# VWR Automatic vertical autoclaves

# INSTRUCTION MANUAL

## European Catalogue Numbers:

**VAPOUR-Line $^{eco}$ 50** **481-0665**

Version: 1
Issued: 10th June 2013

CE

# Legal address of manufacturer

**Europe**
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Italy
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# Country of origin  Italy

# Table of Contents

# Use of the manual

Using this manual will help you to keep your instrument efficient. This manual should be kept in a place nearby the instrument for easy reference.

# Safety Information

The device must be correctly installed according to these instructions before starting any operation.
Never disconnect the device by pulling the electric cable from the socket.
Immediately replace the electric cable when it becomes damaged or worn.
When removing this item when connected to an electrical system pay particular attention to the electronic connection cable.

**Always disconnect from an electrical system when:**

A. Repairing or maintenance; these operations must be carried out by qualified staff only
B. Cleaning the unit
Use original spare parts and accessories for any replacement.
Do not use this device in the presence of explosive gases.

### Precautions during installation

When the electrical system socket is not compatible with device socket, replace it paying attention to the following coded cable colours:
Grey/Black/Brown: Live - Blue: Neutral - Yellow/green: Earth

Please ensure that the voltage and frequency of the electrical system is compatible with device.

The device must be connected to a ground wire. For any question please contact an electrician.
Before starting up the device ensure that the ventilation grids are free of any obstruction.

# Unit description

## General description

The VAPOUR-Line eco 50 autoclave operates by heating element and is classified as a “self-contained steam generator”.

### Operating/project conditions

Working pressure 2,1 bar

Design pressure 2,2 bar

Hydraulic test pressure 3,3 bar

Hydraulic test temperature 20 °C

### Overall dimensions

Height: 1005 mm - height with open lid: 1300 mm

Width: 470 mm - width with taps 550 mm

Depth: 550 mm - depth with cable 570 mm

Weight: 60 kg

### Sterilisation vessel

Total inner volume 50 l

Water required 4 l

### Sterilisation vessel description

Vertical cylindrical chamber, manufactured in AISI 304 S/S mirror polished.

AISI 304 lid, covered with insulating ABS to prevent burns, equipped with a handle for a friendly open/close operation.

Silicon cover gasket specially fitted for high temperatures.

### Structure description

AISI 304 S/S square-shaped outer body.

### Safety devices

The autoclave is equipped with the following safety devices:

1. Thermostatic over-heating cut-off
2. Microprocessor electronic safety; prevents total chamber overheating when temperature reaches 138 °C
3. Lid sensor
4. Pressure activated mechanical lock
5. Shut-off safety valve when pressure gets over 2,2 bar

**Hydraulic system**

• Safety valve
• Wastewater pipe
• Pressure gauge
• Electrical heating element
• Draining tap for vessel water
• Hose connection for condensate discharge
• External port (rear panel) to allow the introduction of a certified thermoprobe
• Electro valve

**Electrical system**

Complies with CEI EN 61010-1, silicon fireproof cables.
• Heating element power: 3700 W
• Power: 220 V / 50 Hz
• Provided with tri-phase electric cable

**Electric connections**

Connections must be carefully followed:
Grey/Black/Brown - live
Blue - neutral
Yellow/green - ground wire
as per the enclosed wiring diagram

Installation requirements:
• Ground wired socket
• An industrial socket with a max. current up to 20 A with a residual current circuit breaker (RCCB) of 30 mA

## Working principle

The sterilisation cycle consists of raising the chamber temperature to a desired value and keeping it for an established period of time.
It is possible to set the temperature value, bearing in mind that there is a correlation between temperature and pressure. Note that the autoclave is equipped with a pressure gauge which shows pressure measured in bar units.
The correlation between temperature and pressure in this autoclave is as follows:
121 °C - 1,03 bar
134 ° C - 2,0 bar
Heating operation produce steam which helps air evacuation. The autoclave is equipped with an electro valve that automatically closes when the air contained in the vessel has been discharged.
When the total sterilisation cycle is completed an acoustic alarm will advise the operator; once the alarm rings the chamber starts its cool down operation.

**External components description**

Pos. 1 - Main switch

Pos. 2 - Vessel pressure gauge

Pos. 3 - Printer (standard)

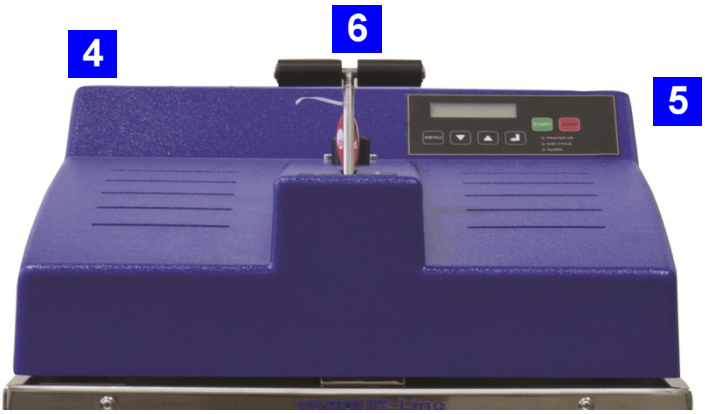
Pos. 4 - Lid locking ring

Pos. 5 - Command panel

Pos. 6 - Lid opening handle

Pos. 7 - Steam drain hose nipple

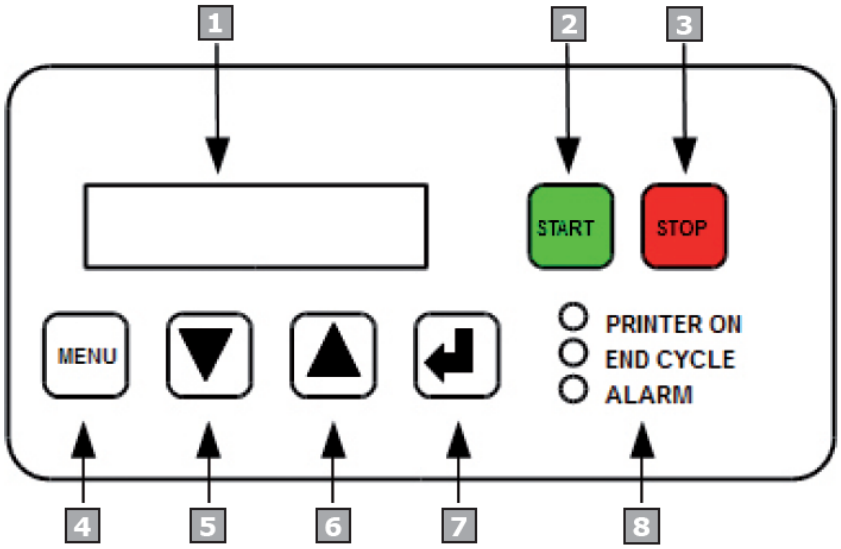
Pos. 8 - Vessel water drain tap






### Control panel description

The autoclave is equipped with specially designed microprocessor that controls the entire instrument and the sterilisation cycles.

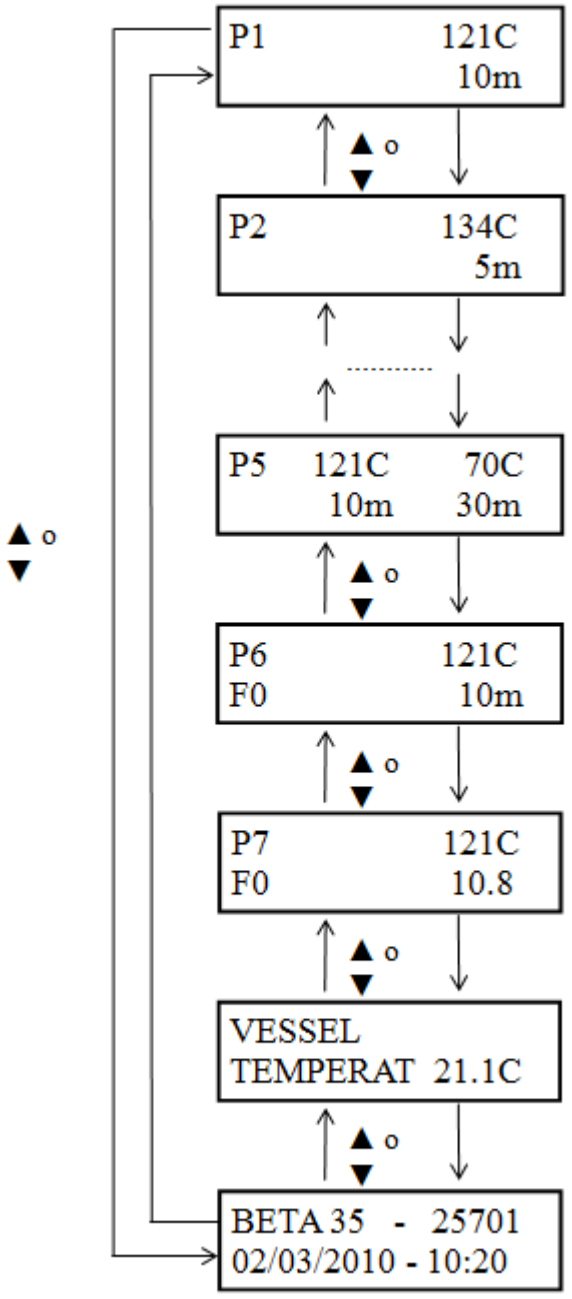



| | |
|---|---|
| Pos. 1 - Display | Multipurpose, it shows all the system messages and sterilisation cycle parameters such as temperature and time |
| Pos. 2 - Start button | Starts the sterilisation cycle shown on the display |
| Pos. 3 - Stop button | Stops the sterilisation cycle and resets all the alarms<br>**WARNING! STOP button is an emergency button. Pushing it will abort the cycle and will open the valves. We don't recommend to push it unless some problem occurs during the cycle.**<br>**The same thing will happen if the instrument is turned of by the main switch.** |
| Pos. 4 - Menu button | Enters the instrument setting menu |
| Pos. 5 - ▼ button | Scrolls up or increases the displayed value |
| Pos. 6 - ▲ button | Scrolls down or decreases the displayed value |
| Pos. 7 - Enter button | Confirms and stores the displayed value |
| Pos. 8 - LED | Reports the status of the autoclave<br>PRINTER ON: Lit when the printer is enabled<br>END CYCLE: Lit at the end of a sterilisation cycle<br>ALARM: lit when an alarm occurs |

## Operation

1. The autoclave should be placed in a room accessible by the operator only
2. Check that the heating element inside the vessel is fully covered by water
3. Check that the water tap (pos.8 page 7) is closed

4. Connect a suitable container to the hose connection of the condensate discharge port (pos. 8 page 7)
5. Insert the basket with the items to be sterilised
6. Pull the safety ring placed on the left side of the cover to freely move the cover
7. Close the cover by using the handle
8. Turn on the autoclave by the main switch
9. The display will show the main menu:




10. Select the desired sterilisation cycle. If you want to modify the sterilisation parameter please follow the procedure described in the following chapters
11. Press START to start the cycle

**You can stop the sterilisation cycle at any time by pressing the STOP button.**

Stops the sterilisation cycle and resets all the alarms

**WARNING! STOP button is an emergency button. Pushing it will abort the cycle and will open the valves. We don't recommend to push it unless some problem occurs during the cycle.**

**The same thing will happen if the instrument is turned of by the main switch.**

### Sterilisation parameter settings

1. Turn on the autoclave by the main switch (Pos. 1 page 7).
2. After the initial presentation the display will show the Program 1 (P1)

| | |
|---|---|
| **P 1** | **1 2 1 C** |
| | **1 0 m** |

3. To modify this programme press the ENTER button, or press the ▲ or ▼ buttons until the programme to be modified is displayed and then press ENTER.

| | |
|---|---|
| **P 1** | **► 1 2 1 C** |
| | **1 0 m** |

4. An arrow will be displayed next to the sterilisation temperature, press the ▲ or ▼ until the desired sterilisation temperature is displayed and then press ENTER.

| | |
|---|---|
| **P 1** | **1 2 1 C** |
| | **► 1 0 m** |

5. An arrow will be displayed next to the sterilisation time, press the ▲ or ▼ until the desired sterilisation temperature is displayed and then press ENTER.
6. The modified data is automatically stored in the memory.
7. Press the START button to start the sterilisation cycle.

NOTES:

The Program 5 can be used to run a double-cycle. It is possible to select two different temperatures and times.
The program 6 can be used to run a cycle with the additional information of the F0 parameter. The calculation of this parameter is based on the setting selected in the sub-menu F0 in the option menu.
The program 7 can be used to run a cycle at the selected temperature until the selected value of the F0 parameter is reached. The calculation of this parameter is based on the setting selected in the sub-menu F0 in the option menu.

### Configuration parameter settings

Press the MENU button to modify the instrument configuration parameter settings.

There are seven sub-menus:

• "**Printer**" - modifies the printer settings

• "**F0**" - set the value for F0 calculation on programs 6 and 7

• "**Delay**" - sets a delayed start of the sterilisation cycle

• "**Print last cycle**" - prints the last sterilisation cycle completed

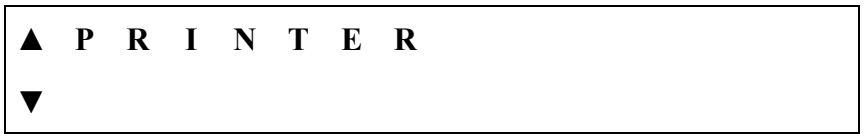
• "**Password**" - sets a password to prevent unauthorised modification of the sterilisation and instrument settings

• "**Date and time**" - modifies the autoclave date and time

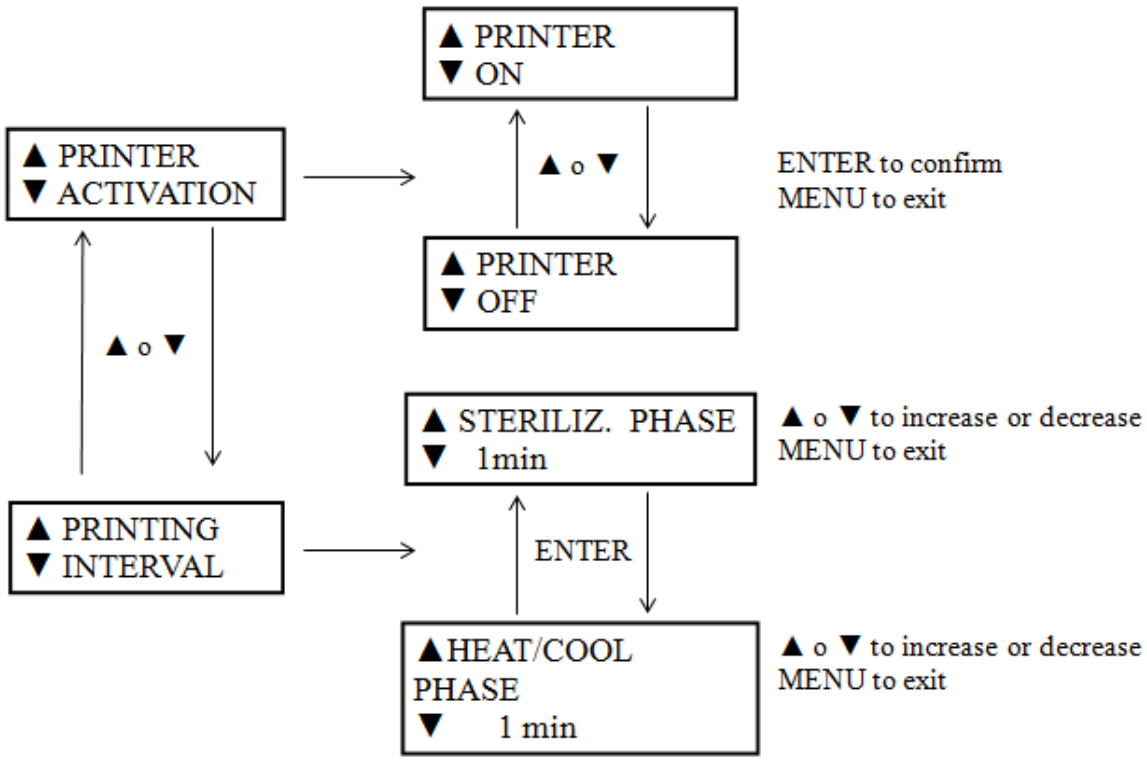
• "**LCD contrast**" - modifies the adjustment of the display contrast

• "**Service**" - This menu is for maintenance authorised personnel only. The parameters stored in this menu can only be displayed but not modified.

**Sub-menu "Printer"**




From this menu it is possible to enable or disable the printer plus set two different printing intervals for the sterilisation and heating/cooling phases. Press the ENTER button from the "PRINTER" menu; the workflow is as follows:




If the printer is enabled the "PRINTER ON" LED on the control panel will be lit.

Printing intervals can be set from a minimum of 1 minute up to a maximum of 30 minutes with a 1 minute step.

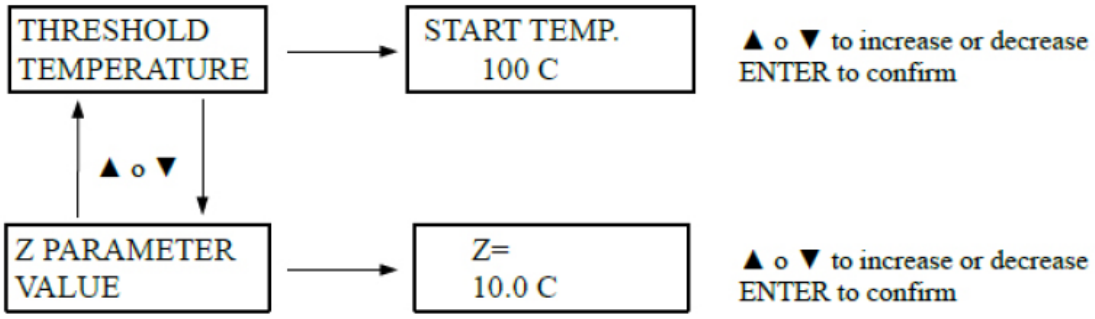
**Sub-menu "F0"**

The setting for F0 parameter can be modified in this sub-menu. The mathematical expression used for the F0 calculation (in minutes) is as follows:

$$F0 = \Delta t \cdot \sum 10^{\left(\frac{T-121,11}{z}\right)}$$

where T is the vessel temperature, z is a microrganism-related parameter ranging from 4,0 to 15,0 (default 10), Δt is the time interval between measurements. The calculation of F0 starts after a threshold temperature Ts, ranging from 100° to 120° (default 100°C), is reached.

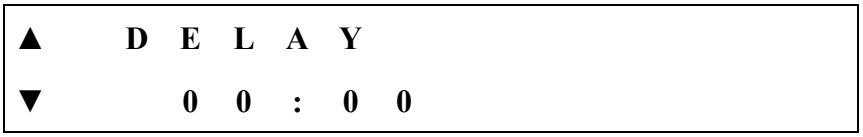
From the F0 menu, by pressing ENTER.



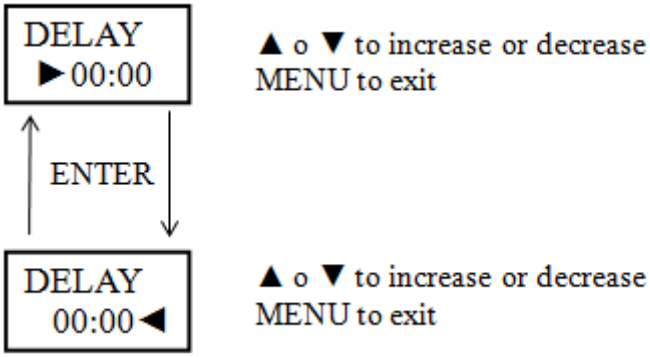

**Values of z for some bacteria:**

| **Microrganism** | **Mean value of Z parameter** |
|---|---|
| Clostridium botulinum | 110 |
| Bacillus stearothermophilus | 6 |
| Bacillus subtilis | 10 |
| Bacillus megaterium | 7 |
| Bacillus cereus | 10 |
| Clostridium sporogenes | 13 |
| Clostridium histolyticum | 10 |

**Sub-menu "Delay"**




From this menu it is possible to set a delayed start for the sterilisation cycle. From the "DELAY" screen press the ENTER button:




Once the delay has been set, after pressing the START button, the display will show the delay and the remaining time before the cycle begins. The delay is stored in the memory, set 00:00 as delay to reset the delay. The maximum settable delay is 23:59

**Sub-menu "Print last cycle"**

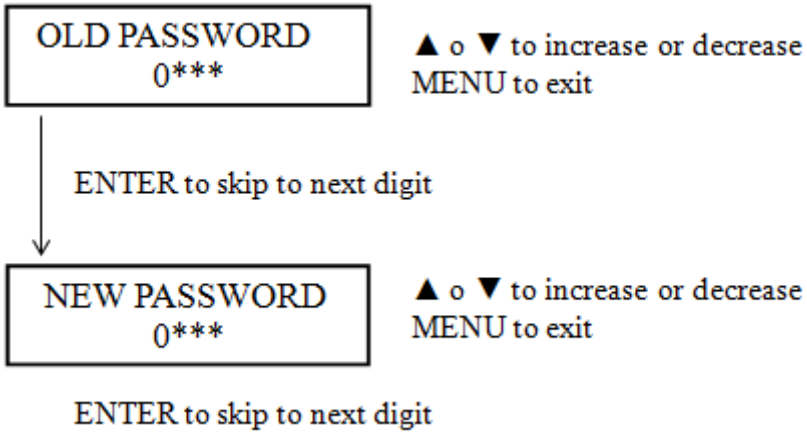
| | |
|---|---|
| ▲ | P R I N T L A S T |
| ▼ | C Y C L E |

From this menu it is possible to print the last completed cycle by pressing the ENTER button.

**Sub-menu "Password"**

| | |
|---|---|
| ▲ | P A S S W O R D |
| ▼ | |

From this menu it is possible to set a password to prevent unauthorised modification of the sterilisation and instrument settings. The password can be set by pressing the ENTER button from "PASSWORD".

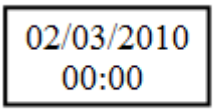



From the main menu the password will be requested every time the ENTER or MENU buttons are pressed. A password will not be requested if the password value has been set to 0000 (default value).

**Sub-menu “Date and time”**

| |
|---|
| ▲ D A T E A N D T I M E |
| ▼ |

From this menu it is possible to adjust the date and time. Press the ENTER button from the “DATE AND TIME” menu.



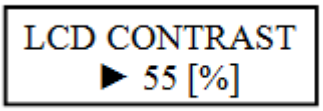

▲ o ▼ to increase or decrease
ENTER to skip to the next field
MENU to exit

**Sub-menu “LCD contrast”**

| |
|---|
| ▲ L C D C O N T R A S T |
| ▼ 5 5 [ % ] |

From this menu it is possible to adjust the display contrast. Press the ENTER button from the menu “LCD CONTRAST”.

The contrast default value is set to 55%.




▲ o ▼ to increase or decrease
MENU to exit

**Sub-menu “Service”**

| |
|---|
| ▲ S E R V I C E |
| ▼ |

This menu is for maintenance authorised personnel only. The parameters stored in this menu can only be displayed but not modified.

### Sterilization cycle

1. To start a cycle, select the desired sterilisation programme
2. Press the START button
3. The display will show on the upper row the selected cycle (temperature and time), while on the lower row will show the actual vessel temperature and the remaining sterilisation time

| |
|---|
| P 1 1 2 1 C - 1 0 m |
| 1 0 3 . 4 C - 1 0 m |

4. Once the sterilisation temperature has been reached, the sterilisation time count will begin. At the end of the sterilisation time a buzzer is activated

5. In the cooling process, when the vessel temperature goes below 100 °C the LED END CYCLE will light up
6. Once the cooling process is completed, open the lid with the handle
7. Switch off the autoclave via the main switch (Pos. 1 page 7)

NOTE:

Press the STOP button to end a running cycle.

**WARNING! STOP button is an emergency button. Pushing it will abort the cycle and will open the valves. We don't recommend to push it unless some problem occurs during the cycle.**

**The same thing will happen if the instrument is turned of by the main switch.**

***The set values are stored in the memory will not be lost after switching the instrument off.***

## Validation

The autoclave should be validated weekly with chemical indicator and monthly with biological indicators.

## Maintenance and cleaning

The autoclave should be inspected annually according to the "Good Laboratory Practice".

Daily cleaning of the autoclave will prevent most of future faults.

Clean the autoclave with a mild detergent using a wet soft cloth. Replace the vessel water daily with new, fresh water. Long-term use of dirty water can cause premature failure of the heating element.

**WARNING**

**Do not use any cleaning product containing halogens or other aggressive substances to clean the autoclave as this can cause rust.**

**Temperature/pressure chart**

| Temperature (°C) | 100 | 102 | 105 | 109 | 112 | 115 | 119 | 120 | 128 | 134 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pressure (bar) | 0 | 0,1 | 0,2 | 0,4 | 0,5 | 0,7 | 0,9 | 1,0 | 1,5 | 2,0 |

## Troubleshooting

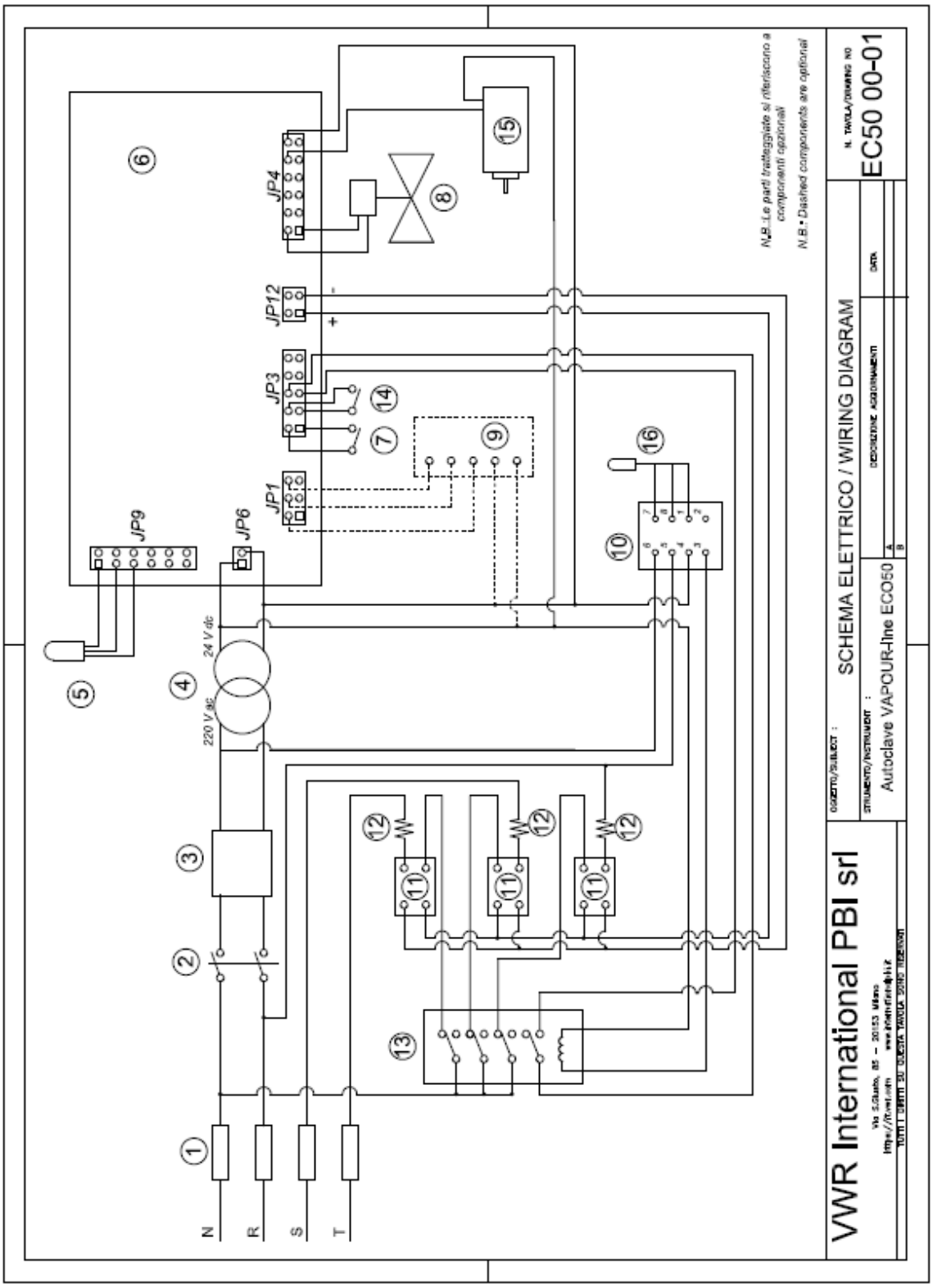
A malfunction or an alarm condition can happen during the normal working procedure.

In the following table the most common faulty conditions are described as well as their possible corrective actions.

**BEFORE OPENING THE DOOR, PLEASE CHECK THE PRESSURE GAUGE THAT THERE IS NO PRESSURE INSIDE THE VESSEL. IN SUCH A CASE LET THE CHAMBER COOL DOWN IN ORDER TO RELEASE THE EXCESS PRESSURE. DO NOT FORCE THE LID OPEN!!!**

| EFFECT | CAUSE | ACTION |
|---|---|---|
| Main switch and display are off | No power to the autoclave | - Check mains voltage<br>- Check power connections<br>- Check fuses |
| Display is off and the main switch LED is on | No power to the main board | Contact technical services, possible faulty main board or low voltage power supply |
| Heating element is not working | - Faulty heating element<br>- Vessel overheating, the safety thermostat is cutting off the heater | Switch off the autoclave, wait for ten minutes and then turn on it back on; if the problem persists contact technical services |
| The autoclave is not reaching the programmed temperature | Faulty electro valve | If the problem persists contact technical services |
| The autoclave only reaches 100/110 °C, but not over this temperature | Faulty electro valve | Contact technical services |
| The vessel temperature is more than 135 °C | Faulty solid state relay | Contact the technical service |
| ALARM LED is lit and the display shows: ALARM DOOR OPEN | Door sensor is not activated | Fully move the closing handle to its closing position; if the problem persists contact technical services |
| ALARM LED lit and the display shows: ALARM OVERTEMPERATURE | Vessel overheating | Contact technical services |
| Display shows "alarm CRC" | No water inside the chamber | Add water |
| Display shows "alarm CRC", but there's water inside the chamber | In order to work properly the water sensor, as it's based on conductivity, must be in contact with water with a minimum amount of salt | Add a small spoon of salt or a glass of tap water to the autoclave |

## Electrical diagram




Pos. 1 Line fuses

Pos. 2 Main switch

Pos. 3 Noise filter

Pos. 4 24V Power supply

Pos. 5 Thermo probe

Pos. 6 Electronic board

Pos. 7 Lid micro switch

Pos. 8 Electro valve

Pos. 9 Printer (optional)

Pos. 10 Safety thermostat

Pos. 11 Solid state relay

Pos. 12 Heating element

Pos. 13 Safety relay

## Printer

The autoclave is equipped with a connection to an optional printer.

The optional printer is retrofittable and can be purchased separately.

The stored information is as follows:

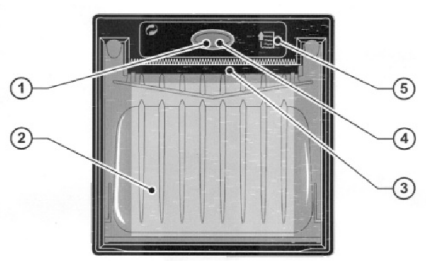
a) Autoclave model and serial number

b) Date and time of the sterilisation cycle beginning

c) Sterilisation parameters set (temperature and time)

c) Vessel temperatures recorded with the set interval time

It is also possible to write down the batch number and operator sign.




Pos.1 Opening button

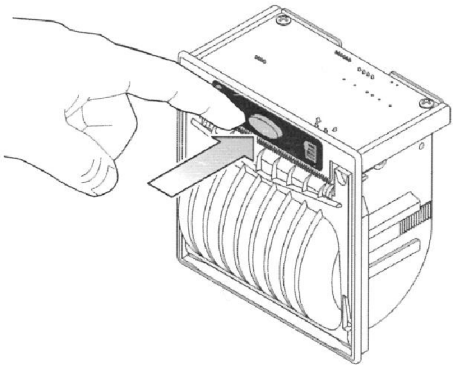
Pos.2 Paper roll container

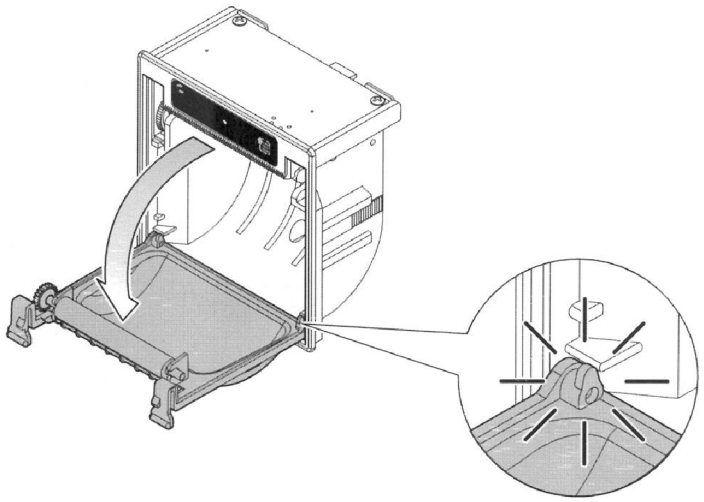
Pos.3 Printing head

Pos.4 Status LED

Pos.5 Paper feed button

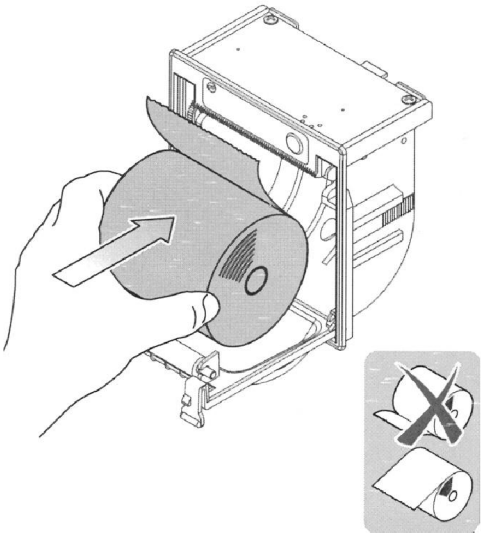
**How to insert a new paper roll**

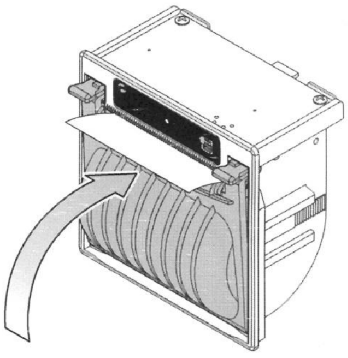




To open the printer, press the central green button.

Place a new paper roll according to the procedure described in the following pictures.





If the paper has been correctly placed, the LED in the central green button will remain steady.

A flashing LED means an error in the paper feeding.

See paragraph 8.1 of this manual for the directions to modify the printing interval.

### Accessories

| Description | Pk | Cat. No. |
|---|---|---|
| Ecobox-50- basket 320x285 | 2 | 481-0672 |
| Ecobox-50 mini basket 310x190 | 3 | 481-0668 |

# Warranty

**VWR International** warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, unless any refusal is due to a defect of the product.

# Equipment disposal

This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.
Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.
For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

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