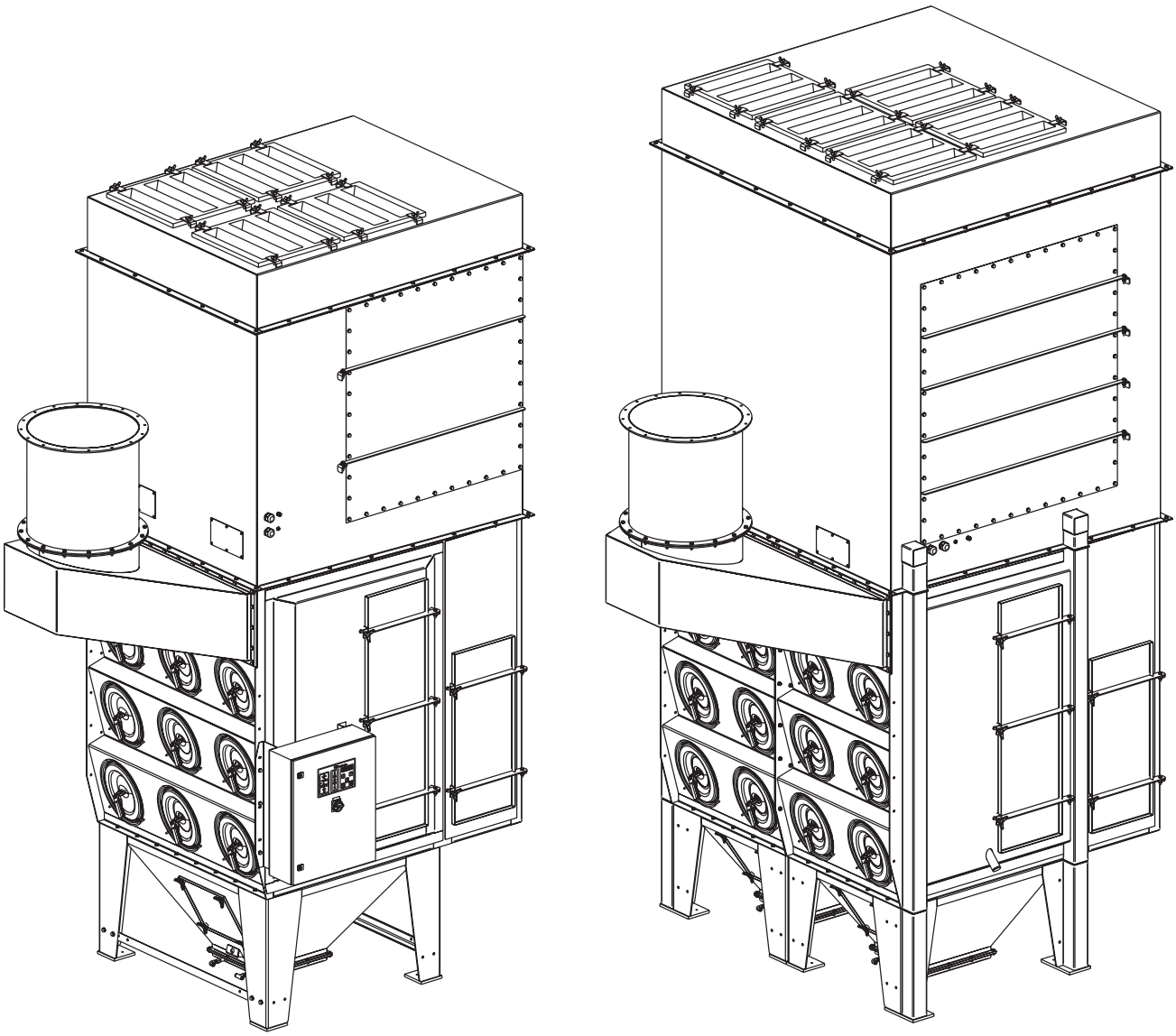
Installation, Operation and Maintenance Manual

Nordson Afterfilter GEN5



Publication 2950A (GB) ● 1108

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLATION.

THIS MANUAL SHOULD BE READ IN CONJUNCTION

WITH THE CONTROLLER MANUAL AND CIRCUIT DRAWINGS

SUPPLIED WITH THE AFTERFILTER.

PRODUCT RELIABILITY, WARRANTY AND

SAFE OPERATION MAY BE COMPROMISED BY NOT FOLLOWING

THE GUIDANCE GIVEN IN THESE DOCUMENTS.

Indicates information on the efficient operation of the collector.

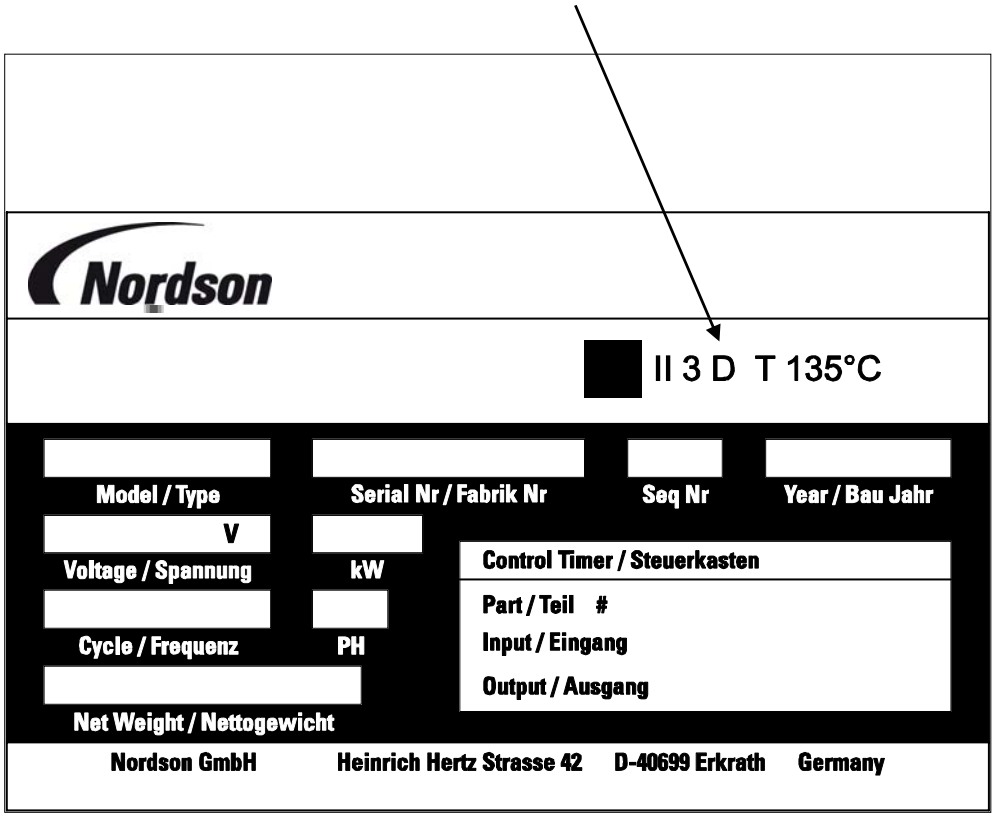
Indicates important information directed towards preventing damage.

Indicates an important warning, designed to prevent injury or extensive damage.

Improper operation of a powder control system may contribute to conditions in the work area or facility that could result in severe personal injury and product or property damage. Check that all collection equipment is properly selected, sized and operated for the intended use.

These details correspond to the serial nameplate
located on the front-right of the equipment

This marking is used only on equipment suitable for use
in Potentially Explosive Atmospheres



CONTENTS

1 SAFETY RECOMMENDATIONS

This manual contains specific precautionary statements relative to worker safety in the appropriate sections. To avoid dangerous situations, the following advice is given:

a) The afterfilter has been built in accordance with state-of-the-art standards and recognised safety rules. Nevertheless, if not handled carefully, it may put people at risk and also cause damage.

b) The afterfilter must only be used in technically perfect condition, in accordance with its designated use and the instructions set out in the operation manual. Any functional disorders, especially those affecting safety, should be rectified immediately.

c) Ensure proper training is given to operators before start-up.

d) The afterfilter is designed exclusively for use in accordance with the scope of delivery, the drawing(s) and the specification sheet.

e) The afterfilter is not designed for applications with combustible materials involving a potential powder explosion risk (e.g. buffing lint, paper, wood powder, aluminium and magnesium).

f) Do not put lit cigarettes or any other burning object into the hood or ducting of any powder collection system.

g) Regular maintenance is important for good performance of the afterfilter.

h) A prudent user of the equipment should consult and comply with all relevant Fire Codes and/or other appropriate codes when determining the location and operation of powder collection equipment.

i) A hand operated supply disconnecting device is necessary for each incoming electrical supply, in accordance with EN 60204-1.

j) To prevent accidents, access to the fan impeller must not be possible during operation. Refer to EN 294.

k) Disconnect all power before servicing. All electrical work must be carried out by a qualified electrician, according to local codes.

l) All exposed conductive parts of the electrical equipment and the afterfilter should be connected to the protective bonding circuit (refer to EN 60204-1).

m) Ensure the compressed is fully isolated and depressurised before any service work is carried out.

n) The afterfilter cannot be used in a potentially explosive atmosphere (according ATEX directive 94/9/EC), unless stated otherwise on the collector nameplate and the scope of delivery.

o) The user of the afterfilter is responsible for disposal of any powder collected by the process, according to local regulations.

p) Do not lift the collector when fully assembled.

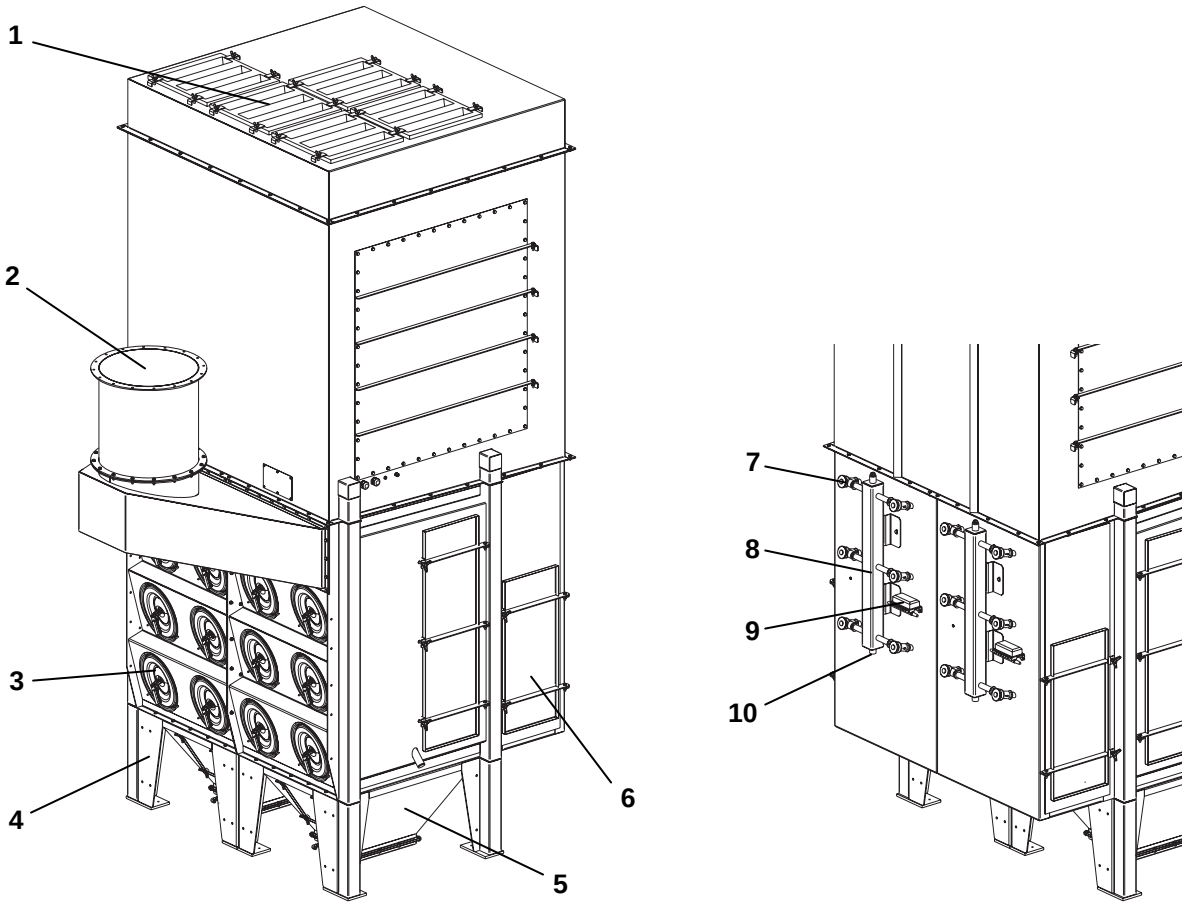
2 INTRODUCTION

2.1 Product information

The afterfilter is used for the collection of airborne powder and particulate. Whether in answer to the problem of air pollution, or as part of a manufacturing process, the afterfilter provides highly efficient, continuous, on-line powder collection.

The filter cartridges are the heart of the afterfilter. These filter cartridges help ensure that only cleaned air is returned to the plant environment.

Technical and field support is available from your local Nordson Representative to answer your questions.



1	Cleaned air outlet	6	Clean air chamber access cover
2	Contaminated air inlet	7	Diaphragm valves
3	Filter cartridge access covers	8	Manifolds
4	Support	9	Pilot valve boxes
5	Hoppers	10	Compressed air connections

Figure 1 Afterfilter (3-24 illustrated)

2.2 Function

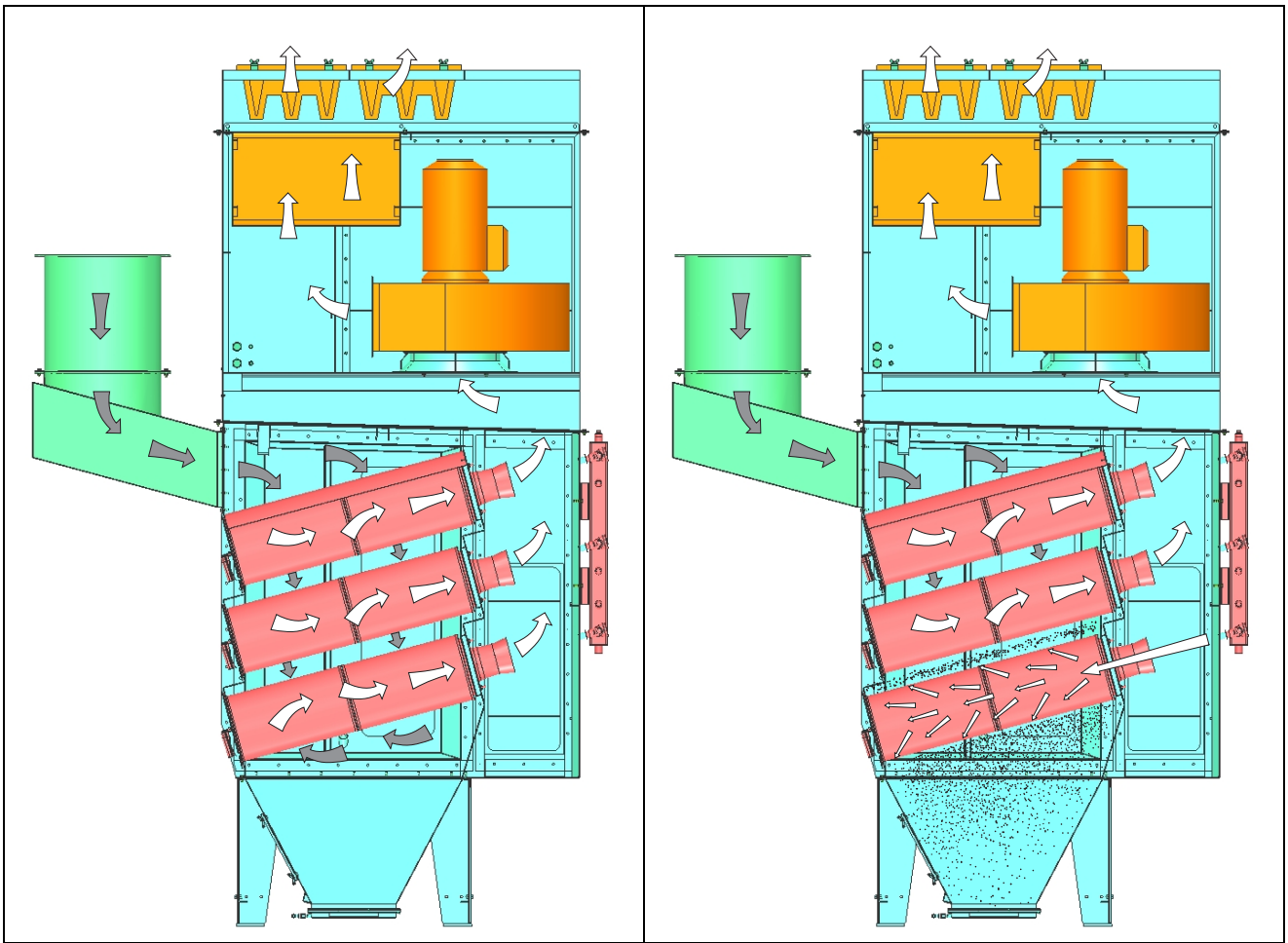
(Refer to Figure 2)

During operation, contaminated air enters the afterfilter through the dirty air inlet and passes through the filter cartridges.

Powder is collected on the outside surface of the filter cartridges. The filtered air flows through the centre of the filter cartridges into the clean air chamber, where it exits through the cleaned air outlet and can be re-circulated into the environment.

To ensure the optimal performance of your afterfilter it is necessary that the filter cartridges are cleaned automatically and sequentially.

During the filter cleaning sequence, the timer energises a solenoid valve, causing the corresponding diaphragm valve to send a pulse of compressed air through the filter cartridges (from the inside, outwards), removing the collected powder from the outside surfaces of the filter cartridges. The powder falls through the hopper to the fluid bed system and from there into a waste container.



Filtering operation	Cleaning operation

Figure 2 Principle of operation (3-18 illustrated)

3 PRE-INSTALLATION

3.1 Location

The afterfilter should be located with consideration for:

- Shortest runs of inlet and outlet ductwork.
- Radius bends on elbows as large as possible.
- Easy access to electrical and compressed air connections.
- Convenient maintenance.

When calculating for foundations or supporting structure consider the following factors:

- The weight of the afterfilter.

   Consult the technical specification sheet and drawings for the afterfilter weight and dimensions.
- The material being collected.
- All auxiliary equipment.
- Live loads.
- Snow and wind loads on outside installations.

3.2 Required tools and equipment

- Fork lift
- Slings/clevis pins and adequate lifting equipment
- Standard tools (e.g. screwdrivers, wrenches, etc.)
- Drill
- Sealant

3.3 Delivery and inspection

The afterfilter is normally shipped by truck in separate sections that are not completely assembled and should be checked for any damage that may have occurred during shipping. Compare the parts received against the packing list. If there is damage or parts missing, notify the delivery company and your local Nordson representative.

GEN5 2-8, 3-12, 3-16 and 3-18 collectors:

- Combined hopper/support and filter section
- Fan section
- Inlet section

GEN5 3-24 and 4-32 collectors:

- Hopper/support section
- Filter section
- Fan section
- Inlet section

Parts shipped loose with the delivery (depending on your order):

- Transition pieces
- Spare parts
- Anchor bolts
- Hardware/Sealant
- Controller (3-24 and 4-32)
- Damper pack

4 INSTALLATION

4.1 Unloading and transport to location

Before unloading, remove packing, strapping and cover plates on inlet and outlet.

A forklift is recommended for the unloading, transport and installation of the afterfilter.

4.2 Installation and assembly

Anchor the afterfilter to the foundations.

4.2.1 Field joining installation

(Refer to Figure 3)

The afterfilter requires field joining.

A detailed drawing of how to join your afterfilter has been shipped with your afterfilter. Most of the joining hardware is on the inside of the collector. A stepladder will be helpful in assembling the flanges near the top of the collector. Both the dirty air and the clean air chambers will have to be accessed during joining.

- A forklift is required**.**
- Read all instructions for assembly.
- Follow all safety precautions when installing the afterfilter.

4.2.2 DFO 2-8, DFO 3-12, DFO 3-16 and DFO 3-18 assembly

Do not lift the collector when fully assembled.

(Refer to Figure 3)

1 Remove protective shipping cover from each module.

2 Using lifting brackets inside the inlet aperture, use forklift to lift combined hopper/support and filter section into required position.

3 Anchor to foundations.

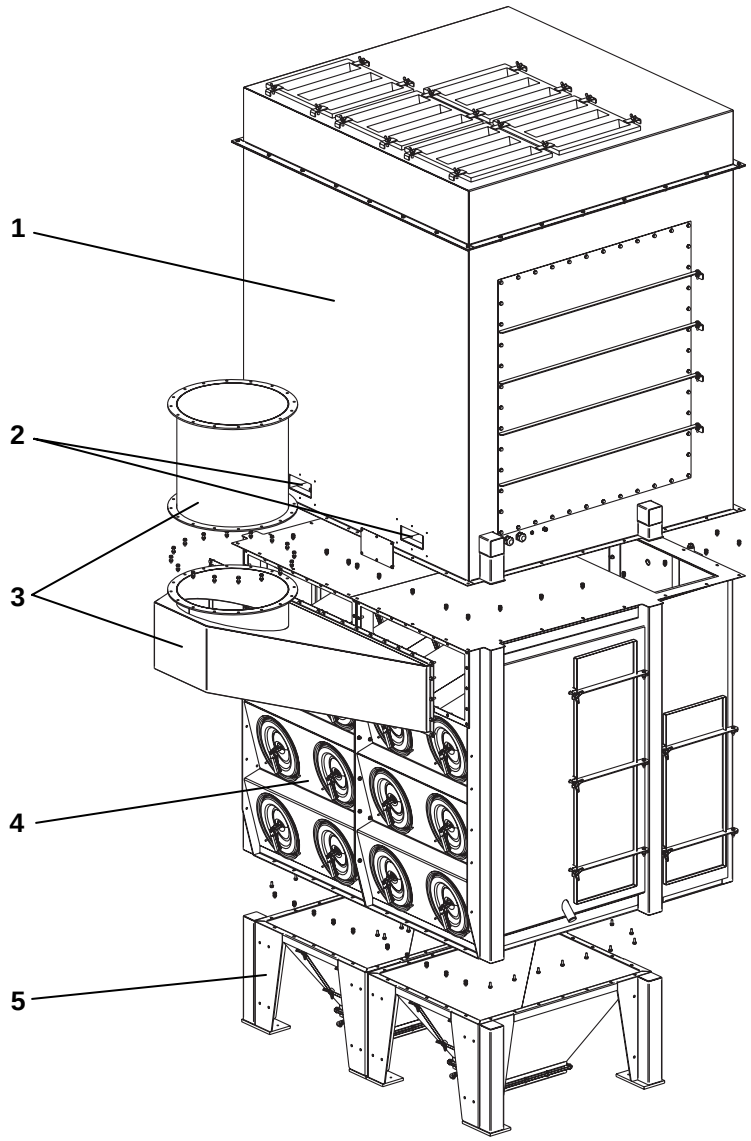
4 Apply sealant to top flange of filter section, each side of hole pattern.

5 Remove cover plates from lifting slots and, using forklift, lift fan section into position for joining. Align bolt holes in the flanges with drift pins. Bolt joint together with bolts, washers and nuts. Replace lifting slot cover plates.

6 Apply sealant to inlet mounting surface, along inside of hole pattern.

7 Position inlet section and align holes. Fasten using bolts and flat washers.

8 Wearing protective rubber gloves, remove any excess sealant. Dispose of excess sealant properly.



1 Fan section	4 Filter section
2 Slots for forklift	5 Hopper/support section
3 Inlet section	

Figure 3 Field joining installation (3-24 illustrated)

4.2.3 GEN5 3-24 and 4-32 assembly

Do not lift the collector when fully assembled.

(Refer to Figure 3)

1 Remove protective shipping cover from each module.

2 Using forklift, lift hopper/support section into required position.

3 Anchor to foundations.

4 Remove lifting brackets and apply sealant to top flange of hopper/support section, each side of the hole pattern.

5 Using lifting brackets inside inlet aperture, use forklift to lift filter section into position for joining. Align bolt holes in flanges with drift pins. Bolt joint together with bolts, washers and nuts.

6 Apply sealant to top flange of filter section, each side of hole pattern.

7 Remove cover plates from lifting slots and, using forklift, lift the fan section into position for joining. Align bolt holes in flanges with drift pins. Bolt joint together with bolts, washers and nuts. Replace lifting slot cover plates.

8 Apply sealant to inlet mounting surface, along inside of hole pattern.

9 Position inlet section and align holes. Fasten using bolts and flat washers.

9 Wearing protective rubber gloves, remove any excess sealant. Dispose of excess sealant properly.

4.2.4 Controller

On 2-8, 3-12, 3-16 and 3-18 collectors the controller is supplied fully fitted to the filter section. On 3-24 and 4-32 collectors to controller is supplied separately.

For controller connections and set-up, refer to separate manual supplied with the afterfilter.

4.2.5 Electrical connection

Amperage and voltage information is shown on the nameplate of the fan motor.

Connect the fan motor to the controller according to the wiring diagram.

Connect the main power to the controller according the wiring diagram included in the controller.

Check rotation of fan impeller (refer to direction of arrow on fan housing). If fan is running the wrong way, it will deliver only approximately 40% of its rated air volume. To reverse fan rotation, isolate all electrical input power and interchange any two wires (3 phase only) on output side of motor starter.

4.2.6 Compressed air connection

- Compressed air pressure must be between 6 and 7 bar.
- Ensure all compressed air components are adequately sized to meet maximum system requirements of 45 N/liters per pulse at max. 7 bar supply pressure (design pressure).
- It is a requirement that adequate precaution is taken to avoid exceeding this pressure. A relief/safety valve will be required if connected supply can exceed this pressure. A label is attached to each manifold indicating manifold design details.

- Compressed air supply should be both oil and moisture free.

- Piping should be installed to provide a fall in direction of air flow to assist in drainage of accumulated moisture. A moisture separator should be provided at lowest point of installation.
- Purge compressed air supply lines to remove debris before connecting to compressed air manifold.
- Connect compressed air supply line to compressed air connection at bottom of manifold.
- Connect compressed air supply line to air connections on fluid bed system.
- Use thread-sealing tape or pipe sealant on all compressed air connections.
- A compressed air shut-off valve, filter/water separator with automatic condensate drain and pressure regulator with gauge must be installed in compressed air supply line. For convenience, locate these components in immediate vicinity of afterfilter.

4.2.7 Solenoid valves

Each afterfilter comes equipped with 24V DC / 20W solenoid valves that control the diaphragm valves.

The solenoid valves are installed in groups of 4, 6, 8 or 9 in an enclosure (pilot valve box), which comes fully assembled and mounted close by the manifold at the rear of the afterfilter.

In each enclosure the common is pre-wired. The remaining terminal of each solenoid and the common must be connected electrically to the controller. A wiring diagram is supplied with the collector. The use of multicore cable with a wire section of min. 0.5 mm² and max. 1.5 mm² is recommended.

If not wired properly, filter cartridge life and cleaning efficiency will be affected.

5 START-UP CHECK LIST

Follow all steps before first start-up or when afterfilter has not been used for a long period. For daily use, follow steps 1, 2, 3, 5, 6 and 8.

1 Check outlet of fan is free of debris before starting.

2 Ensure powder disposal system is properly installed under hopper.

3 Turn on hopper disposal system (where necessary). The system must always be operating when the afterfilter is operating.

4 Check airflow damper is 50% closed.

5 Check access covers are closed.

6 Switch main power on.

7 Check airflow with pilot tube and micro-manometer in ductwork and adjust damper to desired airflow.

Too much airflow can cause electrical failure of fan motor or dramatically reduce life of filter cartridges.

8 Turn on compressed air supply. Adjust pressure to 6.5 bar with compressed air regulator.

Do not increase compressed air pressure beyond 7 bar.

The cleaning cycle only starts when necessary. For customized settings refer to the controller manual.

6 OPERATION SCHEDULE

To maintain optimum performance of the afterfilter follow the schedule according to Table 1.

TABLE 1 – OPERATION SCHEDULE

Check point	Type of control	Recommended action	Day	Week			
				2	3	4	5
Controller	Visually check ΔP (differential pressure)	Refer to fault location guide in controller manual	✓				
Waste powder container	Check level of contents in waste container	If necessary, empty waste container according to local disposal regulations	✓				
Fan assembly	Check for excessive noise	Refer to fault location guide (chapter 8)	✓				
Clean air chamber	Check for powder in clean air chamber	Refer to fault location guide (chapter 8)		✓			
Controller settings	Check settings of both potentiometers (100 ms pulse time, 10 sec. interval time) on controller (refer to separate manual)	Set interval time to 10 sec. Set pulse time to 100 ms		✓			
Filter/regulator	Check for oil and/or water in reservoir	Switch off and bleed compressed air prior to servicing. Clean oil/water separator. Check compressor		✓			
Solenoid valves	Check for air leakage	Refer to fault location guide (chapter 8)		✓			
Diaphragm valves	Check for air leakage	Refer to fault location guide (chapter 8)			✓		
Doors	Visually check gaskets	If necessary, replace gaskets			✓		
Fluid bed system	Use clean white cloth to check for water, oil and other contaminants in air supply	If contamination found, empty hopper and replace fluid bed			✓		
Connection ducts	Check for leakage	Repair as necessary				✓	
Afterfilter and support	Check damage, strength and corrosion	Repair or replace as necessary					✓
Filter cartridges	Preventive maintenance of filter cartridges	Replace filter cartridges every **2 years**, unless stated otherwise in the scope of delivery					

7 SERVICE/MAINTENANCE

Disconnect electrical power before servicing.

Shut off and bleed compressed air supply before servicing any compressed air components.

No welding should be performed inside without fire protection.

Avoid contact or exposure to powder during servicing or maintenance.

7.1 Replacing filter cartridges

(Refer to Figure 4)

All filter cartridges should be changed at the same time.

Powder laden cartridges may be heavy and difficult to handle. Appropriate means of access should be provided to replace filter cartridges safely.

Filter cartridges cannot be washed and re-used.

Do not drop filter cartridges.

Replace only with genuine original filter cartridges.

1 Remove access cover by unlatching the quick -release handle and unhooking eyebolt from yoke end hook.

2 Rotate filter cartridge to break seal between filter cartridges and sealing surface. This action will also remove any accumulation of powder on top of filter cartridges.

3 Slide filter cartridges out of access port along suspension yoke.

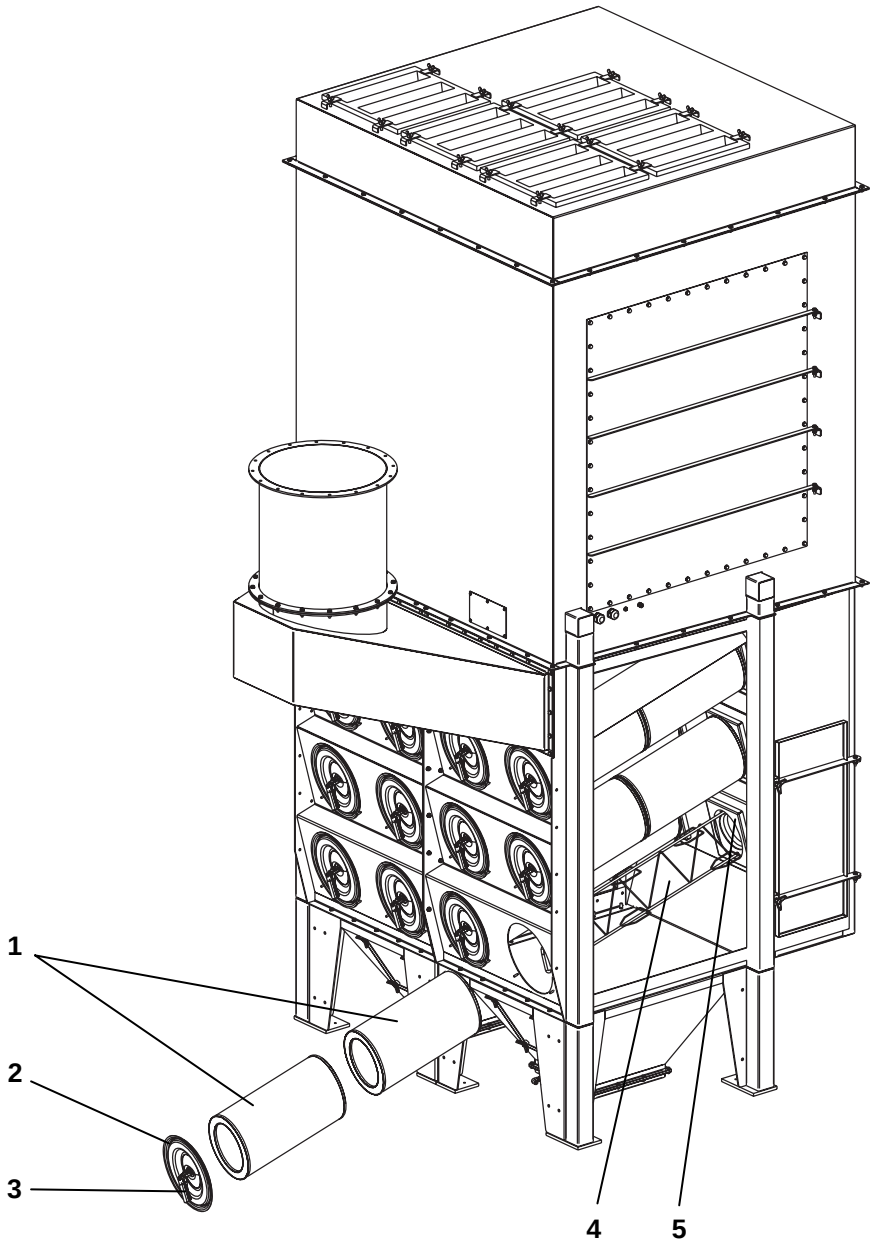
4 Clean sealing surfaces with a damp cloth.

5 Slide new filter cartridge onto suspension yoke with gasket end facing inwards, towards clean air chamber.

6 Replace access cover by hooking eyebolt onto yoke end hook and firmly latching quick-release handle on cover. To prevent leakage, make sure handle is securely latched.

Check access covers are seated and seal properly. Seals must be compressed to ensure an air tight seal.

If gasket is damaged the cover must be replaced.



1 Filter cartridges	4 Yoke
2 Access cover	5 Cartridge sealing surface
3 Quick-release handle	

Figure 4 Replacing filter cartridges (3-24 illustrated)

7.2 Diaphragm valve – type AD1000698 (power pulse)

VALVE DISASSEMBLY

Disassemble in an orderly fashion. Pay particular attention to Figure 5.

1 Using screwdriver or Torx T30, unscrew the 3 screws to remove bonnet from valve.
2 Remove piston assembly with help of screwdriver.
3 If necessary, unscrew clamps.
4 If necessary, remove pipes and pipe o-rings from body with suitable device.
5 Parts now accessible for cleaning or replacement.

VALVE REASSEMBLY

Reassemble in reverse order of disassembly, paying particular attention to Figure 5.

Lubricate all gaskets/o-rings with high quality silicone grease.

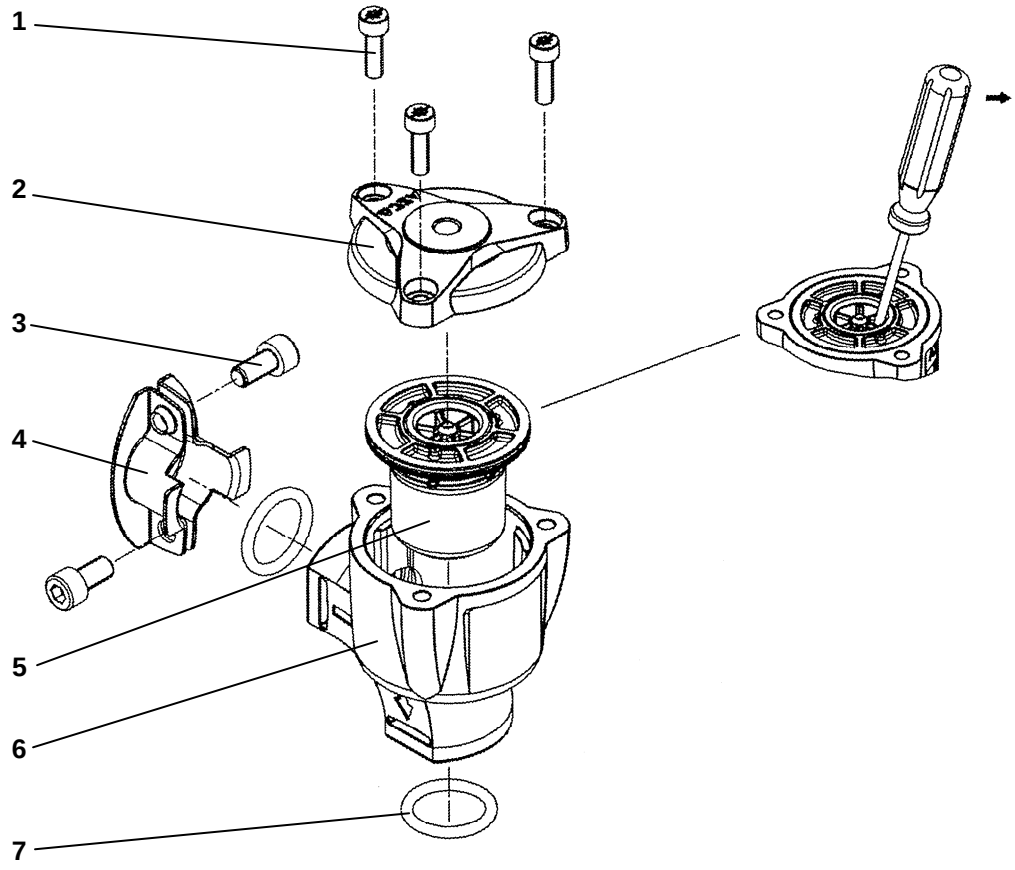
1 If valve has been removed, replace pipe o-rings, replace valve on pipe and replace clamps. Tighten clamp screws.

   Torque 10 Nm (±2) for ∅ ¾" pipe.
   Torque 16 Nm (±2) for ∅ 1" pipe.

2 Replace piston assembly.
3 Replace bonnet and tighten screws using screwdriver or Torx T30.

   Torque 7 Nm (±1).

4 After maintenance operate valve a few times to ensure proper operation.



1 Bonnet screw	5 Piston sub-assembly
2 Bonnet	6 Valve body
3 Clamp screw	7 O-ring
4 Clamp	

Figure 5 Diaphragm valve – type AD1000698 (power pulse)

8 FAULT LOCATION


Consult controller manual, if necessary.


Disconnect power and compressed air supply before any work is carried out.

TABLE 2 – FAULT LOCATION

Symptom	Possible cause	Action
1 Fan does not start.	1.1 Not wired correctly.	Check and correct motor wiring for supply voltage (refer to wiring diagram).
	1.2 Incorrect motor wire size.	Rewire using correct wire size as specified by national and local codes.
2 Fan starts but does not keep running.	2.1 Incorrect overload protection installed.	Check for proper motor overload protection. Replace with correct value as necessary.
	2.2 Access covers open or not closed tight.	Close and tighten access covers.
	2.3 Hopper discharge open.	Install powder disposal system under hopper and seal securely.
	2.4 Damper valve not adjusted correctly.	Check airflow in ducting. Adjust damper valve until correct airflow is achieved. Do not attempt to run without inlet ducting attached.
	2.5 Electrical circuit fuses.	Check supply circuit has sufficient power to run all equipment.
3 Excessive fan noise/vibration.  Rectify at once.	3.1 Powder deposit on impeller.	Clean impeller.
	3.2 Worn impeller.	Replace impeller.
4 Powder emission.	4.1 Filter cartridges not installed correctly.	Check filter cartridge gaskets are firmly pressed against sealing surface (the access cover quick-release handle should be securely latched).
	4.2 Filter cartridge damage, dents in end caps or holes in pleated media.	Replace filter cartridges as necessary (refer to chapter 7.2).
	4.3 Access covers not airtight.	Tighten access covers securely and check sealing.

TABLE 2 (CONTINUED) – FAULT LOCATION		
Symptom	**Possible cause**	**Action**
5 Insufficient air flow.	5.1 Fan rotating wrong way.	Check fan rotation (refer to rotation arrow on fan casing).
	5.2 Access covers open or not closed tight.	Check access covers are closed and tightened securely.
	5.3 Cleaned air outlet restricted.	Check outlet area for obstructions. Remove material or debris blocking outlet.
	5.4 Filter cartridges plugged:	
	a Lack of compressed air	Check compressed air supply for minimum 6 bar. Increase pressure to maximum 7 bar.
	b Pulse cleaning not energised.	Refer to fault finding in controller manual.
	c Hopper full of powder.	Refer to fault finding symptom 6.
	d Filter cartridges need replacing.	Replace filter cartridges (refer to chapter 7.2).
	5.5 Solenoid/diaphragm valves not functioning:	
	a Solenoid/diaphragm valves leaking.	Check for debris obstruction and valve wear or diaphragm failure. Replace damaged solenoid/diaphragm valves or parts.
	b Controller PCB failed or out of adjustment.	Refer to controller manual.
6 Powder not transferring from hopper to waste container.	6.1 Transfer hose blocked.	Check hose and remove any obstructions.
	6.2 Fluid bed not fluidising powder.	Check air connections to fluid bed pan. Check air supply is clean, dry and free from oil.
	6.3 Transfer pump leaking air.	Check o-ring inside transfer pump for damage and replace if necessary. Check air supply to transfer pump is securely fitted.
	6.4 Transfer pump blocked.	Check pump internally for obstructions.
	6.5 Waste container full.	Empty waste container according to local disposal regulations.
7 Excessive noise from diaphragm valve.	7.1 Diaphragm valve failure.	Check for debris, obstruction, and valve wear or diaphragm failure. Replace damaged valve or parts.

9 SPARE PARTS

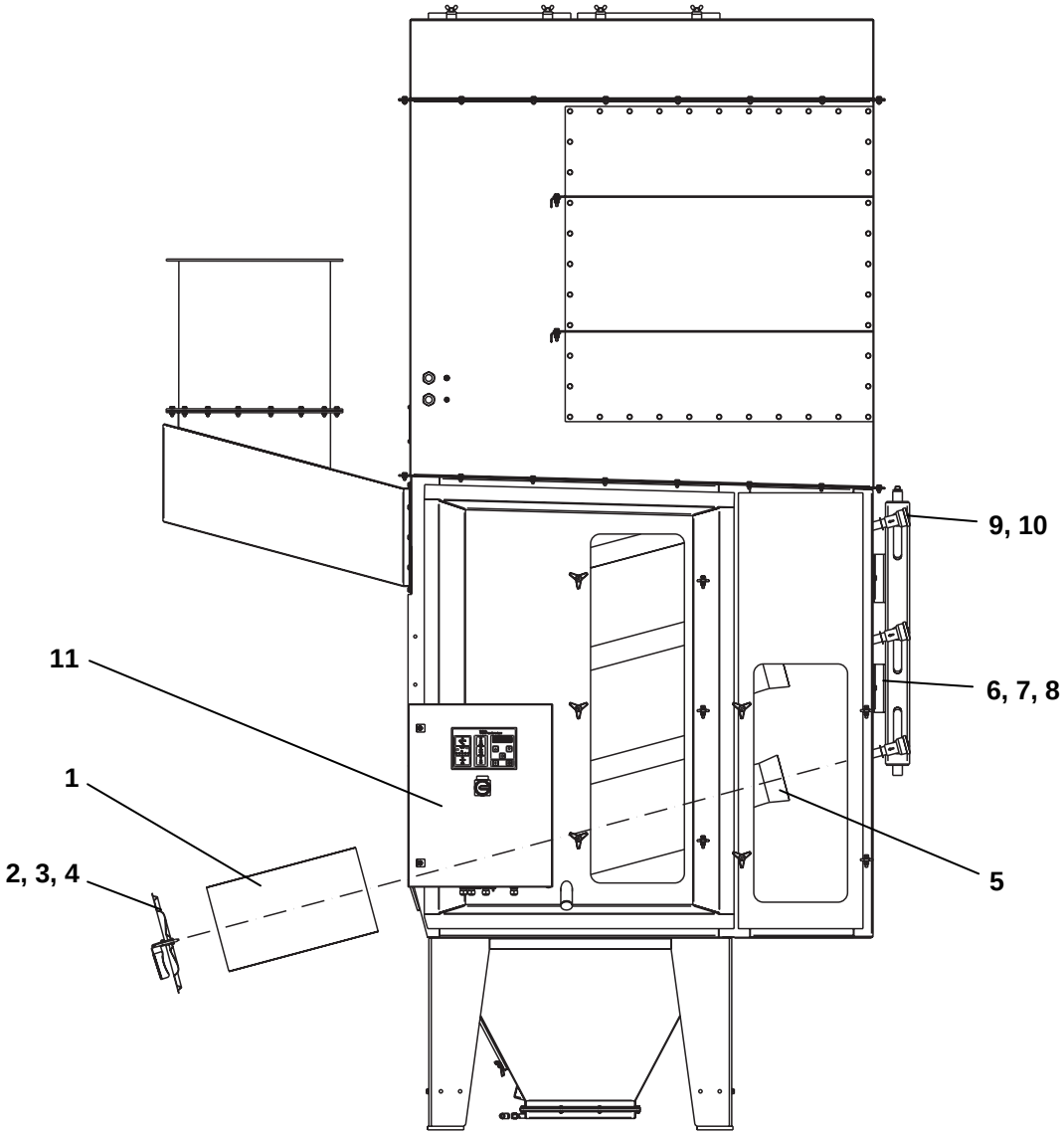


Figure 6 Spare parts identification (3-12 illustrated)

Item	Description	Part number	❖
1	FILTER CARTRIDGE, GEN5 A/F, OVAL	737810	✓
2	ACCESS COVER	N/A	
3	INSIDE GASKET, ACCESS COVER	7034120	
4	OUTSIDE GASKET, ACCESS COVER	7034121	
5	VENTURI, CARTRIDGE CLEANING, GEN5 A/F	7034122	
6	SOLENOID VALVE ENCLOSURE 2-8 (4 solenoid valves) 3-12 and 3-24 (6 solenoid valves) 4-32 (8 solenoid valves) 3-16 and 3-18 (9 solenoid valves)	N/A	
7	KIT, SOLENOID COIL, GEN5 A/F	7034102	
8	COIL, PILOT VALVE, GEN5 A/F	7034103	
9	VALVE, 1“ POWERPULSE, GEN5 A/F	7034110	
10	KIT, SERVICE, 1” POWERPULSE VALVE, GEN5 A/F	7034111	✓
11	CONTROLLER – NORDSON	N/A	
N/S	FINAL FILTER - 610*610*292 – 4off per 20,000m3 unit	7034112	✓
N/S	FINAL FILTER - 305*610*292 – used on 24,000m3 unit (check your required quantity)	7034113	✓

❖ Recommended spares for up to two years’ operation

Damaged safety related parts and safety components should be replaced only with genuine original spare parts otherwise CE mark will become invalid

If you have a requirement for any part without a part number or listed with N/A please contact your local Nordson representative

GB

EC DECLARATION OF CONFORMITY
(Machinery directives 98/37/EEC)

Description of machinery: **Afterfilter**

Description: See attached **Scope of Delivery**

The undersigned, authorized by Nordson, certifies that the machine described above, provided that it is installed, maintained and used in accordance with the instructions for use and the codes of practice, meets the essential safety and health requirements of the following Directives:

- Machinery directives 98/37/EEC
- Low voltage directive 2006/95/EC
- Pressure equipment directive 97/23/EC
- Electromagnetic compatibility directive 89/336/EEC
- Equipment and protective systems intended for use in Potentially Explosive Atmospheres 94/9/EC

IMPORTANT! Read the Installation, Operation and Maintenance Manual before using this machine. If you require additional copies contact your local Nordson representative.

The machinery must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the above mentioned directives.

Signature:

Name: Heiner Carstensen
Position: Product Development Director

Date: June 2008

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