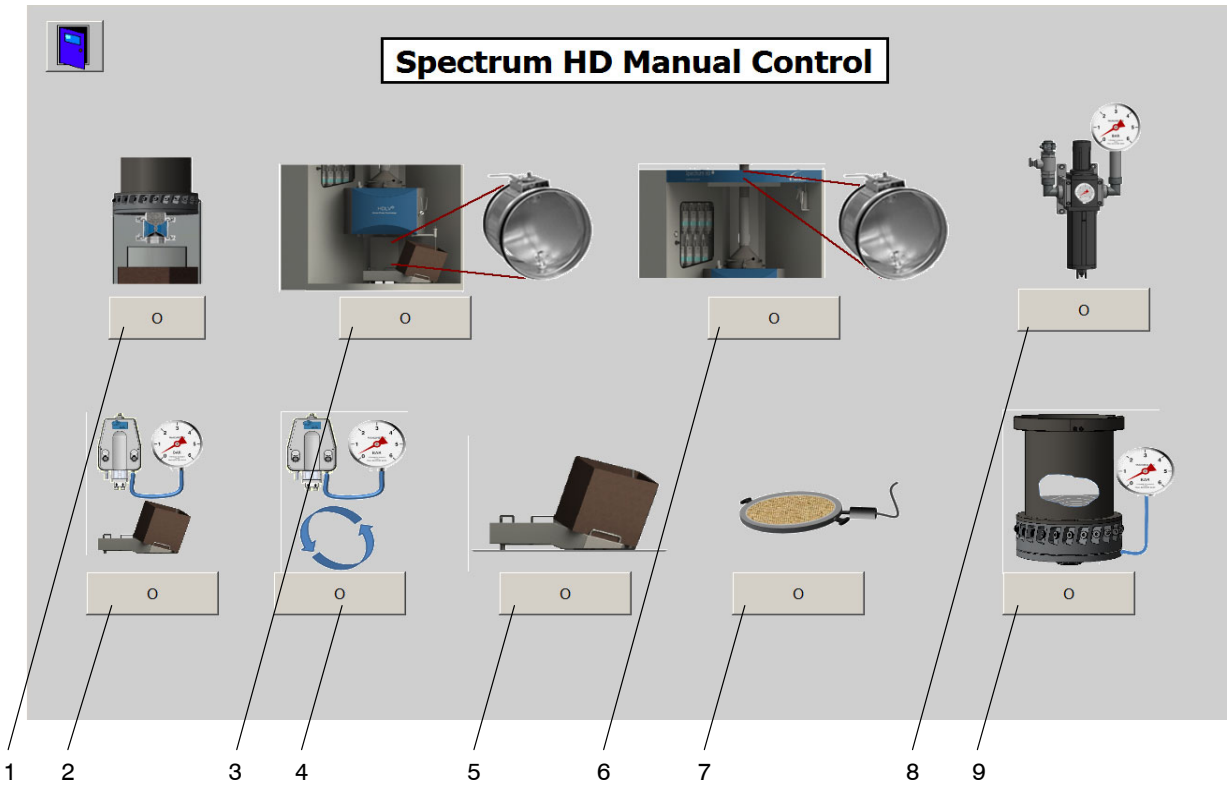


Figure 36 **Spectrum ^{HD} Control Screen (with Big Bag)**

1 – Dump Valve – This button is used to open / close the dump valve in the bottom of the hopper.

2 – Fresh Powder HDLV Transfer Pump On/Off – This button is used to start or stop the pump.

3 – Main duct damper – Used to open or close the damper inside the main extraction duct behind the feed centre.

NOTE: When this duct is closed, the full extraction goes to the purge duct on top of the sieve.

4 – Recycle HDLV transfer pump on/off – This button is used to start or stop the reclaim pump located at the cyclone or a custom recycling system.

5 – Vibrator motor on / off – This button starts or stops the vibratory motor installed into the virgin powder box support.

6 – Purge duct damper – Used to open or close the damper inside the purge duct on top of the sieve.

7 – Ultrasonic Sieve on/off – This button starts or stops the ultra–sonic sieve.

8 – Main Air Solenoid – This button opens or closes the main air solenoid in the supply line to the feed centre.

9 – Hopper Fluidisation On / Off – This button starts or stops fluidising the powder inside the hopper

Spectrum^{HD} Configuration Section

Pressing button K  on the Spectrum^{HD} Control screen – page 38 – will display controls for manual operation of various devices of the feed centre.

NOTE: Configuration should only be done by authorised and trained personnel.

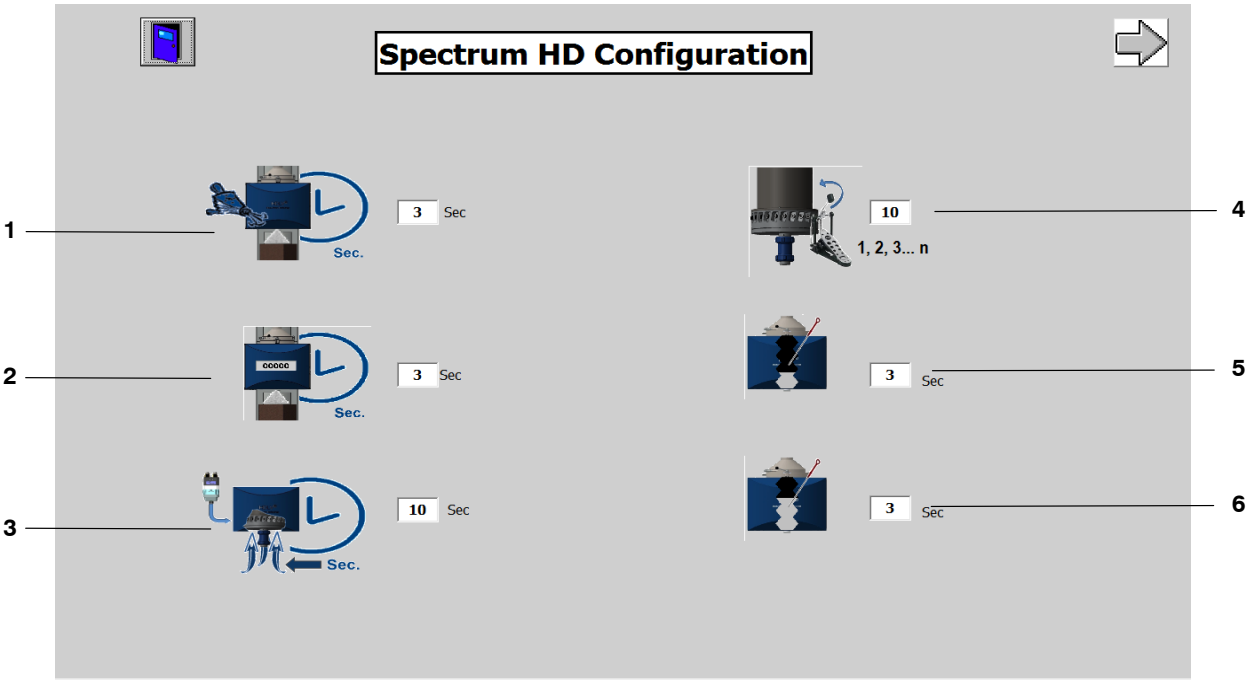


Figure 37 **Spectrum ^{HD} Configuration Screen**

1 – hopper empty assist air time out – time to switch on the assist air when emptying the hopper.

Factory setting is 15

2 – hopper empty time out – count down time when emptying the hopper. After the countdown the OK button will be displayed to move on to the next step.

Factory setting is 30

3 – purge to hopper dump valve delay – delay time for opening of the dump valve while purging the hopper.

Factory setting is 10

4 – hopper banger count – amount of beats to the hopper while emptying to the box.

Factory setting is 10

5 – level probe off delay – time required for the mid level probe to be uncovered before registering as off.

Factory setting is 10

6 – level probe on delay – The time required for the mid level probe to be covered before registering as on.

Factory setting is 10

There are 3 level sensors fitted to the hopper. The top sensor is there to stop all powder recovery and prevent over filling. The middle sensor switches the fresh powder supply on and off to maintain a good level of powder. The bottom sensor is to sound an alarm if the powder level is too low and system needs replenishing with powder.

Spectrum^{HD} Configuration Section(contd)

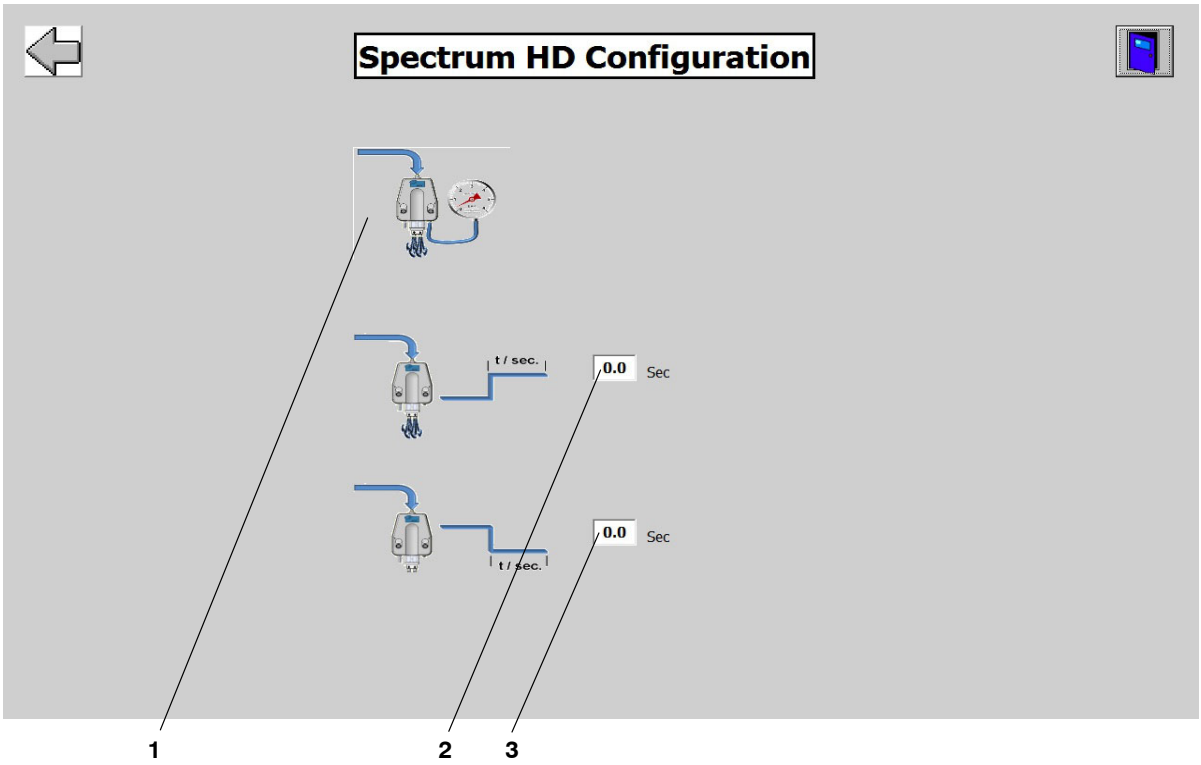
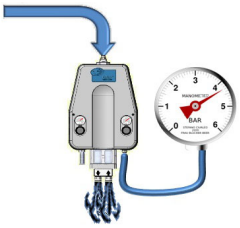


Figure 38 **Spectrum ^{HD} Configuration Screen**

1 – Pump On/Off during purge – Set pumps to automatically run or not during purge / colour change. When set to run during purge, the button will display showing pressure on the gauge.



2 – Pump purge pulse On time – The On time of a cleaning pulse to the HDLV transfer pumps, in seconds.

Factory setting is 1.0

3 – Pump purge pulse Off time – The Off time of a cleaning pulse to the HDLV transfer pumps, in seconds.

Factory setting is 1.0

Colour Change

Spectrum^{HD} Colour Change Operation

CAUTION: Before initiating a colour change sequence, ensure that NO personnel are inside the booth.

NOTE: During the colour change process you will be following on−screen instructions and confirming them.

Step 1

To start a colour change routine the operator presses this button 

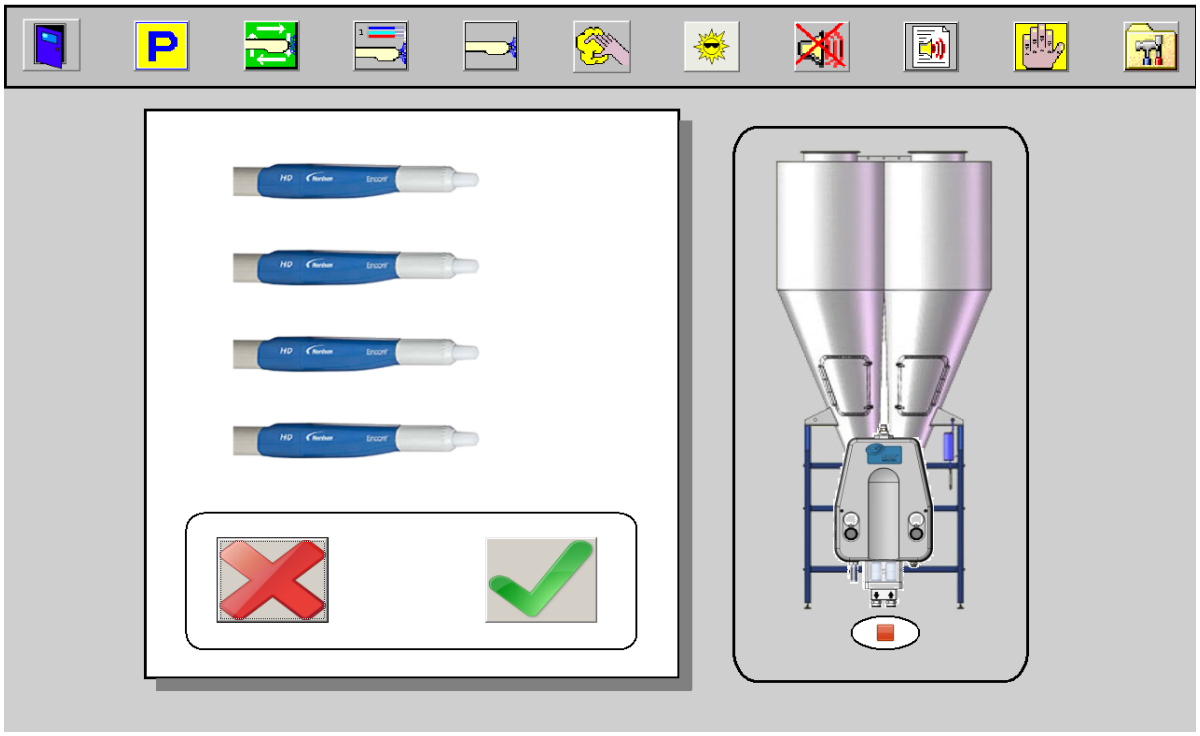


Figure 39 **Spectrum ^{HD} Colour Change Operation Screen − Step 1**

On the screen above the operator can choose to carry on colour changing by pressing this button 

To cancel the procedure and return to the Spectrum ^{HD} screen, press this button  . This can be used at any time during the colour change procedure to cancel the process and return the main screen.

Spectrum^{HD} Colour Change Operation(contd)

Step 2

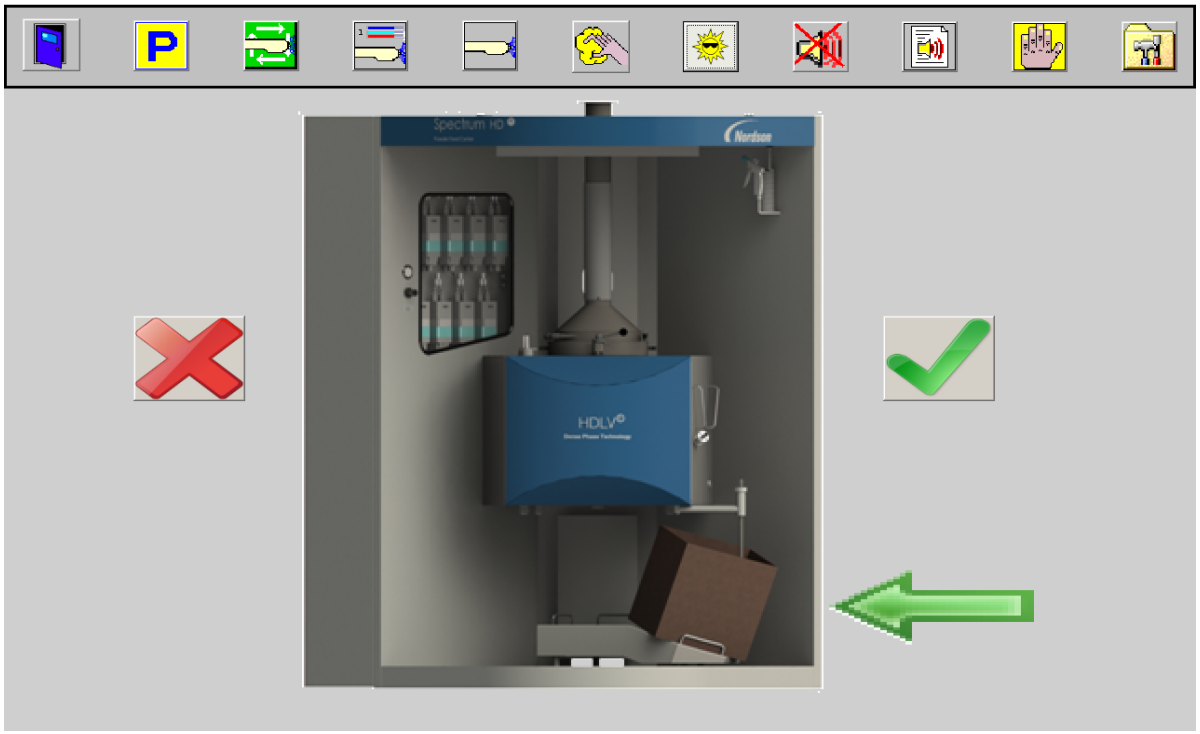


Figure 40 **Spectrum ^{HD} Colour Change Operation Screen – Step 2**

This screen asks the operator to move the powder box underneath the hopper to collect the powder that is still remaining inside the hopper.

After a box is placed under the hopper, the operator presses this button  to release the powder out of the hopper and go to the next step.

Spectrum^{HD} Colour Change Operation(contd)

Step 3

Figure 41 **Spectrum ^{HD} Colour Change Operation Screen – Step 3**

Draining the hopper – When this screen is shown, the dump valve on bottom of the hopper will be opened and powder is released into the box below it.

A timer starts to count down for a time to be set up during configuration.

Once timed out, the  button appears on the screen to bring the operator to the next step.

Spectrum^{HD} Colour Change Operation(contd)

Step 4

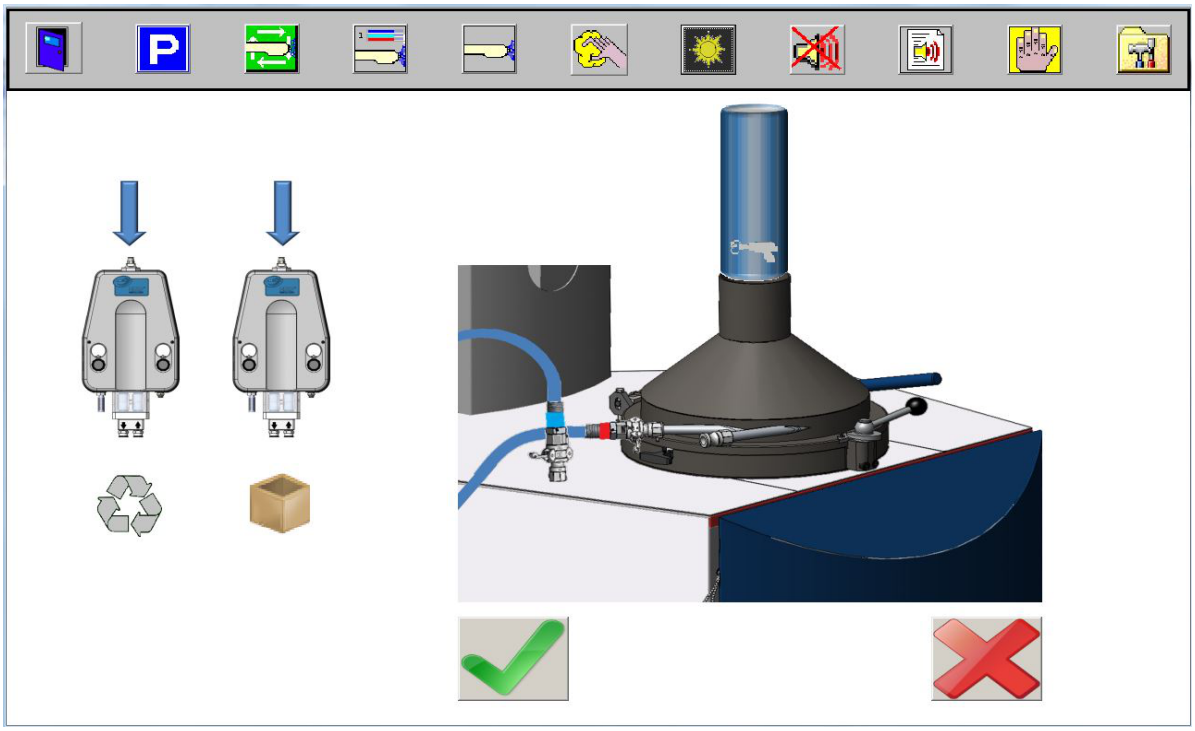


Figure 42 **Spectrum ^{HD} Colour Change Operation Screen – Step 4**

This screen is shown to remind the operator to turn the extraction pipe above the sieve to the cleaning position and move the pump hoses to the extraction sockets.

The operator will also need to close the sieve opening with the plugs provided to avoid powder leaking out there during hopper purge.

Once complete, the  button leads the operator to the next screen.

NOTE: The hose with the red colour band is the reclaimed powder and the hose with a blue colour band is the fresh powder. Ensure they are connected as shown in Figure 42, for this procedure.

Spectrum^{HD} Colour Change Operation(contd)

Step 5

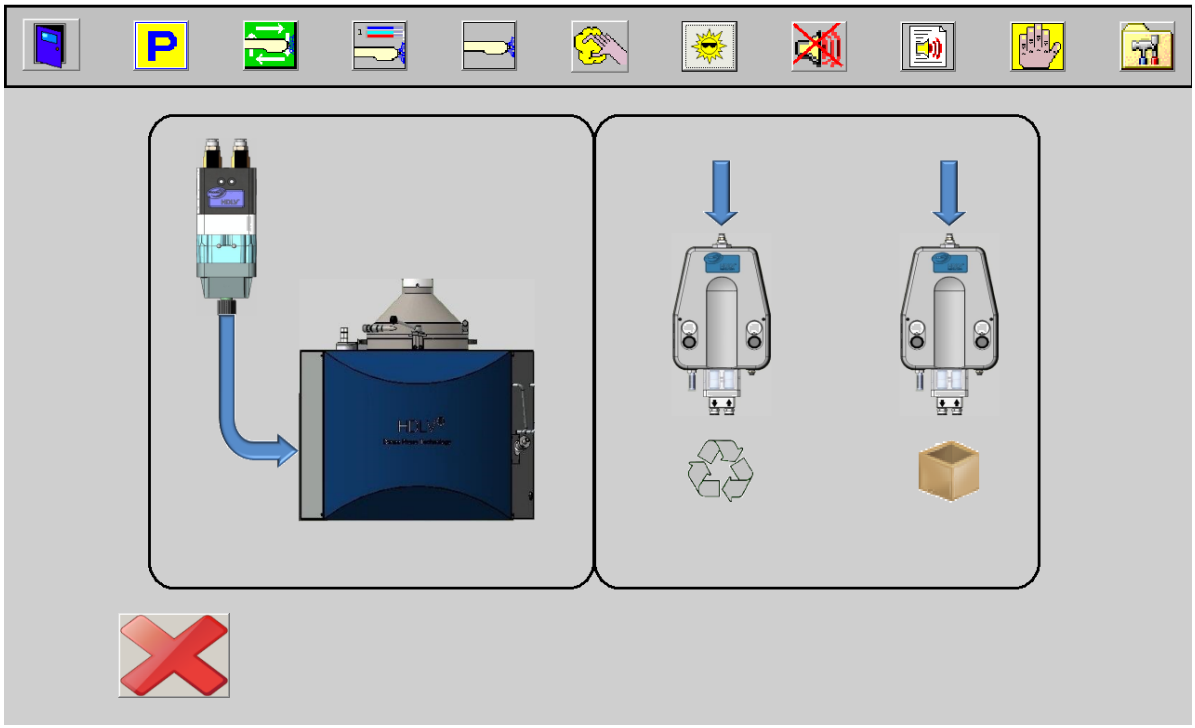


Figure 43 **Spectrum ^{HD} Colour Change Operation Screen – Step 5**

During this step the hopper is cleaned from inside using the pumps and according to timings set up during configuration.

While cleaning the inside of the hopper, avoid opening the cyclone hopper or anything else effecting the extraction. Otherwise the cleaning result will be compromised.

The operator needs to start the cleaning of the HDLV transfer pumps by pressing the pump symbols on the right. Active pump cleaning is visualized by the blue arrows above the pump symbols.

After the configured amount of pulses through the hopper the  button appears again to take the operator to the next screen.

Spectrum^{HD} Colour Change Operation(contd)

Step 6

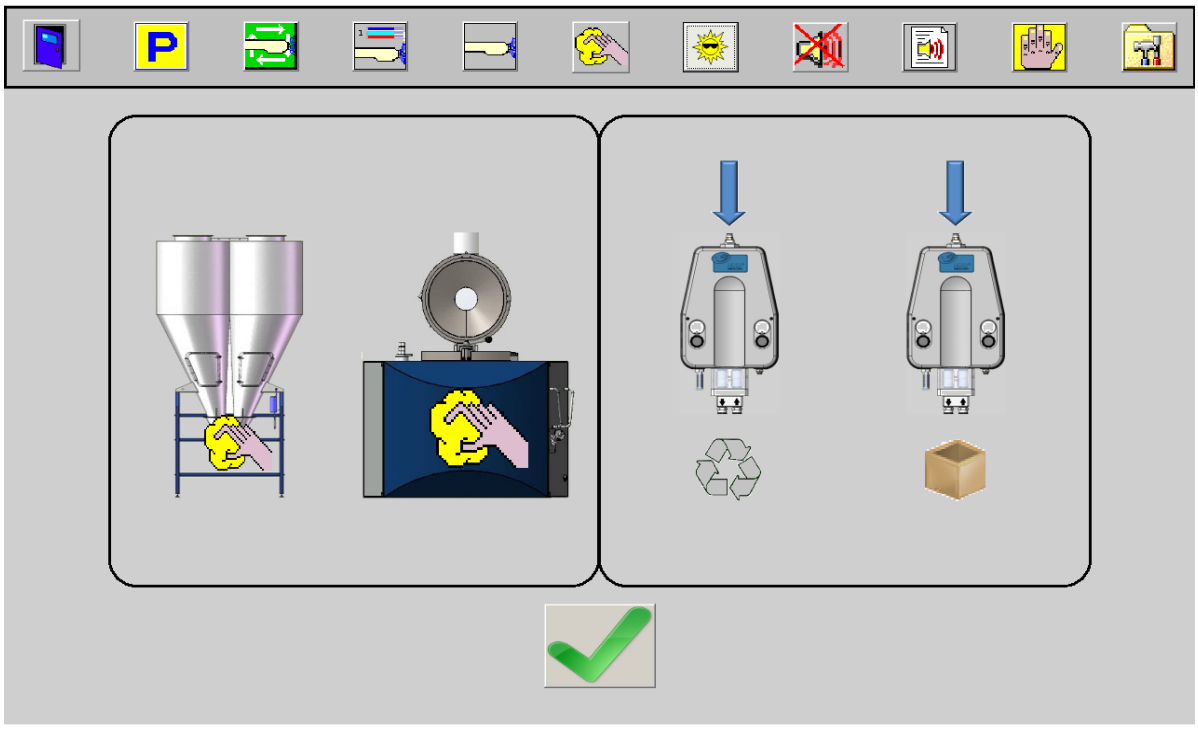


Figure 44 **Spectrum ^{HD} Colour Change Operation Screen – Step 6**

This is the final step of the sequence.

The screen above reminds the operator to manually clean the cyclone and hopper.

Cleaning of the pumps can be activated or stopped by pressing the pump symbols on the right side of the screen. This is visualized by the blue arrows again.

After cleaning, the hoses need to be placed back to their operating positions, attached to the hopper lid, the fresh powder feed pump can be used to refill the hopper with new powder.

When complete, the  button will take the operator back to the Spectrum^{HD} control screen.

Normal production can now start again.

Additional Screen Elements – *(optional)*

Going Green

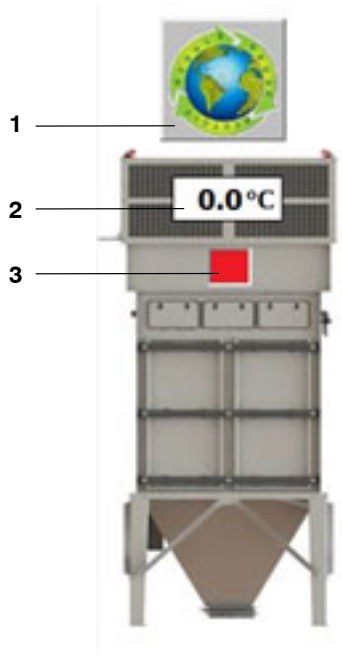


Figure 45 **Spectrum HD Going Green option**

1 – Going Green Bypass – The system is designed to reduce the extract fan speed to a low setting as well as turn off power and air to all production devices when no parts are detected as approaching the booth. This is known as Going Green mode. As parts get close to the booth, the system will ramp the extract fan back up to production speed and re–apply power and air to the equipment. If the booth is in Going Green mode and for example testing needs to be carried out on the guns, this button can be pressed to force the system to run up in full production mode. Each subsequent press of this button toggles the mode between production and going green.

The button displays for each mode as follows:

Going Green Bypass is not active. The booth will go into going green mode when no parts present.

Going Green Bypass active. The booth will always run in full production mode.

2 – Temperature – Indicates temperature inside after filter in degree centigrade.

3 – Fan status – The colour of the symbol indicates the current state of the extract fan.
Red – The fan is stopped
Green – The fan is running
Flashing Yellow – The fan is in fault

Afterfilter – Single Colour System

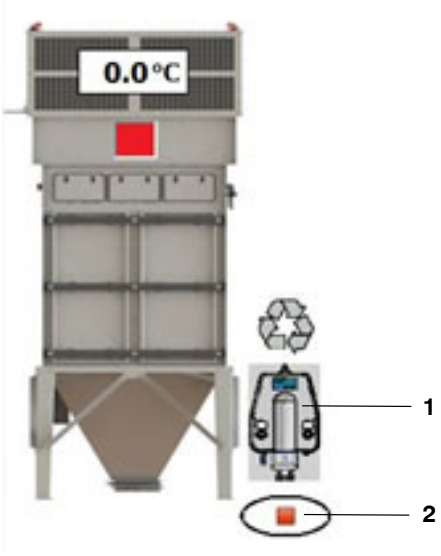


Figure 46 **Afterfilter on a Single Colour System**

1 – Reclaim pump – Pressing this symbol toggles the state of the reclaim pump between disabled and enabled. The reclaim pump transfers over sprayed powder back from the after filter hopper to the rotary sieve for re–use. When enabled, the pump will run as long as the system is in production mode and powder in the main gun hopper is not at high level.

When disabled, the pump will not run.
The status symbol displayed below the pump control icon is defined as follows:

Pump enabled

Pump disabled

2 –

Air Consumption Measurement

Pressing this button  will open the following window.

NOTE: Only displayed on the Booth Control Main Screen – page 16 – if your system has this option.

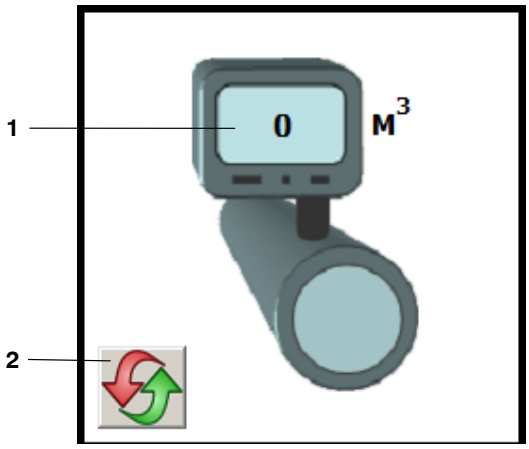


Figure 47 **Air Consumption Screen**

1 – Indicates the total main air consumption in meters cubed.

2 – Resets the air consumption value to zero.

Booth Control Main Screen – Rotary Sieve & Box Unloader *(single Colour)*

NOTE: Only displayed on the Booth Control Main Screen – page 16 – if your system has this option.

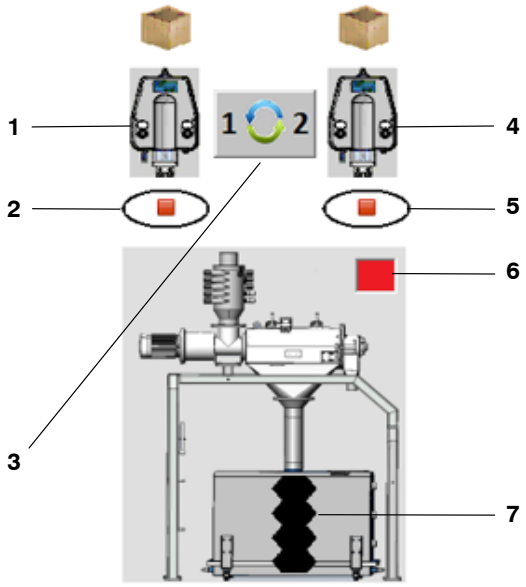


Figure 48 **Rotary Sieve controls**

1 – Box Unloader 1 – This button will turn on/off, box unloader 1

2 – Box Unloader 1 – Status
Red = Off
Green = On
Yellow Flashing = Error

3 – Box Unloader Selection – This button will toggle between the bulk feeders 1 & 2, when equiped with multiple bulk feeders.

4 – Box Unloader 2 – This button will on/off, box unloader 2

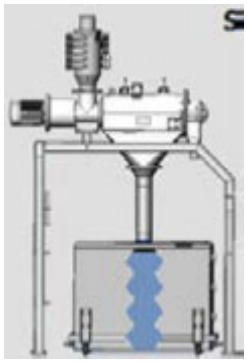
5 – Box Unloader 2 – Status
Red = Off
Green = On
Yellow Flashing = Error

6 – Rotary Sieve Status
Red = Off
Green = On
Yellow Flashing = Error

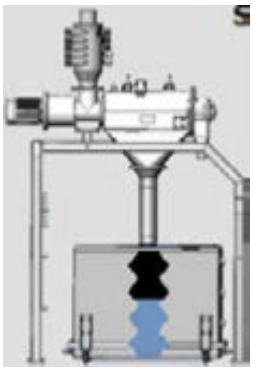
7 – Level Indicator – described on next page.

Booth Control Main Screen – Sieve Hopper Level Monitor

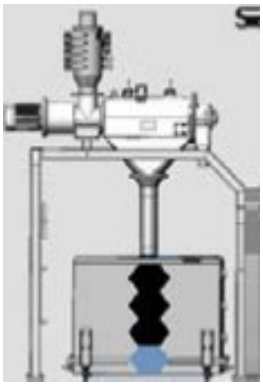
Powder level monitor – the cut out in the hopper is shown in 4 steps representing the actual powder level inside



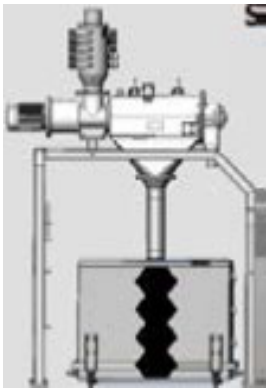
Powder level high, hopper full
All fresh powder and reclaim pumps are switched off.



Powder level medium, this is the working level which the system maintains using the fresh powder feed pump only. The reclaim pump runs all the time unless switched off or powder level is at high level**.**



Powder level low, this is the minimum level for the spray system pumps to work properly. When the powder level drops below this, an alarm is raised to inform the operator about this issue.



Hopper empty, level probe doesn't detect powder, alarm will sound. Operator interaction is urgently required to add powder.

Purge Cleaning – Single Colour System with Rotary Sieve

Pressing this button  starts the pump purge sequence, but first, the operator must acknowledge that the system is ready to be purged. Once completed, again acknowledge that the system is ready to continue in production. See the following pop–up windows.

NOTE: Only displayed on the Booth Control Main Screen – page 16 – if your system has this option.

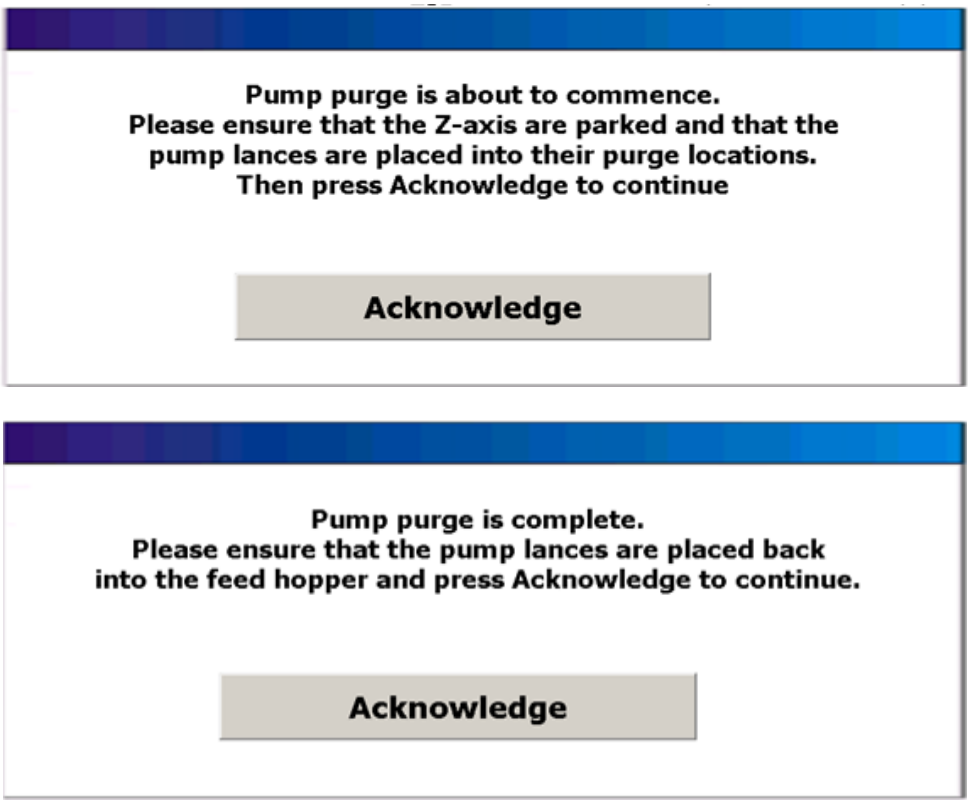


Figure 49 **Pump Purge Acknowledge Windows**

Maintenance

The PPHD has been tested according to the following Standards:

DIN VDE 0113 / **EN 60204** / **BGV A3**

As part of your annual maintenance program, the PPHD should be tested to the same Standards by your chosen qualified engineer.

NOTE: Information regarding maintenance can also be found in other product specific technical manuals.

Troubleshooting

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

These troubleshooting procedures cover only the most common problems. If you cannot solve a problem with the information given here, contact your local Nordson representative for help.

NOTE: Alarms 1 – 24 activate after the pumps have run for the length of time set in figure 22 – entry 11.

Alarm	Alarm Message	Corrective Action
1.	Gun pump 1 inspection is now due	Check gun pumps, replace pinch valves if required
2.	Gun pump 2 inspection is now due	
3.	Gun pump 3 inspection is now due	
4.	Gun pump 4 inspection is now due	
5.	Gun pump 5 inspection is now due	
6.	Gun pump 6 inspection is now due	
7.	Gun pump 7 inspection is now due	
8.	Gun pump 8 inspection is now due	
9.	Gun pump 9 inspection is now due	
10.	Gun pump 10 inspection is now due	
11.	Gun pump 11 inspection is now due	
12.	Gun pump 12 inspection is now due	
13.	Gun pump 13 inspection is now due	
14.	Gun pump 14 inspection is now due	
15.	Gun pump 15 inspection is now due	
16.	Gun pump 16 inspection is now due	
17.	Gun pump 17 inspection is now due	
18.	Gun pump 18 inspection is now due	
19.	Gun pump 19 inspection is now due	
20.	Gun pump 20 inspection is now due	
21.	Gun pump 21 inspection is now due	
22.	Gun pump 22 inspection is now due	
23.	Gun pump 23 inspection is now due	
24.	Gun pump 24 inspection is now due	
2001.	Z–Axis 1 is not sensed as moving on command	The system did not recognise encoder pulses from the Z–Axis, go to main window and switch off and on the Auto mode. If the problem persists, check the encoder and cabling or call your Nordson technical representative.
2002.	Z–Axis 2 is not sensed as moving on command	

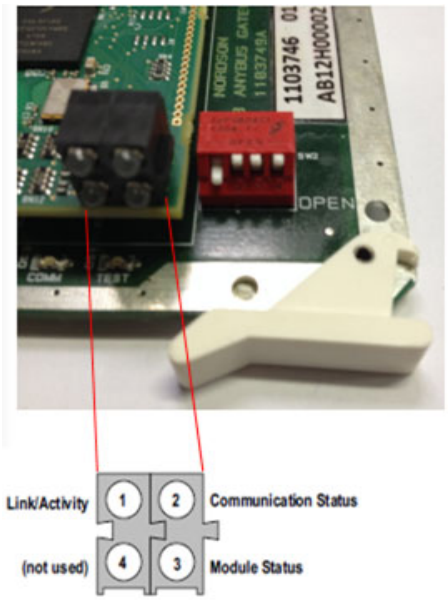
Continued...

Alarm	Alarm Message	Corrective Action
2003.	Ultrasonic Sieve Error	Check if the sieve is still running, check if the ultrasonic transducer is fixed properly to the sieve ring. Use the Sieve configuration program from the PPHD screen (see page 40) and plot an analysis graph. Check if the amplitude of the graph goes above 38kHz or below 30 kHz. Call your Nordson technical representative if outside of this range.
2004.	Ultrasonic sieve tripped	Check relevant circuit breaker, identifiable from the system drawings provided.
2005.	Z−axis 1 invertor drive has tripped	
2006.	Z−axis 2 invertor drive has tripped	
2007.	Z−axis 1 front limit alarm	Set the mover to manual and try to drive it out and off the limit switch − watch the red limit switch icon on the main screen. If the problem persists check the limit switch and cabling. Call your technical representative
2008.	Z−axis 1 back limit alarm	
2009.	ESTOP alarm	Check the emergency circuit electrically Contact your technical representative
2010.	Safety relay de−energised	
2012.	Low powder alarm. Check the bulk feeder	If the bulk feeder still contains enough powder, check the level probes and adjust them if required Contact your Nordson technical representative
2013.	Communication lost to slave PLC	Contact your Nordson technical representative
2014.	The powder hopper level probe signals are implausible	Check for powder residues on the probes. Check level probe wiring. Call your Nordson technical representative
2015.	Ultrasonic sieve not responding as commanded	Check the ultra sonic generator is it switched on, if it is running in auto and does it show any amplitude percentage? Call your Nordson technical representative
2016.	Table vibrator tripped	Check circuit breaker
2017.	Part collision warning. Booth doors are closed. Conveyor stop relay has been energized	Open the booth doors until the hook is propperly inserted into the door switch. Check input I2.3 on a high signal, if the input is high check the door switch and wiring. Contact your Nordson technical representative
2019.	The after filter controller is not responding to run / stop command	Check if the fan is running if it should. Check for any alarms on the filter panel. Contact your Nordson technical representative
2021.	After filter fault. See local filter panel for detail	Check the after filter control panel for alarms. Is the cartridge cleaning active ? Is the DP value above its limit ? Are cartridges properly cleaned ? Contact your Nordson technical representative
2025.	Z−axis 2 front limit alarm	Set the mover to manual and try to drive it out and off the limit switch − watch the red limit switch icon on the main screen. If the problem persists check the limit switch and cabling and call your Nordson technical representative
2026.	Z−axis 2 back limit alarm	
2027.	Recip 1 stroke requested is out of range. Default limits being applied	In variable stroke mode, check the hangers are being detected and adjust the hanger filter values on the booth configuration screen

Alarm	Alarm Message	Corrective Action
2028.	Recip 2 stroke requested is out of range. Default limits being applied	In variable stroke mode, check the hangers are being detected and adjust the hanger filter values on the booth configuration screen
2029.	Z−axis 1 invertor drive fault	Check if your safety cages are open and close them. Try to power off the system, wait 10 seconds and switch on again. If the problem persists, consult your Nordson technical representative
2030.	Z−axis 2 invertor drive fault	
2031.	Z−axis 1 has not initialised	Check if the mover has reached its back limit switch within 1 minute from start−up. Switch the mover to manual mode and check if it reaches the back limit switch, if not, check the sensor and it's wiring − be aware this is a normally closed type of sensor. Contact your Nordson technical representative
2032.	Z−axis 2 has not initialised	
2035.	Gun controller gateway communication has been lost	Check if there is enough extraction and the flow switch is working properly contact your Nordson representative
2036.	Communication to the gun control cards is lost	Check if there is enough extraction and the flow switch is working properly contact your Nordson representative
2037.	Reciprocator 1 invertor drive has tripped	Try to power off the system, wait 10 seconds and switch on again. If the problem persists, consult your Nordson technical representative
2038.	Reciprocator 2 invertor drive has tripped	
2043.	After filter high powder level in the hopper (single colour systems only)	Check if there are residues of powder on the level probe, adjust the probe if necessary or contact your Nordson representative
2045.	Oscillator 1 motor has tripped	Check relevant circuit breaker, identifiable from the system drawings provided.
2046.	Oscillator 2 motor has tripped	
2053.	Reciprocator 1 turn around limits are too close or inverted	Adjust the top and bottom turn values to be more than 40 mm apart from each other
2054.	Reciprocator 2 turn around limits are too close or inverted	
2057.	Recip 1 is not sensed as moving on command	Check reciprocator encoder is functioning. Check drive system is not restricted.
2058.	Recip 2 is not sensed as moving on command	
2061.	Reciprocator 1 invertor drive fault	Check if your safety cages are open and if so, close them. Try to power off the system, wait 10 seconds and switch on again. If the problem persists, consult your Nordson technical representative
2062.	Reciprocator 2 invertor drive fault	
2065.	Gun controller power contactor fault	Check relevant circuit breaker, identifiable from the system drawings provided.
2066.	Recip 2 calculated speed is too high. Default speed is being applied	On variable speed mode the speed required for the reciprocators is calculated from the conveyor speed. This calculation has violated the speed limits of the reciprocators. Reduce the conveyor speed, the number of laps from the booth configuration or the stroke.

Alarm	Alarm Message	Corrective Action
2069.	STS minor fault detected	Check the STS−system on: low battery − dirty Flame detectors − also inside the feedcenter duct − loss of extinguishing agent − weight of the CO bottle. Contact your Nordson representative
2070.	Recip 1 calculated speed is too high. Default speed is being applied	On variable speed mode the speed required for the reciprocators is calculated from the conveyor speed. This calculation has violated the speed limits of the reciprocators. Reduce the conveyor speed, the number of laps from the booth configuration or the stroke.
2071.	Gun KV rack tripped	Check relevant circuit breaker, identifiable from the system drawings provided.
2072.	Extraction flow switch is not detecting flow	Check if there is enough extraction and the flow switch is working properly − check the flow switch inside the duct for impact fusion or dirt etc. Always check booth extraction when adjusting the flow switch − check the after filter cartridges for excessive powder build up. If the problem persists, call your Nordson representative.
2073.	Reciprocator 1 has over travelled its top limit	Set the reciprocator to manual mode and bring it back into range in the middle of its stroke. If the problem persists, contact your Nordson representative.
2074.	Reciprocator 2 has over travelled its top limit	
2075.	Reciprocator 1 has over travelled its bottom limit	Set the reciprocator to manual mode and bring it back into range in the middle of its stroke. Contact your Nordson representative.
2076.	Reciprocator 2 has over travelled its bottom limit	
2077.	Pump rack panel supply has tripped	Check relevant circuit breaker, identifiable from the system drawings provided.
2089.	Reciprocator 1 has not initialised	Check if your safety cages are open and if so, close them. Try to power off the system, wait 10 seconds and switch on again. If the problem persists, consult your Nordson technical representative.
2090.	Reciprocator 2 has not initialised	
2092.	Z−axis 1 has not initialised	
2093.	Z−axis 2 has not initialised	
2095.	Gun controller fault. See gun fault screen for more detail	

Status Indicators



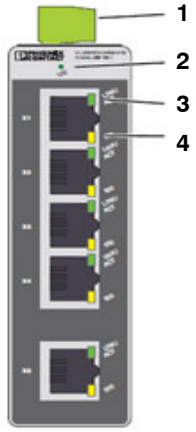
Status Indicators

#	Indication	State	Description
1	Link/Activity	Green	Link established
		Green, flashing	Receiving/Transmitting data
		Off	No link or power off
2	Communication Status	Green	On line, Run - Connection with IO Controller established - IO Controller is in RUN state
		Green, 1 flash	On line, STOP - Connection with IO Controller established - IO Controller in STOP state
		Off	Off line - No connection with IO Controller
3	Module Status	Green	Initialized, no error
		Green, 1 flash	Diagnostic data available
		Green, 2 flashes	Blink. Used by an engineering tool to identify the Anybus module.
		Red, 1 flash	Configuration Error - Too many modules/submodules - I/O size derived from IO Controller configuration is too large - Configuration mismatch (no module, wrong module)
		Red, 3 flashes	No Station Name or no IP address assigned
		Red, 4 flashes	Internal error
		Off	No power or not initialized
4	-	-	-

Figure 50 **Status Indicators – Anybus Gateway Card**

The Anybus Gateway Card can be found in slot 9 of the KV Rack inside the PPHD.

Ethernet Hub



Diagnostic and Status Indicators

Des.	Color	Status	Meaning
US	Green	ON	Supply voltage US in the tolerance range
		OFF	Supply voltage US too low

Data Transmission Speed LEDs (2 LEDs/Port)

	10 Mbps	100 Mbps
LNK/ACT	ON/blinking	ON/blinking
100	OFF	ON

LNK/ACT LED:
ON: indicates an electrical link
Flashing: indicates network traffic (at high data rates the blinking is in a constant rate)

Figure 51 **Ethernet Hub – located inside the PPHD**

1 – Power connector **2** – Power LED (US) – green

3 – LNK/ACT LED – green **4** – 100 LED – yellow

Gun KV Card

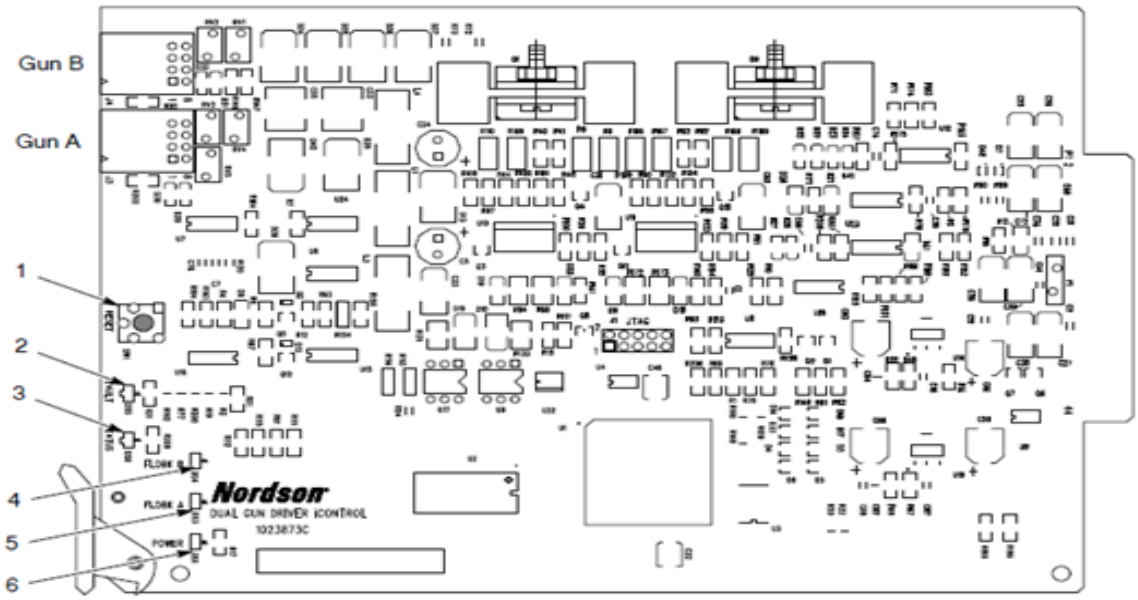


Figure 52 **Gun Card Layout**

1 – Reset switch (reboots the on–board processor)

2 – Fault LED (red)

3 – Status LED (green)

4 – Foldback B LED (yellow)

5 – Foldback A LED (yellow)

6 – Power LED (green)

LED	Colour	Function
Fault	Red	Lights when a fault is detected (communication gun cable, RAM, or hardware).
Status	Green	Flashing (heartbeat) when communicating properly with system.
Foldback B	Yellow	Lights if over–current protection circuit triggered due to high current draw from gun drive circuit.
Foldback A	Yellow	
Power	Green	Lights when power (5 volts) is applied to the board.

Program Upgrade / Restore Procedure

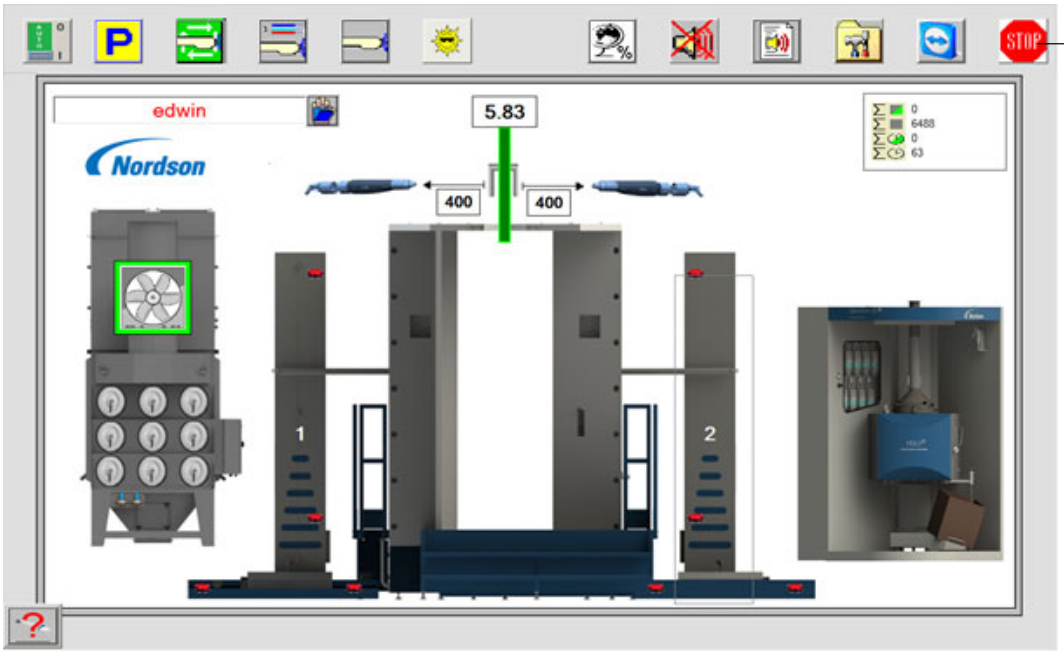


Figure 53 **Home Screen**

1 – Stop button

If the program needs to be upgraded or restored for any reason. The following steps need to be taken to load the software:

Press the Stop button (1) and a drop–down tree appears to allow different shut–down options, see below:

Press this button for complete shut–down of PPHD software followed by Microsoft Windows

NOTE: This process **must** always be carried out prior to turning power off to the control panel.

Aborts shut–down process and returns to the Home screen.

NOTE: Used if the Stop button was pressed in error.

Shuts down the PPHD software and returns to the Microsoft Windows desktop.

Program Upgrade / Restore Procedure(contd)

On the Windows desktop, open the soft PLC settings panel as follows:

Press the Windows start button in the bottom left hand corner of the  desktop

Press “All Programs”

Press the “IBH Softec GmbH” folder to open it

Press the “S7−SoftPLC” folder to open it

Press “S7−SoftPLC settings” to open the settings panel as shown

Then press the “Terminate PLC” button (1), shown below

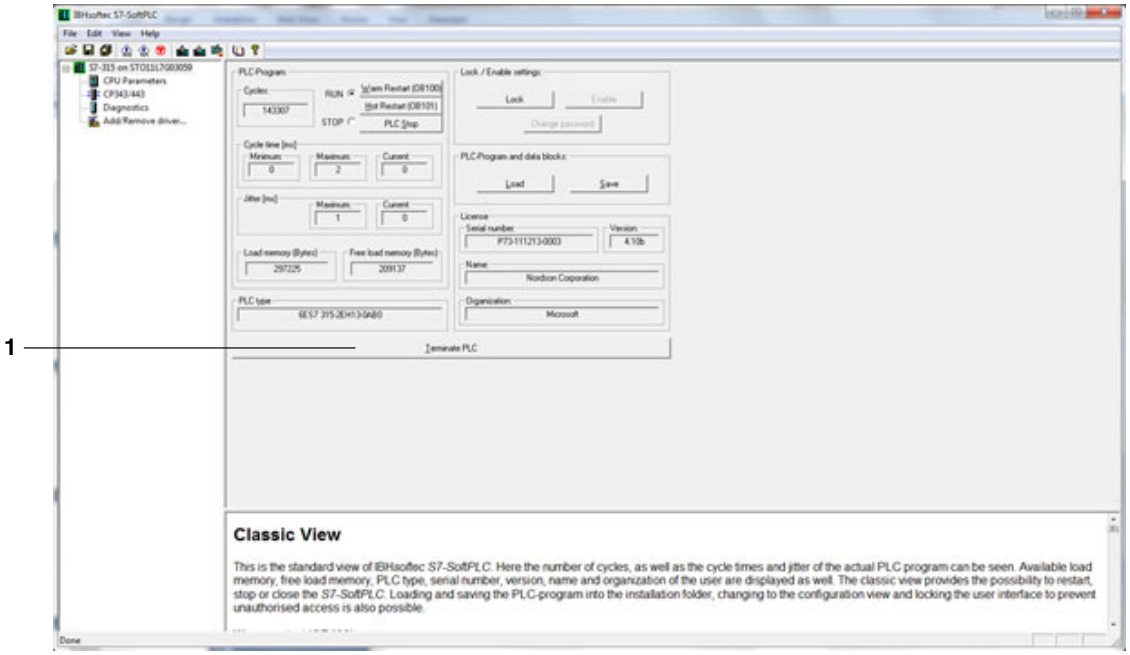


Figure 54 **S7−SoftPLC screen showing Terminate PLC button**

Then open Windows Explorer as follows:

Press the Windows start button in the bottom left hand corner of the desktop

Press “All Programs”

Press the “Accessories” folder to open it

Press “Windows Explorer”

Once a modified program has been supplied to you, the next step is to copy the old program file into the temp folder as backup. If it is just a restore, then proceed to step 9.

Program Upgrade / Restore Procedure(contd)

1 – Expand the arrow next to “Computer” and then C: drive to display the list of folders on the C drive.

2 – Select folder “IBH Softec GmbH”

3 – Double click/press on the folder “SoftPLC”

4 – Single press on the file “S7.BIN”

5 – Press the “Organise” button and select “Cut” from the drop down menu.

6 – Press the “Temp” folder located in the list on the left side of the screen.

7 – Touch anywhere in the right hand window pane to make it active.

8 – Press “Organise” again as shown in step 5 and select “Paste” from the list.

9 – Copy the new file into the root directory of a USB memory stick and insert it into the USB port on the front of the touch screen. This port is located bottom left under a dust cap.

10 – Whilst still in Windows Explorer, touch the “Removable Disk” drive symbol from the list on the left side window pane.

11 – Press the “S7.BIN” file name once from the list in the right hand window pane to highlight it.

12 – Repeat steps 5 to 8 above to cut and paste the file from the memory stick into the Soft PLC folder.

HMI Restore Procedure

If the HMI screens need to be restored for any reason, contact Nordson and a file called PROJECT_1.Device_1.fwx will be emailed to you.

The same steps detailed previously need to be taken to load the software.

The only difference is that the file needs to be copied into a folder on the C drive called HMI.

Application Program Backup Procedure

Follow this procedure when you wish to backup your coating programs.

Shut down the HMI screens, then open Windows Explorer as follows:

Press the Windows start button in the bottom left hand corner of the desktop 

Press “All Programs”

Press the “Accessories” folder to open it

Press “Windows Explorer”

1 – Expand the arrow next to “Computer” and then C: drive to display the list of folders on the C drive.

2 – Select folder “RECIPES”.

3 – Select all 3 files as shown by pressing on “Organise” in the top left hand corner of the screen and press “Select All”.

4 – Press “Organise” again and then “Copy”.

5 – Insert a memory stick into the USB port on the front of the touch screen. This port is located bottom left under a dust cap.

6 – Whilst still in Windows Explorer, touch the “Removable Disk” drive symbol from the list on the left side window pane.

7 – Touch anywhere in the right hand window pane to make it active.

8 – Press “Organise” again and select “Paste” from the list to copy the files onto the root directory of the memory stick.

NOTE: If a restore is required, the backed up files need to be copied into the Recipes folder, overwriting any existing files.

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 Spectrum^{HD} program and operating system on the program PC. Refer to *Program Shutdown* in the *Configuration* section of the Spectrum^{HD} *Operator Interface* manual for the shutdown procedure.

WARNING: Hazardous voltages exist within the Spectrum^{HD} console. Unless power must be on to test circuits, always shut off and lock out power before opening the console to make repairs. All repairs should be made by a qualified electrician. Failure to observe this warning could result in personal injury or death. Repair consists of removing malfunctioning components and replacing them with new ones. There are no components inside the cabinet that can be repaired by the customer. Refer to the wiring diagrams in Section 7 for connections.

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

Gun KV Card Removal & Replacement

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 Spectrum^{HD} program and operating system on the program PC. Refer to *Program Shutdown* in the *Configuration* section of the Spectrum^{HD} *Operator Interface* manual for the shutdown procedure.

WARNING: Hazardous voltages exist within the Spectrum^{HD} console. Unless power must be on to test circuits, always shut off and lock out power before opening the console to make repairs. All repairs should be made by a qualified electrician. Failure to observe this warning could result in personal injury or death. Repair consists of removing malfunctioning components and replacing them with new ones. There are no components inside the cabinet that can be repaired by the customer. Refer to the wiring diagrams for connections. Whenever replacing a component that interfaces with the exterior of the cabinet, such as a gun harness receptacle, make sure that the dust−tight intergrity of the cabinet is intact by installing the correct gaskets and seals. Failure to maintain the dust−tight integrity of the cabinet could invalidate agency approvals and create a hazardous condition.

CAUTION: The gun control cards are electrostatic sensitive devices (ESD). To prevent damage to the cards when handling them, wear a grounding wrist strap connected to the Spectrum^{HD} enclosure or other ground. Handle the cards only by their top and bottom edges. See Figure 55 − Gun KV cards (2) are installed in the card cage from left to right. Each card controls two guns: the bottom receptacle on the card is the odd gun number; the top receptacle the even gun number. To remove a card, unplug the gun harnesses from the card receptacles (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 back−plane (6). Push the locking tab up to lock the card into the card cage. Connect the gun harnesses to the card receptacles.

Gun KV Card Removal & Replacement *(contd)*

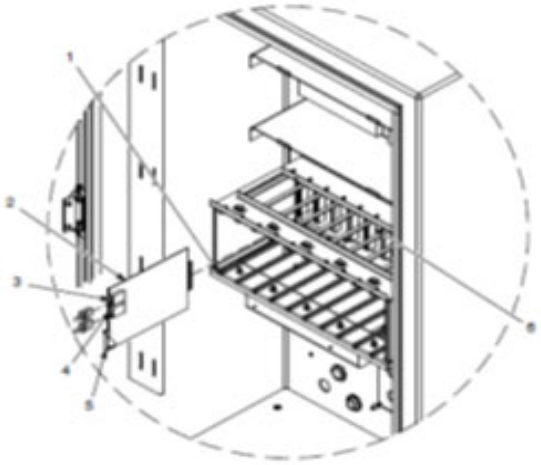


Figure 55 **Gun Control Card Replacement**

1 – Card Cage Slot 1

2 – Gun KV Card

3 – Gun 2 Receptacle

4 – Gun 1 Receptacle

5 – Locking tab

6 – Backplane

Parts

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

Part	Description	Note
7035309	TOUCH−SCREEN 15",P.PILOT,WITH LICENCE,WITH SOFTWARE	
7035310	TOUCH−SCREEN 15",P.PILOT,WITH SOFTWARE,WITHOUT LICENCE	
1031501	RECEPTACLE,8 POSITION,GUN,70 IN	A
939122	SEAL,CONDUIT FITTING,1/2	A
984526	NUT,LOCK,1/2 CONDUIT	A
1031485	HARNESS,NET,CPU,ICONTROL	A
1107144	PCA, AUTO DUAL GUN DRIVER, ENCORE	A
1098445	HARNESS,POWER,+5,+12,−12V,ICONTROL	A
1042648	HARNESS,DIGITAL FLOW,NET,PWR,ICONTROL	A
1027138	HARNESS,POWER,24V,ICONTROL	A
1042647	HARNESS,SIGNAL,INTERFACE,ICONTROL	A
1107142	KIT,POWER SUPPLY,ACE,STD. iCONTROLS	A
1098444	GUIDE,PCB CARD, CONDUCTIVE, 7 INCH	A
334755	BRACKET,CARDFRAME,CTRL CAB	A
1023939	PCA,BACKPLANE,ICONTROL	A
334805	FILTER,LINE,RFI,POWER,10A	A
185067	SUPPRESSOR,FERRITE,7MM DIA	A
1605928	KIT,GATEWAY,SLOT9,PROFINET	A

NOTE A: See the system control panel drawings and contact your Nordson representative to identify this part

NOTE: For all control panel components, see the associated diagrams for your system.
For other product specific technical manuals, go online to: http://emanuals.nordson.com/finishing/