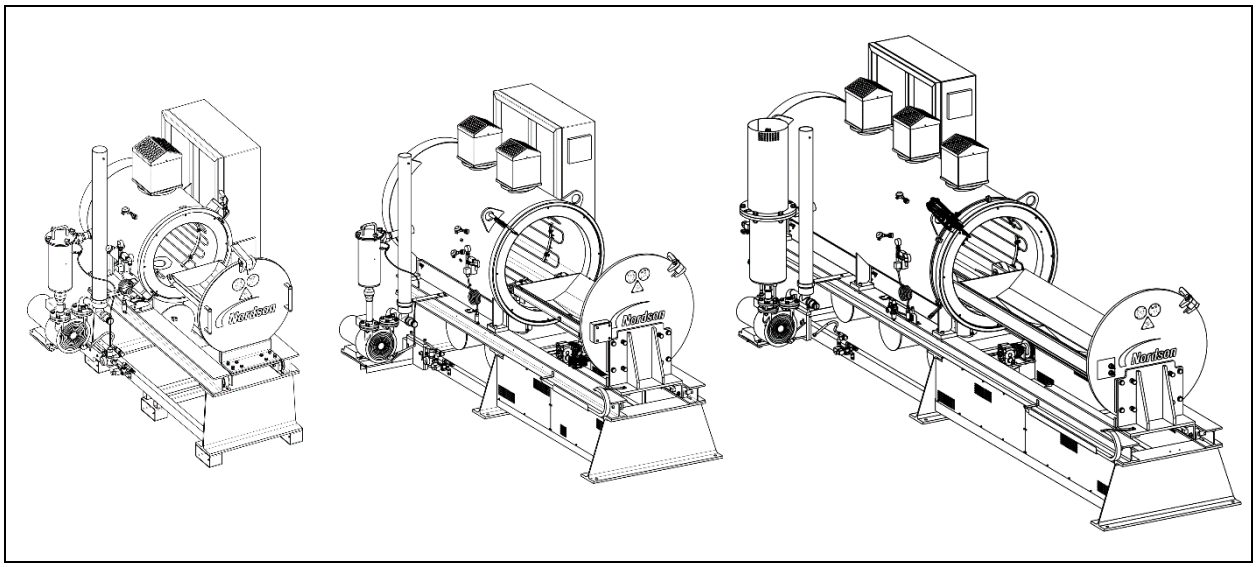
BMS

Fabricant de fournitures pour la plasturgie

Operating and
assembly instruction

BKG® Jet Cleaner JCP
CLEANING OVEN

EN
English
Englisch



Standard-Series:

JCP 1724, JCP 1748, JCP 1760
JCP 2448, JCP 2484
JCP 3648, JCP 3672

Type:	
Machine No.:	
Operating Voltage:	
CATOX:	❑Yes ❑No

Read the operating instruction carefully before you start up the machine.
Keep the operating manual on the site of the machine!

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Operating manual

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1 General Information

1.1 How to use this Manual

This Operating Manual is part of the Technical Documentation for the following NORDSON BKG® Jet Cleaner JCP Cleaning Ovens:

Jet Cleaner JCP Standard Series	
with Secondary Trap	with CATOX
JCP 1724, JCP 1748, JCP 1760	JCP 1724
JCP 2448	JCP 2484
JCP 3648, JCP 3672	JCP 3648

The cleaning oven is also called "machine" or “Jet Cleaner” in this document. Read the operating instruction carefully before you start up the machine. Keep the operating manual on the site of the machine!

All personnel must read and understand this manual before installing, operating or maintaining the Jet Cleaner.
Refer to the drawings supplied with this manual for part name and identification (⇗ see Appendix).

1.2 Machine Identification

The cleaning oven is fitted with a product identification tag, from which the following data can be taken:

Type designation
The cleaning ovens are identified with a type designation.
The type designation is found on the product identification tag.

Machine No. / Serial No.
The number is the reference number for all documentation provided, including this Operating Manual.

Operating Voltage

Control Voltage

Power

Nominal current

Protection rating

Circuit diagram No.

Year of construction of the cleaning oven

Weight

The precise specification of the cleaning oven delivered can be found in the “Operating Values / Limits” and "Technical Data" sheet in the Appendix.

1.3 Symbols in this Manual

DANGER

This symbol together with the signal word describes an imminent danger. Death or very serious injury is the consequence.

WARNING

This symbol together with the signal word describes a potentially dangerous situation. Death or very serious injury may be the consequence, unless the danger is avoided.

CAUTION

This symbol together with the signal word describes a potentially dangerous situation. Slight or minor injury or also serious property damage may be the consequence, unless the danger is avoided.

These notes will be found at all paragraphs of this instruction manual which call for special attention to ensure the correct working process and to avoid damages to the machine.

1.4 Warning Signs at the Machine

All safety and danger notices on the machine must be kept in a legible condition and replaced as and when necessary.

DANGER!
Hazardous voltage!
Contact will cause electric shock or burn.
Disconnect power before servicing.

Wear safety goggles!

Hot Surfaces!
Burning Hazard!
Wear protective gloves and protective clothing!

Wear protective gloves and protective clothing!

1.5 Proper Use

The NORDSON Jet Cleaners are cleaning ovens for the plastic industry. The cleaning ovens work according to the vacuum pyrolysis principle and are used for cleaning extrusion and injection moulding tools, for example:

- Extrusion nozzles
- Blow moulding tools
- Removable screen plates and screens
- Spinning nozzles
- Melt pumps
- Injection moulding nozzles and moulds
- Stainless steel filters

Typical plastics which can be removed are:

ABS	PA	PP	PVDC	PET
PMMA	Cellulose	HIPS	CPVC	PETG
EVA	EPDM	Noryl	PVDF	LDPE
Nylons	PVC	PU	SAN	LLDPE
PBT	PS	RPVC	PC	HDPE

The cleaning ovens are also suitable for:

- Special Plastics: PEEK, PFA, etc.
- Thermoplastics
- Elastomers
- Thermoset Materials

If you want to process products other than these kinds of plastics, please contact NORDSON BKG to check the capabilities for the cleaning oven.

Please note the limitations in the chapter “Improper Usage“.

- The cleaning oven must be operated within the operating values and limits specified in the Appendix (in the sheets "Operating Values / Limits", "Freshwater Requirements" and "Technical Data”).
- Only process extrusion and injection moulding tools that are contaminated with the above mentioned plastics.
- If you clean different polymers in one cycle make sure that they have a similar melting point.
- No foreign objects must be processed in the cleaning oven.
- The operator's plant components, drives and control circuits must guarantee safe, proper use of the cleaning oven.
- The Jet Cleaner cleaning oven may only be operated with a properly installed drain and exhaust system.
- Jet Cleaner emissions may be regulated at the federal, state, or local level, and various government agencies.
- The Jet Cleaner cleaning oven should be installed in a dry, well ventilated indoor location.

1.6 Improper Usage

Each usage which defies the safety- and operating instructions given in this manual, or is not designated, is prohibited.

- Do not operate the machine outside of the defined, procedural limits, given in the Appendix (in the sheets "Operating Values / Limits", "Freshwater Requirements" and "Technical Data").
- Do not clean polymers with different melting points in one cleaning cycle.
- Do not operate this machine in explosive atmospheres.

Use for any other than the aforementioned purpose is not permitted, since improper use may give rise to risks that may injure persons working on the machine or in its immediate vicinity or cause damage to the machine.

The manufacturer will refuse liability for damages resulting from inadequate utilization, improper operation or incorrect handling of this equipment!

1.7 Obligations and Liability

Safe handling and error-free operation of this machine requires familiarity with the basic safety procedures and regulations.

This Operating Manual, specifically the safety procedures, must be observed by all persons working on the machine.

The rules and regulations applicable to the place of use must also be observed. The machine is fitted with state of the art technology and complies with the recognized functional safety regulations. However, use of the machine may pose risks for the user or third party and/or give rise to impaired functions or other technical features. Therefore, the machine may be used only:

- for its designated purpose.
- in a fully operable condition.

Should any fault occur that is likely to impair its safety, the machine must be switched off and restarted only after the fault has been rectified. Our "General Conditions of Sale and Supply", of which the owner is aware, shall always apply.

Warranty and liability claims relating to physical and property damage shall not be considered insofar as they are attributable to one or several of the following causes:

- Use of the machine for something other than its designated purpose.
- Incorrect assembly, commissioning, operation and maintenance of the machine.
- Operating the machine with faulty safety equipment or when incorrectly installed or with inoperable safety and protection equipment.
- Non-observance of the Operating Manual in respect of transportation, storage, installation, commissioning, maintenance and equipping of the machine.
- Autonomous changes to the machine.
- Autonomous changes to the output or drive ratios of the machine.
- Inadequate monitoring of machine components that are subject to wearing.
- Improper repairs.
- Catastrophic incidents caused by third-party intervention or Force Majeure.

2 Safety

2.1 General Notes on Safety

All persons involved in
- assembly
- maintenance and repair work
- commissioning and
- operation

of the cleaning oven, must read and comprehend the Operating Manual (or familiarize themselves with its content).
Moreover, the contents of this Manual must be readily available to all aforementioned persons!

Under no circumstances whatsoever must safety devices, provided by the manufacturer, be either removed or have their function impaired or rendered inoperative!

Commissioning and re-commissioning, assembly, maintenance and repair work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

Before performing installation, maintenance, servicing and disassembly, insure power supply is off and locked against accidental switch-on to prevent electrical shock or death.

Electrical work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

Transport and lifting devices must have the minimum lifting capacity required. Only the lifting points specified in this Manual must be used.

In addition to the Operating Manual, the generally valid and local regulations concerning the mains supply, accident prevention, health and safety of personnel and environmental protection must be made available and observed.

2.2 Qualification of Staff

Only trained and instructed staff are allowed to work with this machine. Staff members who are not instructed are not allowed to stay in the work area of the machine.

Required qualification

Activity / Works	Instructed persons	Technically trained persons	Electrically trained persons
Transport	X		
Start-up*		X	
Operation	X		
Trouble Shooting*	X		
Mechanical fault rectification	X	X	
Electrical fault rectification*		X	X
Servicing*	X		
Mechanical repairs		X	
Electrical repairs*			X

* Only electrically qualified persons are allowed to work with the electrical equipment. The applicable rules of electrical engineering must always be observed.

The machine operator is authorized to rectify only the faults and carry out only the maintenance work stipulated as part of the training. All other faults must be rectified by the appropriate specialist engineers (as indicated in the list). Only instructed personnel may actuate the control. Machine instructions must be acknowledged in writing.

2.3 Personal Protective Equipment

The necessary personal protective equipment must be provided by the owner and kept in an operable condition at all times.
All safety equipment must be checked on a regular basis.

Each person working in the danger zone must wear personal protective equipment.

Personal protective equipment:
- full face protection
- temperature–resistant gloves and protective clothing
- closed safety shoes

2.4 Notes on Operating the Cleaning Oven

Strictly observe the instructions given in the chapter "Proper Use".

Strictly observe the operating values and limits specified in the Appendix to this Manual (in the sheets "Operating Values / Limits", "Freshwater Requirements" and "Technical Data").

All protective and safety equipment must be available and fully operable.

Special safety notices must be observed for start-up, repair and maintenance!

2.4.1 Safety Measures in Normal Mode

Operate the machine only when all protection equipment is fully operable. Before switching on the machine ensure that nobody can be endangered by the running machine during operation.

The machine must be checked regularly for visible damage and operability of the safety equipment.

2.5 Repair and Maintenance, Trouble Shooting

Carry out the specified adjustment, repair and maintenance work in accordance with the schedule.

Protect all utilities from being activated accidentally.

During all servicing, repair and maintenance work, switch the machine off and protect the master switch from unexpected reactivation, affix repair plate.

On completion of the servicing work ensure that the safety equipment is fully operable before the machine is restarted.

2.6 Cleaning and Disposal of the Machine

Handle and dispose of all substances and materials properly specifically:

- when working on lubrication systems.
- when cleaning with solvents.

2.7 Safety Facilities to be provided

Before starting-up of the machine, all protective equipment must be correctly installed and fully operable. Protective equipment may only be removed after the machine has come to a standstill and on switchover to Manual Mode or Step Mode. On delivery or retrofitting of sub-components, the protective equipment must be installed by the owner in accordance with the instructions.

The cleaning oven must not be operated without the above mentioned safety devices. This Manual contains further notes and recommendations.

2.8 Residual Dangers

DANGER

Residual risks exist on the entire machine. These risks may result in serious injury or even death!
Risk caused by electrical equipment
Risk caused by heat, fire and explosion.
Risks/danger caused by mechanical influences.

Wear protective gloves and protective clothing!
Wear safety goggles!
Wear safety boots!
All protective and safety equipment must be available and fully operable.
Special safety notices must be observed for start-up, repair and maintenance!
All safety and warning notices issues by the individual manufacturers must be observed.

In observance of the Operating Manual and proper use of the cleaning oven:

The cleaning oven is operated at high temperatures! Do not touch hot surfaces of Jet Cleaner components and cleaned parts. If surfaces are touched, without protection, there is a danger of injury by burning.

Wear personal protective equipment!

When thermoplastics are processed, hazardous vapors can develop.

The Jet Cleaner cleaning oven may only be operated with a properly installed drain and exhaust system.

2.8.1 Risks caused by Electrical Power

Work on the electrical supply may be carried out only by qualified electrical engineers.

The machine's electrical equipment must be checked on a regular basis.

In the event of faulty electrical equipment, the machine must be switched off immediately and the damage repaired by a qualified electrical engineer.

The machine may only be restarted when the electrical equipment has been checked and no further faults are present.

2.8.2 Hazard Areas / Personal Protective Equipment

Stay alert and proceed with caution and respect when working on or near the Jet Cleaner. Conditions present are:
- a high temperature vacuum chamber
- high temperature polymer which may ignite if exposed to air
- very hot surfaces, danger of burning
- dangerous electrical voltage on the electrical equipment and control cabinet
- danger of crushing by moveable parts of the oven
- deflagration is possible in case of malfunction
- danger of pneumatic energy (if oven is fitted with pneumatic clamps)

The operator must ensure that only authorized, experienced and skilled staff members are working in the hazard areas.
Any person working in a hazard area must wear personal protective equipment.

Personal protective equipment:
- full face protection
- temperature–resistant gloves and protective clothing
- closed safety shoes

2.8.3 Machine Noise

The permanent sound pressure level emitted by the machine is 77 dB(A).

2.9 Structural Changes to the Machine

No changes, retrofits or modifications may be made to the machine without the manufacturer's approval.
Imperfect machine components must be replaced immediately and the manufacturer must be notified.
Use only original spare and wearing parts.

2.10 Accident and Health and Safety Regulations

Compliance with the applicable Accident and Health and Safety regulations is imperative.
In the case of an accident, switch the machine off immediately at the master switch.

3 Technical Description

3.1 General / Control Unit

The Jet Cleaner, is a cleaning oven specifically designed to remove plastic contaminants from metal parts. The cleaning oven works according to the vacuum pyrolysis principle: The parts to be cleaned are heated in an oxygen starved chamber.

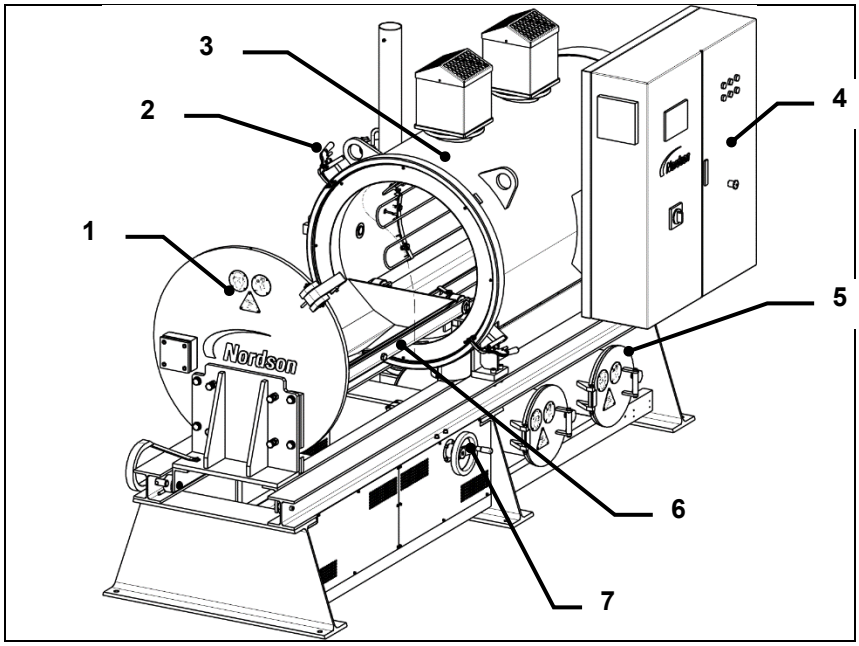
The central element is a cylindrical cleaning chamber. The chamber can be heated up to a temperature of about 510°C (950˚F) by means of heater modules. A vacuum pump generates a vacuum of up to 847 mbar (635 mm Hg, 25 in Hg) in the cleaning chamber.

The process is controlled by a programmable control unit that monitors the individual pyrolysis cycles and temperatures. Each cycle is controlled automatically by the control unit. The control unit can be individually programmed according to each customer's requirements. It is possible to create and save customized control programs (recipes for pyrolysis cycle times and temperatures)

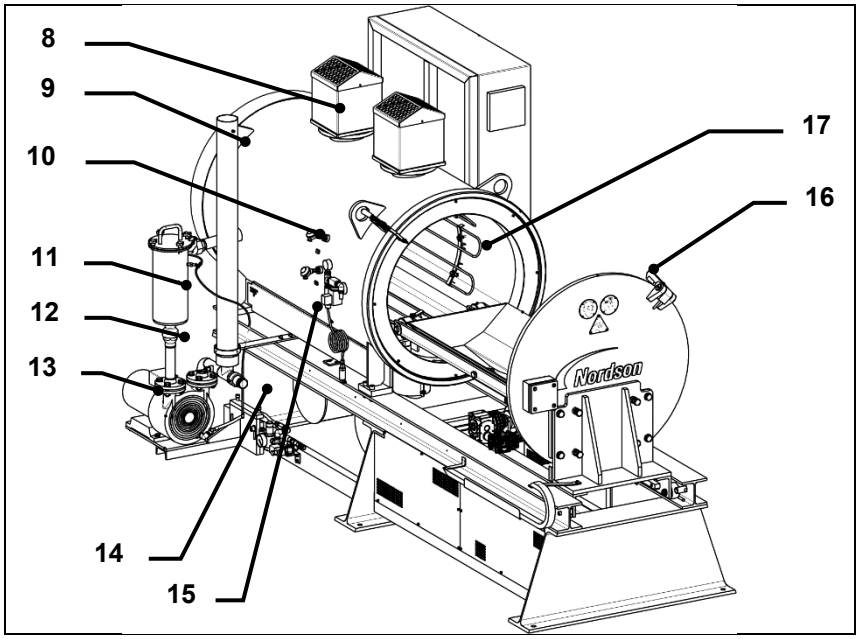
Operation of the heaters depends on the vacuum, or on the use of the vacuum switch. Furthermore, the chamber door must be closed. The door is monitored by an electrical safety switch. The chamber door cannot be opened until temperature and vacuum have reached the predetermined values.

3.2 Jet Cleaner Overview

3.2.1 Basic Design

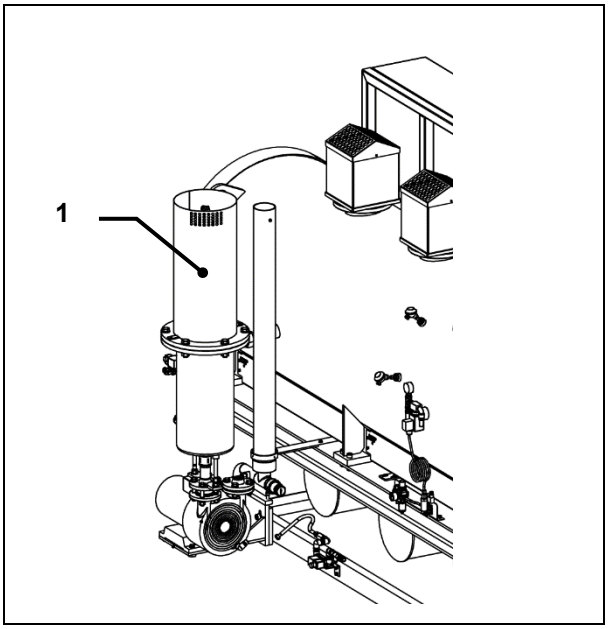


1	Chamber door	**5**	Primary trap
2	Door clamps	**6**	Parts tray
3	Cleaning chamber	**7**	Handwheel for chamber door (JCP 24xx, 36xx)
4	Control cabinet		



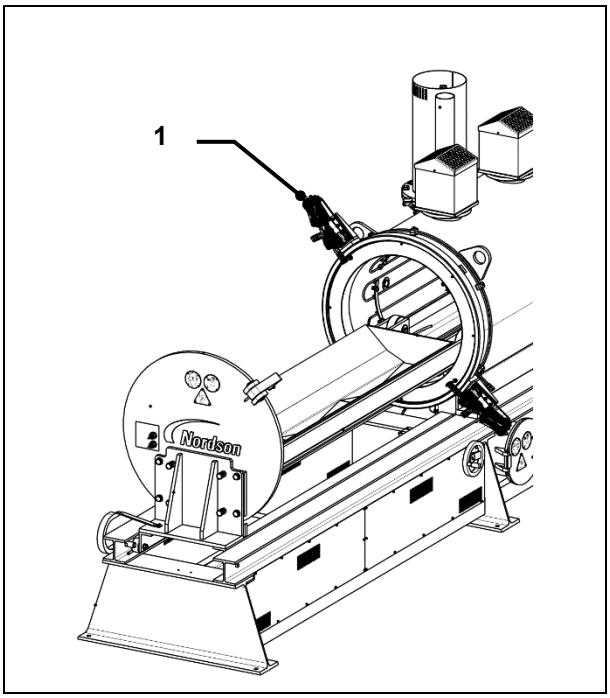
8	Excess pressure valve	**13**	Vacuum pump
9	Exhaust air	**14**	Drain
10	Thermocouple	**15**	Air solenoid valve
11	Secondary trap	**16**	Safety clamp
12	Relief valve	**17**	Heater

3.2.2 Variants



Jet Cleaners with CATOX

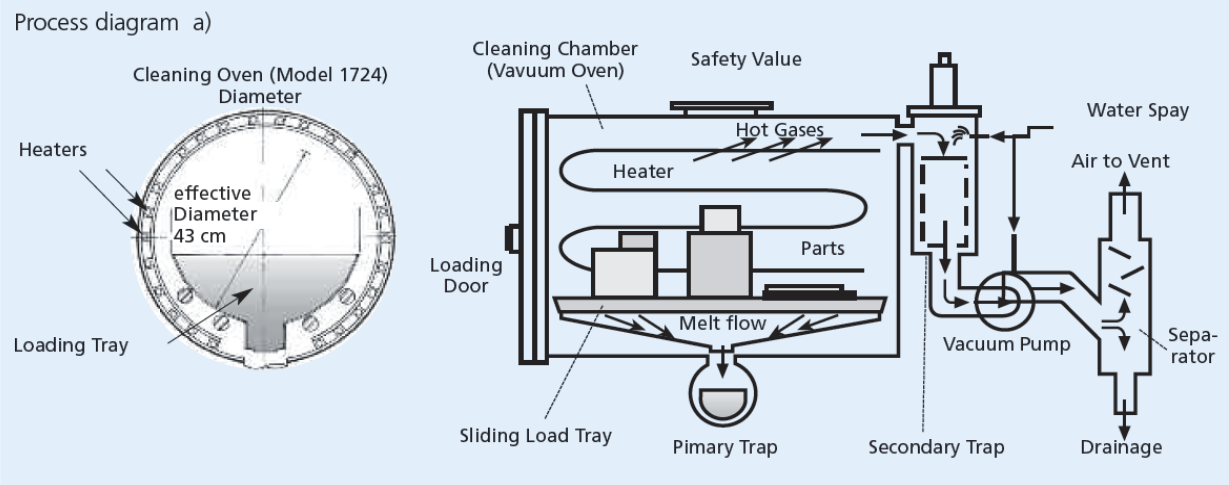
The CATOX unit (**1**) is optionally available for some models and replaces the secondary trap.



Jet Cleaners with pneumatic clamps

Larger Jet Cleaner models are fitted with pneumatic clamps (**1**) for the chamber door. Smaller models are fitted with manually operated door clamps.

3.3 Functional Components



3.3.1 Cleaning Chamber

The chamber has heat insulation plates and heating elements on the inside. Temperature measurements and internal pressure measurements are used for controlling the oven. The chamber is hermetically sealed and secured with a safety clamp and pneumatic or manually operated chamber door clamps. The chamber and internal fittings are made of stainless steel. In addition there is a sliding load tray in the oven which can be removed for loading and unloading when the door is open.

Depending on the size of the parts to be cleaned, the loading tray can be provided with supports for holding the parts. The loading, for example of the models 1724, 3648 etc, is done horizontally from the side.

3.3.2 Primary Trap

The primary trap receives the liquid plastic which drains off at the bottom. The plastic accumulates in a removable and easy to clean collector pan. The primary trap (possibly several) is closed with a quick release bracket so that it can be opened for cleaning.

3.3.3 Secondary Trap

The secondary trap (scrubber) is used for washing the hydrocarbon gases produced during the cleaning procedure out of the extracted oven atmosphere. Thereby, the hot gases from the oven are washed out in the secondary trap by a water spray and pass into the aqueous solution.

3.3.4 Vacuum Pump

The pump and motor are directly coupled with each other. The water-ring pump has the task of ensuring the evacuation of the cleaning chamber and the secondary separator. The water-ring pump principle has particularly proven itself in the delivery of hot air with high proportions of split-off gases.

In a subsequent separation stage, exhaust air and waste water are separated from each other and conducted to the ventilation or the drain.

3.4 Safety Devices

3.4.1 Test and Inspection of Safety Devices

Inspect all safety devices on a regular basis to find out whether they are still intact.
Repair or replace if necessary. Running the machine with defective safety devices is prohibited.

Under no circumstances whatsoever must safety devices, provided by the manufacturer, be either removed or have their function impaired or rendered inoperative!

3.4.2 Emergency Stop

The Emergency Stop Button is located at the control cabinet (⇗ 4.1.1). The Emergency Stop Button switches off the heaters and the vacuum pump.

3.4.3 Over-Temperature Transmitter

If a failure occurs, the over-temperature alarm and general alarm turn on, heater switches off.

3.4.4 Safety Switch for the Chamber Door

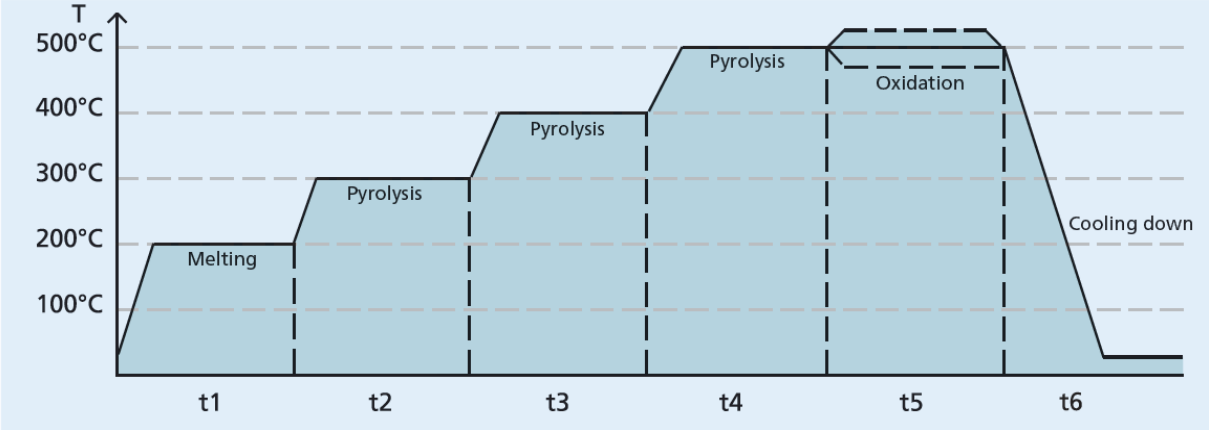
Supervised door with tumbler. The chamber door cannot be opened until temperature and vacuum have reached the predetermined values.

3.4.5 Pressure Relief Valve for Excess Pressure

Opens as soon as excess pressure occurs due to deflagration etc.
Ensure sufficient space above the excess pressure relief valve and above the cleaning chamber.

3.5 Function

3.5.1 Cycle Description



T = temperature oven (temperatures are examples)
t1 – t6= time

Time	Description of the melting and carburation of the plastic contamination
t1	Melting of the plastic
t2 - t4	Carburation of the volatile plastic components for rising boiling points
t5	Oxidation section. Here, the last thin layer (partially layers of a few molecules), which adheres very strongly to the surface (adsorption and absorption) is oxidized in order to better transfer it to the gaseous state and extract it using the pump. Inorganic components (fillers) are also oxidized to ashes. This happens using a specific temporary ventilation of the vacuum oven.
t6	Cooling down of the oven for removal of the parts.

Melting Cycle (t1)

During the melting cycle most of the plastic material should be melted off in the primary trap.

Pyrolysis Cycle (t2-t4)

The Jet Cleaner pyrolysis cycle uses heat and vacuum to remove material such as thermoplastics from metal parts.

The parts to be cleaned are heated in an oxygen starved chamber. The major portion of the polymer charge melts and drains into the primary trap collector pan. Remaining polymer is vaporized and passes through the secondary trap (↗ chapter 3.3.3), or, if fitted, through a CatOx process which oxidizes nearly all organic vapors into water and CO_2 (↗ chapter 3.5.2). The flow proceeds through a liquid ring vacuum pump to a water vapor separator, where exhaust gasses and drain water are separated and discharged.

Optional Oxidation Cycle (t5)

The Jet Cleaner Oxidation Cycle uses heat and air in the cleaning chamber to enhance cleaning when polymers leave a carbon residue.

After a pyrolysis cycle, the oxidation cycle provides a controlled flow of air into the chamber, while the chamber temperature is maintained. Oxygen from the air reacts with the carbon from the polymer providing a cleaner part.

Cool Down Cycle (t6)

The Jet Cleaner cool down cycle uses air flow without heat to cool the parts before removal from the chamber.
After a pyrolysis cycle or the optional oxidation cycle is completed, a flow of air is introduced into the chamber, and the heaters are turned off. This cools the parts in the enclosed environment of the chamber.

Programmable Temperature Control

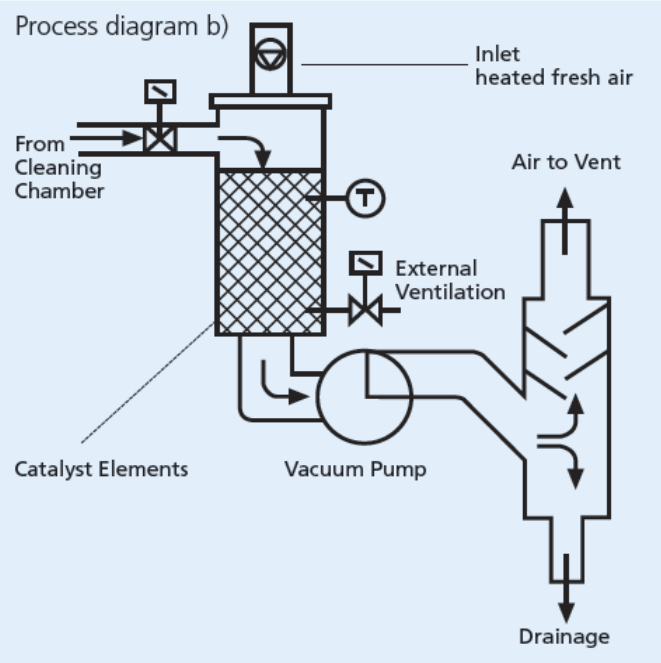
For Steps t1 through t4, the temperature of the Jet Cleaner chamber will climb to the set point for that stage, and then begin timing out the duration of that stage.

3.5.2 Catox Cycle Description (optional)

Cleaning Procedure (Redox Reaction)

$C_mH_n+xO_2 \rightarrow y(CO_2) + z(H_2O)$
$NO_x + H_2 / HC \rightarrow N_2 + CO_2 + H_2O$

This means the neutral substances N_2, CO_2 and H_2O from the gaseous hydrocarbons (split-off gases) of the plastic reach the environment. Thus, no pollutants of any kind reach the environment.



At initial startup the isolation control valve will exercise closed and then open to assure proper function. During this time the vacuum level will temporarily hold until the valve reopens at which time the vacuum will climb to about 14 in HG.

The temperature of the preheated air (TCp) will climb to about 950°F (510°C) and the catalyst (Tcmix & Tcmid) will slowly climb above 700°F (371°C) at which temperature the organic gasses will react with the catalyst. After the catalyst temperature is sufficient, the main chamber temperature is permitted to climb above 500°F (260°C).

As the polymer on the parts to be cleaned heats up, gasses will start to evolve and be pulled into the catalyst. These gasses combust in the catalyst bed and produce heat, and the catalyst temperature (Tcmid) and the combustion temperature (TCc) will rise. As the catalyst temperature (Tcmid) climbs from 900°F (482°C) to 1025°F (553°C) the air preheater is gradually turned off. This provides a lean combustion mixture and air to absorb heat.

If the combustion temperature (TCc) climbs above 1100°F (593°C) the MIDCAT solenoid air valve opens to absorb more heat. If TCc climbs over 1150°F (621 °C) the AIRVLV2 opens to absorb heat.

If TCc exceeds 1350°F (732°C), **or if its rate of increase projected for 10 minutes would exceed that temperature**, the chamber heaters are interrupted. This will slowly reduce the rate of generation of burnable gasses from the cleaning chamber.

It is important to note that rapid heating of polymer laden parts can create a temperature overshoot and a resulting gas creation which can overwhelm the CatOx system. Always run moderate to low temperature starting stages on new loads and materials until behavior is known.

As TCc climbs near 1300°F (704°C) the chamber isolation valve will gradually close, cutting off gasses from entering the catalyst, further damping peak temperatures. If this isolation is not accompanied by reduced gas creation (either by polymer exhaustion or lower chamber temperatures) in extreme cases it is possible to build atmospheric pressure in the chamber and gasses will leak from the excess pressure relief valve.

AGAIN, extreme loading of the chamber with high volumes or low- temperature- boil-off organic materials (i.e. Polystyrene or solvents, etc) can overwhelm the CatOx. Take care, with moderate loads and low temperatures, until behavior is known.

If TCc exceeds 1350°f (732°C) all valves close and the cycle is aborted to smother combustion. After all cools down, a more conservative, lower temperature cycle can be run.

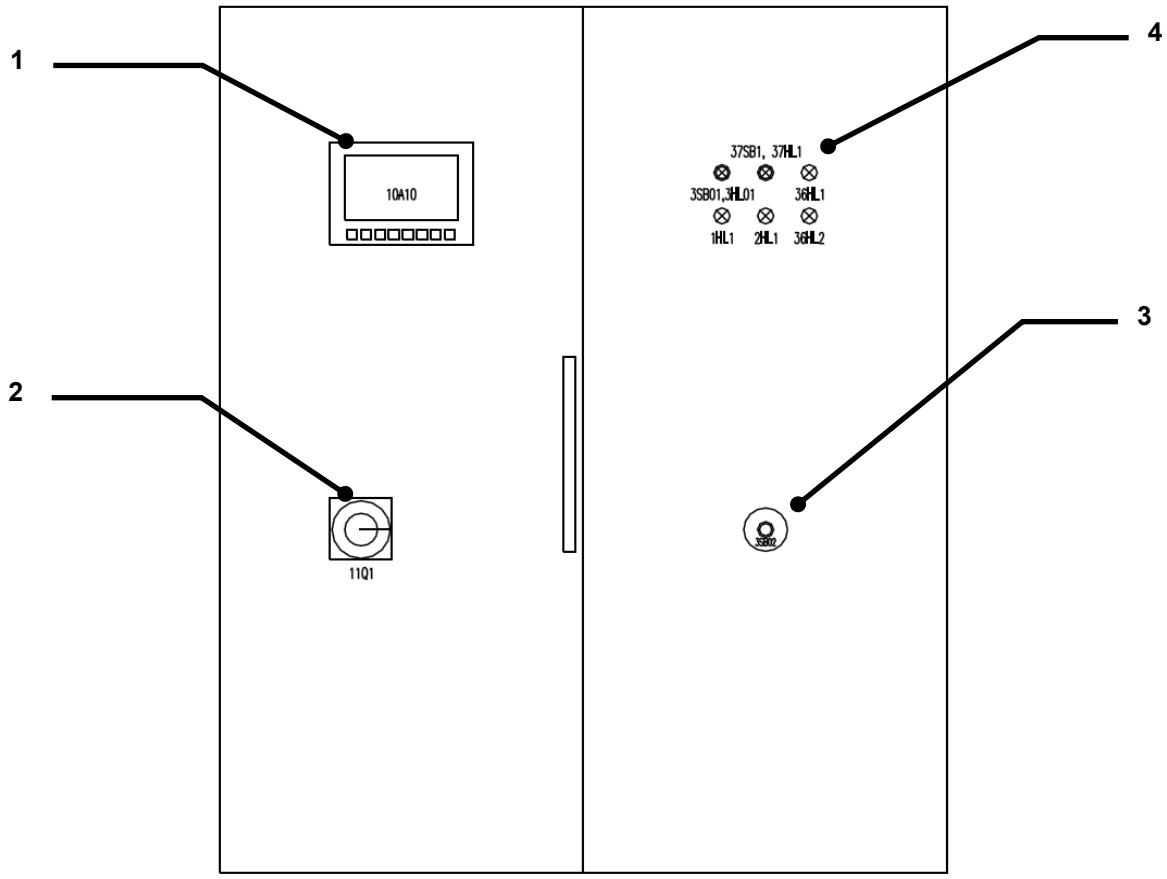
If the “PREHEATER TEMERATURE OUT OF RANGE” light comes on, either the prior run did not produce enough gasses to heat the CatOx or the catalyst is damaged. If less than one pound of polymer per hour was cleaned, and the water discharge did not smell bad, the catalyst is likely still functional, just not making much heat.

Target catalyst operating temperature is between 950°F and 1150°F (510°C and 621°C).

4 Control System

4.1 Configuration

4.1.1 Control Cabinet



No.	Operating element	Description
1	Touch panel	Operator panel keyboard and display ⇗ see chapter 4.5 and 4.6
2	Main Switch	Switches complete system on / off
3	Emergency Stop	EMERGENCY OFF switches off the heaters and the vacuum pump
4	Pushbuttons / Indicator Lights	⇗ see chapter 4.5.1 and 4.5.2

4.2 Operation Modes of the Control System

Normal Mode

The Normal Mode is the continuous operation mode of the control system.

The Jet Cleaner is equipped with a programmable control unit that monitors the individual pyrolysis cycles and temperatures. Each cycle is controlled automatically by the control unit. The control unit can be individually programmed according to each customer's requirements. It is possible to create and save customized control programs (recipes for pyrolysis cycle times and temperatures).

If custom programs are created by the end user, it is important for the user to be familiar with the programming procedure and to understand how program settings affect the cleaning process (⇗ see chapter 4.6.6 and 7.2.4).

Notice: Programs with very high temperatures may result in gases leaking from the chamber!

Manual Mode / Step Mode (Manual Control)

Manually switching on Heaters or Vacuum pump can cause faults or damage to the system. When doing so please be very careful and be sure you know in advance what you are doing. This should only be done by service persons from NORDSON **(Administrator password is required).**

4.3 Signal Provision

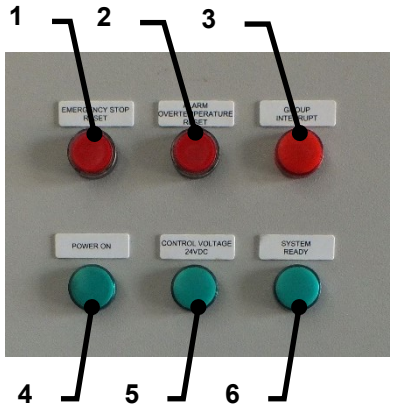
The specifications of the input signal and interfaces can be found in the documentation electrical engineering.

4.4 Locking in Normal Mode

The chamber door cannot be opened until temperature and vacuum have reached the predetermined values. The door is monitored by a safety switch.

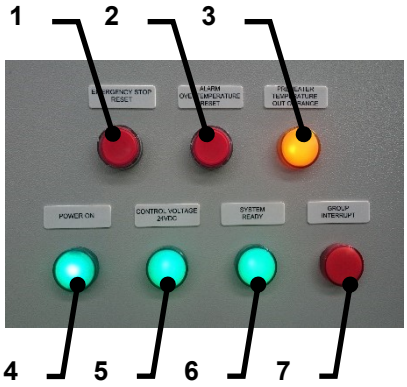
4.5 Operating and Display Elements

4.5.1 Jet Cleaners with Secondary Trap



No.	Operating element	Description
1	Pushbutton and Indicator Light	Emergency Stop Reset
2	Pushbutton and Indicator Light	Alarm Overtemperature Reset / Temperature Alarm Reset
3	Indicator Light	Group Interrupt / General Alarm (↗ chapter 4.6.4)
4	Indicator Light	Power ON
5	Indicator Light	Control Voltage
6	Indicator Light	System Ready

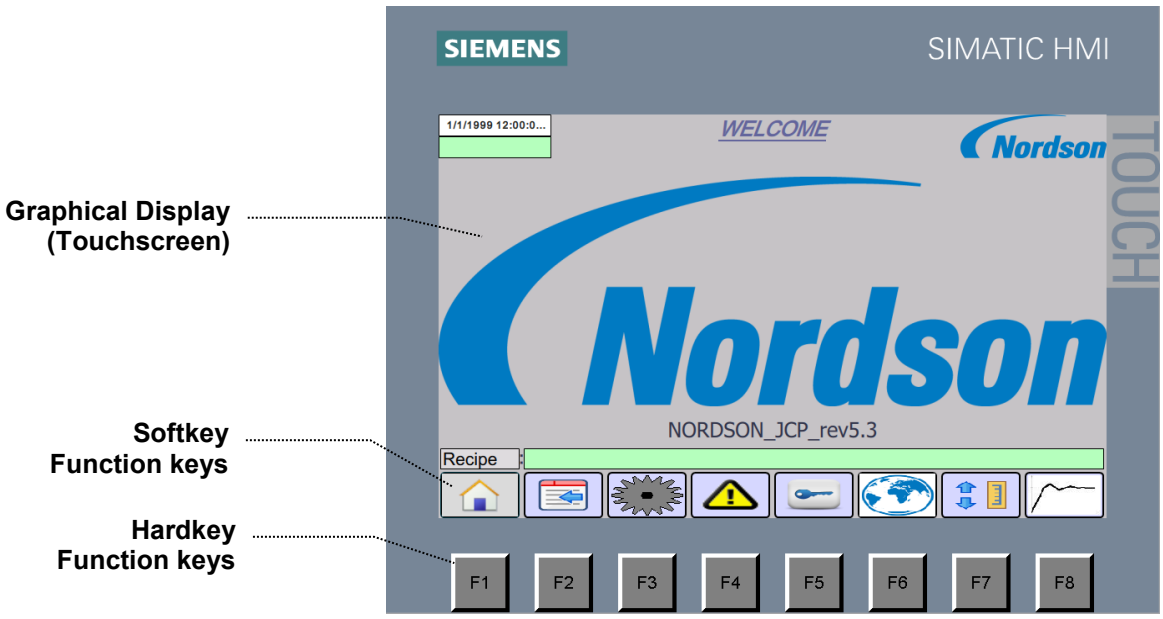
4.5.2 Jet Cleaners with CATOX



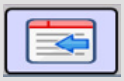
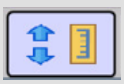
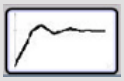
No.	Operating element	Description
1	Pushbutton and Indicator Light	Emergency Stop Reset
2	Pushbutton and Indicator Light	Alarm Overtemperature Reset / Temperature Alarm Reset
3	Indicator Light	Preheater Temperature out of Range
4	Indicator Light	Power ON
5	Indicator Light	Control Voltage
6	Indicator Light	System Ready
7	Indicator Light	Group Interrupt / General Alarm (↗ chapter 4.6.4)

4.5.3 Operating Panel KTP700

The operating panel of the KTP700 has a TFT display with touch operation and 8 function keys.



4.5.4 Key Assignment (Softkey)

	Home (Main Screen) (↗ chapter 4.6.2)
	Program / Recipe settings (↗ chapter 4.6.6)
	Manual Control (↗ chapter 4.6.5)
	Alarms and faults (↗ chapter 4.6.4)
	Machine settings (↗ chapter 4.6.7)
	Language settings (↗ chapter 4.6.8)
	Analog Values (↗ chapter 4.6.9)
	Graph (↗ chapter 4.6.10)

4.5.5 Softkey Function Keys / Input Boxes

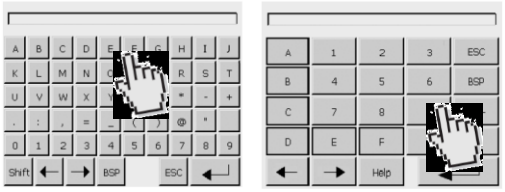
The necessary function keys and input boxes are shown as touch cells in the display.

4.5.6 Touch Screen Control

All operating elements needed for the operation are displayed on the touch screen and can be invoked and executed.

On-screen keyboard
If numerical or alpha-numerical entries need to be made, a corresponding keyboard is displayed on the screen as soon as an input box is touched.

Numerical or alpha-numerical on-screen keyboard



↵ Confirming an entry

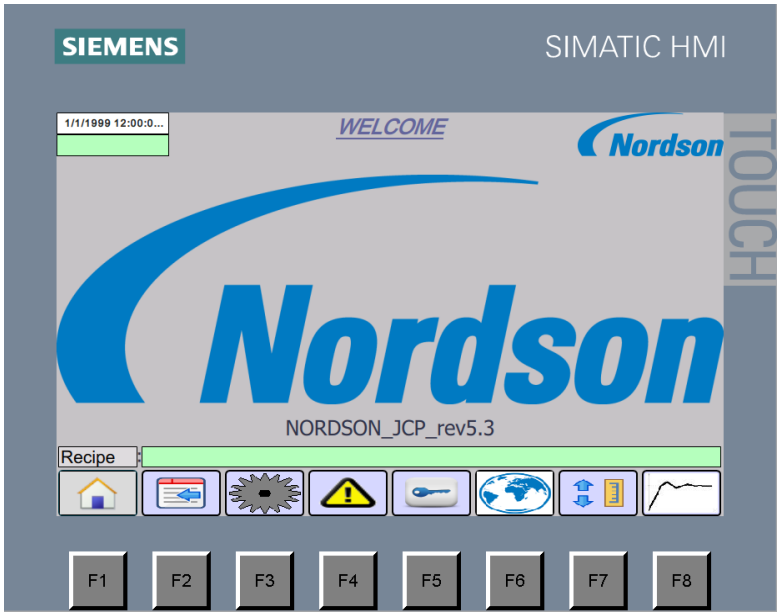
ESC Hiding the keyboard or cancelling the action

The windows and their basic functions are described below. Further descriptions on this control panel can be found in the accompanying Siemens manual.

4.6 Menu Structure / OP Screens

4.6.1 Start-up Screen

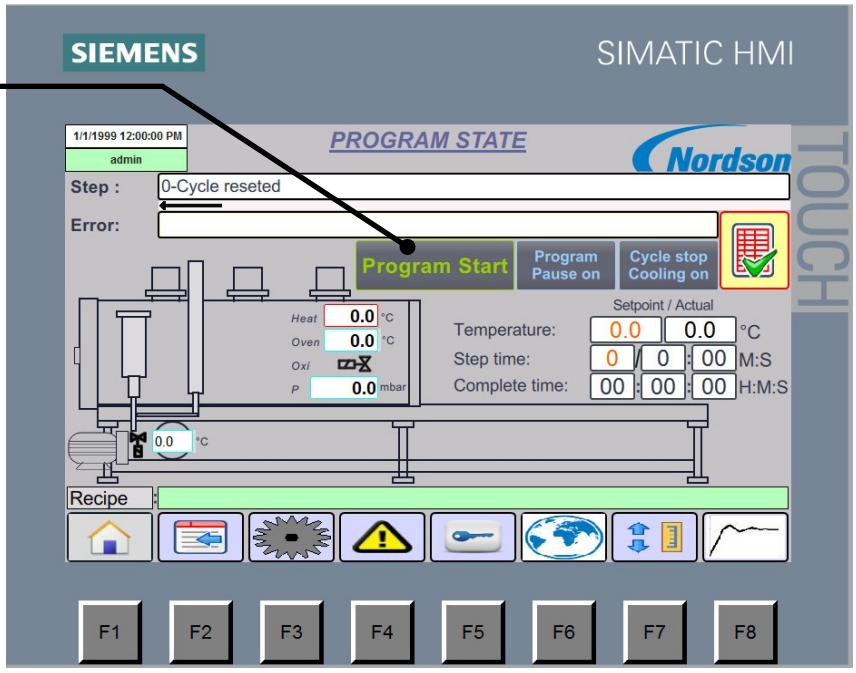
The first screen displayed after power-up is the **Start-up** Screen. This screen shows the basic settings such as the software version.



By pressing the “**Home”** button or **F1** the **Main Screen** (Program State) appears (⇗ chapter 4.6.2).

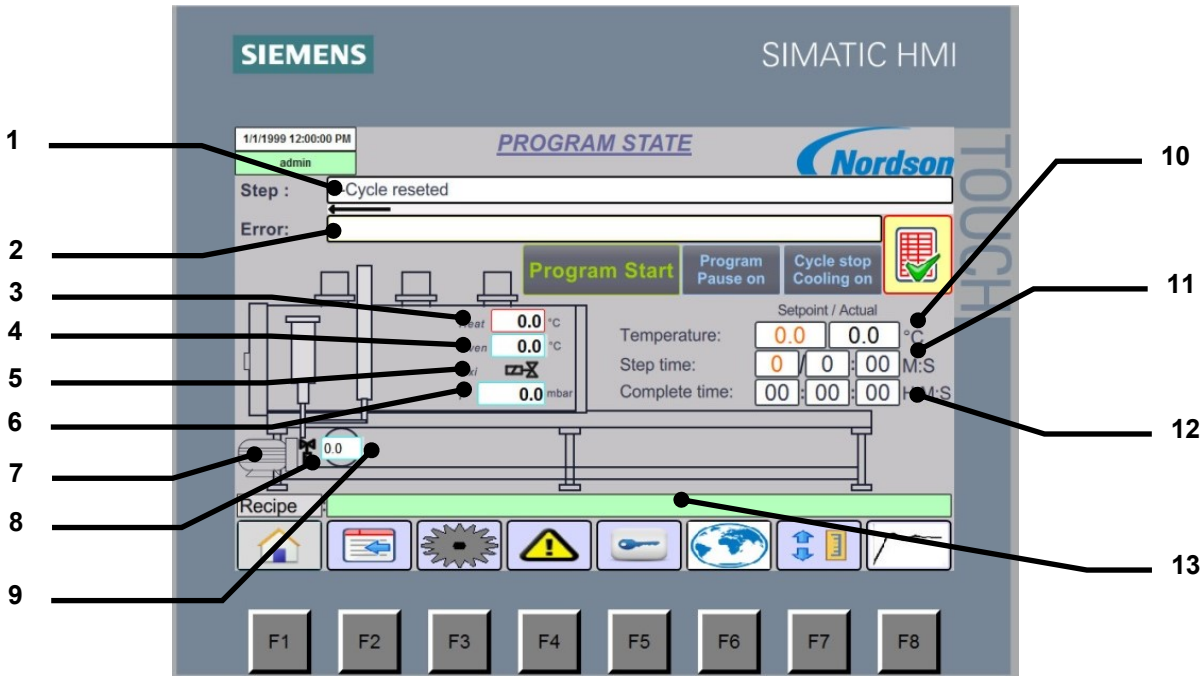
4.6.2 Main Screen (Program State)

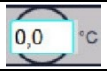
Operating elements



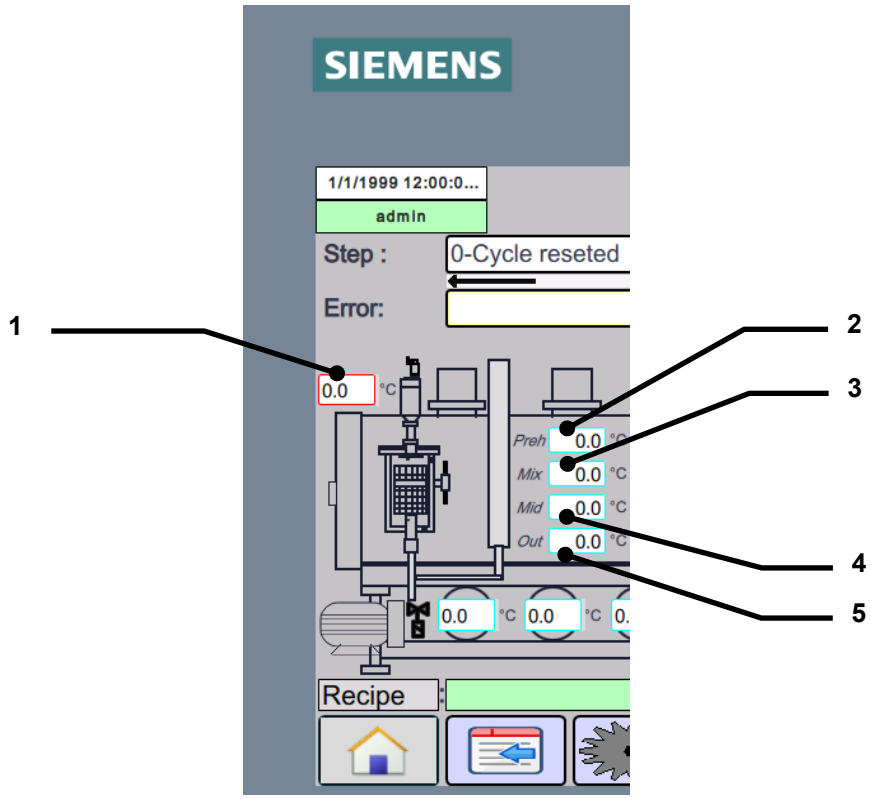
No.	Operating element	Description
1	Program Start / Program Pause on / Cycle stop Cooling on	Program Start/Stop, Program Pause, Cooling (⇗ chapter 4.6.3)

Display Elements



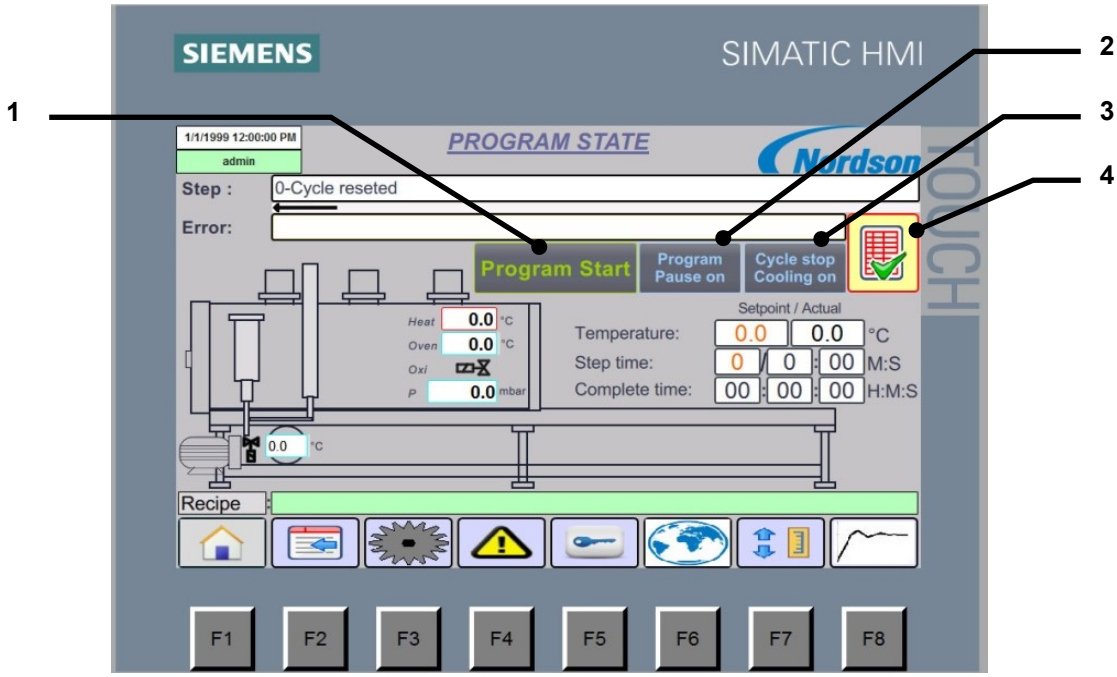
No.	Display element	Description
1	Step	Actual step
2	Error	Fault status
3	Heat	Heater temperature
4	Oven	Oven temperature
5	Oxi 	Air solenoid valve (Oxidation): open* / closed
6	P	Pressure (mbar)
7		Vacuum pump on*/ off
8		Water solenoid valve: open* / closed
* Status “open” / “on” is indicated by display element changing to green colour.		
9		Primary trap temperature
10	Temperature	Set point temperature and actual temperature
11	Step time	Time for each step
12	Complete time	Total running time after completing the cycle
13	Recipe	Name of selected recipe

Display Elements CATOX (optional)



No.	Display element	Description
1	0,0 °C	Preheater - Temperature of heater element
2	Preh (TCp)	Preheater - Air Temperature (actual Temperature)
3	Mix (Tcmix)	Gas Mixture Temperature (actual Temperature)
4	Mid (Tcmid)	Mid Catalyst Temperature (actual Temperature)
5	Out (TCc)	Combustion Temperature (actual Temperature)

4.6.3 Program Start/Stop/Pause



No.	Operating element	Description
1	Program Start	By pressing this button the Program starts / stops.
2	Program Pause on	By pressing this button the program pauses. If you press this button again, the program continues.
3	Cycle stop Cooling on	By pressing this button the program stops and cooling starts directly.
4		Fault reset. Before you can start a cycle it's important to reset the fault.

The program can be halted at any time and restarted. The oven heating will only work when the vacuum is at 720 mbar.

WARNING

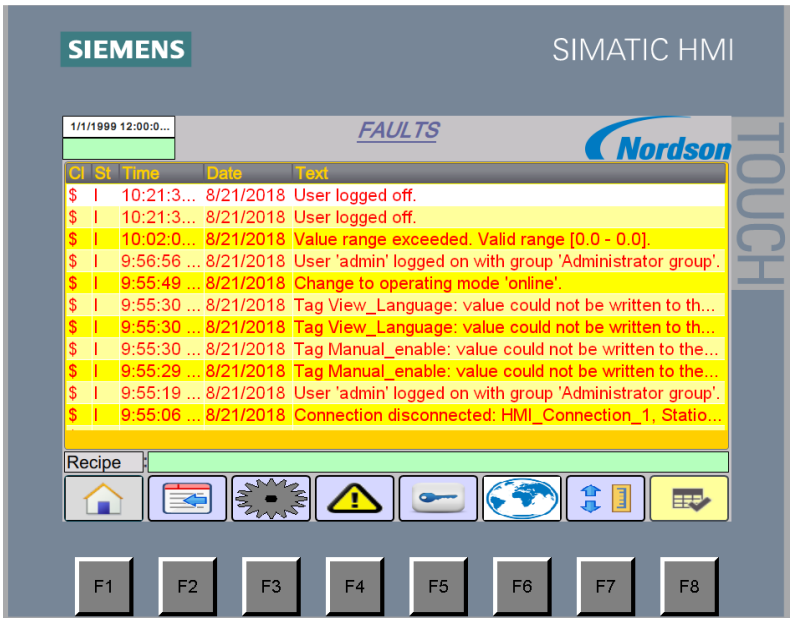
Before you open the oven the cooling phase should always be completed. Only then you can be sure that the temperature has gone down to a safe level.

Opening the oven and taking out parts, should only be done when the appropriated safety measures have been taken:

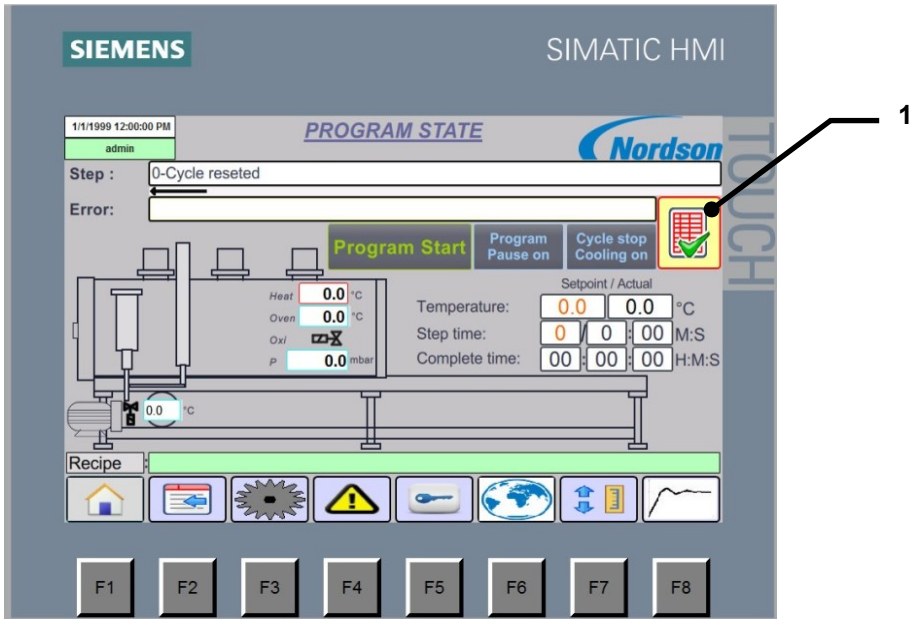
Wear safety clothing, heat protected gloves, safety goggles or a full face mask

4.6.4 Alarms and Faults

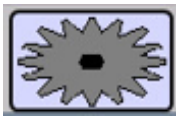
In this overview you see all faults with date and time.



Before you can start a cycle it's important to reset the fault (**1**) in the Main Screen.



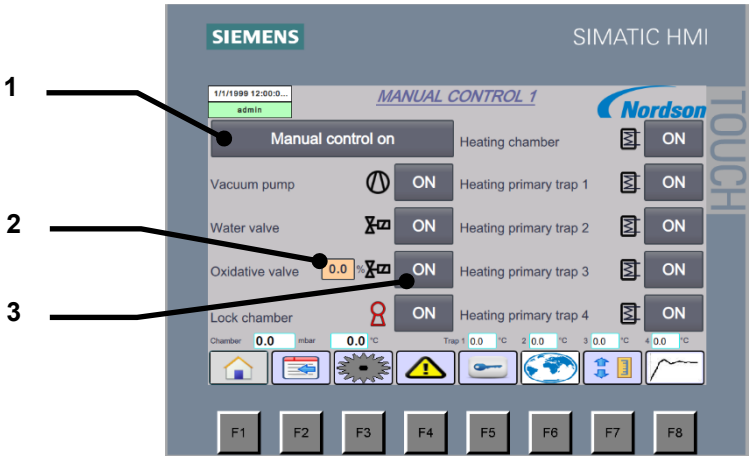
4.6.5 Manual Control



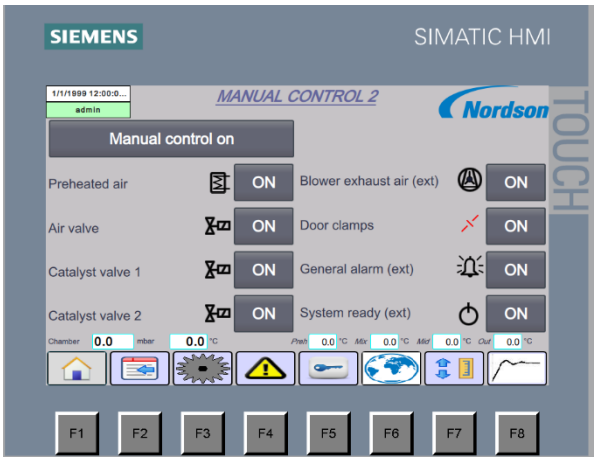
Manually switching on Heaters or Vacuum pump can cause faults or damage to the system. When doing so please be very careful and be sure you know in advance what you are doing. This should only be done by service persons from NORDSON (Administrator password is required).

To manually open or close the valves you first need to push the button "**Manual control on**" (**1**).

By now pushing the "**ON**" button (**3**) for the corresponding valve that valve will become active and the number "**1**" will be shown in the message box (**2**) telling you that the valve has been activated / opened.



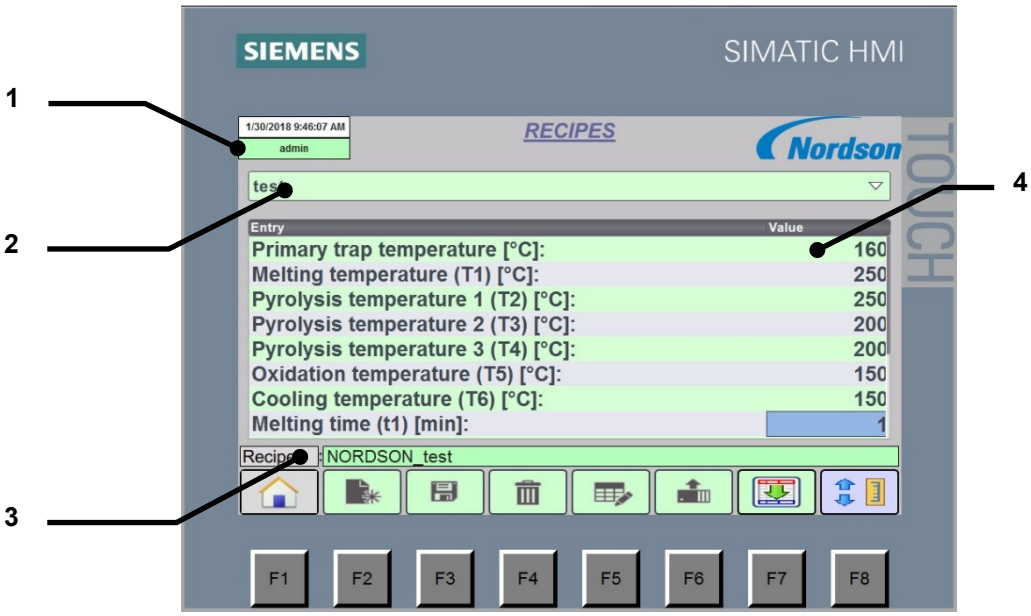
In order to change between menu pages, press **F3.**



4.6.6 Program / Recipe Settings

By using the correct login password it is possible to change the temperatures and times for each step and this for every program / recipe. This function should only be used by authorized staff so that the operators only have to select those programs and like this they cannot do something wrong with the program or the device.

Program (RECIPES) screen – Parameter list



Login

By tapping on one of the **"Temperature"** (T1-T6) or **"Time"** (t1-t6) parameters (**4**) a new window (Login dialogue) will appear where you can enter a username and a password.

Standard Login:
User: **user**; Password: **100**).
It is also possible to enter username and password in the **Machine Settings** Screen (↗ chapter 4.6.7).

When you have typed in your username and password you have to push the **"Enter"** button to return back to the Login dialogue. When you now push the "**OK**" button and the password is correct you will have access to create new recipes and change recipe parameters. When your password is correct you will see the username in the message box (**1**) top left as well.

You can now edit all temperatures and times. Mind the correct settings.

Key assignment (Softkey)

New Recipe	Save Recipe	Delete Recipe	Rename Recipe	Read from PLC	Write in PLC

By pushing the "**Home**" (**F1**) button you can go back to the **Main Screen**.

Creating and saving a new Recipe

By pushing "**New Recipe**" it is possible to enter the needed values in the parameter list (**4**). For determining these values (temperatures and times) ⇗ see chapter 7.2.4.

For changing values in the parameter list of a recipe, select the value by tapping on it.

For each temperature setting **(T1-T6)** there is a corresponding timer setting **(t1-t6)**. In order to edit all timers, scroll down the parameter list.

Normally the melting temperature **(T1)** of JCP is a value of around 30°C (86°F) higher than melting temperature of your polymer.
In the next steps (Pyrolysis) go higher and higher with temperature (**T2-T4)** to transfer the polymer step by step to the gaseous state.
The Oxidation step burns last materials.

It is important to melt as much as possible from the material.
This protects the vacuum pump.
Shown times and temperatures are only an example!

Enter a name for the new recipe by tapping on the input box (**2**).
After entering all data in the parameter list you have to save your recipe by pushing the "**Save Recipe**" button. After saving it is important to push the button "**Write in PLC**". Only after that the entered values are also in the PLC and valid for the cycle.

Do not clean polymers with different melting points in one cleaning cycle. In order to avoid part or machine damages and improper cleaning only mix materials with similar melting points.

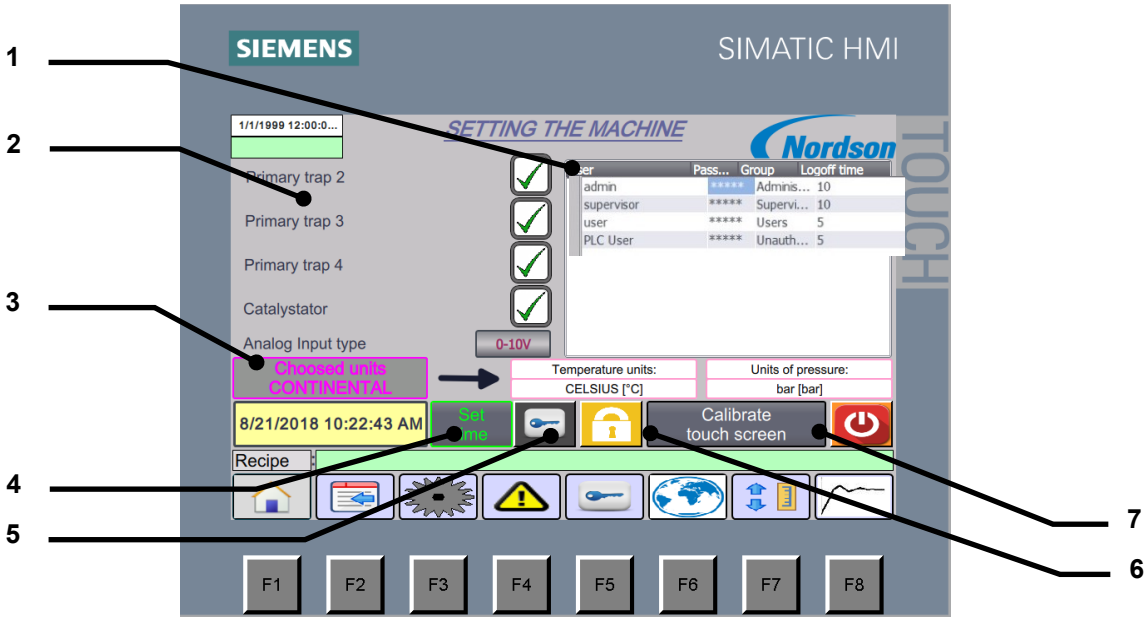
Selecting a different Recipe

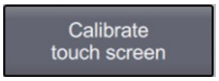
The name of the selected recipe which is valid for the cycle is indicated in the message box (**3**).

For displaying / checking the parameter list of the recipe which is valid for the cycle press the "**Read from PLC**" button.

If you want to change from one recipe to another select the desired recipe from the dropdown list (**2**) and push the "**Write in PLC**" button.

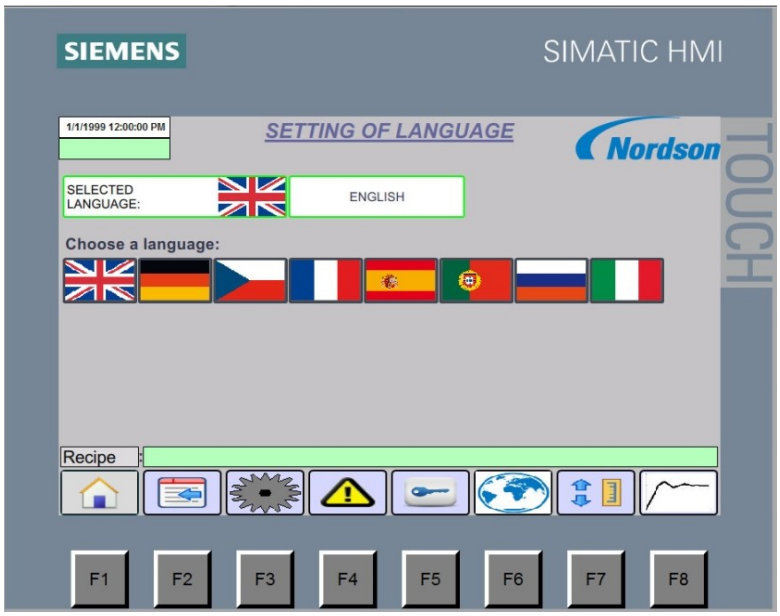
4.6.7 Machine Settings



No.	Operating element	Description
1	Password settings	Here you can define rights and scope of operation for each user.
2	Primary trap	Here you define the quantity of primary traps (depends on JCP-Size).
3		Unit selector: define units (°C and °F or bar and psi).
4		Set time: time and date settings.
5		Log on user
6		Log off user
7		Calibrate touchscreen: Re-calibrate touchscreen if precision is lost.

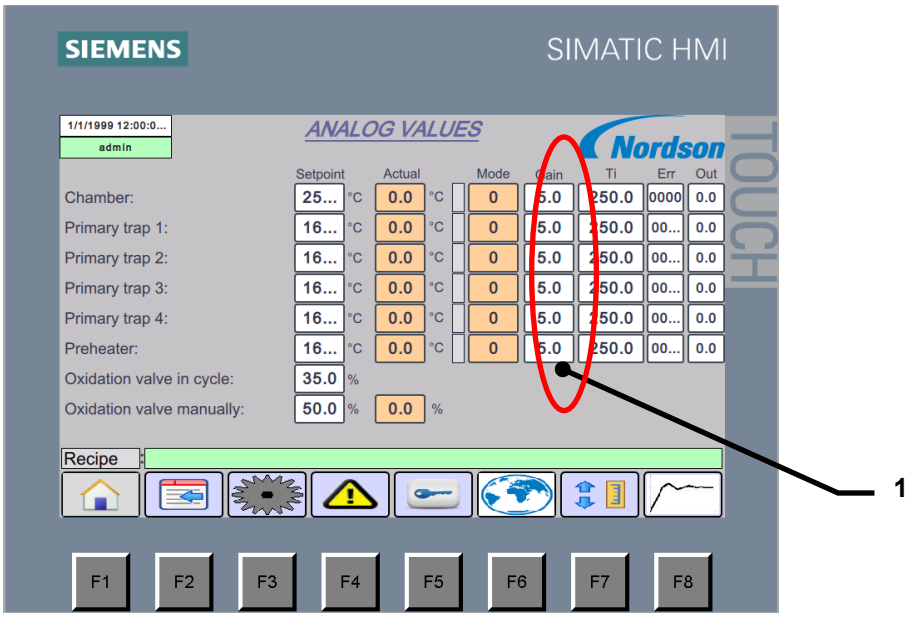
4.6.8 Language Settings

For changing the language, press the needed flag, the language changes immediately.



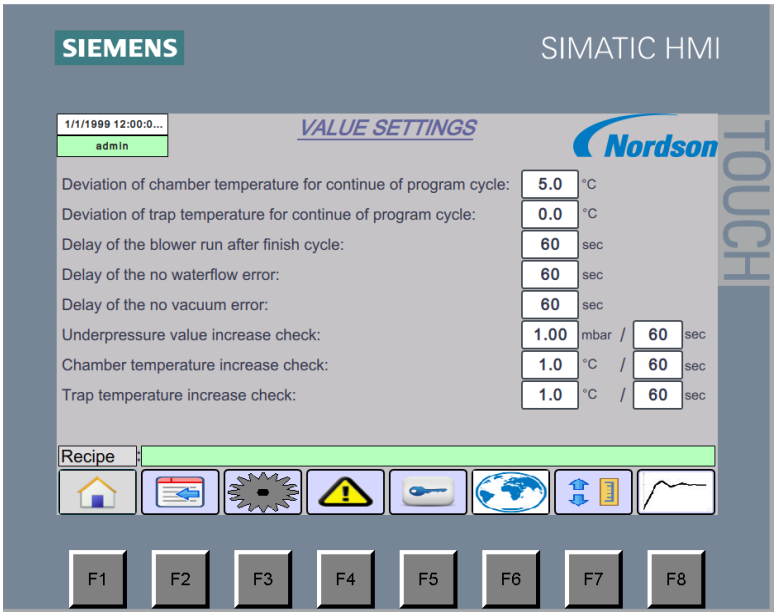
4.6.9 Analog Values

These values are pre-configured by the manufacturer. You must be logged in as admin for changing them.



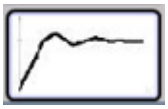
PID data (pre-configured)
Here the PID data (**1**) are configured. Normally it's not necessary to change them.

In order to change between menu pages, press **F7**.

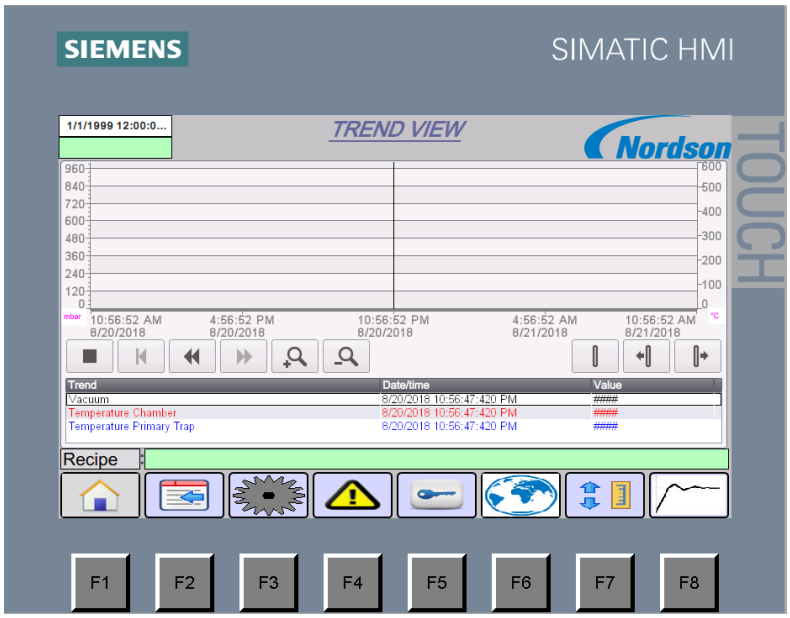


Element	Description
Deviation of chamber temperature for continue of program cycle	Define deviation when the cycle time starts
Deviation of trap temperature for continue of program cycle:	Define deviation from primary trap when the cycle time starts
Delay of blower run after finish cycle:	Runtime of blower when cycle is finished.
Delay of the no waterflow error:	Time delay until fault if water flow is interrupted.
Delay of the no vacuum error:	Time delay until fault if vacuum gets lost.
Underpressure value increase check:	Check the increase of vacuum.
Chamber temperature increase check:	Check the increase of temperature in chamber.
Trap temperature increase check:	Check the increase of temperature of primary trap.

4.6.10 Graph (Trend View)



After pressing the **Graph** button you see the following screen. Here you can check for temperatures (chamber and primary trap) and vacuum. The data is shown for different times in the past.



When you tap on the line in the graph you can move it left or right to check the value at this time.

Otherwise you can tap on this button  to go step by step through the saved data.

With the glasses  you can zoom in and out.
With that option you can see if you had a gap at the vacuum, for example, or how the heaters are working.

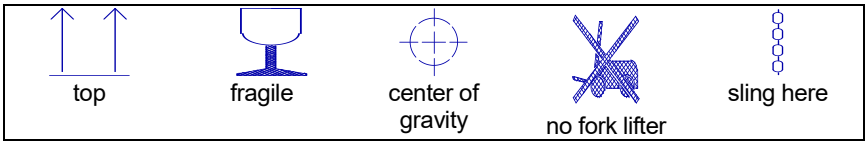
5 Transportation and Storage

5.1 Scope of Delivery and Notification of Transportation Damage

Upon plant receipt, carefully uncrate the equipment. Review all parts and insure that none are damaged. If part damage has occurred, report to the freight carrier and NORDSON. Do not start up the equipment with damaged parts.

5.2 Pictographs on the Packaging

Please observe the pictographs attached to the packaging, like e.g.:



5.3 Transportation

WARNING

WARNING!
Danger of crushing by falling objects!
Death or serious injuries possible.
Never walk or stand under lifted loads!

Risk of danger through machine parts falling or tipping.
Transport and lifting devices must have the minimum lifting capacity required.
The general safety and accident prevention regulations must be observed.
Only transport the Jet Cleaner when the chamber door is closed.
Only the lifting points specified in this Manual must be used. (⇗ chapter 5.3.1 and 5.3.2)
The weight of the Jet Cleaner can be found in "Technical Data" sheet in the Appendix. The machine's centre of gravity is labelled on the pallet / crate.

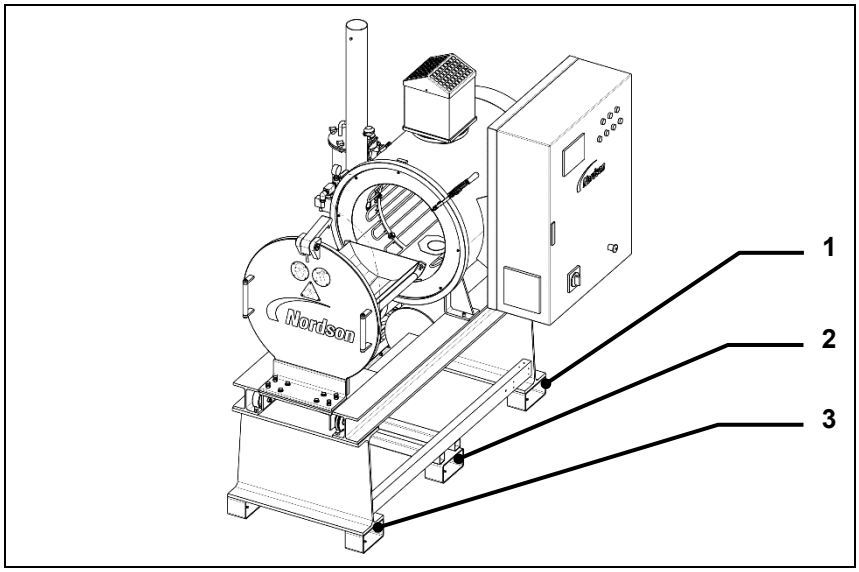
Danger of Crushing and sheering of limbs during machine installation.

Only use safe lift trucks and transport devices. All transport must be done by appropriately trained and qualified personnel.

Do not let the Jet Cleaner be damaged by other items during transit.

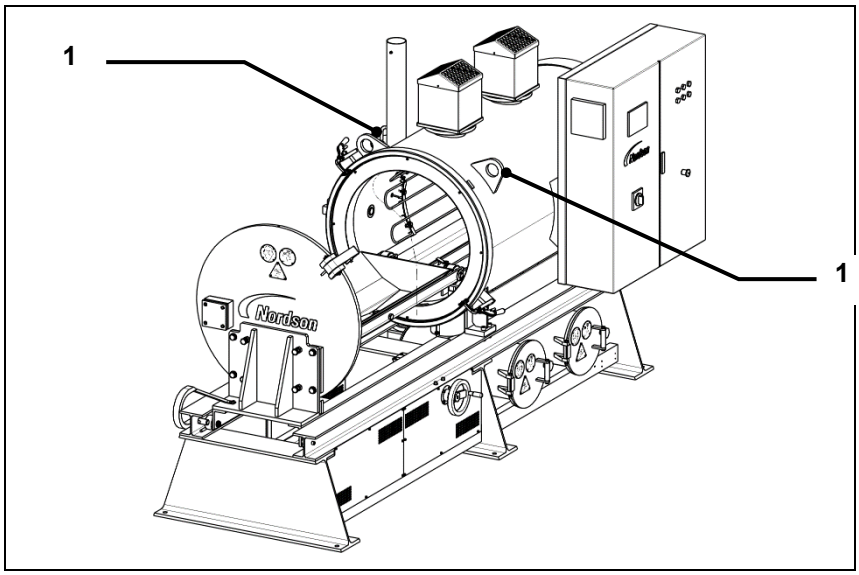
Use only the original packaging.

5.3.1 Jet Cleaners with Forklift Pockets



- Close the chamber door before transporting the oven.
- For transportation always use the forklift pocket (**1**) at the closed end of the cleaning chamber. Together with this forklift pocket (**1**) use either forklift pocket (**2**) or (**3**) depending on the available fork spacing.

5.3.2 Jet Cleaners with Lifting Eyes



- Close the chamber door before transporting the oven.
- For transportation always use all four lifting eyes (**1**) which are located on top of the cleaning chamber.

5.4 Storage / Conservation

An outdoor storage is not permitted.
Not even for packaged equipment.
If longer storage is provided, the following conditions must be observed!

Storage conditions

- Store equipment in a dry location and prevent freezing.
- Protect against dust.
- Store the Jet Cleaner in original packaging only.

If a longer period of storage is foreseen, the machine should be left in the packaging supplied and stored as described above. The above mentioned protective measures must not be damaged or removed or they should be renewed if necessary

5.4.1 Vacuum Pump

The vacuum pump has to be maintained according to the manufacturer's instruction. If not used for a longer time, remove water from housing and protect against corrosion in order to prevent blocking of impeller.

6 Installation and Commissioning

6.1 Safety

Commissioning and re-commissioning, assembly, maintenance and repair work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

All installation, operation, maintenance, servicing and dismantling must be done by appropriately trained and qualified personnel.

Electrical work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

Under no circumstances whatsoever must safety devices, provided by the manufacturer, be either removed or have their function impaired or rendered inoperative!

In addition to the notes on safety contained within this Manual, the safety and accident prevention regulations in force locally must be strictly adhered to!

DANGER

Risk of electrical shock or death!
Before performing installation, maintenance, servicing and disassembly, insure power supply is off and locked against accidental switch-on.

WARNING

WARNING!
Danger of crushing by falling objects!
Death or serious injuries possible.
Never walk or stand under lifted loads!

Risk of danger through machine parts falling or tipping.
Transport and lifting devices must have the minimum lifting capacity required.
The general safety and accident prevention regulations must be observed.
Only transport the Jet Cleaner when the chamber door is closed.
Only the lifting points specified in this Manual must be used. (⇗ chapter 5.3.1 and 5.3.2)
The weight of the Jet Cleaner can be found in "Technical Data" sheet in the Appendix. The machine's centre of gravity is labelled on the pallet / crate.

WARNING

Danger of Crushing and sheering of limbs during machine installation.

Only use safe lift trucks and transport devices. All transport must be done by appropriately trained and qualified personnel.

DANGER

Deflagration is possible in case of malfunction.
Injuries and property damages possible.
Always keep excess pressure relief valve operable.
Ensure sufficient space above the excess pressure relief valve and above the cleaning chamber.
Be careful of vacuum sealing surfaces as damage may reduce the chamber vacuum and introduce air during the pyrolysis cycle.
Check and clean all vacuum sealing surfaces and the seals at the excess pressure valves on a regular basis.

Keep all control features and safety interlocks in good working condition. ⇗ Chapter 3.4
Keep the excess pressure relief valve in good working condition.
The excess pressure relief valve relieves positive pressure that may develop if polymer ignition occurs.
The operator of the system into which this machine is integrated is responsible for any necessary safety measures at the excess pressure relief valve.

WARNING

Hot surfaces of Jet Cleaner components and cleaned parts.
The cleaning oven is operated at high temperatures! If surfaces are touched, without protection, there is a danger of injury by burning!
After cleaning cycle completion allow the oven and the cleaned parts to cool down.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

WARNING

Danger of crushing and shearing at the chamber door and at the parts tray when opening or closing the chamber door.
Keep a safe distance! Do not put your hand between moveable parts.

WARNING

Danger of contact with plastic melts / hazardous materials.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

6.1.1 Material/Substance Hazards

WARNING

Danger of pollutant emissions.
The exhaust air from the water vapor separator must be vented outside the plant and may require treatment. Drain water from the water vapor separator may need treatment.
The exhaust air piping must be regularly checked for leaks.

Danger of contact with plastic melts / hazardous materials.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

Solids emissions from the primary trap and secondary trap must be properly disposed of, with rubber glove handling recommended to avoid contact with polymer residue.

Jet Cleaner emissions may be regulated at the federal, state, or local level, and various government agencies.

6.1.2 Hazards of Pneumatics System (if fitted)

WARNING

Danger of bursting on pneumatics system with overpressure!
At all times adhere to the permitted operating pressure of 8 bar.

Danger of escape of hot gases or liquids in pneumatics system!
The intake lines must be properly installed.
Inspect and replace lines on a regular basis.
Maintenance and repair work must only be carried out in pressure-free and cool condition.

Wear protective clothing and safety goggles.

6.2 Installation Requirements

The Cleaning Oven must be installed in the plant in such a way, that there is sufficient access space available to allow installation and repair work to be carried out.

- Minimum clearance for Primary Trap and Secondary Trap cleaning, Control Panel access, and Vacuum Pump maintenance 1.2 meters (4 feet) on all sides of the Jet Cleaner is recommended.
- Ensure sufficient space above the excess pressure relief valve and above the cleaning chamber. ⇗ Chapter 3.4.5

The location of connections and the spatial requirements can be found in the accompanying dimensional drawings. ⇗ Appendix

Observe the details given in the Chapter 0 "Transportation and Storage"

6.2.1 Assembly

Upon plant receipt, carefully uncrate the equipment. Review all parts and insure that none are damaged. If part damage has occurred, report to the freight carrier and NORDSON. Do not start up the equipment with damaged parts. Store equipment in a dry location and prevent freezing.

- Review the safety guidelines section (⇗ Chapter 6.1), and read this section completely before starting the installation. Several factors must be considered for a good installation.
- Review the order and part Information page of this manual for options supplied. ⇗ Appendix
- Review the drawings supplied with this manual for machine arrangements, utility connections, and part name identification. ⇗ Appendix

The Jet Cleaner should be installed in a dry, well ventilated indoor location.

6.2.2 Positioning

The oven has to be positioned in the direction that it has a vertical declination between 1° and 3° to the closed end of the oven. So no fluid can drop out over the oven door seal. This will keep your workshop clean and guarantees a long life of the oven seal.

6.2.3 Mechanical Installation

Only transport the Jet Cleaner when the chamber door is closed.
For moving the Jet Cleaner into position use the forklift pockets or the lifting eyes depending on model. ⇗ Chapter 5.3

The minimum recommended clearance for primary trap and secondary trap cleaning, control panel access, and vacuum pump maintenance is 1.2 meters (4 feet) on all sides of the Jet Cleaner.

Part handling is the responsibility of the end user.

Suitable space should be provided to ease handling and to allow for operator safety. Small parts can be loaded by hand. Auxiliary handling equipment may be desired for larger parts. Part holding fixtures may be desired to maximize effective use of the Jet Cleaner. For the best cleaning, fixtures should maximize polymer drainage into the parts Tray, avoiding flow across other parts, and maximize radiant heat exposure to the parts. A nearby steel covered work bench for part preparation before reuse is recommended for convenience.

Level the Jet Cleaner so that the parts tray moves in and out of the chamber freely. Lagging the frame to the floor is not necessary.

Verify the chamber door alignment to the chamber. Closing the chamber door clamps must insure that the chamber door „O" Ring contacts the chamber flange, all around.

6.2.4 Installation of the Exhaust System

Run the water vapor separator exhaust outside the plant. A blower may be used for runs over 9 meters (30 feet). A barometric damper in the line to prevent excessive water carry over from the drain should be included.
An airflow of 100 standard cubic feet per minute (2.8 standard cubic meters per minute) is sufficient.

The Jet Cleaner location should have good ventilation to remove polymer fumes and heat. An exhaust hood can be installed.

6.2.5 Water and Drain

- Connect water at a minimum supply pressure of 15 PSI (1 bar) to the water inlet shown on the plumbing diagram. ⇗ Appendix.

Flow rates during operation are nozzle regulated approximately as follows:

Jet Cleaner Model	Gallons Per Minute	Liters Per Minute
1724	2.5	9.5
2448	3.0	11.4
2484	5.0	18.9
3648	5.0	18.9
3672	5.0	18.9

- Connect the water vapor separator drain to the plant drain system.
- Insure minimum restriction to the gravity drain.

High temperature plumbing is not required as operating drain water temperatures are cool.

6.2.6 Water Specification for JCP Cleaning Ovens

For the vacuum pump we recommend using fresh water as operating fluid and cooling medium. The oven variant with secondary trap additionally uses fresh water to wash gases out of the exhaust stream. Well water, drinking water or cooling water can be used as fresh water. However, it is essential to follow the table and the instructions below to ensure a trouble-free operation.
We recommend connecting an upstream water particle filter to the plant in order to eliminate any possible contaminations even before they occur.

Table of freshwater requirements	
Hydrological data	Limit Values
Water supply pressure at the system connection	min. 1 bar (15 PSI)
Water temperature at the system connection	10°C (50°F) to max. 40°C (104°F)
pH value	7-8,5
Water hardness degree soft	less than 2 millimole calcium carbonate per litre
Suspended particles in water	> 5 < 15 mg/dm³ (water particle filter recommended)
Conductivity	< 2200 µS/cm
Nitrate and Nitrite	< 10mg/dm³

When using cooling water it is mandatory to comply with the national cooling water guidelines and regulations in order to prevent problems. If the above-mentioned limit values cannot be met, the following solutions are possible:

Problem	Solution
Mechanical contamination:	Filtering of water via mesh filter, gravel filter, cartridge filter, precoated filter.
Excessive hardness:	Softening of the water via ion exchange.
Moderate content of mechanical contaminations and hardeners:	Adding stabilisers and/or dispersing agents to the water.
Moderate content of chemical contaminations:	Adding passivators and/or inhibitors to the water.
Biological contaminants, slime bacteria and algae:	Adding biocides to the water.

6.2.7 Compressed Air / Filter Lubricator

If the Jet Cleaner is fitted with automatic chamber door clamps or other pneumatic devices, connect a compressed air line to the filter regulator as shown on the plumbing or general arrangement drawing
⇗ Appendix.
For oil requirements/additional data, ⇗ see Appendix.

WARNING

Danger of bursting on pneumatics system with overpressure!
At all times adhere to the permitted operating pressure of 8 bar.

Danger of escape of hot gases or liquids in pneumatics system!
The intake lines must be properly installed.
Inspect and replace lines on a regular basis.
Maintenance and repair work must only be carried out in pressure-free and cool condition.

Wear protective clothing and safety goggles.

Never connect compressed air to the air solenoid valve.

6.2.8 Catox Connection (optional)

The CatOx chamber and plumbing are shipped loose for efficient and safe transport.

- Connect the inlet, discharge piping to the chamber/valve, and pump respectively.
- Adjust the support column to take the weight of the CatOx unit off the plumbing connections.
- Connect wiring for the air preheater and the three solenoid valves per the schematic.
- Assemble the heat guarding around the CatOx Sub-assembly.

6.3 Control System / Electrical Connecting

DANGER

Danger from electrical energy. Fatal electrical shock and death possible.
During installation, maintenance, servicing and disassembly the machine must be secured against being switched back on.
Trained and instructed personnel may only operate the machine.

Electrical work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

- Connect the electrical power supply to the control panel per the wiring diagram and local electrical codes and standards.

A recommended power input location to the control panel is shown on the Jet Cleaner “Dimension Sheet”. ⇗ Appendix.

Connection specifications and interfaces are defined in the wiring diagram located in the control cabinet.

6.3.1 Power supply

The power supply and the fuses are to be provided by the operator.
⇗ Electrical Documentation (Appendix)

7 Operating and Troubleshooting

7.1 Safety

7.1.1 General Notes

All installation, operation, maintenance, servicing and dismantling must be done by appropriately trained and qualified personnel.

Electrical work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

Under no circumstances whatsoever must safety devices, provided by the manufacturer, be either removed or have their function impaired or rendered inoperative!

Failure to follow recommendations for specific Jet Cleaner features and a lack of good industrial practice can increase personnel safety risks and create possible unreliable machine operation.

Refer to the drawings supplied with this manual for part name and identification. (⇗ see Appendix).

7.1.2 Electrical Hazards

DANGER

Risk of electrical shock or death!
Before performing installation, maintenance, servicing and disassembly, insure power supply is off and locked against accidental switch-on.

7.1.3 Thermal Hazards

DANGER

Deflagration is possible in case of malfunction.
Injuries and property damages possible.
Always keep excess pressure relief valve operable.
Ensure sufficient space above the excess pressure relief valve and above the cleaning chamber.
Be careful of vacuum sealing surfaces as damage may reduce the chamber vacuum and introduce air during the pyrolysis cycle.
Check and clean all vacuum sealing surfaces and the seals at the excess pressure valves on a regular basis.

WARNING

Hot surfaces of Jet Cleaner components and cleaned parts.
The cleaning oven is operated at high temperatures! If surfaces are touched, without protection, there is a danger of injury by burning!
After cleaning cycle completion allow the oven and the cleaned parts to cool down.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

Hot polymer may self-ignite if exposed to air.
This can happen when opening the Chamber Door after a pyrolysis cycle that was set for too short of a time period. Impact injuries or burns are possible if you are near the Chamber Door or excess pressure relief valve when an ignition occurs.
When opening the Chamber Door at the end of a cleaning cycle, wear a full face mask, heat resistant gloves, fully covering clothing, steel toe safety shoes, and use the Chamber Door as a heat shield.

If polymer ignition does occur, close the parts in the chamber and rerun a longer pyrolysis cycle.
If the Jet Cleaner will not operate, close the parts in the chamber to smother the fire, and reopen when cool.

WARNING

Danger of crushing and shearing at the chamber door and at the parts tray when opening or closing the chamber door.
Keep a safe distance! Do not put your hand between moveable parts.

WARNING

Danger of contact with plastic melts / hazardous materials.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

WARNING

Do not run the pyrolysis cycle vacuum with less than 25 inHg (0.85 bar) or the oxidation cycle vacuum less than 20 inHg (0.68 bar).
Low vacuum operation increases the risk of polymer ignition, burns, part or machine damage, and excessive emissions from the Jet Cleaner.

Do not clean parts with foreign materials in the Jet Cleaner. Material expansion or off-gassing could cause part failures with impact risks.

Keep all control features and safety interlocks in good working condition. ⇗ Chapter 3.4
Keep the excess pressure relief valve in good working condition. The excess pressure relief valve relieves positive pressure that may develop if polymer ignition occurs.
The operator of the system into which this machine is integrated is responsible for any necessary safety measures at the excess pressure relief valve

7.1.4 Mechanical Hazards

WARNING

Danger of crushing and shearing at the chamber door and at the parts tray when opening or closing the chamber door.
Keep a safe distance! Do not put your hand between moveable parts.

Risk of getting squeezed by moveable parts (at the primary and secondary trap and at the excess pressure relief valve).
Injuries of fingers and hands possible.
Do not put your hand between moveable parts.
Wear heat protected gloves and protective clothing.
The operator of the system into which this machine is integrated is responsible for any necessary safety measures at the excess pressure relief valve.

WARNING

Danger of crushing by falling objects!
Death or serious injuries possible.
Never walk or stand under lifted loads!

Load and unload parts carefully.

Small parts are usually loaded manually. Large parts may require a part handling system to the parts tray. This system is the responsibility of the end user and must be capable of safely handling the parts. Parts must be very stable when positioned in the parts tray to allow safe loading and unloading into the chamber.

7.1.5 Material/Substance Hazards

WARNING

Danger of pollutant emissions.
The exhaust air from the water vapor separator must be vented outside the plant and may require treatment. Drain water from the water vapor separator may need treatment.
The exhaust air piping must be regularly checked for leaks.

Danger of contact with plastic melts / hazardous materials.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

Solids emissions from the primary trap and secondary trap must be properly disposed of, with rubber glove handling recommended to avoid contact with polymer residue.

Jet Cleaner emissions may be regulated at the federal, state, or local level, and various government agencies.

7.1.6 Hazards of Pneumatics System (if fitted)

WARNING

Danger of bursting on pneumatics system with overpressure!
At all times adhere to the permitted operating pressure of 8 bar.

Danger of escape of hot gases or liquids in pneumatics system!
The intake lines must be properly installed.
Inspect and replace lines on a regular basis.
Maintenance and repair work must only be carried out in pressure-free and cool condition.

Wear protective clothing and safety goggles.

7.1.7 Hazard Areas / Personal Protective Equipment

Stay alert and proceed with caution and respect when working on or near the Jet Cleaner. Conditions present are:
- a high temperature vacuum chamber
- high temperature polymer which may ignite if exposed to air
- very hot surfaces, danger of burning
- dangerous electrical voltage on the electrical equipment and control cabinet
- danger of crushing by moveable parts of the oven
- deflagration is possible in case of malfunction
- danger of pneumatic energy (if oven is fitted with pneumatic clamps)

The operator must ensure that only authorized, experienced and skilled staff members are working in the hazard areas.
Any person working in a hazard area must wear personal protective equipment.

Personal protective equipment:
- full face protection
- temperature–resistant gloves and protective clothing
- closed safety shoes

7.1.8 Continuous Operation / Maintenance

The inspection and maintenance intervals have to be kept for usage according to the regulations.

Please note the information in ⇗ chapter 0 "Maintenance and Servicing“

7.1.9 Noise

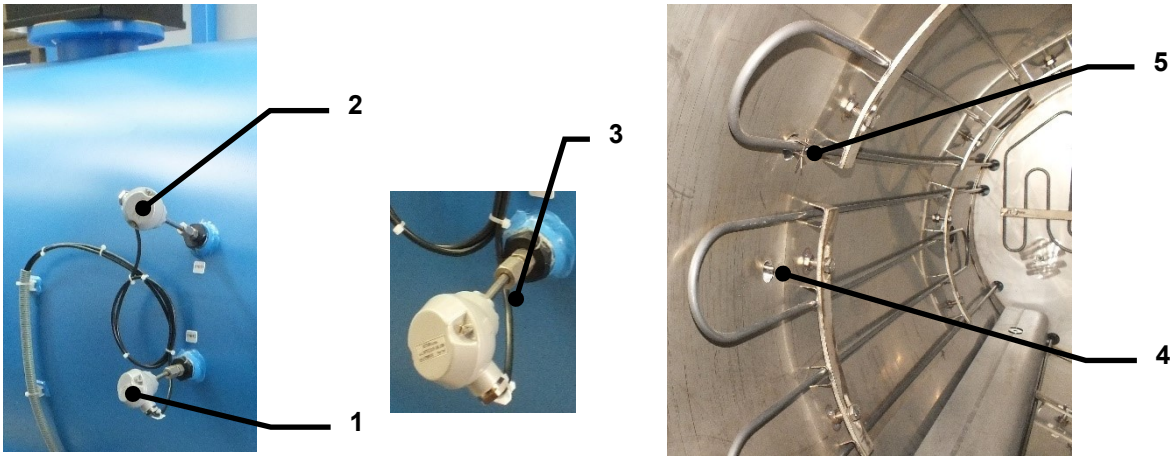
Jet Cleaner noise levels during operation are about 77 dBA 3 feet from the vacuum pump. This is below the ISO 10% allowable noise dose per 40 hour work week. Full operator exposure is allowed. Operator attendance is not required at the Jet Cleaner.

7.2 Operating the Cleaning Oven

Before operating the oven, review and follow the safety guidelines.
⇗ Chapter 7.1

7.2.1 Pre-operational Check

Before you can operate the cleaning oven you have to run through the steps of this chapter.



The control thermocouple (**1**) and (**4**) measures the temperature inside the oven.

The over-temperature thermocouple (**2**) measures the chamber heater temperature. The over-temperature thermocouple is inserted into a protective thermowell which is connected to the chamber heater (**5**). Only when the tip of the over-temperature thermocouple is contacting the bottom of the thermowell the thermocouple can accurately measure the heater temperature.

- Check the control thermocouple (**1**) and the over-temperature thermocouple (**2**) to insure they are both firmly fixed. If necessary re-tighten the fixing nut (**3**). Make sure that there are no air leaks.
- Verify that the over-temperature thermocouple (**2**) is contacting the **thermowell bottom**. Check that the thermowell is connected to the chamber heater (**5**).
- Inspect all vacuum seal surfaces and clean if necessary.

  Small amounts of dirt can prevent initial vacuum, or reduce operating vacuum. The excess pressure relief valve, when fitted, has a metal to metal seal.

  - Insure that the Chamber Door „0" Ring, Primary Trap „0" Ring, and Secondary Trap Gasket are in place and not damaged.
  - Close the chamber door, primary trap door, and secondary trap cover.
  - Close the manually operated chamber door clamps, if fitted, and tighten the primary and secondary trap cover to make light „0" Ring or gasket contact all around.

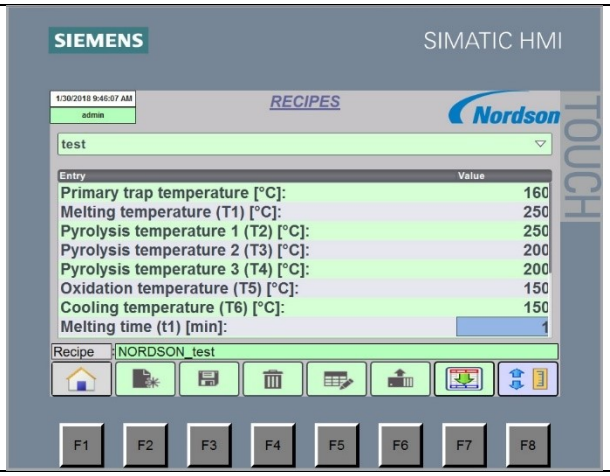
    Over-tightening can cause cocking, vacuum loss and part damage. During operation, the force created by the vacuum will establish the seal.

  - Turn on the electrical power supply, water, and compressed air if required.
  - If you operate the cleaning oven for the first time after installation or re-installation run an initial test cycle and continue with Chapter 7.2.2.
    Otherwise continue with chapter 7.2.3.

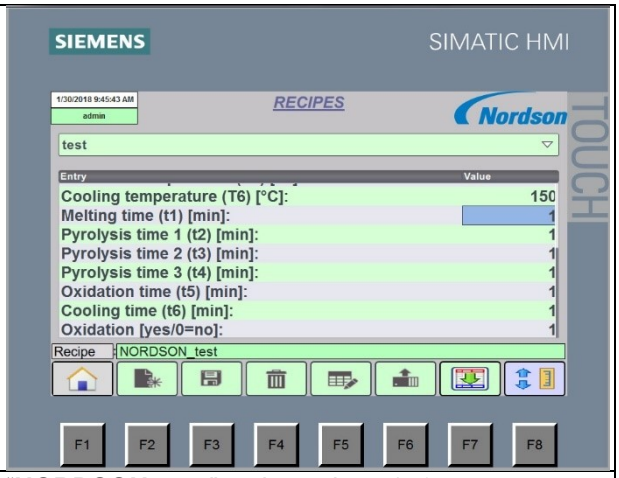
7.2.2 Running a Test Cycle

For more information on the "**Program / Recipe Settings**" menu ⇗ see also chapter 4.6.6.

After installation or re-installation of the cleaning oven run an initial test cycle as follows:



"NORDSON_test" recipe – temperature T1-T6



"**NORDSON_test**" recipe – time t1-t6

For each temperature setting **(T1-T6)** there is a corresponding timer setting **(t1-t6)**. In order to edit all timers scroll down the parameter list.

1. **Run Pump Rotation Test**

- Turn the power switch on, turn the PLC into test run cycle, program "**NORDSON_test**", settings are of minimum values, and start.

  The vacuum pump starts and the air solenoid valve closes. If supplied, automatic chamber door clamps close.

- Confirm correct rotation of the vacuum pump motor indicated by the rotation arrow.

Electrical work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

If vacuum pump rotation is incorrect, stop the program (see ⇗ chapter 4.6.3), disconnect main power, and rewire to correct motor rotation. Turn on the main power and restart the cycle "**NORDSON_test**".

2. Run Water Flow Test

- Confirm water flow to the vacuum pump by observing the drain.

  The chamber heater for the Jet cleaner can receive power only when the chamber reaches a 720 mbar absolute pressure (21 inches of mercury).
  At the end of the one minute test cycle time, the vacuum pump and water flow will stop.

- Open the chamber door and primary trap door and confirm that the chamber and primary trap collector pan(s) are dry.

  Water inside the chamber and primary trap indicates that the check valve is not installed properly, allowing back flow of water during repressurization.

- Close the chamber door and primary trap door.
- Open the secondary trap cover and again start the same cycle to confirm water spray from the secondary trap spray nozzles.
- Stop the cycle and close the secondary trap cover.

3. Run Oxidation Cycle Test

- Oxidation Cycle is activated (setting is "**1 = yes**"), also set 10 minutes on the Oxidation Cycle Timer. Set zero minutes on the Cool Down Cycle Timer and start the cycle.

  When the Pyrolysis Cycle times out, the Air Solenoid Valve opens to allow air flow through the Chamber. All other Pyrolysis Cycle functions continue. At the end of the Oxidation Cycle time, the Jet Cleaner shuts down in the same manner as at the end of the Pyrolysis Cycle.

4. Run Cool Down Cycle Test

- Also set one minute on the Cool Down Cycle Timer and start the cycle.

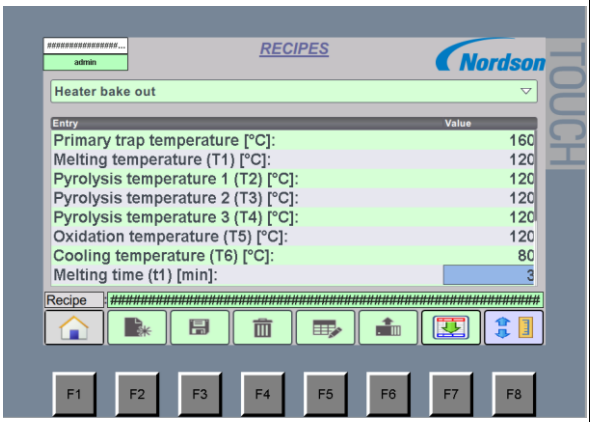
  When the Pyrolysis Cycle and Oxidation Cycle times out, the Air Solenoid Valve opens to allow air flow through the Chamber, and the Heaters are turned off. All other Pyrolysis Cycle functions continue. At the end of the Cool Down Cycle, the Jet Cleaner shuts down in the same manner as at the end of the Pyrolysis Cycle.

5. Run Power Loss Test

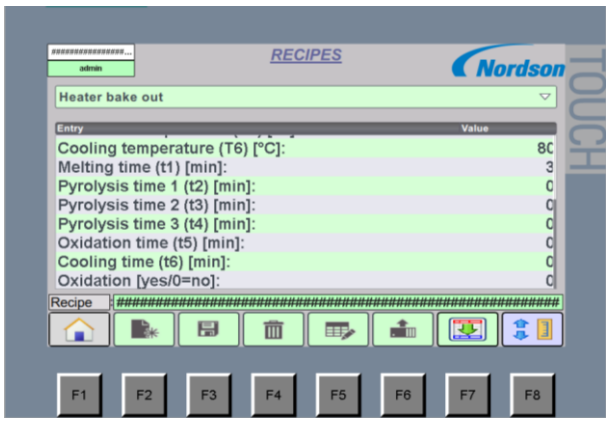
- Set 5 minutes on the Pyrolysis Cycle setting, set the Temperature to minimum, zero minutes on any other Cycle Timers, and start the cycle.
- Allow the Vacuum Gage indication to stabilize. Minimum Chamber vacuum should be 25 inches of Mercury (0.85 bar) at sea level.
- Turn the Main Switch **OFF** to simulate a plant power loss. The Jet Cleaner will completely shut down and the vacuum will hold with a gradual loss.
- Turn **ON** the Main Switch to open the Air Solenoid Valve.

6. Run two Heater bake out cycles

Residual moisture must be baked out of all new Heaters to prevent premature failure.



Heater bake out – temperature T1-T6



Heater bake out – time t1-t6

First Heater bake out cycle

- Set 160°C (320°F) on the Primary Trap Controller. Set 120°C (250°F) on the Melting Temperature Controller, 3 minutes on the Melting Timer.
- Set the Cooling Temperature to 80°C (175°F) other temperatures to minimum, and zero minutes on any other Cycle Timers.
- Start the first cycle. A large temperature overshoot is typical at low settings.
- After cycle completion open the Chamber Door and cool for 20 minutes.

Second Heater bake out cycle

- Set 250°C (480°F) on the Primary Trap Controller.
- Set a temperature of 480°C (900°F) with 4 minutes on the Pyrolysis Cycle Timer to power the Heaters for about 4 minutes, and start the second cycle.
- When complete, open the Chamber Door and cool for 20 minutes.

7. Run Dry cleaning Cycle

- Perform a dry cleaning cycle (recipe “**NORDSON_test**”) to confirm all normal control functions.
- Start the cycle.
- Observe Pyrolysis Cycle start and operation. Verify that the Chamber temperature is controlled at the Temperature Controller set point.
- Observe operation features of other cycle(s). Confirm shut down at the end of the cleaning cycle.

7.2.3 Loading Parts and Preparing the Cleaning Oven

WARNING

Danger of crushing by falling objects!
Death or serious injuries possible.
Never walk or stand under lifted loads!

Load and unload parts carefully.
Small parts are usually loaded manually. Large parts may require a part handling system to the parts tray. This system is the responsibility of the end user and must be capable of safely handling the parts. Parts must be very stable when positioned in the parts tray to allow safe loading and unloading into the chamber.

WARNING!
Before you open the oven the cooling phase should always be completed. Only then you can be sure that the temperature has gone down to a safe level.

Opening the oven and taking out parts, should only be done when the appropriated safety measures have been taken:

Wear safety clothing, heat protected gloves, safety goggles or a full face mask.

The Oven can be opened by lifting the safety clamp on top of the chamber door and by opening the manually operated Chamber Door Clamps or the Pneumatic Clamps on the side of the Jet Cleaner (depending on model). Now it is possible to open the oven and place the parts that need to be cleaned inside the Parts Tray.

- Make sure that there are no foreign objects in the cleaning chamber.
- Load the parts into the Parts Tray in a secure manner to minimize part falling and operator safety risks.
- Arrange parts to maximize polymer drainage, avoiding flow across other parts. Maximize part exposure to the radiant heat.
- Insure that all polymer drainage will occur by gravity flow so that the polymer is routed and collected in the Primary Trap Collector Pan.
- Close the Chamber Door and manually operated Chamber Door Clamps, if fitted.

Lining the Primary Trap Collector Pan(s) with aluminum foil is recommended to ease removal of the collected material at the end of the cleaning cycle.

- Insure that the Primary Trap Door and Secondary Trap Cover are closed.
- Insure that the electrical power supply, water, and compressed air if required, are turned on for the Jet Cleaner.
- Switch on the control cabinet (main switch in the door) so the system can perform a self-check of the touch panel and the PLC.

  When this all is finished the NORDSON logo is displayed on the screen. ⇗ Chapter 4.6.1

7.2.4 Operating conditions

Review the Cycle Descriptions section of this manual to confirm cycle function and other cycles supplied with the Jet Cleaner. ⇗ chapter 3.5.1

Optimum operating conditions depend on many variables, including the configuration and weight of the part to be cleaned and the type and amount of polymer to be removed.

Cycle times

Cycle times have the largest effect on cleaning performance. Longer cycles are recommended initially, with 15 minute reductions to arrive at the most efficient conditions based on cleaning experience.

For large parts, the times should be increased by approximately 25%.

Step	Temperature	Time	Remarks
Melting	Melt point of the plastic material + 30°C	60 - 300 min	The time depends on the weight of the parts and the amount of the plastic remnants; most of the plastic material should be melted off in the primary trap.
Pyrolysis 1:	Melt point of the plastic material + 80°C	60 min	Plastic material will be transferred into gaseous state.
Pyrolysis 2:	Melt point of the plastic material + 130°C	60 min	Plastic material will be transferred into gaseous state.
Pyrolysis 3:	Melt point of the plastic material + 180°C	60 min	Plastic material will be transferred into gaseous state.
Oxidation:	450°C	minimum 60 min	The remaining plastic material will be burned. When removing the parts they should have a light-white or light-brown layer of dust.
Cooling:	100°C	5 min	The parts and the oven will be cooled down. The time starts to run when the oven has the temperature of 100°C.

All Jet Cleaner cycle temperatures must be well below the temperature of any heat treating that was performed on the parts to be cleaned, to prevent loss of hardness or strength.

Do not clean polymers with different melting points in one cleaning cycle. In order to avoid part or machine damages and improper cleaning only mix materials with similar melting points.

Jet Cleaners with CatOx System (optional)

The CatOx system must not be overloaded with polymer vapors otherwise environmental damage or equipment damage can result. This can be safe-guarded by observing the following:

- NEVER clean more than 17.6 pounds (8 kg) per hour of polyolefin (PE, PP, etc) from the parts.
- NEVER clean polyolefins with chamber temperature above 825°F (440°C) until CatOx Combustion temperature TCc returns below 900°F (482°C).
- NEVER clean more than 8.8 pounds (4kg) per hour of PET from parts.
- NEVER clean more than 6.6 pounds (3kg) per hour of polystyrene.
- NEVER clean polystyrene with chamber temperatures above 750°F (400°C) until CatOx Combustion Temperature TCc returns below 900°F (482°C).

For best CatOx treatment and life, run the first two steps at a temperature between the melt temperature of the polymer and 750°F (400°C) for styrene and 825°F (440°C) for other polymers.
Step three or four can be used as a "polishing" step at higher temperature once most of the polymer is drained or vaporized.

Temperature settings of 850°F (455°C) are adequate for most polymers. The set temperature, sensed on the Chamber Heater sheath will be indicated quickly on the Temperature Controller. However, the parts to be cleaned will heat up much more slowly.

Temperatures below 800°F (425°C) usually require excessively long cycle times to clean the parts.

Temperatures of 900°F (480°C) usually provide more rapid cleaning but are MUCH more likely to exceed the CatOx treatment capability, and can ONLY be used where amounts of polymer remaining in the part are very small.

Small temperature changes of 60°F (15°C) are recommended until the optimum setting is determined based on experience.

Heavy parts with enclosed polymer should be cleaned at initial melting temperatures of at least 60°F (15°C) below the above recommendations since by the time polymer flows the chamber may be very hot, boiling off much fuel gas at one time.

7.2.5 Running a Cleaning Cycle

DANGER

Deflagration is possible in case of malfunction.
Injuries and property damages possible.
Always keep excess pressure relief valve operable.
Ensure sufficient space above the excess pressure relief valve and above the cleaning chamber.
Be careful of vacuum sealing surfaces as damage may reduce the chamber vacuum and introduce air during the pyrolysis cycle.
Check and clean all vacuum sealing surfaces and the seals at the excess pressure valves on a regular basis.

WARNING

Hot surfaces of Jet Cleaner components and cleaned parts.
The cleaning oven is operated at high temperatures! If surfaces are touched, without protection, there is a danger of injury by burning!
After cleaning cycle completion allow the oven and the cleaned parts to cool down.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

Hot polymer may self-ignite if exposed to air.
This can happen when opening the Chamber Door after a pyrolysis cycle that was set for too short of a time period. Impact injuries or burns are possible if you are near the Chamber Door or excess pressure relief valve when an ignition occurs.
When opening the Chamber Door at the end of a cleaning cycle, wear a full face mask, heat resistant gloves, fully covering clothing, steel toe safety shoes, and use the Chamber Door as a heat shield.

If polymer ignition does occur, close the parts in the chamber and rerun a longer pyrolysis cycle.
If the Jet Cleaner will not operate, close the parts in the chamber to smother the fire, and reopen when cool.

WARNING

Danger of crushing and shearing at the chamber door and at the parts tray when opening or closing the chamber door.
Keep a safe distance! Do not put your hand between moveable parts.

Risk of getting squeezed by moveable parts (at the primary and secondary trap and at the excess pressure relief valve).
Injuries of fingers and hands possible.
Do not put your hand between moveable parts.
Wear heat protected gloves and protective clothing.

The operator of the system into which this machine is integrated is responsible for any necessary safety measures at the excess pressure relief valve.

WARNING

Danger of contact with plastic melts / hazardous materials.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

WARNING

Do not run the pyrolysis cycle vacuum with less than 25 inHg (0.85 bar) or the oxidation cycle vacuum less than 20 inHg (0.68 bar).
Low vacuum operation increases the risk of polymer ignition, burns, part or machine damage, and excessive emissions from the Jet Cleaner.

Do not clean parts with foreign materials in the Jet Cleaner.
Material expansion or off-gassing could cause part failures with impact risks.

Keep all control features and safety interlocks in good working condition. ⇗ Chapter 3.4
Keep the excess pressure relief valve in good working condition.
The excess pressure relief valve relieves positive pressure that may develop if polymer ignition occurs.
The operator of the system into which this machine is integrated is responsible for any necessary safety measures at the excess pressure relief valve

All Jet Cleaner cycle temperatures must be well below the temperature of any heat treating that was performed on the parts to be cleaned, to prevent loss of hardness or strength.

Do not clean polymers with different melting points in one cleaning cycle. In order to avoid part or machine damages and improper cleaning only mix materials with similar melting points.

- Verify that all functions are in working condition on the “Alarms and Faults” screen. Check that there is no active alarm.
- Set the cycle conditions based on the above recommendations. ⇗ chapter 7.2.4
- If a set of pre-programmed recipes is supplied, review and select a pre-programmed recipe (⇗ chapter 4.6.6) for the parts to be cleaned, or program a recipe based on the recommendations above.
- Start any blowers in the exhaust system (optional), that are not arranged to automatically start with the Jet Cleaner cycle.
- Start the first cleaning cycle. ⇗ chapter 4.6.3

  The vacuum pump starts and the water inlet is opened.

- Check if a high vacuum is produced, and that the temperature increases continuously.

  Once the temperature of a step is reached, the countdown of the selected step time starts. Once the step time has elapsed, the temperature rises to the value required for the next step.

  As soon as the oxidation step temperature is reached, the air valve opens and the countdown of the oxidation step time commences.

  As soon as the oxidation cycle time has elapsed, the heating is switched off. The vacuum pump continues to run and the air valve remains open.

  Once the chamber temperature is lower than the selected Cooling Temperature, the vacuum pump switches off and the water inlet and air valve are closed. The cleaning cycle is complete.

- After cycle completion allow the parts to cool and then remove them from the parts tray.
  Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

Some polymer compounds may leave an inorganic residue that can be brushed off. A suitable coating on the cooled part will prevent rusting.

If the parts do not seem to be cleaned well, see the trouble shooting guide section of this manual for recommendations (⇗ chapter 7.3), or call the NORDSON Service Department (⇗ chapter 8.5).

Before cleaning the oven pay attention to ⇗ Chapter 0 “**Maintenance and Servicing**”.

- Allow the oven to cool down.
- Open and clean the primary trap and clean the parts tray. Insure that the polymer drainage hole leading from the oven chamber into the primary trap is open.
- Open the secondary trap cover and clean the secondary trap basket.
- Clean the oven chamber.
- Turn off water after finishing the cleaning process.

7.3 Troubleshooting

A selection of possible faults and remedies are listed below. If other faults occur or if the remedy is unsuccessful, please contact NORDSON BKG customer service center ⇗ chapter 8.5.

Fault	Possible Cause	Remedial Measures
1. Poor part cleaning	1.1 Low chamber vacuum	If pressure is less than 14 inches of mercury (0.5 bar) during the pyrolysis cycle, ⇗ see **fault 2.** "**Low or erratic vacuum**" section below for recommendations to correct.
	1.2 Individual heater failure	The cycle operation may appear unchanged as long as the chamber heater sensed by the over-temperature thermocouple is operating. Replace any failed heaters.
	1.3 Cleaning cycle is not optimized	⇗ Review the **Cycle Descriptions** and **Operating Condition** sections in this manual for guidelines (chapter 3.5.1 and 7.2.4). Consider increasing cycle times, and then cycle temperatures.
	1.4 There is a solid organic residue after cleaning	- Increase the pyrolysis cycle time. - Increase the oxidation cycle time.
	1.5 Red oxide is apparent immediately after cleaning	Oxygen (air flow into the chamber) is present during cleaning. Do not use an oxidation cycle. ⇗ See **fault 2. "Low or erratic vacuum"** section below for recommendations to correct leakage during the pyrolysis cycle.
2. Low or erratic vacuum	14 inches mercury (0.5 bar) is the minimum chamber vacuum during the pyrolysis cycle for good cleaning at sea level. Each 1000 feet (300 meters) of elevation above sea level will reduce the chamber vacuum readings by 1" Hg (0.034 bar).	
	2.1 Vacuum seal surfaces are leaking	- Inspect and clean the seal surfaces of the chamber door, primary trap door, secondary trap cover or CatOx chamber cover, and excess pressure relief valves. - Replace any damaged chamber door „O"-Ring, Primary Trap „O" Ring, secondary trap gasket or CatOx chamber cover gasket and insure they are properly installed. The primary trap doors, secondary trap cover or CatOx chamber covers should be hand tightened to make primary trap „O" Ring and secondary trap gasket or CatOx chamber gasket contact all around with the mating flange. Heavy tightening may cock the seal surface preventing proper seating, cause vacuum loss and damage parts. Shortly after the initial vacuum, all seal surfaces will be drawn tightly to the mating flange.
	2.2 Leaking air solenoid valve or manual valve	- Clean or replace
	2.3 Faulty vacuum gage or pressure transmitter.	- Replace
	2.4 Plugged water strainer	- Clean
	2.5 Leaking plumbing or hose connections	- Systematically check each joint between the vacuum pump and the chamber and tighten or replace as required.

Fault	Possible Cause	Remedial Measures
	2.6 Plumbing connections are blocked	- Check internal passages and remove any blockages.
	2.7 Faulty Vacuum Pump Operation	- Insure the water can drain freely during the cycle. - Replace water flow control if flow rates do not match ratings in the “Installation and Comissioning” section of this manual (⇗ chapter 6.2.5). - If no vacuum, the vacuum pump rotation may be incorrect. - Block off the vacuum pump inlet with a vacuum gage fitted. If the vacuum does not reach 27 to 28 inches Mercury (0.92 to 0.95 bar) at sea level immediately, rebuild or replace the vacuum pump.
3. Temperature does not reach set point	3.1 Faulty control thermocouple, over-temperature thermocouple, over-temperature controller, or wiring	- Repair or replace as required.
	3.2 Faulty heater that is not sensed by the over-temperature thermocouple	- Replace.
	3.3 Faulty vacuum switch	- Adjust to power heater contactor at 10 inches mercury (0.3 bar). Replace if not operating.
	3.4 Air preheat of CatOx may be inoperative, disabling chamber heater elements.	- Check continuity and power. Replace if necessary.
4. “ALARM OVER TEMPERATURE RESET” Light Illuminates	4.1 CatOx may have sensed a rapid temperature rise at restart with hot equipment	- Wait three to five minutes if cycle continues to run, and the light may extinguish itself.
	4.2 Over-temperature thermocouple is not sensing temperature	- Insure that the over-temperature thermocouple is bottomed in the thermowell and that it is firmly fixed. If necessary re-tighten the fixing nut. - Insure that the thermowell does not contain dirt, or other material that could result in temperature readings lower than the actual chamber heater temperature. - Check the thermowell condition for air leaks and verify that the thermowell is connected to the chamber heater. - Verify that inside the oven the thermowell is disconnected from the chamber liner. ⇗ see also chapter 8.2.6

Fault	Possible Cause	Remedial Measures
	4.3 Faulty control thermocouple, over-temperature thermocouple, over-temperature controller, or wiring	- Repair or replace as required.
	4.4 Faulty chamber heater at the over-temperature thermocouple location	- Replace.
	4.5 Incorrectly adjusted over-temperature controller	- Adjust to 1100°F (593.3°C) or replace.
5. Vacuum pump will not start or trips starter overloads	5.1 No electrical power	- Insure power supply to the Jet Cleaner. Reset the motor starter overloads.
	5.2 Vacuum pump is frozen	There is solid polymer residue on the vacuum pump rotor. - Disassemble and clean. Assure CatOx is functional.
6. Primary trap inlet plugs with polymer	6.1 The primary trap inlet is too cold	- Insure correct heater operation on primary trap inlet and correct control operation.
	6.2 Part drainage is not aligned with the primary trap inlet	- Insure correct assembly of parts tray or drain deflector so that melt discharge aligns with the primary trap inlet flange.
7. "PREHEATER TEMERATURE OUT OF RANGE" - light comes on	If the "PREHEATER TEMERATURE OUT OF RANGE" light comes on, either the prior run did not produce enough gasses to heat the CatOx or the catalyst is damaged. If less than one pound of polymer per hour was cleaned, and the water discharge did not smell bad, the catalyst is likely still functional, just not making much heat.	

7.4 De-commissioning the Oven

⇗ Review chapter 7.1 and follow the safety guidelines.

7.4.1 Emergency or Alarm Shutdown

- In case of an emergency or alarm shutdown, immediately clear the equipment of the cause for the alarm shutdown.
- Make necessary adjustments to the system controls or the process to clear alarm conditions.
- Perform the startup procedures again as previously described.

7.4.2 Cleaning the Oven

Pay attention to the following
⇗ Chapter 0 “Maintenance and Servicing”

7.4.3 Storing the Oven

The Oven must only be stored if in a clean condition.

Please also refer to
⇗ Chapter 5.4 “Storage / Conservation”
The measures described there also apply to storing the Oven.

7.5 Re-commissioning the Oven

An overhauled Oven can be re-commissioned in the precisely the same way as initial installation and commissioning.
⇗ Chapter 6

8 Maintenance and Servicing

8.1 Safety / General Information

Commissioning and re-commissioning, assembly, maintenance and repair work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

All installation, operation, maintenance, servicing and dismantling must be done by appropriately trained and qualified personnel.

Electrical work must only be carried out by skilled, specialist personnel, under strict compliance with all safety notes given in this Manual.

Under no circumstances whatsoever must safety devices, provided by the manufacturer, be either removed or have their function impaired or rendered inoperative!

In addition to the notes on safety contained within this Manual, the safety and accident prevention regulations in force locally must be strictly adhered to!

Danger from insufficient maintenance.
Injuries or damages to the machine are possible.
Always follow the maintenance instructions. ⇗ chapter 8.2

DANGER

Risk of electrical shock or death!
Before performing installation, maintenance, servicing and disassembly, insure power supply is off and locked against accidental switch-on.

WARNING

Danger of Crushing and sheering of limbs during machine installation.

Only use safe lift trucks and transport devices. All transport must be done by appropriately trained and qualified personnel.

DANGER

Deflagration is possible in case of malfunction.
Injuries and property damages possible.
Always keep excess pressure relief valve operable.
Ensure sufficient space above the excess pressure relief valve and above the cleaning chamber.
Be careful of vacuum sealing surfaces as damage may reduce the chamber vacuum and introduce air during the pyrolysis cycle.
Check and clean all vacuum sealing surfaces and the seals at the excess pressure valves on a regular basis.

WARNING

Hot surfaces of Jet Cleaner components and cleaned parts.
The cleaning oven is operated at high temperatures! If surfaces are touched, without protection, there is a danger of injury by burning!
After cleaning cycle completion allow the oven and the cleaned parts to cool down.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

WARNING

Danger of crushing and shearing at the chamber door and at the parts tray when opening or closing the chamber door.
Keep a safe distance! Do not put your hand between moveable parts.
Risk of getting squeezed by moveable parts (at the primary and secondary trap and at the excess pressure relief valve).
Injuries of fingers and hands possible.
Do not put your hand between moveable parts.
Wear heat protected gloves and protective clothing.
The operator of the system into which this machine is integrated is responsible for any necessary safety measures at the excess pressure relief valve.

WARNING

Danger of contact with plastic melts / hazardous materials.
Wear personal protective equipment (full face mask, temperature–resistant gloves and protective clothing)!

WARNING

WARNING!
Danger of crushing by falling objects!
Death or serious injuries possible.
Never walk or stand under lifted loads!

Risk of danger through machine parts falling or tipping.
Transport and lifting devices must have the minimum lifting capacity required.
The general safety and accident prevention regulations must be observed.
Only transport the Jet Cleaner when the chamber door is closed.
Only the lifting points specified in this Manual must be used. (⇗ chapter 5.3.1 and 5.3.2)
The weight of the Jet Cleaner can be found in "Technical Data" sheet in the Appendix. The machine's centre of gravity is labelled on the pallet / crate.

8.1.1 Hazards of Pneumatics System (if fitted)

WARNING

Danger of bursting on pneumatics system with overpressure!
At all times adhere to the permitted operating pressure of 8 bar.

Danger of escape of hot gases or liquids in pneumatics system!
The intake lines must be properly installed.
Inspect and replace lines on a regular basis.
Maintenance and repair work must only be carried out in pressure-free and cool condition.

Wear protective clothing and safety goggles.

8.2 Maintenance Intervals

When cleaning never use sharp steel tools or coarse emery cloth, as these can destroy the surfaces!
Use a soft cloth and organic detergent to clean the surfaces and the vacuum seals.
Never use acids or other aggressive or corrosive cleaning agents, as these can destroy the vacuum seals!

Action	Interval				⇗ for further information see chapter
	after each cleaning cycle	weekly	regularly	according to supplier documentation	
Cleaning the Primary Trap	X				8.2.1
Cleaning the Secondary Trap Basket ***)**	X				8.2.2
Cleaning the Oven Chamber	X				8.2.3
Checking the Secondary Trap Spray Nozzles ***)**		X			8.2.4
Checking and Cleaning the Vacuum Seals			X		8.2.5
Checking the Thermocouples		X			8.2.6
Checking the Air Solenoid Valve			X		8.2.7
Checking the Pneumatics System (if fitted)			X		8.2.8
Maintaining the Vacuum Pump				X	8.2.9
Maintaining other Components				X	8.2.10
Test and Inspection of Safety Devices			X		8.3
***)** Action is only required for models without CATOX.					

8.2.1 Cleaning the Primary Trap

The primary trap collector pan(s) must be cleaned after each cleaning cycle. Insure that the polymer drainage hole leading from the oven chamber into the primary trap is open.

A lining of aluminum foil in the Collector Pan will ease material removal. Rubber gloves are recommended when cleaning to avoid contact with polymer residues.

8.2.2 Cleaning the Secondary Trap Basket

The secondary trap basket must have any deposits removed after each cycle.

Residue carry over can build up in the plumbing and the vacuum pump impeller. This can reduce chamber vacuum, increase air emissions, and bind the vacuum pump.

Rubber gloves are recommended when cleaning to avoid contact with polymer residues.

8.2.3 Cleaning the Oven Chamber

The chamber must be cleaned after each cleaning cycle.

Brush off any dust from the chamber. When cleaning the oven chamber wear a dust mask and personal protective equipment (full face mask, temperature–resistant gloves and protective clothing).

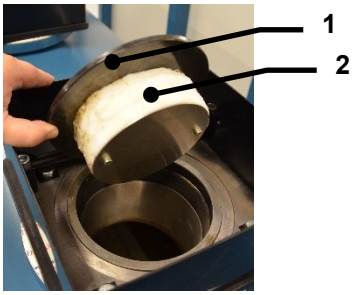
8.2.4 Checking the Secondary Trap Spray Nozzles

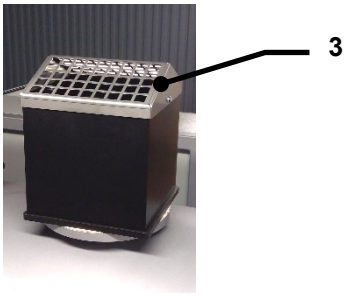
Check the secondary trap spray nozzles (1) for full spray weekly.

Gases not properly cooled will carry over more residue to the plumbing and vacuum pump. This can reduce chamber vacuum, increase air emissions, and bind the vacuum pump.

Clean the spray nozzle by using pressurized air, a nozzle needle or water the nozzles.

8.2.5 Checking and Cleaning the Vacuum Seals



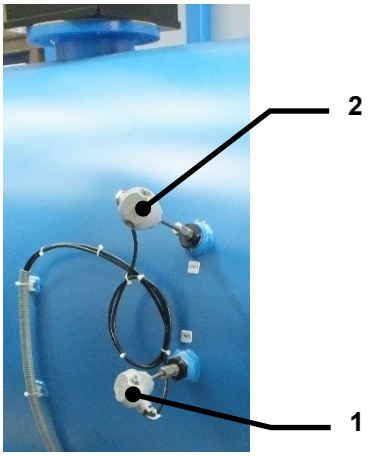


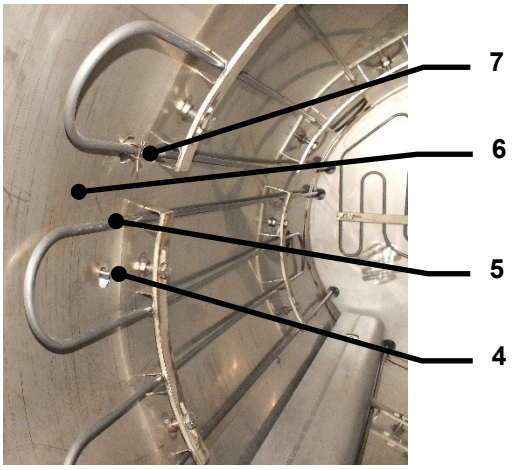
Check and clean the seals at the chamber door and at the excess pressure valves (1) on a regular basis.
Replace the insulation (2) of the excess pressure valve if the insulation should be damaged.
After maintenance always reinstall the perforated plate cover (3) of the excess pressure valve.

Inspect and clean the seal surfaces of the primary trap, secondary trap or CatOx chamber cover on a regular basis.

Replace any damaged „O"-Rings or gaskets and insure they are properly installed.

8.2.6 Checking the Thermocouples





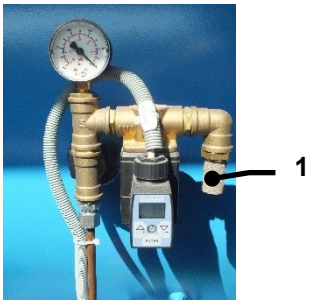
Check the control thermocouple (1) weekly to insure it is firmly fixed. If necessary re-tighten the fixing nut (3). Make sure that there are no air leaks.
Check that inside the oven the control thermocouple (4) does not contact the nearby chamber heater (5) or the chamber liner (6).

Check the spring loaded over-temperature thermocouple (2) weekly to insure it is firmly fixed. If necessary re-tighten the fixing nut (3). Make sure that there are no air leaks.
Insure that the over-temperature thermocouple is bottomed in the thermowell. Check that the thermowell is connected to the chamber heater (7).
Check that inside the oven the thermowell does not contact the nearby chamber liner (6).

Temperature readings lower than the actual chamber heater temperature can damage the chamber heaters. Low thermocouple readings and high chamber temperatures can be caused by:

- Thermocouples that are not firmly fixed.
- Excessive dirt in the thermowell.
- Wells / Ducts that are leaking air.
- A thermowell that is disconnected from the chamber heater.
- An over-temperature thermocouple that is not contacting the thermowell bottom.
- A thermocouple / a thermowell that is connected to the chamber liner.

8.2.7 Checking the Air Solenoid Valve



Clean the sound absorber (1) of the air solenoid valve on a regular basis using pressurized air.

8.2.8 Checking the Pneumatics System

Inspect and replace the lines of pneumatic system (if fitted) on a regular basis.

8.2.9 Vacuum Pump

The vacuum pump has to be maintained according to manufacturer's instruction. If not used for a longer time, remove water from housing and protect against corrosion in order to prevent blocking of impeller.

8.2.10 Other Components

Please take the maintenance instructions and intervals of other components from the attached operating manuals.

8.3 Test and Inspection of Safety Devices

Inspect all safety devices on a regular basis to find out whether they are still intact. ⇗ Chapter 3.4
Repair or replace if necessary. Running the machine with defective safety devices is prohibited.

8.4 Disposal / Recycling

All waste arising has to be disposed of professionally or to be recycled. Please watch the national regulations.
If necessary, contact the local disposal and recycling companies.

Packing material: Divide the packing material (wood, carton, metals, plastics) and give the parts to professional recycling.

Process and lubrication materials: Please see hints on product packaging.

Pressure sensors can contain hazardous materials (e.g. mercury). Follow the manufacturer's disposal instructions.

8.5 NORDSON BKG SERVICE

8.5.1 Service Adress

After-Sales Service Address

Nordson BKG GmbH
Hessenweg 3-5
Postfach 15 02 16
48061 Münster, Germany

Mail: aftermarket-pps@nordson.com

Telephone: Switchboard: +49 251 26501 0
FAX: +49 251 26501 98
Hotline +49 251 26501 500

8.5.2 Spare Parts

Please indicate the following information on your spare part order:

- **Oven type**
- **Serial number (Machine No.)**
- **Designation**
- **Part position number**
- **Quantity**

A1 Declaration of Conformity

CE Declaration of conformity

in the sense of EC Machinery Directive 2006/42/EC, Annex II, Part 1 A

We hereby declare that the machine described in the following

Model	**Cleaning Oven**
Type / Type series	**JCP 1724, JCP 1724 CATOX, JCP 1748, JCP 1760, JCP 2448, JCP 2484 CATOX, JCP 3648, JCP 3648 CATOX, JCP 3672**

conforms to the applicable provisions of EC Machinery Directive 2006/42/EC.

Insofar as applicable and contractually agreed, the following Directives, harmonised standards or other standards were applied:

- **EN ISO 12100:2010**
- **EN ISO 13849-1:2015**
- **EN 60204-1:2018**

The intended use, the limits of the machine and the conditions for the commissioning are described in the assembly instructions for this machine.

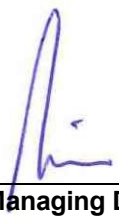
The required technical documentation was created pursuant to Annex VII A and shall be submitted to the responsible national authorities on request.

Person authorised for preparation of the documentation:
Mr. Petr Pavlicek, Jateční 169, Prštné, 76001, Zlin, Czech Republic, Phone: +420 577 210 935

Nordson BKG GmbH
Hessenweg 3-5
48157 Münster/Germany

Place / Date **Münster, 19.09.2018**

Signatory



Ralf Simon, Managing Director

A2 Operating Values / Limits

Operating Limits	
Electrics:	200 V - 480 V
Operating temperature of heaters:	427 °C - 482 °C
Generally processed materials	All types of thermoplastics and thermosets (⇗ see chapter 1.5)
Maximum pressure of system	Vacuum of 0.847 bar or 635 mmHg
Ambient temperature	+5 to 40 °C in operation
Atmospheric conditions	Dry, shielded
Installation height	< 1000 m a. SL

A3 Freshwater Requirements

Freshwater Requirements (⇗ see chapter 6.2.6)	
Hydrological data	Limit Values
Water supply pressure at the system connection	min. 1 bar (15 PSI)
Water temperature at the system connection	10°C (50°F) to max. 40°C (104°F)
pH value	7-8,5
Water hardness degree soft	less than 2 millimole calcium carbonate per litre
Suspended particles in water	> 5 < 15 mg/dm³ (water particle filter recommended)
Conductivity	< 2200 µS/cm
Nitrate and Nitrite	< 10mg/dm³

A4 General Spare Parts

The spare part drawings showing the Code numbers (VE000xxx) can be found in the “Technical Documents” section of the Appendix.

Spare Parts for all Jet Cleaner Models		
Code No.	**Item Description**	**Qty.**
VE000003	Filters for fitting G 1/2 Brass	1
VE000008	2/2 solenoid valve 24 VDC G-1/2" Water 10Y1	1
VE000014	Safety door switch / Limit Switch	1
VE000015	Key to safety door switch	1
VE000024	Pressure Transducer Vacuum	1
VE000056	Sliding bolt	2
VE000057	Thermocouple “J”	1
VE000095	Sealing ring Ø33 x Ø21 x 3mm	6-36
VE000105	Vacuum pump (all models except JCP 3672)	1
VE000556	Vacuum pump (only JCP 3672)	1
VE000107	Proportional valve PWM	1
VE000108	Electronic control of PWM valve	1
VE000109	Manometer for vacuum	1
VE000129	Seal 133x2mm	1-3
VE000130	Sealing safety valve 279,5x2mm	1-4
VE000136	Touch panel 7"	1
VE000158	Thermocouple for heaterband Primary trap	1
VE000159	Silencer / Filter	1
VE000160	Flow controller	1
VE000162	Pressure regulator	1
VE000169	Round cord viton	3,5-7,35m
VE000368	Electrode reduction	1
VE000369	Electrode	1
VE000469	Temperature limiter/monitor	1
VE000845	Drawer of primary trap	1

A5 Spare Parts (depending on Model)

The spare part drawings showing the Code numbers (VE000xxx) can be found in the "Technical Documents" section of the Appendix.

Jet Cleaner Models with Secondary Trap		
Code No.	**Item Description**	**Qty.**
VE000131	Sealing secondary trap 214x2mm	1
VE000143	Check valve, stainless steel 1.4301, connection 1 ½"	1
VE000144	Nozzle Fulljet	2
VE000846	Basket of secondary trap	1

Jet Cleaner Models with CATOX		
Code No.	**Item Description**	**Qty.**
VE000007	Solenoid valve 2/2, 24V/DC connection 1/4	3
VE000056	Sliding bolt	6
VE000057	Thermocouple "J"	3
VE000342	SUREHEAT® MAX: 1400 F (760C), 60 psi, 2 built in t/c's, Length 24" (609.6mm)	1
VE000347	Oxidation Catalyst EnviCat 2520-MH - 200 cpsi	3
VE000373	Thermocouple "J"	1
VE000374	Thermocouple "J"	1
VE000375	Thermocouple "J"	1
VE000379	Check valve, stainless steel 1.4301; steel on steel	1
VE000385	Seal 345x2mm	1
VE000430	Control valve	3

Jet Cleaner Models with pneumatic Door Clamps		
Code No.	**Item Description**	**Qty.**
VE000541	Magnetic valve	1
VE000549	Pneumatic clamp	2

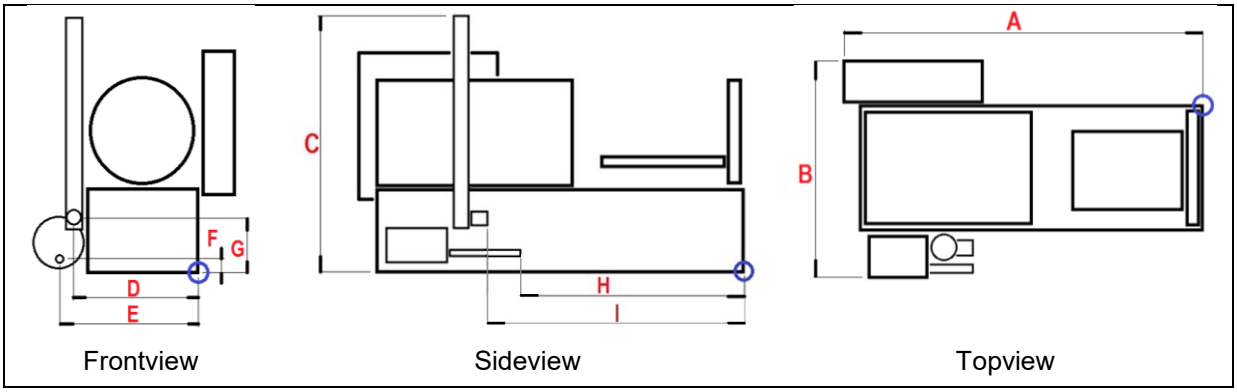
Jet Cleaner Models with manually operated Door Clamps		
Code No.	**Item Description**	**Qty.**
VE000180	Clamp for chamber door	2

Band heater elements for primary trap *)			
Code No.	**Item Description**	**Part of JCP-Model**	**Qty.**
VE000816	125x107mm 380V,1.5kW,1,5m	1760,3648	1
VE000815	125x107mm 380V,1.5kW,2m	1760	1
VE000813	125x107mm 400V,1.5kW,1.5m	1748,1760,2448,2484	1
VE000817	125x107mm 400V,1.5kW,2m	1760,2484	1
VE000814	125x107mm 460V,1.5kW,1.5m	1748,2448,2484,3648	1
VE000824	125x107mm 460V,1.5kW,2m	2484	1
VE000911	125x107mm 400V,1.5kW,4.5m	2484	1
VE000751	125x63mm 380V,1.0kW,1.5m	1724	1
VE000157	125x63mm 400V,1.0kW,1.5m	1724,3672	1
VE000818	125x63mm 400V,1.0kW,2m	3648,3672	1
VE000321	125x63mm 480V,1.0kW,1.5m	1724	1

Chamber heater elements *)			
Code No.	**Item Description**	**Part of JCP-Model**	**Qty.**
VE000176	Heater element 400V,3.0kW,50Hz	1724	3
VE000189	Heater element 480V,3.0kW,60Hz	1724	3
VE000190	Heater element 380V,3.0kW,50Hz	1724	3
VE000749	Heater element 380V,2.15kW,50Hz	1760	12
VE000192	Heater element 400V,2.15kW,50Hz	1760	12
VE000776	Heater element 460V,4.5kW,60Hz	2448	5
VE000777	Heater element 460V,4.5kW,60Hz	2448	2
VE000194	Heater element 400V,4.5kW,50Hz	2448	5
VE000195	Heater element 400V,4.5kW,50Hz	2448	2
VE000196	Heater element 400V,4.0kW,50Hz	2484	10
VE000502	Heater element 400V,5kW,50Hz	3648	8
VE000503	Heater element 400V,5.5kW,50Hz	3648	2
VE000811	Heater element 460V,5.5kW,60Hz	3648	2
VE000812	Heater element 460V,5.0kW,50Hz	3648	8

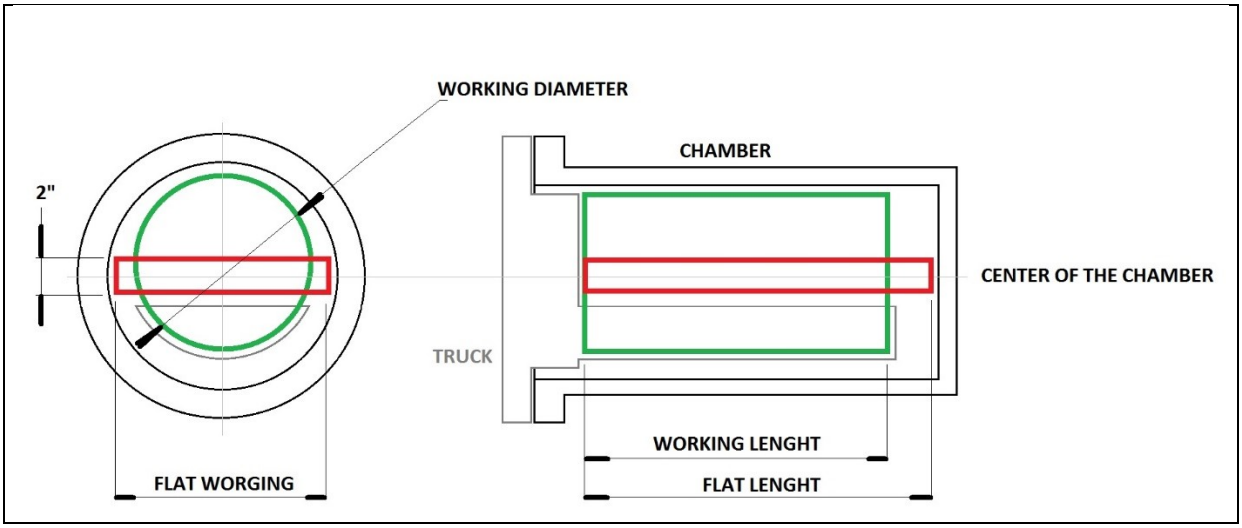
***) Voltage needs to be specified.**

A6 Technical Data JCP 1724 / JCP 1724 CATOX



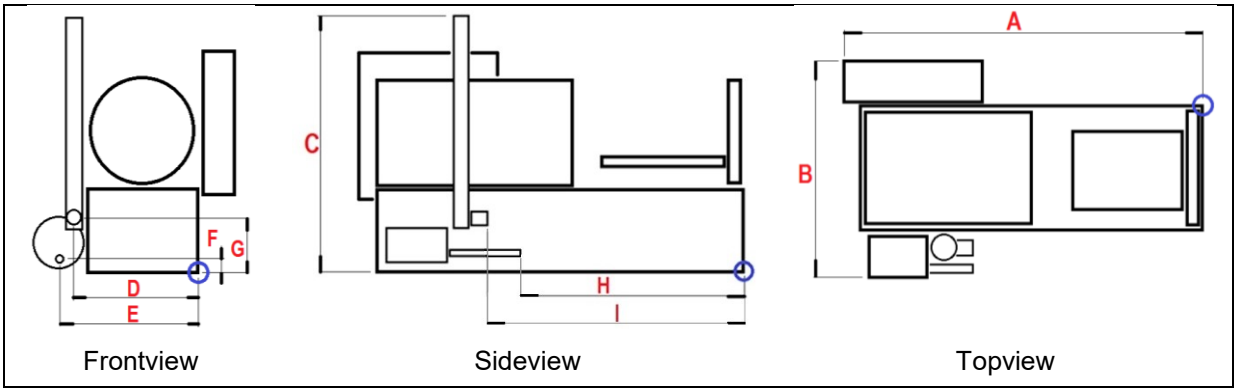
Frontview Sideview Topview

Type / Variant	**JCP 1724**	**JCP 1724**
Option	**---**	**with Catox**
AX-Part #:	**EU101322**	**EU101323**
Machine Outside Dimensions *)		
A (Length)	2136 mm	2136 mm
B (Width)	1541 mm	1724 mm
C (Height)	1985 mm	1902 mm
Water connection position *)		
D	850 mm	941 mm
E	790 mm	790 mm
F	295 mm	295 mm
G	624 mm	541 mm
H	1029 mm	1029 mm
I	1257 mm	1257 mm
Weight *)		
Machine weight (netto)	850 kg	950 kg
Crating Outside Dimensions *)		
Length	2280 mm	2280 mm
Width	1700 mm	1870 mm
Height	2320 mm	2320 mm
Machine + Crating weight	1376 kg	1500 kg
m²	27 m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.		



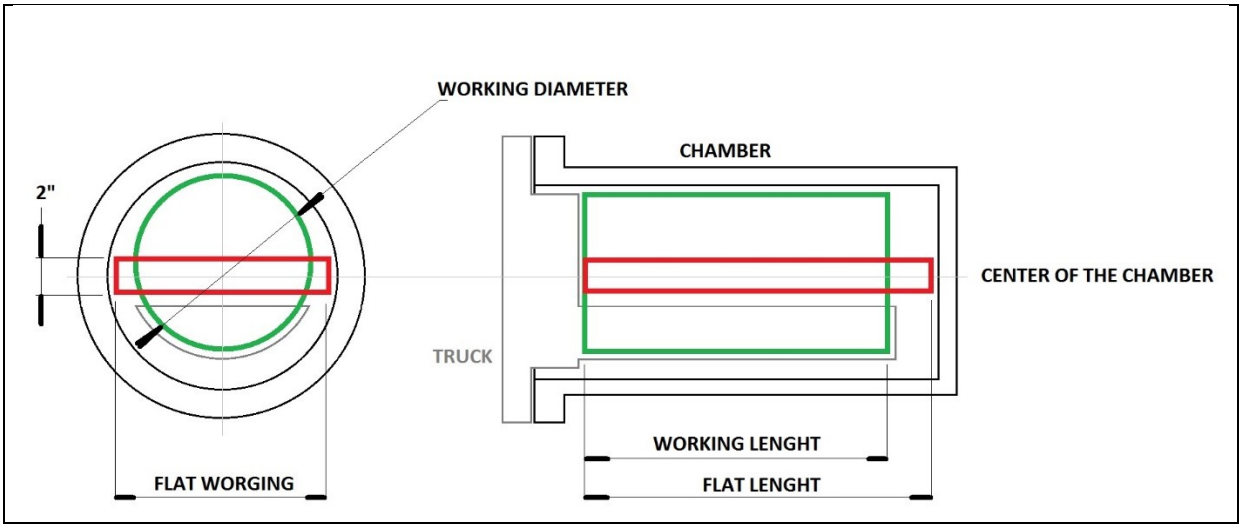
Type / Variant	JCP 1724	JCP 1724 CATOX
Loading		
Max. Weight	136 kg / 300lbs	136 kg / 300lbs
Working Diameter	ø 403 mm	ø 403 mm
Working Length	x 598 mm	x 598 mm
Flat Working	448 mm	448 mm
Flat Length	x 625 mm	x 625 mm
Electrical data		
Installed Power	12,4 kW	20 kW
Heat Output	10kW/3Ph	10+6kW/3Ph
Control Voltage	24VDC	24VDC
Vacuum pump	50Hz, 2.2kW D:200-240V/3ph Y:346-420V/3ph	
	60Hz, 3.0kW D:254-280V/3ph Y:440-480V/3ph	
Water Consumption	13,5 l/min	13,5 l/min
Water Operating	water	water
Temperature	15 °C	15 °C
Hardness of Water	2	2
Connections		
Water Supply	3/4" Hose	3/4" Hose
Outflow water	2" Hose	2" Hose
Exhaust Tube ø	104 mm	104 mm
Pressure Foul Air Duct	960 Hpa abs.	960 Hpa abs.
Air and Pressure Valve	-	
Air Pressure	-	
Others		
Noise emission	79dB	
Cabinet protection class	IP55, NEMA 12	
Field instrument. Protection class	IP54	

A7 Technical Data JCP 1748



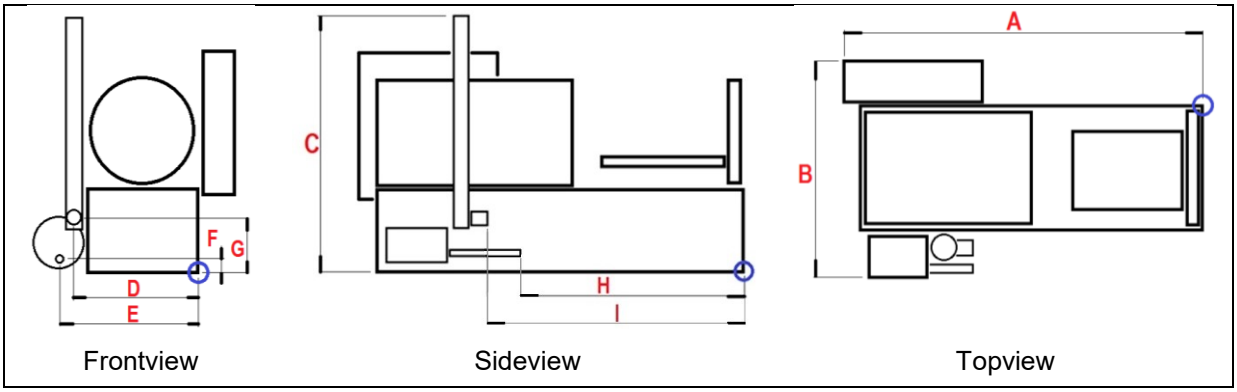
Frontview Sideview Topview

Type / Variant	**JCP 1748**
Option	**---**
AX-Part #:	
Machine Outside Dimensions *)	
A (Length)	3323 mm
B (Width)	1541 mm
C (Height)	1985 mm
Water connection position *)	
D	850 mm
E	790 mm
F	295 mm
G	624 mm
H	2182 mm
I	2409 mm
Weight *)	
Machine weight (netto)	1655 kg
Crating Outside Dimensions *)	
Length	3450 mm
Width	1670 mm
Height	2420 mm
Machine + Crating weight	2250 kg
m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.	



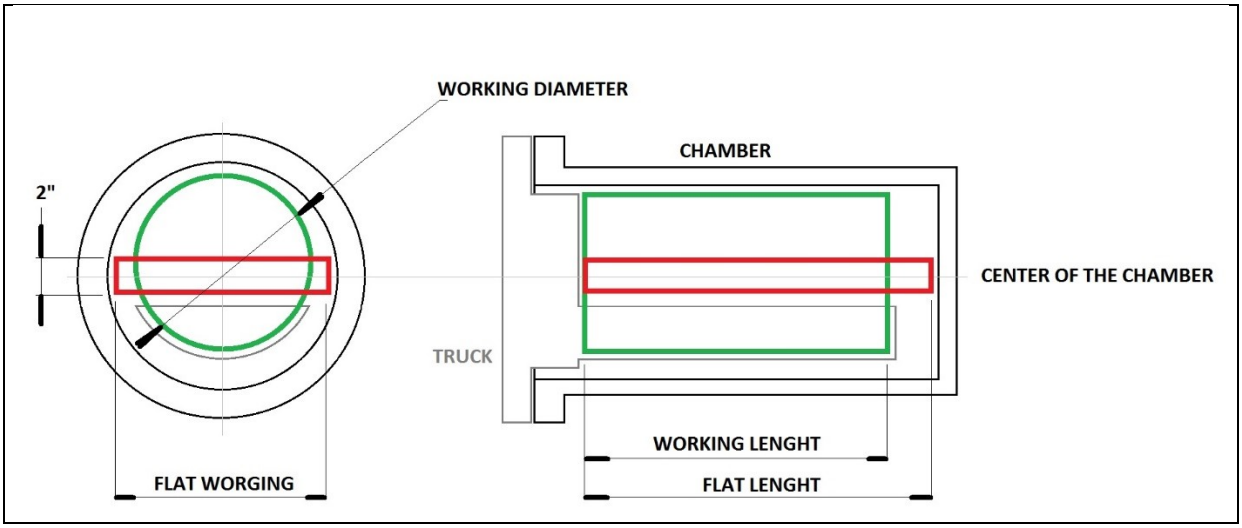
Type / Variant	JCP 1748
Loading	
Max. Weight	200 kg / 440lbs
Working Diameter	ø 403 mm
Working Length	x 1220 mm
Flat Working	448 mm
Flat Length	x 1430 mm
Electrical data	
Installed Power	26,5 kW
Heat Output	23,5kW/3Ph
Control Voltage	24VDC
Vacuum pump	50Hz, 2.2kW D:200-240V/3ph Y:346-420V/3ph
	60Hz, 3.0kW D:254-280V/3ph Y:440-480V/3ph
Water Consumption	13,5 l/min
Water Operating	water
Temperature	15 °C
Hardness of Water	2
Connections	
Water Supply	3/4" Hose
Outflow water	2" Hose
Exhaust Tube ø	104 mm
Pressure Foul Air Duct	960 Hpa abs.
Air and Pressure Valve	-
Air Pressure	-
Others	
Noise emission	79dB
Cabinet protection class	IP55, NEMA 12
Field instrument. Protection class	IP54

A8 Technical Data JCP 1760



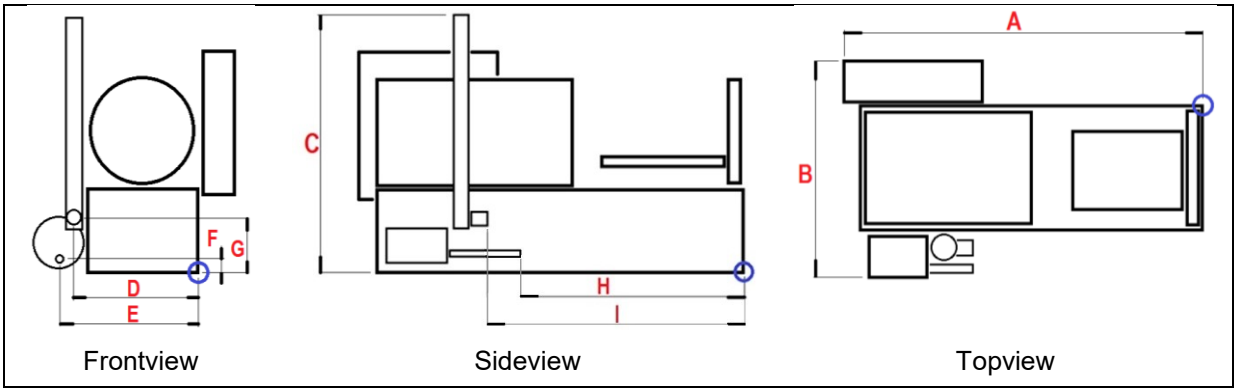
Frontview Sideview Topview

Type / Variant	**JCP 1760**
Option	**---**
AX-Part #:	**EU102131**
Machine Outside Dimensions *)	
A (Length)	3923 mm
B (Width)	1541 mm
C (Height)	1985 mm
Water connection position *)	
D	850 mm
E	790 mm
F	295 mm
G	624 mm
H	2782 mm
I	3009 mm
Weight *)	
Machine weight (netto)	1800 kg
Crating Outside Dimensions *)	
Length	4050 mm
Width	1680 mm
Height	2390 mm
Machine + Crating weight	2250 kg
m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.	



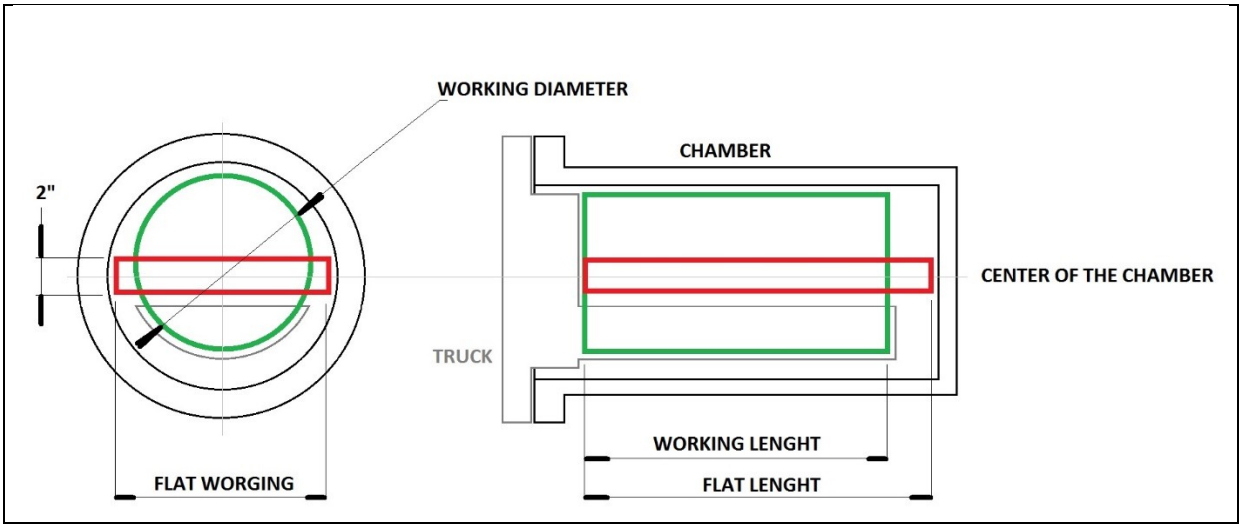
Type / Variant	JCP 1760
Loading	
Max. Weight	250 kg / 550lbs
Working Diameter	ø 403 mm
Working Length	x 1520 mm
Flat Working	450 mm
Flat Length	x 1730 mm
Electrical data	
Installed Power	32,9 kW
Heat Output	28,8kW/3Ph
Control Voltage	24VDC
Vacuum pump	50Hz, 2.2kW D:200-240V/3ph Y:346-420V/3ph
	60Hz, 3.0kW D:254-280V/3ph Y:440-480V/3ph
Water Consumption	13,5 l/min
Water Operating	water
Temperature	15 °C
Hardness of Water	2
Connections	
Water Supply	3/4" Hose
Outflow water	2" Hose
Exhaust Tube ø	104 mm
Pressure Foul Air Duct	960 Hpa abs.
Air and Pressure Valve	-
Air Pressure	-
Others	
Noise emission	79dB
Cabinet protection class	IP55, NEMA 12
Field instrument. Protection class	IP54

A9 Technical Data JCP 2448



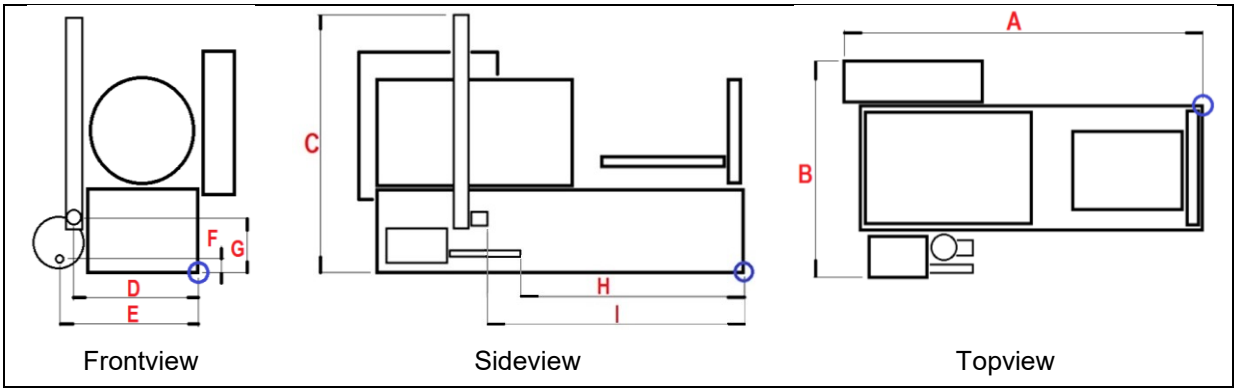
Frontview Sideview Topview

Type / Variant	**JCP 2448**
Option	**---**
AX-Part #:	**EU101324**
Machine Outside Dimensions *)	
A (Length)	3525 mm
B (Width)	1881 mm
C (Height)	2036 mm
Water connection position *)	
D	1274 mm
E	1061 mm
F	202 mm
G	508 mm
H	2415 mm
I	2644 mm
Weight *)	
Machine weight (netto)	2300 kg
Crating Outside Dimensions *)	
Length	3620 mm
Width	2000 mm
Height	2420 mm
Machine + Crating weight	2860 kg
m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.	



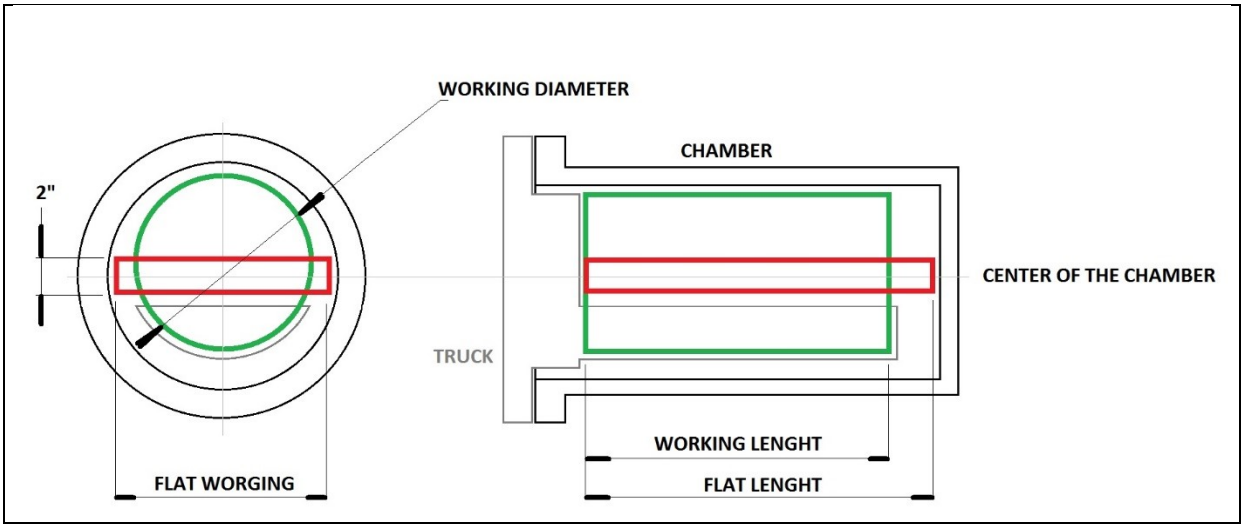
Type / Variant	JCP 2448
Loading	
Max. Weight	680 kg / 1500lbs
Working Diameter	ø 620 mm
Working Length	x 1220 mm
Flat Working	685 mm
Flat Length	x 1400 mm
Electrical data	
Installed Power	36,8 kW
Heat Output	34,5kW/3Ph
Control Voltage	24VDC
Vacuum pump	50Hz, 2.2kW D:200-240V/3ph Y:346-420V/3ph
	60Hz, 3.0kW D:254-280V/3ph Y:440-480V/3ph
Water Consumption	13,5 l/min
Water Operating	water
Temperature	15 °C
Hardness of Water	2
Connections	
Water Supply	3/4" Hose
Outflow water	2" Hose
Exhaust Tube ø	104 mm
Pressure Foul Air Duct	960 Hpa abs.
Air and Pressure Valve	-
Air Pressure	-
Others	
Noise emission	79dB
Cabinet protection class	IP55, NEMA 12
Field instrument. Protection class	IP54

A10 Technical Data JCP 2484 CATOX



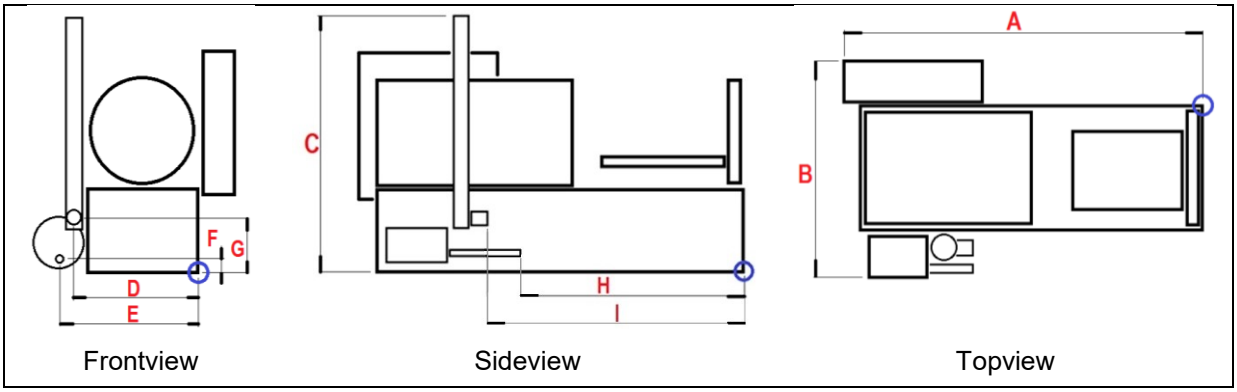
Frontview Sideview Topview

Type / Variant	**JCP 2484**
Option	**with Catox**
AX-Part #:	
Machine Outside Dimensions *)	
A (Length)	5458 mm
B (Width)	1973 mm
C (Height)	2036 mm
Water connection position *)	
D	1274 mm
E	1061 mm
F	201 mm
G	508 mm
H	3880 mm
I	4109 mm
Weight *)	
Machine weight (netto)	3150 kg
Crating Outside Dimensions *)	
Length	5930 mm
Width	2070 mm
Height	2470 mm
Machine + Crating weight	4530 kg
m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.	



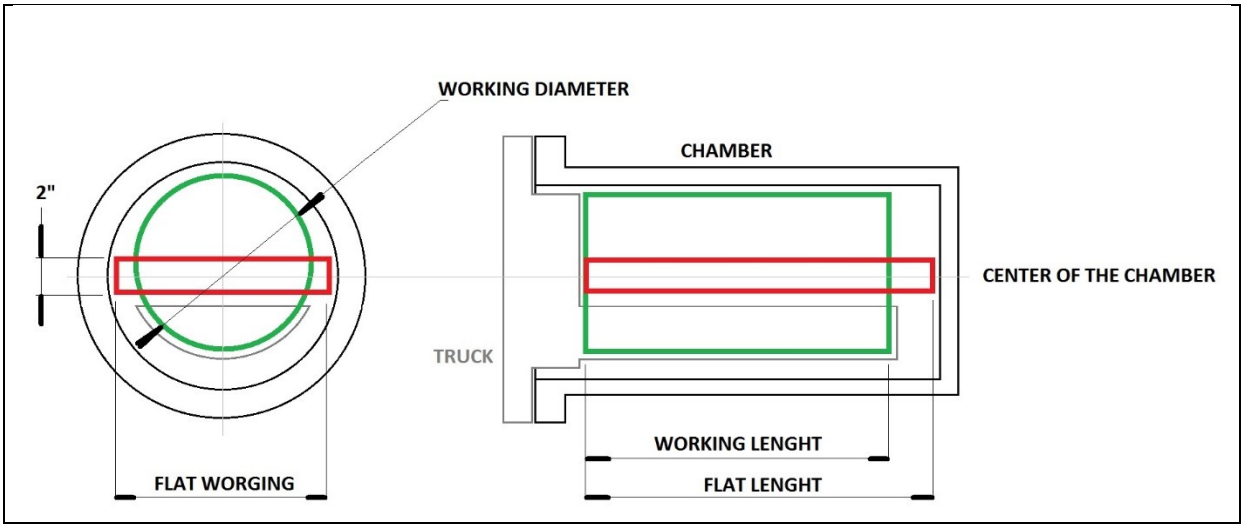
Type / Variant	JCP 2484 CATOX
Loading	
Max. Weight	900 kg / 2000lbs
Working Diameter	ø 620 mm
Working Length	x 2134 mm
Flat Working	685 mm
Flat Length	x 2460 mm
Electrical data	
Installed Power	61,8 kW
Heat Output	59,5+6kW/3Ph
Control Voltage	24VDC
Vacuum pump	50Hz, 2.2kW D:200-240V/3ph Y:346-420V/3ph
	60Hz, 3.0kW D:254-280V/3ph Y:440-480V/3ph
Water Consumption	13,5 l/min
Water Operating	water
Temperature	15 °C
Hardness of Water	2
Connections	
Water Supply	3/4" Hose
Outflow water	2" Hose
Exhaust Tube ø	104 mm
Pressure Foul Air Duct	960 Hpa abs.
Air and Pressure Valve	8 mm Hose
Air Pressure	6 bar
Others	
Noise emission	79dB
Cabinet protection class	IP55, NEMA 12
Field instrument. Protection class	IP54

A11 Technical Data JCP 3648 / JCP 3648 CATOX



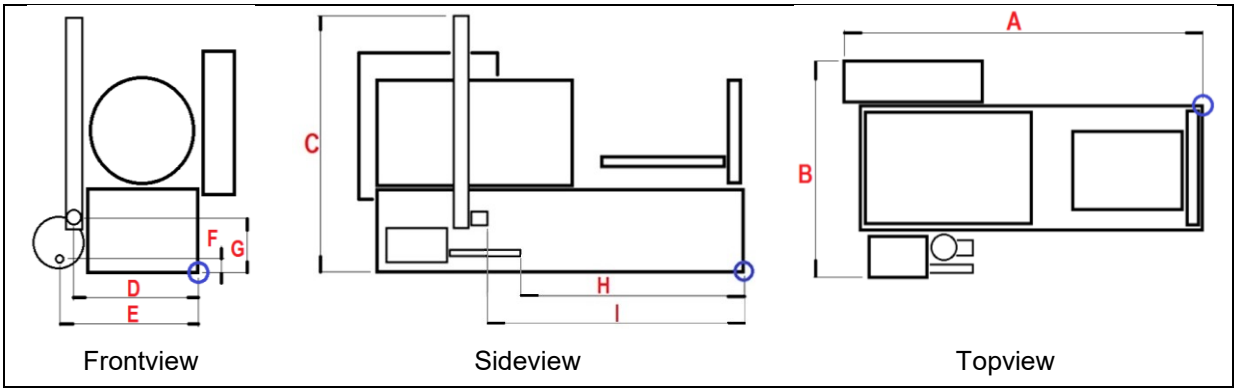
Frontview Sideview Topview

Type / Variant	**JCP 3648**	**JCP 3648**
Option	**---**	**with Catox**
AX-Part #:	**EU101325**	**EU101326**
Machine Outside Dimensions *)		
A (Length)	3401 mm	3401 mm
B (Width)	2181 mm	2280 mm
C (Height)	2280 mm	2280 mm
Water connection position *)		
D	1467 mm	1467 mm
E	1145 mm	1145 mm
F	196 mm	196 mm
G	562 mm	562 mm
H	2265 mm	2265 mm
I	2391 mm	2391 mm
Weight *)		
Machine weight (netto)	3000 kg	3100 kg
Crating Outside Dimensions *)		
Length	3550 mm	3550 mm
Width	2270 mm	2410 mm
Height	2570 mm	2570 mm
Machine + Crating weight	3440 kg	3500 kg
m²	57,1 m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.		



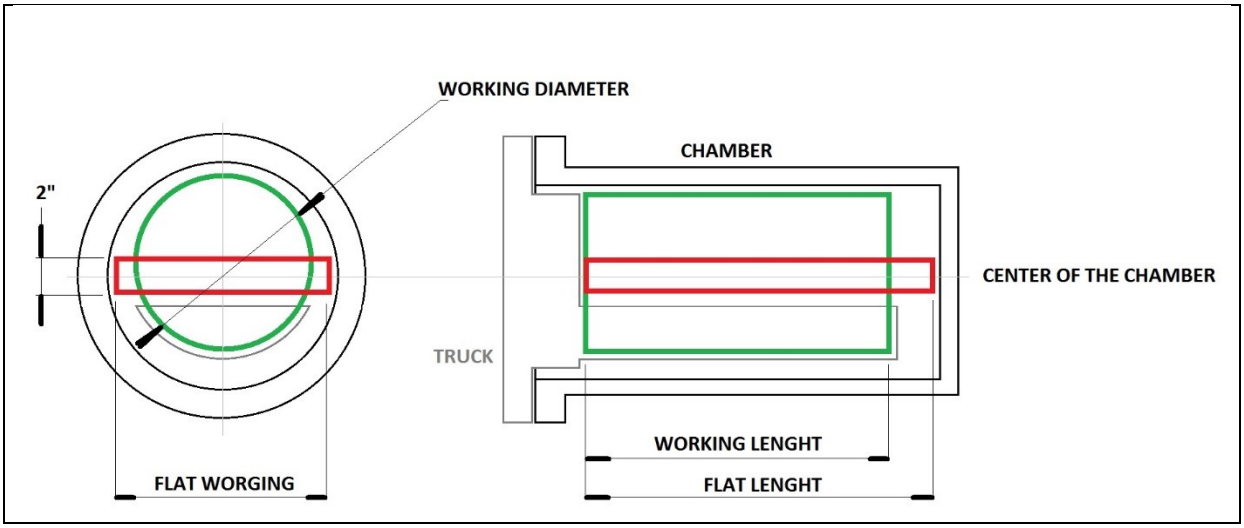
Type / Variant	JCP 3648	JCP 3648 CATOX
Loading		
Max. Weight	910 kg / 2000lbs	910 kg / 2000lbs
Working Diameter	ø 905 mm	ø 905 mm
Working Length	x 1215 mm	x 1215 mm
Flat Working	1000 mm	1000 mm
Flat Length	x 1420 mm	x 1420 mm
Electrical data		
Installed Power	66,5 kW	78 kW
Heat Output	64,0 kW/3Ph	69 kW/3Ph
Control Voltage	24VDC	24VDC
Vacuum pump	50Hz, 2.2kW D:200-240V/3ph Y:346-420V/3ph	
	60Hz, 3.0kW D:254-280V/3ph Y:440-480V/3ph	
Water Consumption	13,5 l/min	13,5 l/min
Water Operating	water	water
Temperature	15 °C	15 °C
Hardness of Water	2	2
Connections		
Water Supply	3/4" Hose	3/4" Hose
Outflow water	2" Hose	2" Hose
Exhaust Tube ø	104 mm	104 mm
Pressure Foul Air Duct	960 Hpa abs.	960 Hpa abs.
Air and Pressure Valve	8 mm Hose	8 mm Hose
Air Pressure	6 bar	6 bar
Others		
Noise emission	79dB	
Cabinet protection class	IP55, NEMA 12	
Field instrument. Protection class	IP54	

A12 Technical Data JCP 3672



Frontview Sideview Topview

Type / Variant	**JCP 3672**
Option	**---**
AX-Part #:	
Machine Outside Dimensions *)	
A (Length)	4621 mm
B (Width)	2181 mm
C (Height)	2280 mm
Water connection position *)	
D	1467 mm
E	1145 mm
F	196 mm
G	562 mm
H	3400 mm
I	3603 mm
Weight *)	
Machine weight (netto)	3.500kg
Crating Outside Dimensions *)	
Length	4750 mm
Width	2270 mm
Height	2570 mm
Machine + Crating weight	5070 kg
m²	
*) Standard dimensions / positions / weights. For customized Jet Cleaners see dimension sheet.	



Type / Variant	**JCP 3672**
Loading	
Max. Weight	1.360kg / 3000lbs
Working Diameter	ø 905 mm
Working Length	x 1825 mm
Flat Working	1000 mm
Flat Length	x 2030 mm
Electrical data	
Installed Power	78 kW
Heat Output	74.8kW/3Ph
Control Voltage	24VDC
Vacuum pump	50Hz, 3kW D:200-240V/3ph Y:346-420V/3ph
	60Hz, 4.6kW D:254-280V/3ph Y:440-480V/3ph
Water Consumption	13,5 l/min
Water Operating	water
Temperature	15 °C
Hardness of Water	2
Connections	
Water Supply	3/4" Hose
Outflow water	2" Hose
Exhaust Tube ø	104 mm
Pressure Foul Air Duct	960 Hpa abs.
Air and Pressure Valve	8mm Hose
Air Pressure	6 bar
Others	
Noise emission	79dB
Cabinet protection class	IP55, NEMA 12
Field instrument. Protection class	IP54

A13 Technical Documents JCP 1724

Dimension Sheets

Layout, profile, front-view	**01724-S99-900**
Foundation drawings	**01724-S99-900**

Drawings

General arrangement	**01724-S99-900**
Spare parts drawing	**01724-S99-900**

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A14 Technical Documents JCP 1724 CATOX

Dimension Sheets

Layout, profile, front-view	**01724-S99-900**
Foundation drawings	**01724-S99-900**

Drawings

General arrangement	**01724-S99-900**
Spare parts drawing	**01724-S99-900**
CATOX Spare parts drawing	

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A15 Technical Documents JCP 1748

Dimension Sheets

Layout, profile, front-view	**01748-S99-900**
Foundation drawings	**01748-S99-900**

Drawings

General arrangement	**01748-S99-900**
Spare parts drawing	**01748-S99-900**

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A16 Technical Documents JCP 1760

Dimension Sheets

Layout, profile, front-view	**01760-S99-900**
Foundation drawings	**01760-S99-900**

Drawings

General arrangement	**01760-S99-900**
Spare parts drawing	**01760-S99-900**

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A17 Technical Documents JCP 2448

Dimension Sheets

Layout, profile, front-view	**02448-S90-900**
Foundation drawings	**02448-S90-900**

Drawings

General arrangement	**02448-S90-900**
Spare parts drawing	**02448-S90-900**

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A18 Technical Documents JCP 2484 CATOX

Dimension Sheets

Layout, profile, front-view	**02484-S90-900**
Foundation drawings	**02484-S90-900**

Drawings

General arrangement	**02484-S90-900**
Spare parts drawing	**02484-S90-900**
CATOX Spare parts drawing	
Pneumatic diagram	

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A19 Technical Documents JCP 3648

Dimension Sheets

Layout, profile, front-view	**03648-S90-900**
Foundation drawings	**03648-S90-900**

Drawings

General arrangement	**03648-S90-900**
Spare parts drawing	**03648-S90-900**
Pneumatic diagram	

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A20 Technical Documents JCP 3648 CATOX

Dimension Sheets

Layout, profile, front-view	**03648-S90-900**
Foundation drawings	**03648-S90-900**

Drawings

General arrangement	**03648-S90-900**
Spare parts drawing	**03648-S90-900**
CATOX Spare parts drawing	
Pneumatic diagram	

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0080A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**

A21 Technical Documents JCP 3672

Dimension Sheets

Layout, profile, front-view	**03672-S90-900**
Foundation drawings	**03672-S90-900**

Drawings

General arrangement	**03672-S90-900**
Spare parts drawing	**03672-S90-900**
Pneumatic diagram	

Supplier Documentation / Data sheets

Vacuum Pump	BUSCH	**LC0110A**

Electric Engineering

Wiring Diagrams	**separate – located in the control cabinet.**