Ecomax

Customer Product Manual
Part 7593428_03
Issued 09/2020

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

This document is subject to change without notice.
Check http://emanuals.nordson.com for the latest version.

NORDSON DEUTSCHLAND GMBH

Contact Us

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

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Germany

Notice

Trademarks

Change Record

Revision	Date	Change
03	09/2020	Dimensions of booths updated
03	09/2020	Parts list quantities updated

EC DECLARATION OF CONFORMITY

ACCORDING TO CE DIRECTIVE 2006/42/ EG ANNEX II A

DESCRIPTION: Ecomax Booth (Range 1 to 6)
Manual Powder Spray Booth

FAMILY/MODELS: All variants and models and components

APPLICABLE DIRECTIVES & STANDARDS USED TO VERIFY COMPLIANCE:

Directive 2006/42/EG (Machinery)
2014/34/EU Explosive Atmosphere
EN 16985:2018 Coating plants
EN 60204-1: 2005 "Safety of Machinery - Electrical equipment of machines"
EN ISO 12100 "Safety of machinery - Basic concepts, general principles for design"

MARKING OF PRODUCT: CE

MARKING/USE OF COMPONENTS IN ATEX ZONES: Ex II3D or min. IP54

The equipment delivered is generally intended to be part of a powder coating system, and can be operated on its own or in conjunction with other equipment. An additional flame or fire detection acc. EN16985 Chapt. 4.8.4 is not required but recommended.

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 powder coating system upon incorporation of the equipment in the powder coating 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 the Nordson manuals, its operation is safe.

Name and address of the person authorised to compile the technical file

Kai Flockenhaus
Manager Procurement & Process,
ICS Europe (Industrial Coating Systems)
Nordson Deutschland GmbH -40699 Erkrath

Date: 09/05/2019

Table of Contents

EcoMax

Safety

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

CAUTION: 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

Freestanding ductless powder coating booth. Can be used for multi–colour or dedicated single colour.

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 unauthorised 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

WARNING: 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 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) 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.
- Do not use the air blow gun to clean your body. Compressed air can pierce the skin and if directed towards the face it could cause a severe eye injury.

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 ohm when measured with an appropriate instrument.
- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator working area 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.
- After servicing equipment, reconnect all disconnected equipment, ground cables and wires.

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 EcoMax booth is a compact powder coating booth and recovery system with primary and secondary filters. It is available in 6 different variations (1 – 6). See the *Specifications* section.

Each has a self–contained cartridge filter extract system coupled to the booth, with the option to pulse clean the cartridge filters to prolong life. The clean filtered air returns back into the workplace; eliminating the need for a ducted extract system or explosion relief vent.

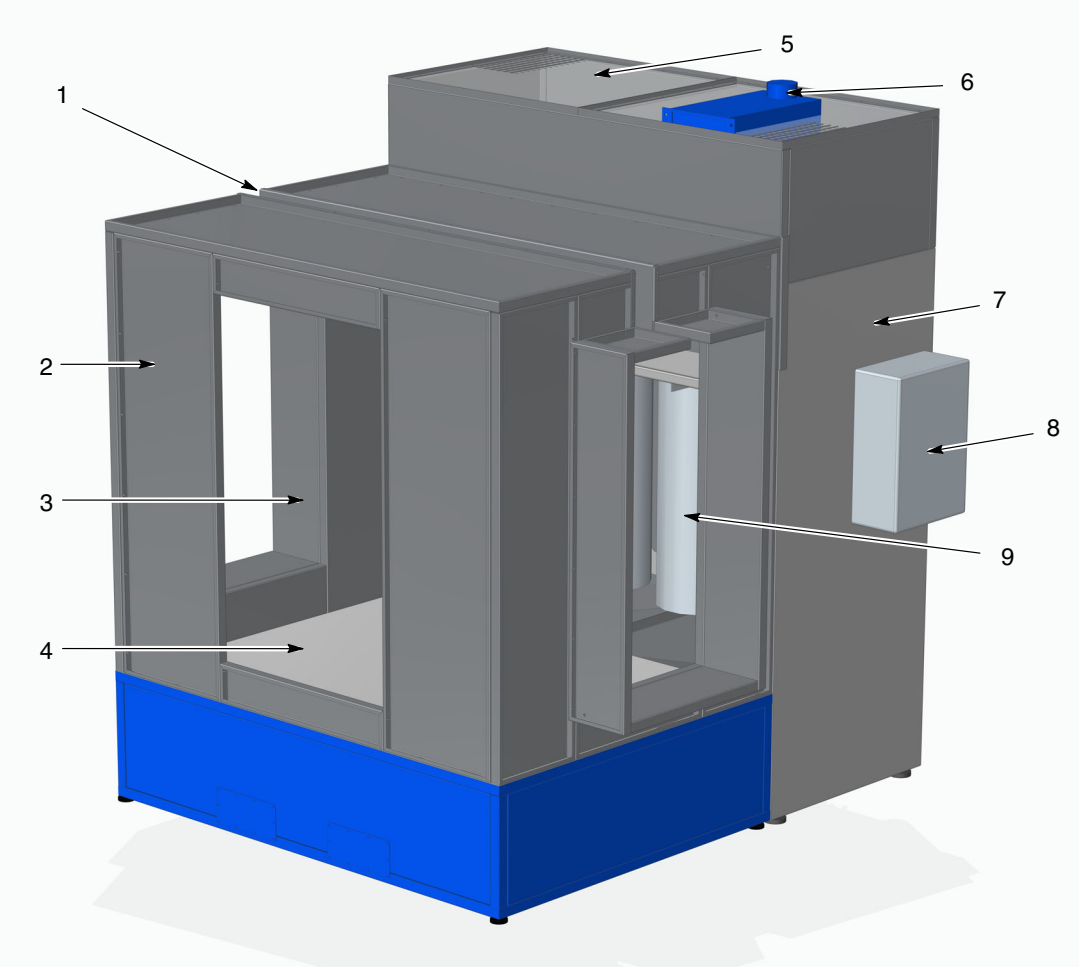


Figure 1 EcoMax 3

1. Conveyor slot
2. Booth canopy enclosure
3. Operator access opening
4. Booth floor
5. Secondary filter
6. Fan/Motor assembly
7. Extract module housing
8. Booth control panel
9. Cartridge/primary filters

Features

- Delivered pre–assembled to minimise installation time
- System control panel and an additional socket for a manual powder spray system
- LED lighting inside the canopy
- Reverse jet – pulse cleaning to prolong filter life and maximum extract
- Quiet operation

Installation

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

Unpacking

Carefully unpack the unit to avoid damaging it. Check for damage caused during transport.

Save packing materials for possible later use. Otherwise recycle or dispose of properly according to local regulations.

Storage

Pack the unit in suitable packing materials and sturdy cartons. Protect from humidity, dust and large temperature fluctuations (condensation).

Disposal

Dispose of properly according to local regulations.

Setting up the Unit

1. Check all electrical and pneumatic connections.
2. Check that the overload setting for the motor is set to a value appropriate for the motor in use.
3. Start the fan and check operation of the fan contacter. Check the fan for correct direction of rotation.
4. Check operation of the airflow switch. This is used to interlock the application equipment supply and should only be on when the fan is running.
5. Set all regulators to zero, ensure that the service air line has been drained before opening the valve to the control panel. Check for air leaks, remedy as necessary.
6. Set the pulse air pressure to 4.5 bar.
7. Check operation of the booth light.

Electrical

WARNING: Allow only qualified personnel to perform electrical connections. Observe the safety instructions.

A single supply cable is required to the control panel. The supply should be fed from a suitable disconnect device. Introduce the cable into the panel using an IP6X cable gland.

Ensure that all the electrical wires are suitably sized for the fan motor loading and adequate fuse/circuit protection is provided at the source of supply.

NOTE: The fan motor is designed to be switched “Direct-on-line” (refer to the electrical circuit schematic supplied with the unit, for power requirements before installation).

On starting the fan motor, check for correct rotation, normally clockwise looking at the motor from the impeller end, (air is pushed out of the exhaust on the fan scroll). Do this by starting and immediately stopping the fan motor. Proper fan rotation is extremely important. With the fan running in the wrong direction, the extract will not be sufficient to contain the powder in the booth. If incorrect, rectify by reversing any two phases on the load side of the fan motor starter.

Check operation of solenoid valves. The valves should open and close sequentially to the preset dwell between each pulse.

Pneumatic

Before connecting to an air supply ensure that the available air is of the correct quality. (Refer to Technical Section). Nordson can advise on suitable air conditioning equipment to provide air of a suitable quality.

The pneumatic connection (BSP thread) is made next to the air reservoir or into the Nordson control panel and is provided with a ball valve for system isolation. Ensure that when bringing in the air connection there is a drain leg for the collection of any materials or oil that may be in the air lines before the connection is made to the control panel.

Air pressure of approximately 6 bar is required for fast efficient operation. Failure to do so could result in poor powder application and poor cleaning of the cartridge media.

Operation

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

Daily Startup and Shutdown

1. Turn on the supply to the control panel.
2. Press the RESET button (for shutdown, skip this step)
3. Turn on the panel isolator.
4. Start the fan.
5. Turn on the lights.
6. Operate the powder spray equipment in accordance with the appropriate instructions.

CAUTION: When operating or cleaning the booth or application equipment, ensure that the fan is running and appropriate PPE (Personal Protective Equipment/Clothing) is worn.

7. Shutdown the booth by reversing the above sequence.
8. To empty the booth hopper to a waste bucket, lift the handle on the hopper and pull out from the booth. Using a scoop, empty the waste powder into the desired container.

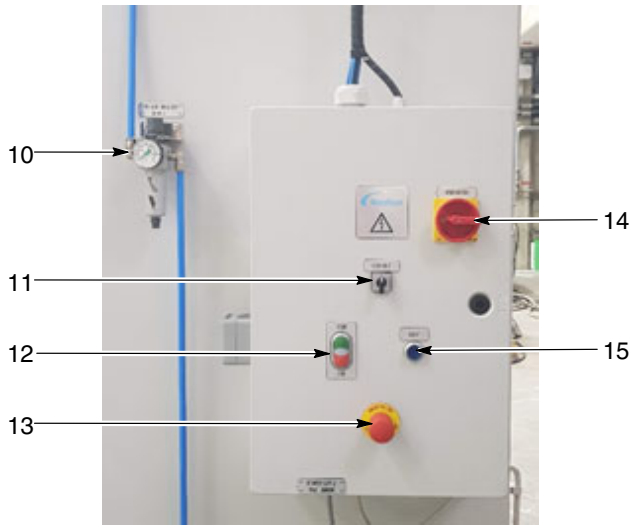


Figure 2 **Control Panel Identification**

10. Pressure regulator with gauge
11. Light switch
12. Fan START/STOP
13. Emergency Stop
14. Mains isolator
15. RESET button

Control Screen

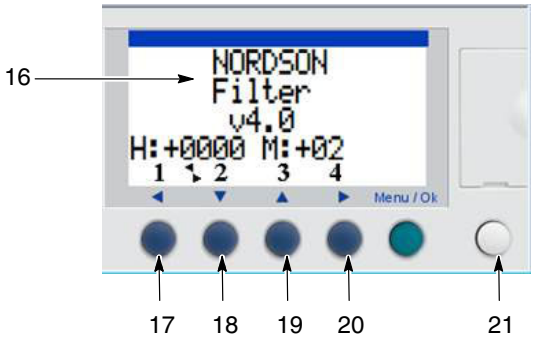


Figure 3 **Control Screen Button Identification**

16. Display screen
17. Scroll LEFT
18. Scroll DOWN
19. Scroll UP
20. Scroll RIGHT
21. Button not used

Control Screen – Operation

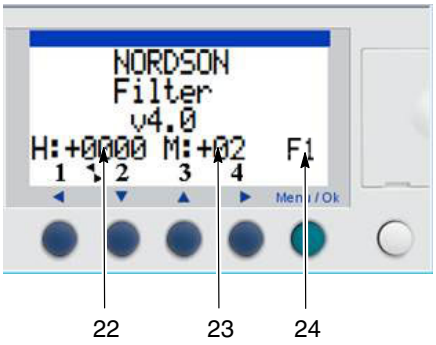


Figure 4 **Control Screen Display Identification**

22. Working hours
23. Working minutes
24. Current filter being cleaned

Filter currently being cleaned (for example F1) appears on the screen.

The working hours counter is running when the programme is in operation mode and the machine is turned on. When the counter reaches 60 minutes, it will increase the counter of working hours by 1, the minute counter resets to 0. The counter of operating hours has a maximum of 9999 hours, then it resets to 0.

When the system is turned on, the controller always starts in the operating mode. You can adjust the time delay (PAUSE TIME) between filter cleaning pulses and the duration (PULSE TIME) of the pulse.

Timed Cleaning of Filters

Timed cleaning of the filters is done as follows:

1. Initiating (at start–up) – at start the filter are blown once in 10 second intervals, pulse cleaning time is 1 second.
2. Operating – the filters are cleaned in cycles – PAUSE TIME and PULSE TIME, intervals are set in seconds.

Control Screen – Parameter Setting

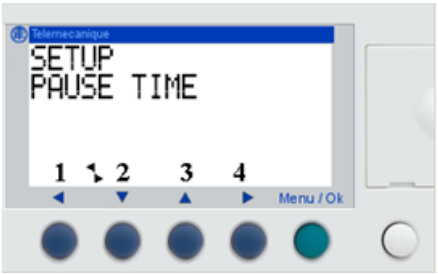


Figure 5 **Parameter Setting Screen**

To enter the settings mode, push buttons LEFT (1) and RIGHT (4) at the same time. In the settings mode you can choose between the following parameters with the buttons UP (3) and DOWN (2):

Pause Time – The time between each filter pulse clean
Pulse Time – The duration of the pulse. (Short sharp pulses are better)

NOTE: To exit the settings screen, push buttons LEFT (1) and RIGHT (4) at the same time.

Control Screen – Parameter Changes

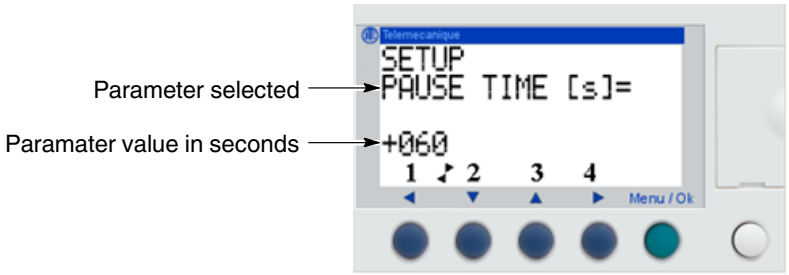


Figure 6 **Parameter Changes Screen**

To enter the parameter change mode, push button RIGHT (4). Use the buttons UP (3) and DOWN (2) to increase and decrease the value. Use the LEFT (1) button to go back from this screen.

Parameter	Factory Setting	Minimum Value	Maximum Value
Pause time	60	1	300
Pulse time	1	1	10

NOTE: To exit the settings screen, push buttons LEFT (1) and RIGHT (4) at the same time.

Maintenance

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

CAUTION: Breathing in certain airborne dusts (including finishing powders) may be hazardous to health. Ask the powder manufacturer for a Material Safety Data Sheet (MSDS) for information. Use appropriate respiratory protection.

CAUTION: Wear suitably conductive protective footwear when operating or working on powder coating equipment.

Wear all necessary PPE (Personal Protective Equipment/Clothing) when operating or working on powder coating equipment.

Daily Maintenance

Equipment	Procedure
System	Visually check the complete system for leaks, rectify.
Cables and Hoses	Visually check all external cables and hoses. Repair or replace if necessary
Booth Interior	With the fan operating, clean the booth interior with a rubber squeegee then an air blow gun, directing the powder into the extract section of the booth.
Cartridge Cleaning	Unless automatic pulsing is included, every 4 hours run the cartridge cleaning sequence for at least 10 minutes, longer if necessary, to maintain good air flow.
Filter Pressure Drop Gauges	Monitor the reading of the gauges. An increased reading on the pressure drop gauge can be an indication of blocked filters. A sudden reduction on the gauge for primary filters could indicate a leaking filter. Powder entering the secondary filter membrane can be an indication of a damaged filter or seal. Inspect and replace as required. If the reading reaches 6 at any time, replace the filters immediately. Replace as required and also replace the secondary filter membrane. Do NOT manually clean the filters!
Application Equipment	Check the powder pump and gun, clean according to the product manual.
Powder Supply	Depending on usage, every 8 hours or less check the powder supply level. When adding new powder or replacing the box, minimise powder powder spillage and clean the area prior operation. Ensure that any vacuum cleaner used is suitably rated for vacuuming the powder you are using.
Flame Detector System (if fitted)	Check the detector lenses and clean if necessary. Ensure the built–in airwash system is supplying sufficient air to the detector lens. Do NOT blow high pressure air onto the lenses, this can damage them or block the airwash system.

Monthly Maintenance

Equipment	Procedure
Waste Powder Hopper	Empty and clean the hopper
Air Dryer	Check the air dryer operation. Refer to your air dryer manual for maintenance procedures and schedules.
Electrical Connections	Check all terminal blocks and junction boxes for loose wires. Tighten any loose connections and inspect the system wiring. Replace any damaged wires.
Equipment Grounds	Check all equipment grounds. Repair or replace unconnected or damaged ground cables. Refer to individual product technical manuals where necessary
Cartridge Cleaning Pulse Valves	Ensure the pulse valves are operating correctly by listening for a short sharp pulse of air during the cleaning sequence. If a valve is deemed to be faulty, replace. First isolate the air supply then bleed the air from the pulse air tank. Isolate the electrical supply. Remove the rear access panel. Remove and replace the faulty valve. Turn on the air and electrical supplies and check for air leaks. Replace the access panel.

Annual Maintenance

Equipment	Procedure
Fan Assembly	If the fan changes in vibration or noise levels, contact your Nordson representative. Refer to the manufacturers instructions for lubrication and maintenance of the fan motor.
Fan Enclosure	Inspect for powder or foreign particles. Vacuum the enclosure clean and if excessive powder or foreign particles are found, contact your Nordson representative.
Cartridge Filters	Replace filters as routine annual maintenance. Do NOT manually clean the filters!

NOTE: For daily maintenance of the application equipment (spray guns & powder supply), refer to the relevant individual 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.

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.

Problem	Possible Cause	Corrective Action
1. Fan will not start or shuts down automatically	Power off	Switch on power.
	Electrical Protection Device / Circuit Breaker activated	Investigate cause, rectify the issue then reset the circuit breaker.
	Motor failure	Investigate cause. Contact your Nordson representative.
	Timer on airflow switch set incorrectly	Ensure timer is set 5–8 seconds.
	Filters blocked or leaking powder	Inspect condition of the cartridge filters and final filter. Ensure cartridge filters are secured tight and gaskets are in good condition. Replace if necessary.
	Airflow switch faulty	Replace.
2. Loss of extract but fan running as normal	Cartridge filters blocked	Check pulse cleaning air pressure is set to 4.5 bar then manually run the cleaning sequence for 30 minutes. If no improvement, replace filters.
(ensure there are no air leaks and that the pulse cleaning produces a short sharp pulse/bang of air)	Pulse valve fault	Locate faulty valve and repair or replace.
3. Powder escaping (also see point 2)	Cartridge leak	Check condition of filter and seal. Any sign of damage, replace filter.
	Powder hose leak	Inspect and replace as required
	Cross drafts are pulling powder out of the booth	Eliminate drafts in the vicinity of the booth
	Fan rotation backwards	Reverse fan rotation by swapping 2 electrical phases
	Parts are entering the booth too hot	Cool the parts before bringing them into the booth

Parts

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

See Figure 7 – Page 14

Item	Part	Description	Quantity	Note
1	7034133	FILTER MEDIA,GEN5_AF,592 X 592	1	
2	768405	VALVE,PULSE,2/2,3/4BSP,24V,ATEX	AR	A
3	165726	NOZZLE,CARTRIDGE PULSE	AR	A
4	7035272	LIGHT ASSEMBLY, ECOMAX	AR	C
4	7035278	LIGHT FOR ECOMAX 3, 4, 6	AR	D
5	767058	FILTER,CARTRIDGE,POLYESTER,1000MM	AR	A
6	N/A	WASTE POWDER HOPPER	2	B
NS	768002	GAUGE, MINIHELIC (filter pressure drop)	2	

NOTE A: Quantity depends on version of booth. 1 required per cartridge filter.

B: Quantity depends on version of booth. 2 required per extract module. This is a non–saleable part, contact your Nordson representative if you need to order.

C: For EcoMax 1 & 2 (600mm)

D: For EcoMax 3, 4 & 6 (1287mm)

AR: As Required

NS: Not Shown

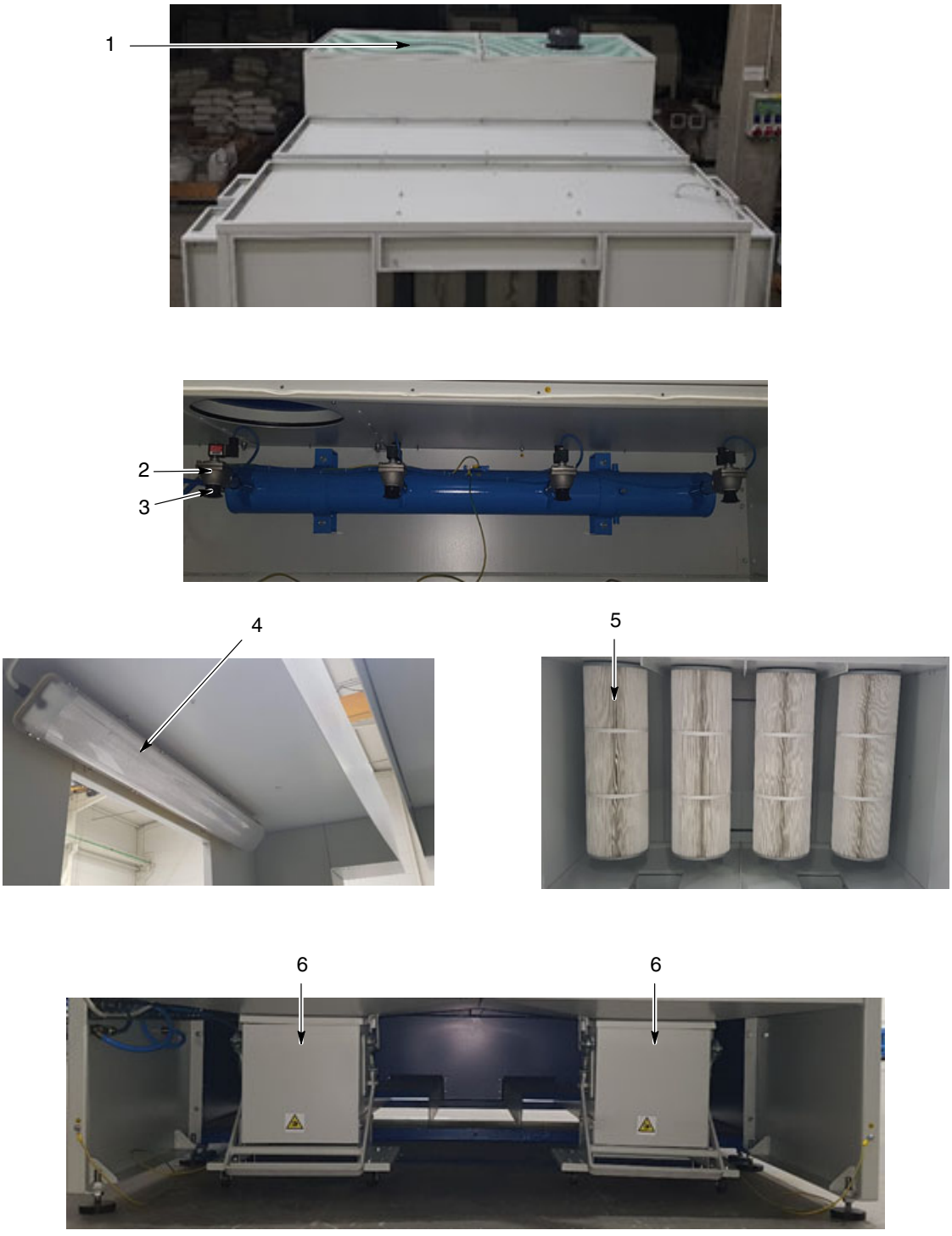


Figure 7 **Parts Identification**

Operating Environment

Description	Values
Factory ambient temperature	5°C - 35°C
Humidity	45 - 55% RH
Electrical connection	50Hz – 3 phase 380v (N+E) – 1 phase 230v
Pneumatic connection	¼" BSP (quick release connector)
Maximum air pressure	8 bar
Minimum air pressure	6 bar
Air quality	2°C or less dewpoint – oil free – filtered to 5µ or less
Noise	80dB Maximum during normal operation
Cross drafts	No more than 18.3 m/min (60FPM)

NOTE: Temperature of parts entering the booth should not be more than 49°C (120°F)

Specifications

NOTE: Nordson reserve the right to change specifications/dimensions at any time

Ecomax 1 – Part Number 7035226

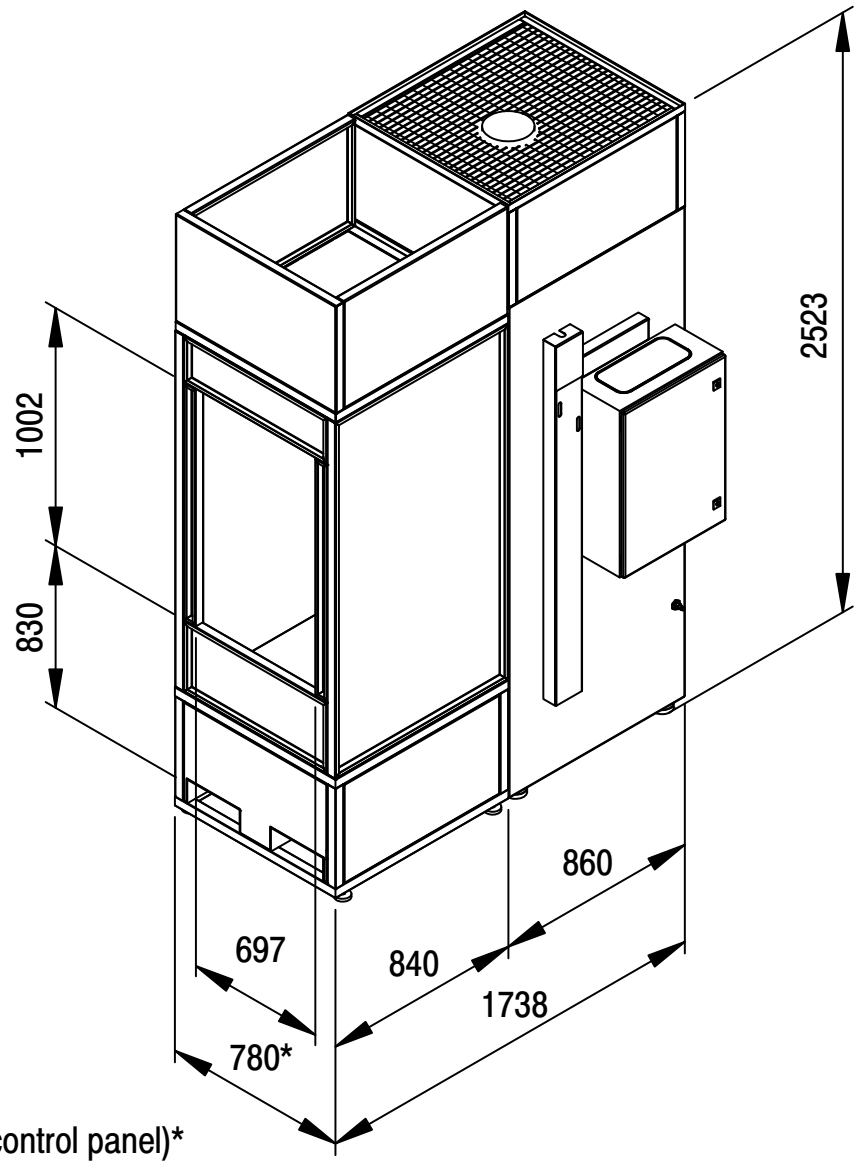


Figure 8 **EcoMax 1 – Dimensions**

Description	Data
Airflow	1300 m^3/h
Number of cartridges	1
Electrical power consumption	TBC Kw
Supply voltage	400v / 50Hz
Weight	TBC kg

Ecomax 2 – Part Number 7035227

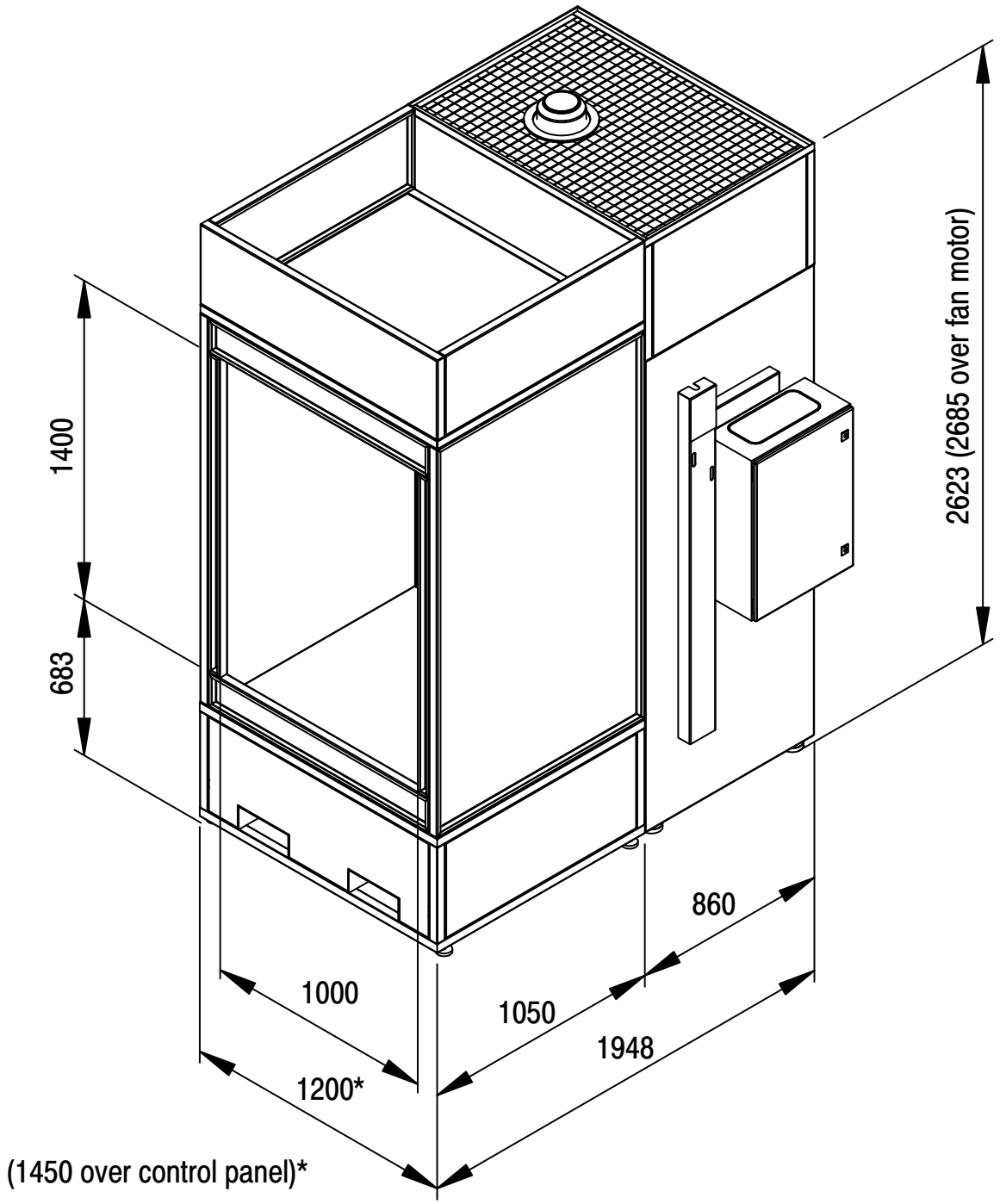


Figure 9 **EcoMax 2 – Dimensions**

Description	Data
Airflow	2600 m^3/h
Number of cartridges	2
Electrical power consumption	2.2 Kw
Supply voltage	400v / 50Hz
Weight	TBC kg

Ecomax 3 – Part Number 7035228

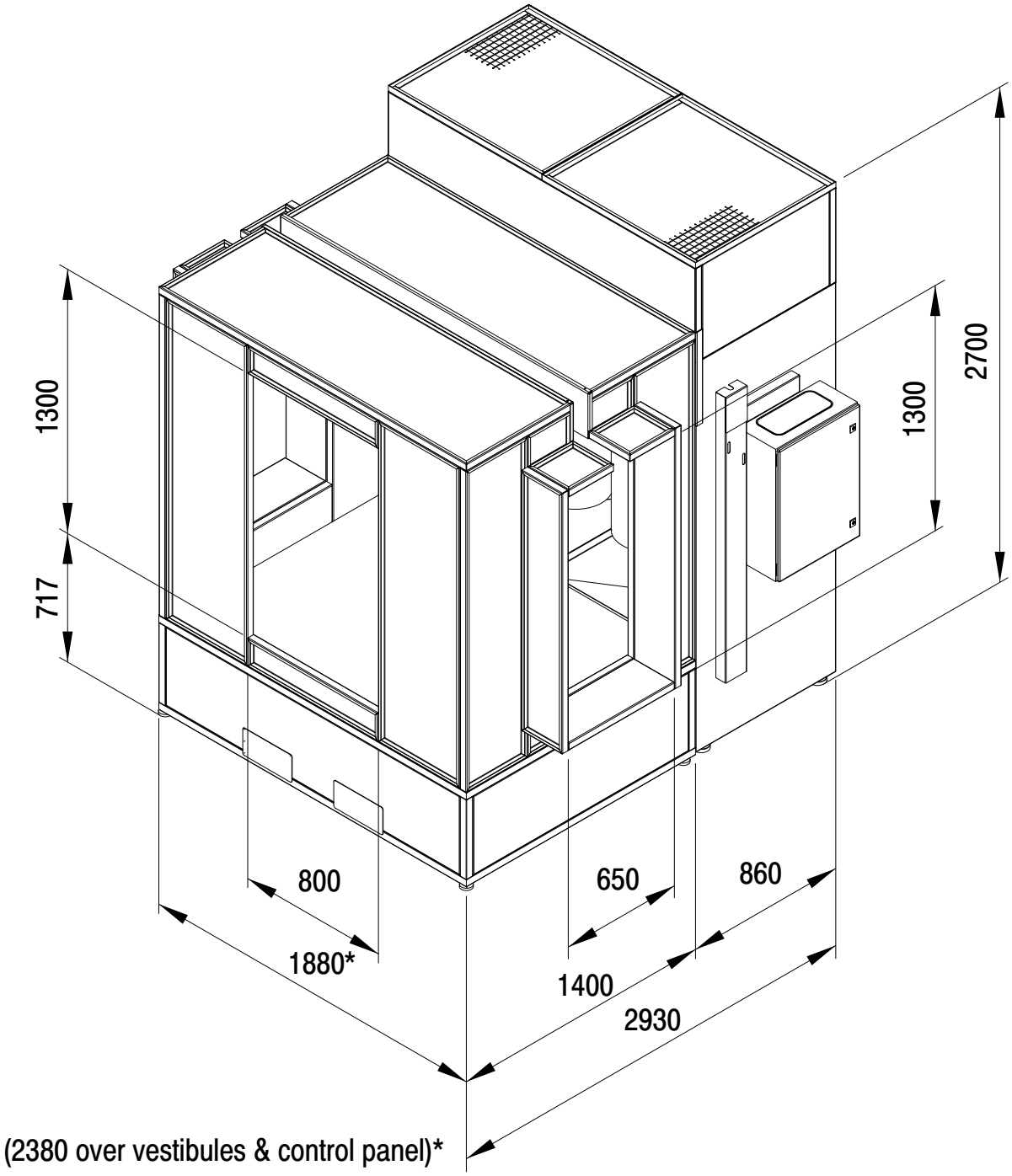


Figure 10 **EcoMax 3 – Dimensions**

Description	Data
Airflow	5600 m^3/h
Number of cartridges	4
Electrical power consumption	5 Kw
Supply voltage	400v / 50Hz
Weight	950 kg

EcoMax 4 – Part Number 7035229

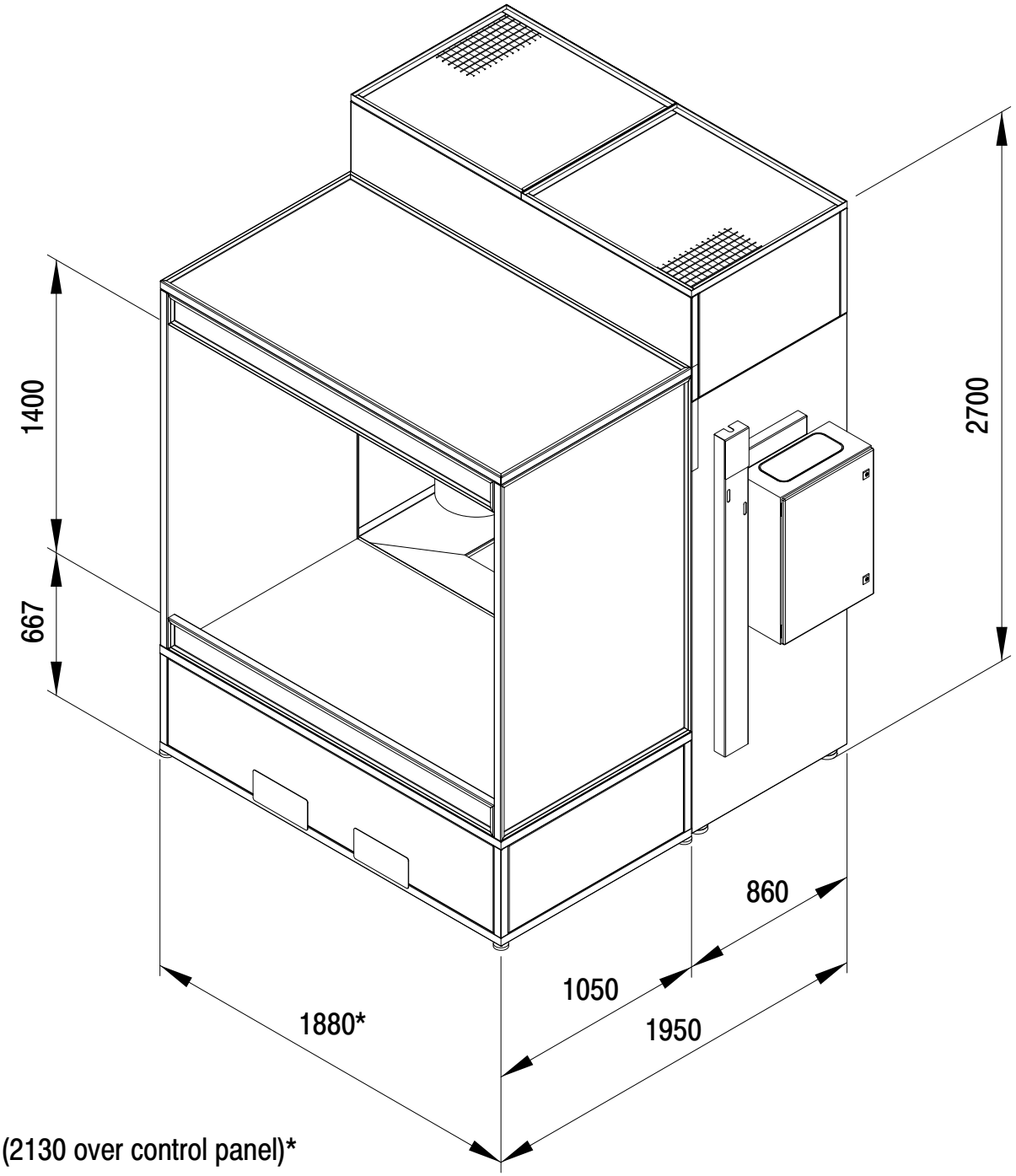


Figure 11 **EcoMax 4 – Dimensions**

Description	Data
Airflow	5600 m^3/h
Number of cartridges	4
Electrical power consumption	5 Kw
Supply voltage	400v / 50Hz
Weight	900 kg

EcoMax 5 – Part Number 7035230

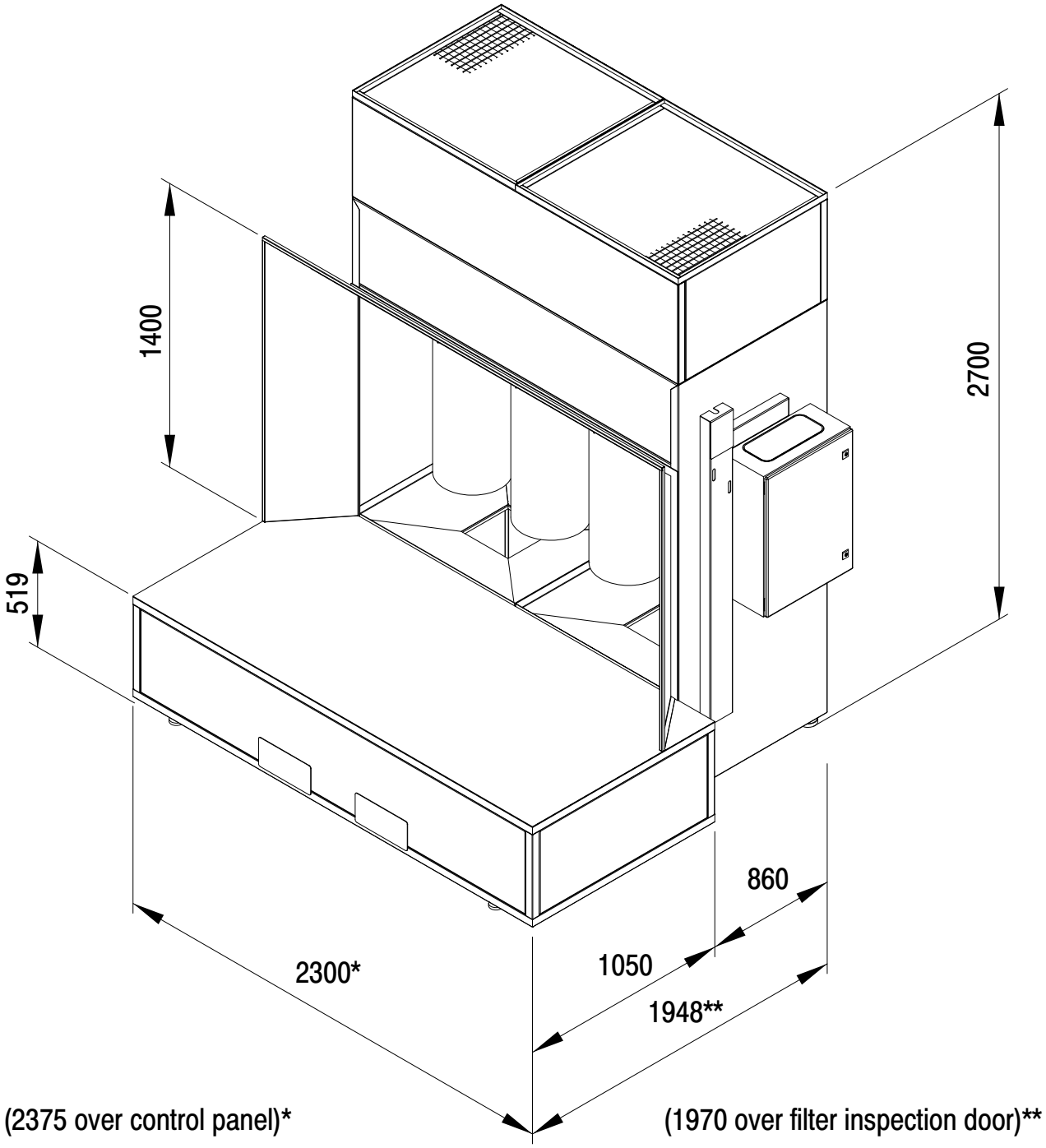
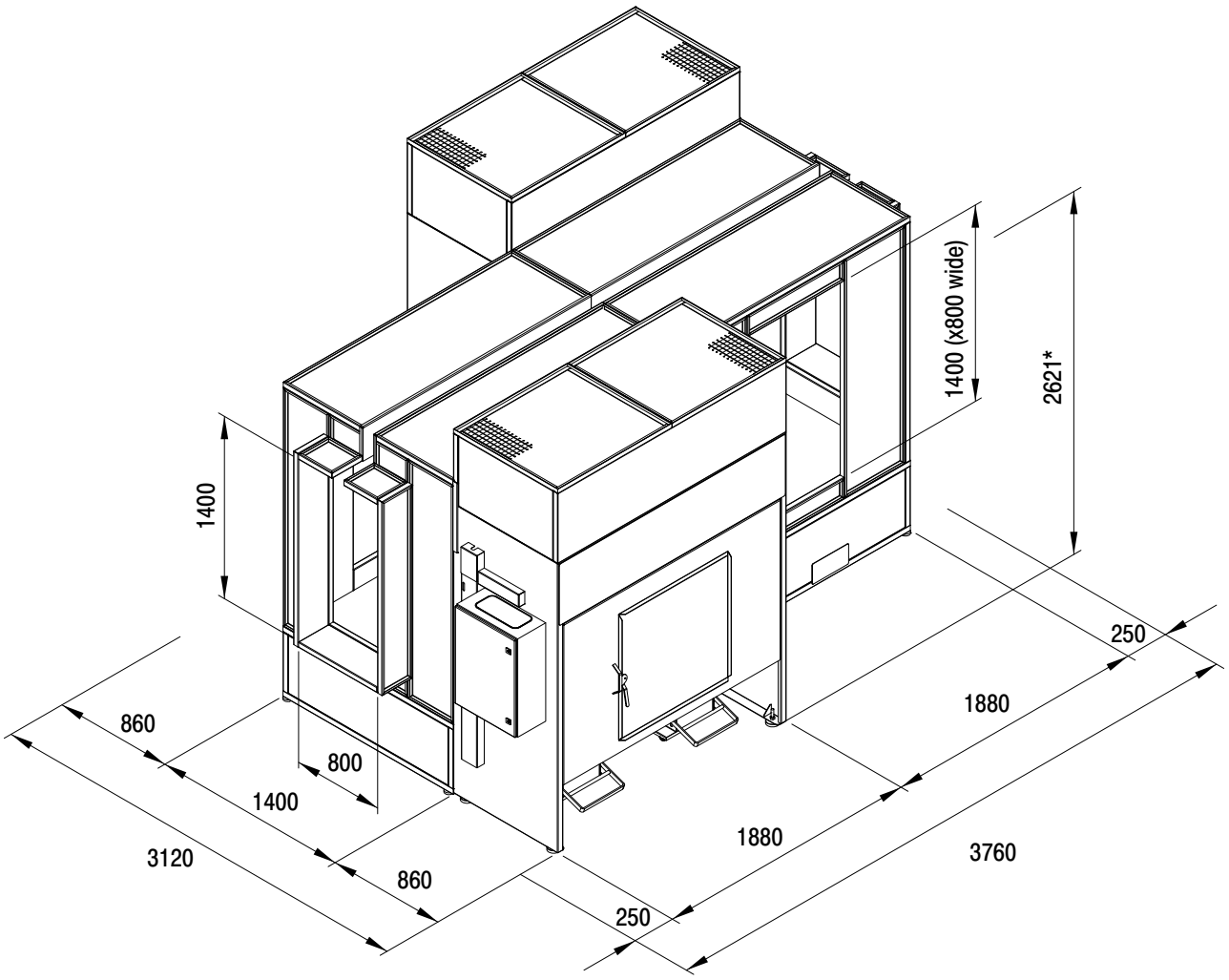


Figure 12 **EcoMax 5 – Dimensions**

Description	Data
Airflow	5600 m^3/h
Number of cartridges	4
Electrical power consumption	5 Kw
Supply voltage	400v / 50Hz
Weight	850 kg

EcoMax 6 – Part Number 7035231



(2710 over fan motor)*

Figure 13 **EcoMax 6 – Dimensions**

Description	Data
Airflow	11200 m^3/h
Number of cartridges	2 * 4
Electrical power consumption	2 * 5Kw
Supply voltage	400v / 50Hz
Weight	TBC kg

Electrical and Pneumatic Diagrams

Description	Part Number
Ecomax Control Panel	######

NOTE: As there are several versions of the Ecomax booth, there are also several versions of the Control Panel drawings. Please contact your Nordson representative to obtain the relevant drawings.