Vacucenter VC20/50

User Manual

swiss made +

User Manual Vacucenter VC20/50

CE DECLARATON OF CONFORMITY

CE

Declaration of Conformity

Wir
We **Renggli AG / SalvisLab**
Nous

(Name des Anbieters) (supplier's name) (nom du fournisseur)

Birkenstrasse 31, CH-6343 Rotkreuz

(Anschrift) (address) (adresse)

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product
déclarons sous notre seule responsabilité que le produit

Vacuum Drying Oven **VC 20 / 50**

Year of Construction **2002**

(Bezeichnung Typ oder Modell, Los-, Chargen- oder Seriennummer, möglichst Herkunft und Stückzahl)
(name, type or model, lot, batch or serial number, possibly sources and numbers of items)
(nom, type ou modèle, no de lot, d'échantillon ou de série, éventuellement sources et nombre d'exemplaires)

auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt
to which this declaration relates is in conformity with the following standard(s) or other normative document(s)
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s)

(Titel und/oder Nummer sowie Ausgabedatum der Norm(en) oder der anderen normativen (Dokumente)
(title and/or number and date of issue of the standard(s) or other normative document(s)
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Gemäss den Bestimmungen der Richtlinien; following the provisions of directives; conformément aux dispositions des directives; (falls zutreffend) (if applicable) (le cas échéant)

Safety EN 61010-1:2001 **Safety EN 61010-2:2003**
Low voltage directive 2006/95/EC **EMC directive 2004/108/EC**

(Ort und Datum der Ausstellung)
(Place and date of issue)
(Lieu et date)

(Name/Unterschrift oder Kennzeichnung des Befugten)
(name and signature or equivalent marking of authorised person)
(nom et signature du signataire autorisé)

Rotkreuz, 12.02.2002

Marcel Käppeli
Technical Manager

Important information

Quick information for service

- Please fill out all the below list

SERIALNUMBER	
TYPE OF OVEN	☐ VC20 ☐ VC50
VACUUM OPTION	☐ None ☐ Vacuum display ☐ Vacuum control valve ☐ Vacuum control pump
SERVICE PHONE NUMBER	
PURCHASE DATE	
SOFTWARE VERSION (see display during power ON)	

Technical data

		VC 20	VC 50
Outer dimension			
Width	mm	545	645
Height	mm	375	475
Depth	mm	425	525
Installation: Wall distance from the back	mm	50	50
Installation: Wall distance from the side	mm	50	50
Inner dimension			
Width	mm	250	350
Height	mm	250	350
Depth	mm	320	420
Internal volume	l	20	50
Shelf	standard / max	1/3	1/5
Shelf dimension	mm	300x240	400x341
Distance between shelf (WxD)	mm	57	54
Max. load per shelf	kg	20	20
Max. load per oven	kg	37	47
Weight of oven (empty)	kg	48	62
Temperature range approx. 5 °C over RT to	°C	200	200
Temperature deviation [1] at 50°C	± °C	1.0	1.0
Temperature deviation [1] at 100°C	± °C	1.7	1.9
Temperature deviation [1] at 150°C	± °C	2.4	2.6
Temperature fluctuation [2] at 150°C	± °C	0.2	0.2
Heating up [3] to 70°C	min	39	42
to 150°C	min	58	106
Power supply (±10%) 50/60 Hz	V	230/115	230/115
Nominal wattage	W	900	1350
Energy consumption at 100°C	W	185	205
at 150°C	W	243	286
Vacuum connection	mm	NW 6	NW 6
Pass through	mm	NW 25	NW 25
Vacuum (absolute)	mbar	$< 4.8 \times 10^{-1}$	$< 6 \times 10^{-1}$
Vacuum leakage rate	liter / second	$< 1.7 \times 10^{-3}$	$< 4.2 \times 10^{-2}$
Recommended ambient values	°C	15 – 25	15 – 25
	RhF%	20 – 60	20 – 60
Equipment			
Microprocessor - temperature controller with LCD		Yes	Yes
Timer	hours / min	0-999h 59m	0-999h 59m
Serial interface RS 232		Yes	Yes
Automatic restart after power cut-off		Yes	Yes
Adjustable print interval		Yes	Yes
Programming	program / step	50 / 15	50 / 15
Ramp function		Yes	Yes

1) measured with 3 temperature probes on horizontal level / divided in 1/3 of the chamber size
2) maximum temperature deviation in time for one temperature probe
3) to 98% of set temperature

All technical specification are specified for units with standard equipment at an ambient temperature of + 25°C (+77°F) and a voltage fluctuation of ±10 %. The temperature data are determinated in accordance to following DIN 12880, part 2 respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber (vacuum set to 10.0 mbar). All indications are average values, typical for units produced in series. Differing ambient temperatures or variances in the design of individual equipment may produce different performance.

We reserve the right to alter technical specifications at any time without prior notice.

Introduction

Overview

- Microprocessor with enhanced fuzzy logic
- Less heat loss due to special insulation
- Robust Swiss quality design
- Work chamber of stainless steel
- Standard provided with one aluminium shelf
- Chamber has rounded edges which allows easy cleaning
- Exterior of textured powder coated steel

Applications

- Vacucenter line designed for all purposes of vacuum drying in a variety of laboratory fields
- Controller with alphanumeric display and programming capabilities
- Temperature range up to + 200°C.

Note: Vacucenter not built to use as ovens for drying substances which are explosive or release explosive gases during drying process

Construction

- Due to extremely compact construction the VC saves valuable space in lab
- Inner chamber of electro-polished stainless steel, thus resistant to chemicals and highly durable
- Much more shelf area than other vacuum ovens (in comparison to inner volume): max. 5 shelves in VC 50, max. 3 shelves in VC 20
- Shelves made of 5 mm thick aluminium, thus conduct heat efficiently
- Aluminium shelves anodised to resist chemicals
- Door seal easy removable for cleaning or replacing
- All edges rounded
- Big size glass window allows full view of inner chamber
- Window made of double glazed safety glass
- No hot surfaces
- Due to spring loaded door latch door will open slightly in case of over-pressure

Vacuum and air systems

- Electromagnetic valve controls vacuum connection at rear
- In case of power failure valve shuts and opens automatically
- Inlet of fresh air or inert gas controlled by needle valve
- Deflector plate at inlet of chamber

Controller

- Fuzzy logic microprocessor controller
- Digital alphanumeric LCD display
- Real time clock
- Wide range of temperature controlling functions
- Brilliant LCD display for user dialog
- Easy to operate keypad for fast programming and operating
- Five languages can be selected
- Easy to operate and programming with “EasyMenu”
- Allows to store 50 programs with 15 program steps each (step = 1 ramp, 1 temperature and
- 1 hold time = dwell time)
- Hold time (dwell time) 0 - 999h 59m
- Programs remain stored in memory even without external power
- Real time clock allows start of process at any time – e.g.: on January 6, 2015 at 5.30 in the morning
- Serial interface RS 232
- All data can be protocol with a printer or computer
- When opening door integrated door switch interrupts heater

Safety / Power Cut-Off

- DIN 12880 class 3.1:
  - In case of over-temperature a built in safety controller takes over heating control and shuts oven down
  - The mechanical over-temperature device provides additional safety
- After power cut-off controller restarts automatically and last stored values remain (only for menu ”Temp & Options”)
- High quality accurate PT 100 temperature probes
- Superior “Swiss Made” manufacturing quality

Getting started

Parts delivered

Your System will be delivered with following parts:

- 1 system unit
- 1 shelf
- 1 power cord
- 1 user manual

Installation requirements

- Ensure that conditions according to technical data sheet are met before installing system
- Electric power connection as per specification plate at rear must meet your power connection.

Installation

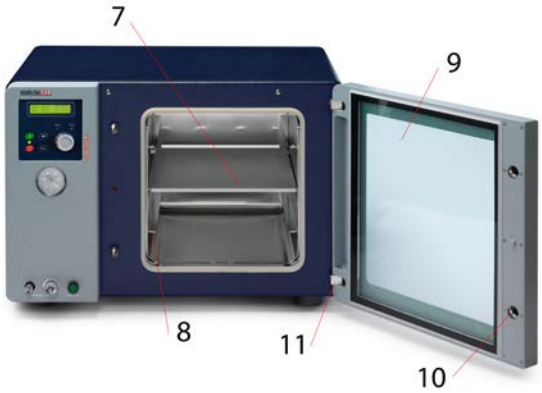
- Place shelf in appropriate position
- Plug cord
- Close door
- Switch power on
- Display is showing current software version during power on sequence
- For oven operation go to chapter “Operating menus”

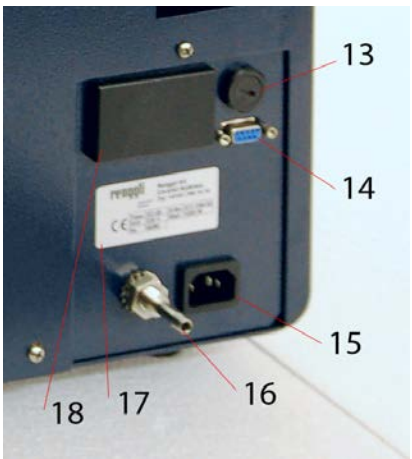
Cleaning

- Use mild detergents for cleaning oven (no acid based or similar detergents)

System components

1 Controller
2 Pressure gauge
3 Inert gas / air inlet
4 Precision valve
5 Vacuum switch
6 Door handle
7 Shelf
8 Shelf glider
9 Double paned security glass
10 Spring loaded door lock
11 Spring loaded door hinge
12 Pass through NW 25
13 Main fuse
14 Serial interface RS232
15 Power connection
16 Vacuum connection (diameter 6mm)
17 Specification plate
18 Power connection for vacuum pump (only option vacuum control of internal valve and vacuum pump)





Controller

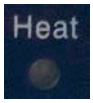
- All information displayed on a backlit liquid crystal display (LCD)
- LED indicators for status of power, heating and program used for indicating main process status
- Buzzer (not visible) is indicating audible status or alarm

Keypad & display

Buttons

	↻	Down	Scroll through the menu structure
	↻	Plus	Increase flashing value, select multiple choices; Input value must flash to make ↻ button operable
	↺	Minus	Decrease flashing value, select multiple choices; Input value must flash to make ↺ button operable
	↵	Enter	Confirm
	**ESC**	Escape	Cancel
		ON/OFF	Switch ON or OFF your System Lit LED indicates powered on system

LED indicators

	When **lit**:	Heating is on
	When **lit**: When **flashing**:	Running program Subsequent start for program operation was entered

How to interpret display

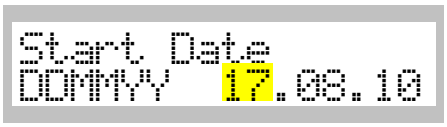
Power ON sequence

- When pressing power on button display is showing
- software version
- After a few moments display will show first main menu
- point

Input field

- Highlighted input value in yellow (grey) background means
- this value is flashing on the real display

Multiple input field



- First part of input field is flashing to indicate input here
- Flashing input fields can be changed with turning knob

Multiple choice field

- In a multiple choice field the last saved value is flashing
- Change with ↻ and confirm with ↵

Definitions of terms

Set temperature

- "Target" temperature oven should operate with

Gradient

- Slope of heating up process to specific set temperature (indicated in °C/minute)
- Negative gradients not allowed
- Maximal value of gradient depends on system and has a range which is predefined by manufacturer

Set vacuum / hysteresis vacuum (ONLY WITH OPTION VACUUM CONTROL)

- Set vacuum is target vacuum value
- Hysteresis vacuum is vacuum value range to set value (within this range valve or pump is not active)

Hold time

- Duration a set temperature has to be hold (build-in timer is starting to count back as soon as set temperature is reached)
- Maximal set time is 999 hours and 59 minutes

Start date / time

- Future date/time to start process or program

Main menu - overview

General operation buttons

- Scroll through menu points with turning knob (↻)
- Select desired menu point with ↵

1 "Temperature & Options"

Manual operation: Define set temperature and options like gradient, vacuum values, hold time, programmed starting date/time

↵ accept ➔ **1.1**
ESC return to ➔ **1**

2 "Program"

Programmable operation: Menu point "Program" is divided in menus for creating, editing, deleting , starting and printing programs

↵ accept ➔ **2.1**
ESC return to ➔ **1**

3 "Configuration"

Menu point "Configuration" allows to configure the system

↵ accept ➔ **3.1**
ESC return to ➔ **1**

4 "Service Mode"

Menu point protected by access code and only available for trained service technicians

↵ accept ➔ **4.1**
ESC return to ➔ **1**

1 Main menu – “Temp & Options“

Manual operation: Define set temperature and options like gradient, vacuum values, hold time, programmed starting date/time

↵ accept ➔ **1.1**
ESC return to ➔ **1**

1.1 Set temperature

↻ ↺ change
↵ accept ➔ **1.2**
ESC restore previous value or return to ➔ **1**

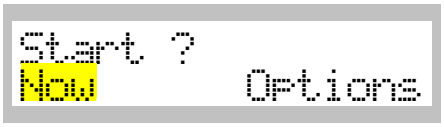
1.2 Set vacuum (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **1.3**
ESC restore previous value or return to ➔ **1**

1.3 Set hysteresis of vacuum (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **1.4**
ESC restore previous value or return to ➔ **1**

1.4 Select quick start or start with options



↻ ↺ change
↵ accept
If **now** selected: System starts immediately ➔ **6**
If **option** selected: ➔ **1.5**
ESC return to ➔ **1**

1.5 Set gradient

↻ ↺ change
↵ accept ➔ **1.6**
ESC restore previous value or return to ➔ **1.2**
Note Value **0.0** indicates maximal possible gradient!

1.6 Set hold time

↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or store time and go to ➔ **1.7**
ESC restore previous value and skip back one input field (MM ➔ HH) or return to ➔ **1.2**
Note Value **0:00** indicates endless hold time!

1.7 Set start date

↻ ↺ change
↵ accept and skip to next input field (DD ➔ MM, MM ➔ YY) or store date and go to ➔ **1.8**
ESC restore previous value and skip back one input field (YY ➔ MM, MM ➔ DD) or return to ➔ **1.2**

1.8 Set start time

↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or store time and go to:
If start date and/or start time is in the **past**, menu will return to ➔ **1**
If start date and/or start time is in the **future** menu will go to ➔ **5**
ESC restore previous value and skip back one input field (MM ➔ HH) or return to ➔ **1.2**

2 Main menu – “Program”

Programmable operation: “Program” is divided in menu points for creating, editing, deleting , starting and printing programs
↵ accept ➔ **2.1**
ESC return to ➔ **1**

2.1 Menu “Program – Start”

Start existing program
↻ ↺ change
↵ accept ➔ **2.1.1**
ESC return to ➔ **2**

2.2 Menu “Program – New”

Create new program
↻ ↺ change
↵ accept ➔ **2.2.1**
ESC return to ➔ **2**

2.3 Menu “Program – Edit”

Edit existing program
↻ ↺ change
↵ accept ➔ **2.3.1**
ESC return to ➔ **2**

2.4 Menu “Program – Delete”

Delete existing program
↻ ↺ change
↵ accept ➔ **2.4.1**
ESC return to ➔ **2**

2.5 Menu “Program – Print”

Print program
↻ ↺ change
↵ accept ➔ **2.5.1**
ESC return to ➔ **2**

2.1 Menu “Program – Start”

Start existing program
↻ ↺ change
↵ accept ➔ **2.1.1**
ESC return to ➔ **2**

2.1.1 Select program No.

↻ ↺ change
↵ accept ➔ **2.1.2**
ESC return to ➔ **2.1**
Note Only stored program numbers with content appear on display. If no program has been defined at all buzzer sounds and a message will be displayed

2.1.2 Choose type of program start

↻ ↺ change
↵ accept
If **now** selected: System starts immediately ➔ **6**
If **later** selected: ➔ **2.1.3**
ESC return to ➔ **2.1**

2.1.3 Set start date

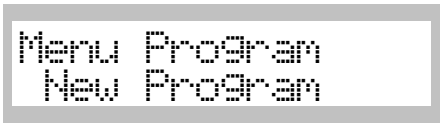
↻ ↺ change
↵ accept and skip to next input field (DD ➔ MM, MM ➔ YY) or store date and go to ➔ **2.1.4**
ESC restore previous value and go back one input field (YY ➔ MM, MM ➔ DD) or return to ➔ **2.1**

2.1.4 Set start time

↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) orstore time and go to:
If start date and/or start time in the **past** display will return to ➔ **2.1.2**
If start date and/or start time in the **future** operating display will appear ➔ **7**
ESC restore previous value and go back one input field (MM ➔ HH) or return to ➔ **2.1**

2.2 Menu “Program – New”

- Storage capacity is 50 programs with 15 steps each
- Each step contains set temperature, gradient and hold time
- Following sample assumes creating a program No. 4 with two steps



Create new program
↻ ↺ change
↵ accept ➔ **2.2.1**
ESC return to ➔ **2**

2.2.1 Create a new program

↻ ↺ change
↵ accept ➔ **2.2.2**
ESC return to ➔ **2.2**
Note Only non-used program numbers appear on display

2.2.2 Set temperature – Step 1

↻ ↺ change
↵ accept ➔ **2.2.3**
ESC restore previous value or return to ➔ **2.2**
Attention: Step and program number not stored!
Note Display 04/01 means current program/step number

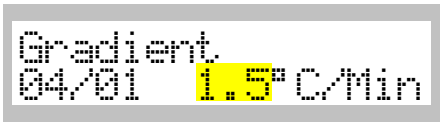
2.2.3 Set vacuum – Step 1 (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **2.2.4**
ESC return to ➔ **2.2**

2.2.4 Set hysteresis of vacuum – Step 1 (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **2.2.5**
ESC return to ➔ **2.2**

2.2.5 Set gradient – Step 1



↻ ↺ change
↵ accept ➔ **2.2.6**
ESC restore previous value or return to ➔ **2.2**
Attention: Step and program number not stored!
Note Value **0.0** indicates maximal heating power!

2.2.6 Set hold time – Step 1

↵ ↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or store selected time and go to ➔ **2.2.7**
ESC restore previous value and go back one input field (M➔H) or return to ➔ **2.2**
Attention: Step and program number not stored!
Note Value of **0:00** indicates endless hold time!

2.2.7 Choose if additional step is required

↵ ↻ ↺ change
↵ accept
If **yes** selected: Step number will increment with 1 ➔ **2.2.8**
If **no** selected: ➔ **2.2.14**

2.2.8 Set temperature – Step 2

↵ ↻ ↺ change
↵ accept ➔ **2.2.9**
ESC restore previous value or return to ➔ **2.2**
Attention: Step and program number not stored!
Note Display 04/02 means current program/step number

2.2.9 Set vacuum – Step 2 (ONLY WITH OPTION VACUUM CONTROL !)

↵ ↻ ↺ change
↵ accept ➔ **2.2.10**
ESC return to ➔ **2.2**

2.2.10 Set hysteresis of vacuum – Step 2 (ONLY WITH OPTION VACUUM CONTROL !)

↵ ↻ ↺ change
↵ accept ➔ **2.2.11**
ESC return to ➔ **2.2**

2.2.11 Set gradient – Step 2

↵ ↻ ↺ change
↵ accept ➔ **2.2.12**
ESC restore previous value or return to ➔ **2.2**
Attention: Step and program number not stored!

2.2.12 Set hold time – Step 2

↵ ↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or store time and go to ➔ **2.2.13**
ESC restore previous value and go back one input field (M ➔ H) or return to ➔ **2.2**
Attention: Step and program number not stored!
Note Value **0:00** indicates endless hold time!

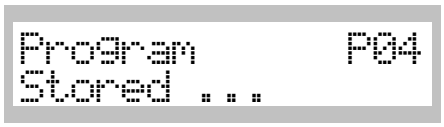
2.2.13 Choose if additional step is required

↻ ↺ change
↵ accept
If **Yes** selected: Step number will increment with 1 ➔ **2.2.7**
If **No** selected: ➔ **2.2.14**

2.2.14 End of programming sequence

↻ ↺ change
↵ accept
If **Yes** selected: ➔ **2.2.15**
If **No** selected: ➔ **2.2.13**

2.2.15 Confirm and save new program



Confirmation that new program has been stored
After a few seconds menu will return to ➔ **2.2**

2.3 Menu "Program- Edit"

- Following sample assumes editing program No. 4 with two steps

Edit existing program
↻ ↺ change
↵ accept ➔ **2.3.1**
ESC return to ➔ **2**

2.3.1 Choose program to edit

↻ ↺ change
↵ accept and skip to next field (P ➔ S) or ➔ **2.3.2** (to selected step number)
ESC return to ➔ **2.3**
Note Only stored program numbers will appear in the display

2.3.2 Set temperature – Step 1

↻ ↺ change
↵ accept ➔ **2.3.3**
ESC restore previous value or return to ➔ **2.3**
Attention: Step and selected program number not stored!
Note Display 04/01 means current program/step number

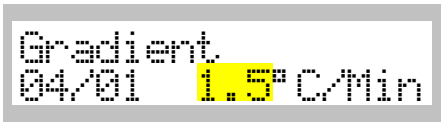
2.3.3 Set vacuum – Step 1 (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **2.3.4**
ESC return to ➔ **2.3**

2.3.4 Set hysteresis of vacuum – Step 1 (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **2.3.5**
ESC returns to ➔ **2.3**

2.3.5 Set gradient – Step 1



↻ ↺ change
↵ accept ➔ **2.3.6**
ESC restore previous value or return to ➔ **2.3**
Attention: Step and selected program number not stored!
Note Value **0.0** indicates maximal gradient!

2.3.6 Set hold time – Step 1

↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or store time and go to ➔ **2.3.7**
ESC restore previous value and go back one input field (M ➔ H) or return to ➔ **2.3**
Attention: Step and selected program number not stored!
Note Value **00:00** indicates endless hold time!

2.3.7 Set temperature – Step 2

↻ ↺ change
↵ accept ➔ **2.3.8**
ESC restore previous value or return to ➔ **2.3**
Attention: Step and selected program number not stored!
Note Display 04/02 means current program/step number

2.3.8 Set vacuum – Step 2 (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **2.3.9**
ESC restore previous value or return to ➔ **2.3**
Attention: Step and selected program number not stored!

2.3.9 Set hysteresis of vacuum – Step 2 (ONLY WITH OPTION VACUUM CONTROL !)

↻ ↺ change
↵ accept ➔ **2.3.10**
ESC restore previous value or return to ➔ **2.3**
Attention: Step and selected program number not stored!

2.3.10 Set gradient – Step 2

↻ ↺ change
↵ accept ➔ **2.3.11**
ESC restore previous value or return to ➔ **2.3**
Attention: Step and selected program number not stored!

2.3.11 Set hold time – Step 2

↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or store time and go to ➔ **2.3.12**
ESC restore previous value and go back one input field (M ➔ H) or return to ➔ **2.3**
Attention: Step and selected program number not stored!
Note Value **0:00** indicates endless hold time!

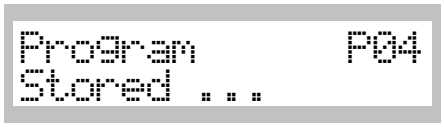
2.3.12 Choose if additional step is required

↻ ↺ change
↵ accept
If **Yes** selected: Step number will increment with 1➔ **2.3.7**
If **No** selected: ➔ **2.3.13**

2.3.13 End of programming sequence

↻ ↺ change
↵ accept
If **Yes** selected: ➔ **2.3.14**
If **No** selected: ➔ **2.3.12**

2.3.14 Confirm & save new program



Confirmation that new program has been stored.
After a few seconds menu will return to ➔ **2.3**

2.4 Menu “Program – Delete”

Delete existing program
↻ ↺ change
↵ accept ➔ **2.4.1**
ESC return to ➔ **2.4**

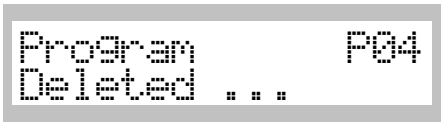
2.4.1 Choose program number that needs to be deleted

↻ ↺ change
↵ accept ➔ **2.3.2**
ESC return to ➔ **2.4**
Note Only used program numbers will appear in display

2.4.2 Deletion confirmation will be displayed

↻ ↺ change
↵ accept
If **Yes** selected: ➔ **2.4.3**
If **No** selected: ➔ **2.4**

2.4.3 Deletion confirmation will be displayed



Confirmation that selected program has been deleted.
After a few seconds menu will return to ➔ **2.4**

- If you delete a program, you delete all steps associated
- After deleting number is available in list of free program numbers again

2.5 Menu “Program – Print”

Print program
↻ ↺ change
↵ accept ➔ **2.5.1**
ESC return to ➔ **2**

2.5.1 Choose program number which has to be printed

↻ ↺ change
↵ accept ➔ **2.5.2**
ESC return to ➔ **2**
Note Only stored program numbers will appear in the display

2.5.2 Displaying print in progress

Confirmation that program has been printed.
After a few seconds menu will return to ➔ **2.5**

- For a sample of printout and printer connection refer section “Printer Operation”

3 Main menu – “Configuration”

- Configuration of system by user

In menu point “Configuration” can be defined and set system options

↻ ↺ change
↵ accept ➔ **3.1**

3.1 Select language

↻ ↺ change
↵ accept ➔ **3.2**
Attention: After confirming language all subsequent dialogs will be in selected language

3.2 Set actual date for internal real time clock

↻ ↺ change
↵ accept and skip to next input field (DD ➔ MM MM ➔ YY) or save date and go to ➔ **3.3**
ESC restore previous value and/or go back one input field (YY ➔ MM, MM ➔ DD)

3.3 Set actual time for internal real time clock

↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or save time and go to ➔ **3.4**
ESC restore previous value and/or go back one input field (MM ➔ HH)

3.4 Set allowed maximal temperature

Set maximum possible temperature for manual operation

↻ ↺ change
↵ accept ➔ **3.5**
ESC restore value

3.5 Set threshold value (ONLY WITH OPTION VACUUM CONTROL !)

Set threshold value between 1 – 1100 mbar
Heating will only start when set value has been reached
For heating without this safety feature, enter value of 1100.0 mbar

↻ ↺ change
↵ accept ➔ **3.6**
ESC restore value

3.6 Set waiting time for threshold value (ONLY WITH OPTION VACUUM CONTROL !)

Set waiting time for threshold value between 1 Min and 1 Hour 59 Min
Should threshold value (3.5) not been reached within programmed time, process will not start and message “No Vacuum” will appear on display

↻ ↺ change
↵ accept➔ **3.7**
ESC restore value

3.7 Set print interval for printer log via serial RS232 interface

Set print interval time
Value 00:00 will disable printout of operating values

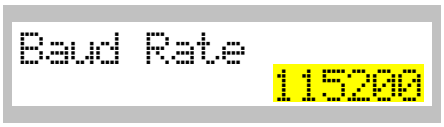
↻ ↺ change
↵ accept and skip to next input field (HH ➔ MM) or save time and go to ➔ **3.8**
ESC restore previous value and/or go back one input field (MM ➔ HH)

3.8 Set automatic interval to scroll status display

Select if operation display will switch automatically instead of manually switching by ↻

↻ ↺ change
↵ accept ➔ **3.9**

3.9 Select baud rate for serial RS232 interface



Available baud rates are4800/9600/57600/115200

↻ ↺ change
↵ accept ➔ **3.10**

3.10 Delay door alarm (starting with SW 2.0g)

Delay for the door alarm. If door has not been closed again within this time, then alarm buzzer will sound.
Time can be chosen between 01 and 59 minutes.

↻ ↺ change
↵ accept ➔ **3.11**

3.11 Set program end buzzer

↻ ↺ change
↵ accept ➔ **3.12**
If **Yes** selected: Buzzer will sound when program has ended
If **No** selected: Buzzer will not sound

3.12 Set safety alarm buzzer

In any case of over temperature alarm situation buzzer will give audio signal

↻ ↺ change
↵ accept ➔ **3.13**

3.13 Set offset between internal PT-100 probe and actual display

Offsets internal PT-100 probe with actual displayed temperature
Is calibrated with external temperature probe

↻ ↺ change
↵ accept ➔ **3.14**
ESC restore value

3.14 Set offset between internal pressure sensor and actual display (ONLY WITH OPTION VACUUM CONTROL !)

Offsets pressure sensor with the actual displayed vacuum
Calibrated with external pressure sensor

↻ ↺ change
↵ accept value ➔ **3.15**

3.15 Confirmation that entered values have been storing

Confirmation that configurations have been stored
After a few seconds menu will return to ➔ **3**

4 Main menu – “Service Mode”

A

User has only access to history data
↵ accept

↻ ↺ change to 8
↵ accept
Repeat these two steps until display shows 888
↵ accept

Number (11) indicates how many entries have been stored
↻ continue

Display shows in first line date and time when entry was stored Second line shows code for stored value/message
↻ continue

↻ continue
↵ back to menu point “History”

↻ continue

↻ ↺ change
↵ accept
After a few seconds menu will return to ➔ **1**

B

Query the serial numbers (starting with SW 2.0g)
↵ accept

↻ ↺ change to 2
↵ accept
Repeat these two steps until display shows 234
↵ accept

Serial number of Oven is shown (9 digits)
↻ Change to next field

Serial number of PCB is shown (6 digits)
↻ Change to next field

Serial number of Display is shown (6 digits)
↻ Change to next field
Display will return to ➔ **1**

Status Display

General

- Change readout on display with ↻ or set display interval in menu “Configuration” (➔ **3**)

5 Status display: Manual mode – Defined start date

- If programmed start date/time has achieved system starting, display switches to ➔ 6
-

	❶ without options	❷ option vacuum display	❸ option vacuum controller	
Start Date 01.01.10 12:59	✓	✓	✓	Start date and time ↻ next set of display
Set Temp 100.9°C Gradient 1.9°C/M	✓	✓	✓	Set temperature and gradient ↻ next set of display
SVac 20.0mbar HVac 2.0mbar			✓	Set vacuum and hysteresis vacuum ↻ next set of display
Hold Time 10:59	✓	✓	✓	Hold time ↻ first set of display

6 Status display: Manual mode – Process running

	❶ without options	❷ option vacuum display	❸ option vacuum controller	
Set Temp 100.0°C Act Temp 100.0°C	✓	✓	✓	Set temperature and actual temperature ↻ next set of display
Gradient 1.9°C/M	✓			Gradient ↻ next set of display
Gradient 1.0°C/M AVac 20.9mbar		✓		Gradient and actual vacuum ↻ next set of display
Gradient 1.9°C/M HVac 2.0mbar			✓	Gradient and hysteresis vacuum ↻ next set of display
SVac 20.0mbar Vac 20.2mbar			✓	Set vacuum and actual vacuum ↻ next set of display
Hold Time 1:59 01.01.10 12:00	✓	✓	✓	Hold time and date/time ↻ first set of display

7 Status display: Program mode - Defined program start date

- If programmed start date/time has been achieved, display switches to ➔ **8**

LED light „Prog“ is flashing as long as defined start date/time has not been reached

	❶ without options	❷ option vacuum display	❸ option vacuum controller	
Start Date P14 01.01.10 12:00	✓	✓	✓	Start date / program number **ESC** cancel start date ➔ **1**

8 Status display: Program mode - Program running

LED light „Prog“ illuminates during programmed operation

	❶ without options	❷ option vacuum display	❸ option vacuum controller	
Set Temp 100.9°C Act Temp 100.9°C	✓	✓	✓	Set temperature and actual temperature ↻ next set of display
Gradient 1.9°C/M	✓			Gradient ↻ next set of display
Gradient 1.9°C/M AVac 20.0mbar		✓		Gradient and actual vacuum ↻ next set of display
Gradient 1.9°C/M AVac 2.0mbar			✓	Gradient and hysteresis vacuum ↻ next set of display
SVac 20.0mbar AVac 20.2mbar			✓	Set vacuum and actual vacuum ↻ next set of display
Hold Time 10:59 01.01.10 12:00	✓	✓	✓	Hold time and date/time ↻ next set of display
Program 04 Step 01	✓	✓	✓	Program number and program step ↻ first set of display

- At the end of program buzzer will sound and following message will be shown:

Message: Program finished	↵ accept message

9 Cancel running process with ESC key

- Running system is stopped by pressing ESC

9.1 Safety question when stopping a running system

↻ ↺ change
↵ accept
If **Yes** selected: ➔ **9.2**
If **No** selected: ➔ **Return to running status**

9.2 Conformation that process has been cancelled

Confirmation that running process has been cancelled
After a few seconds menu will return to main menu ➔ **1**

10 Messages and errors

- Messages and errors are announced with buzzer and can be confirmed by pressing ↵
- Errors are severe system failures and have to be fixed by trained service people

Messages

Indicates that no program is in memory
↵ accept

Indicates that program memory is full
↵ accept

Indicates that door is open
↵ accept

Indicates that threshold value for vacuum has not been reached within programmed waiting time
↵ accept

Errors

PT100 probe or cable defect
↵ accept
Call service!

Temperature exceeded security range level
↵ accept
Cool oven down. If error persists call service!

↵ accept
Call service!

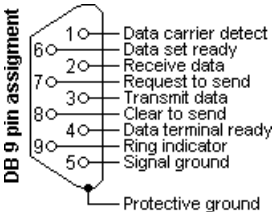
Printer operation

Printer requirements

In order to connect printer with RS232 the following requirements must be fulfilled :

- RS232 serial interface / at least 4800 baud transfer rate (depending on printer)

Pin layout RS232 DB9 connector system



Used pins: 2:TxD , 3:RxD and 5:Signal ground
Data format: 8 data bits, 1 stop bit, no parity
No specific protocol

Printouts during a manual run

		❶ without options	❷ option vacuum display	❸ option vacuum controller
Date:	01.01.10	✓	✓	✓
Time:	12:00	✓	✓	✓
Set Temperature:	40.0°C	✓	✓	✓
Act Temperature:	40.1°C	✓	✓	✓
Gradient:	0.2°C/Min	✓	✓	✓
Set Vacuum:	5.5mbar			✓
Act Vacuum:	5.4mbar		✓	✓
Hysteresis Vacuum:	2.5mbar			✓
Hold time:	1:00HH:MM	✓	✓	✓

Printout of a stored program

		❶ without options	❷ option vacuum display	❸ option vacuum controller
Program No.:	1	✓	✓	✓
Step:	1	✓	✓	✓
Set Temperature:	20.0°C	✓	✓	✓
Gradient:	0.2°C/Min	✓	✓	✓
Set Vacuum:	5.5mbar			✓
Hysteresis Vacuum:	2.5mbar			✓
Hold time:	1:00HHH:MM	✓	✓	✓

Printout of a running program

		❶ without options	❷ option vacuum display	❸ option vacuum controller
Date:	01.01.10	✓	✓	✓
Time:	12:00	✓	✓	✓
Program:	48	✓	✓	✓
Step:	2		✓	✓
Set Temperature:	20.0°C	✓	✓	✓
Act Temperature:	20.4°C	✓	✓	✓
Gradient:	0.2°C/Min	✓	✓	✓
Set Vacuum:	5.5mbar			✓
Act Vacuum:	5.4mbar		✓	✓
Hysteresis Vacuum:	2.5mbar			✓
Hold time:	1:00HH:MM	✓	✓	✓

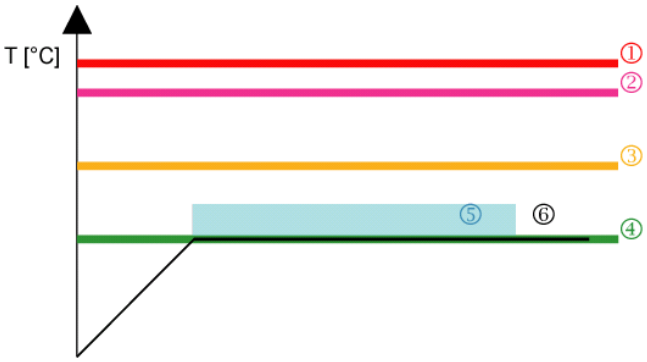
Appendix A

Hysteresis value for vacuum control

- Hysteresis value of vacuum allows influence on behaviour of vacuum controlling
- Drying process under vacuum is influenced by vapour pressure of fluids in drying good (the higher
- vapour pressure the lower vacuum)
- In extreme case vacuum pump will run or vacuum valve is open all time because of reducing
- vacuum by vapour (this can be controlled by system but pump or valve is all time switching on
- and off)
- To reduce this effect hysteresis value depending on set vacuum value can be set (allows controller
- a range of acting)

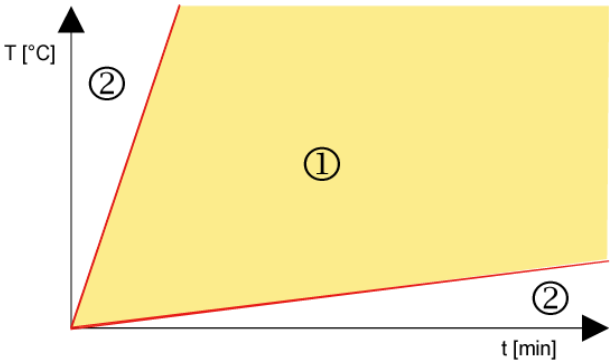
Graphs of temperature limits and gradient and program run

Temperature limiter & safety controlling (safety bond)



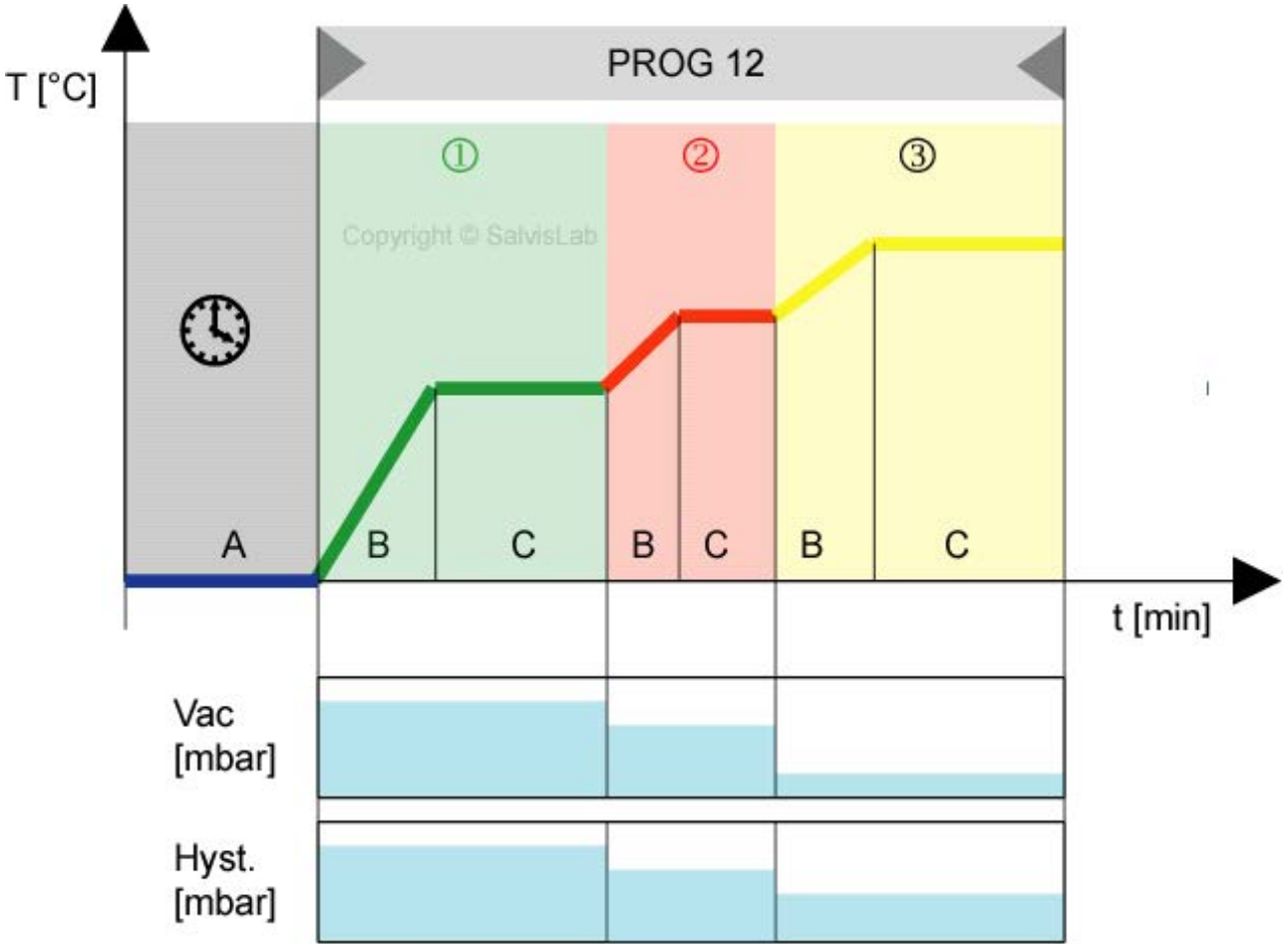
1. Over temperature limiter by thermo mechanical switch
2. Maximal allowed end temperature
3. Maximal allowed working temperature (menu "Configuration")
4. Set temperature
5. Control range of safety controller
6. Actual temperature

Range of gradient



1. Gradient can be set in this range
2. This range cannot be used (system depending)

Graphical presentation of a program run



This example shows a program No. 12 with 3 steps and a preset start date/time

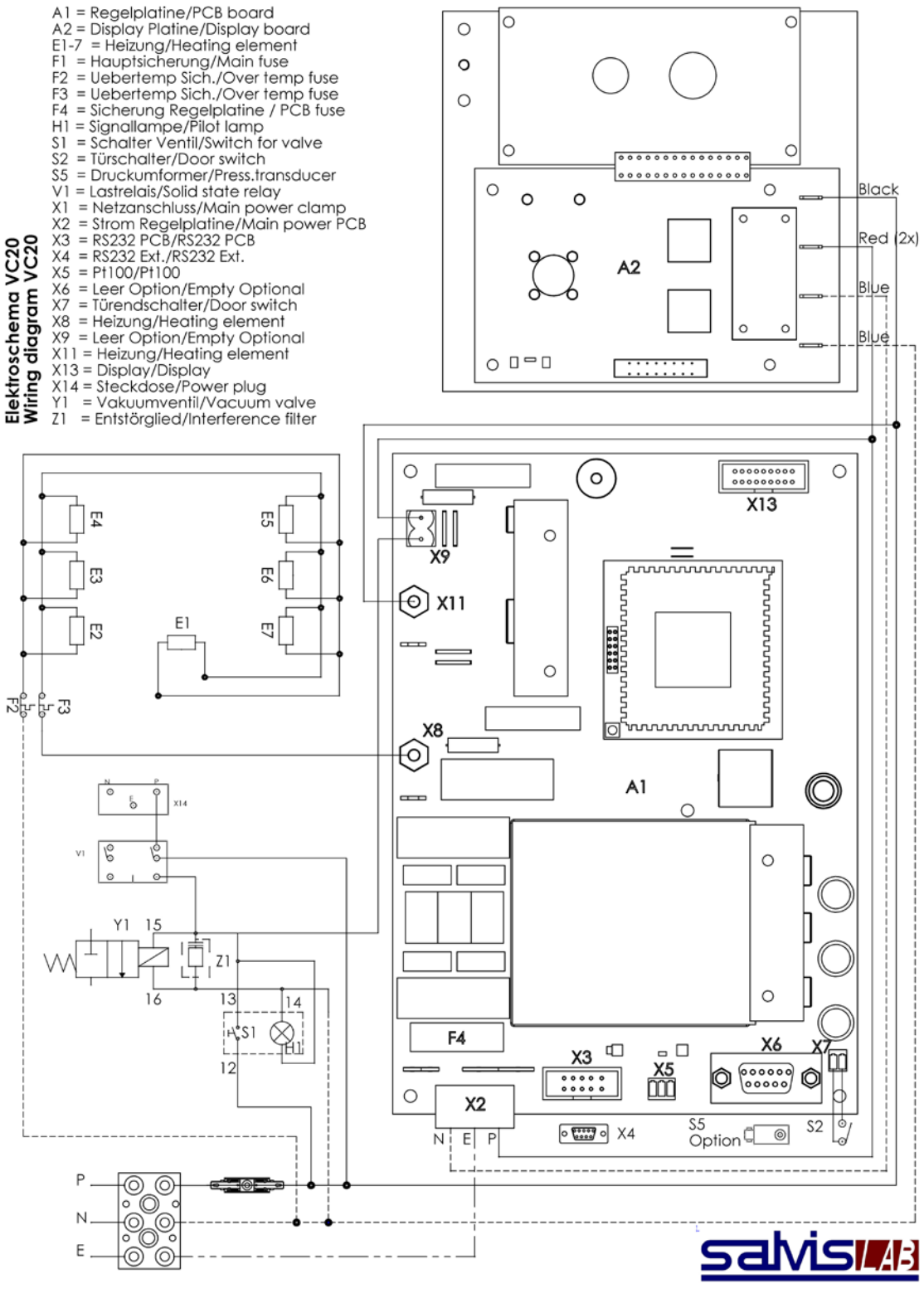
A Timeframe of the start date/time
B Positive gradient (adjustable)
C Hold time (adjustable)

Each of the following 3 steps has parameter: Set temperature, gradient, hold time, set vacuum, hysteresis vacuum

1 Step 1 : Start program
2 Step 2 : New parameter setting where used
3 Step 3 : New parameter setting where used (after end of step 3 program ends)

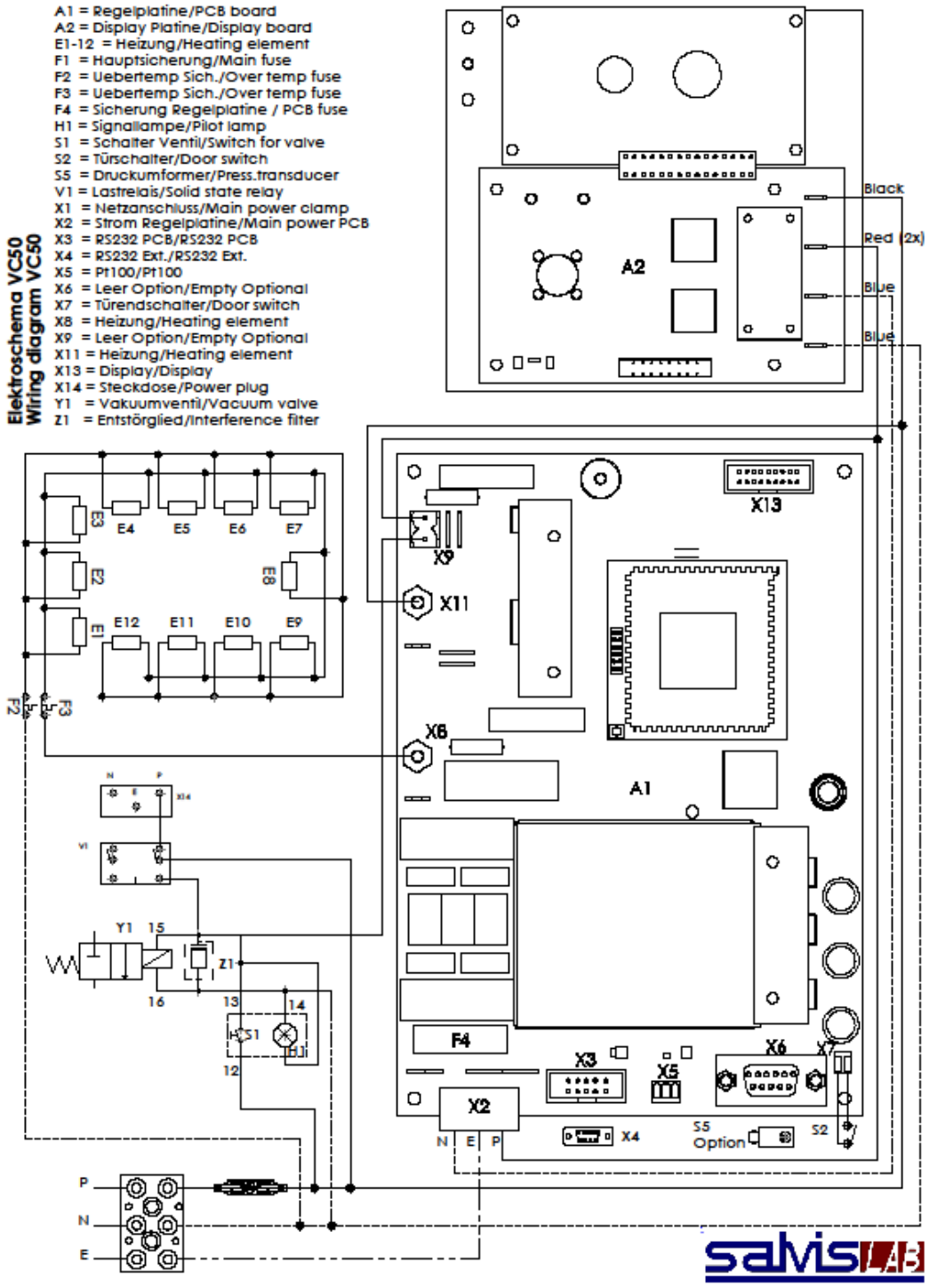
Appendix B

Wiring diagram VC 20



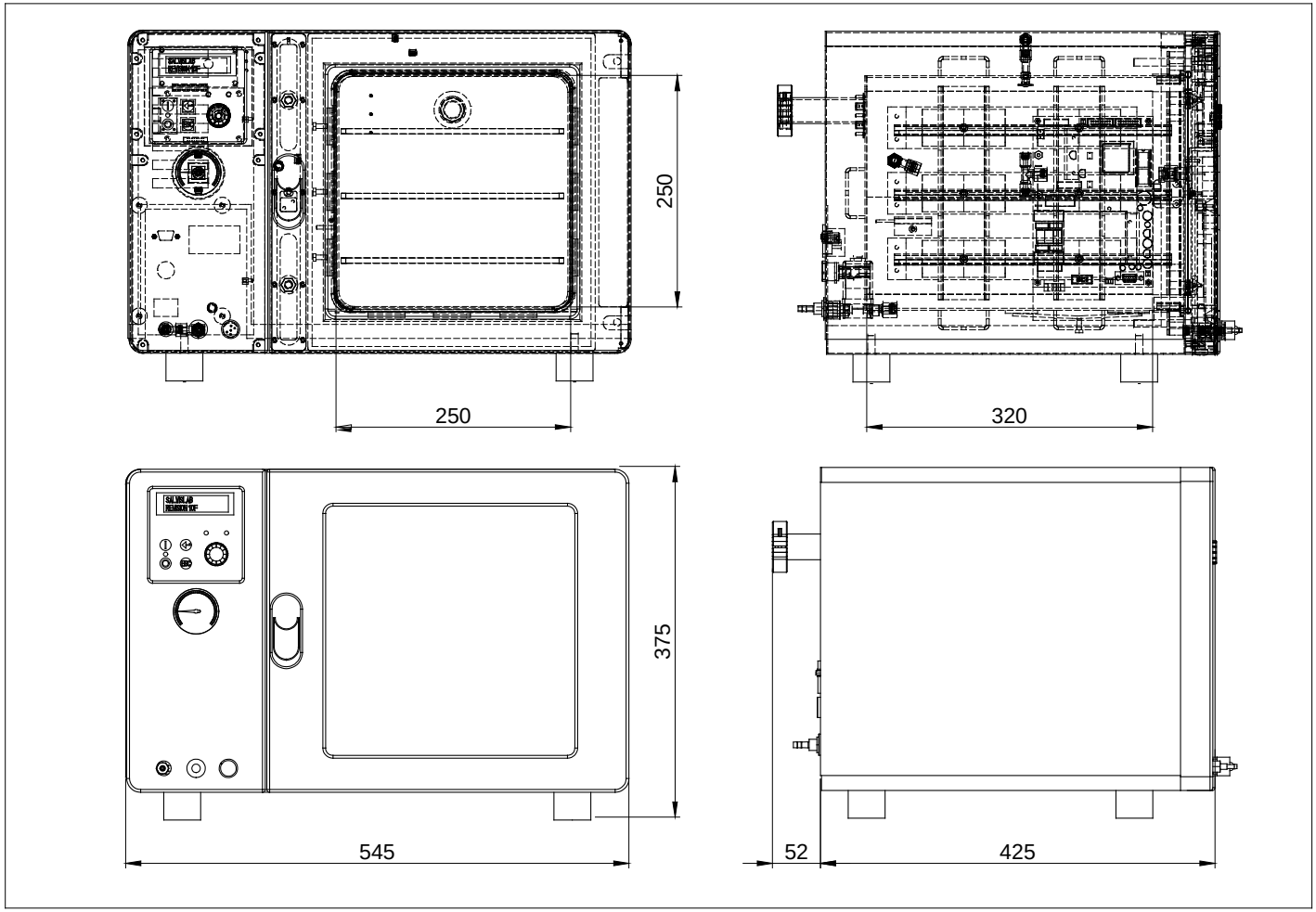
Appendix C

Wiring diagram VC 50



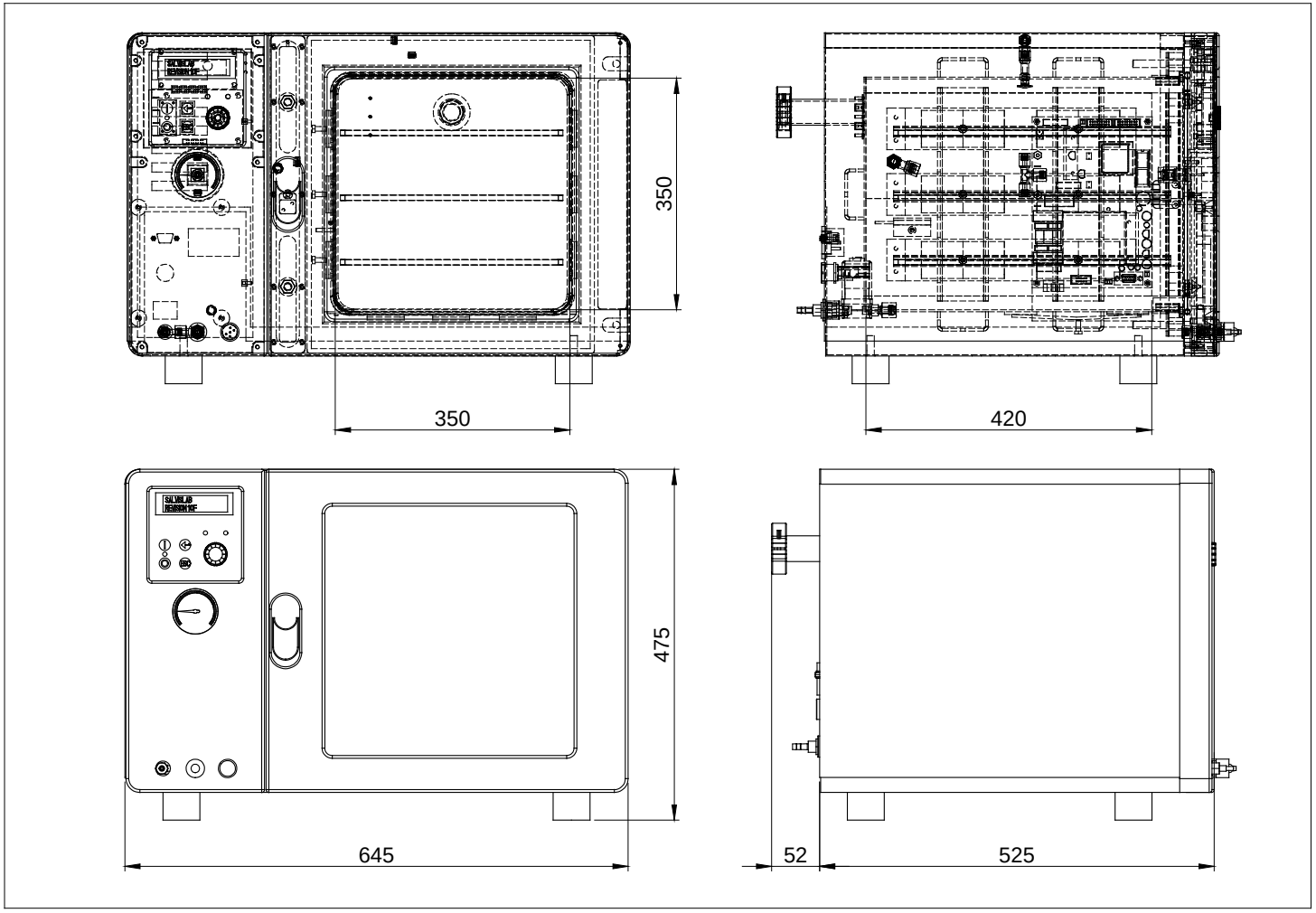
Appendix D

Drawing VC 20



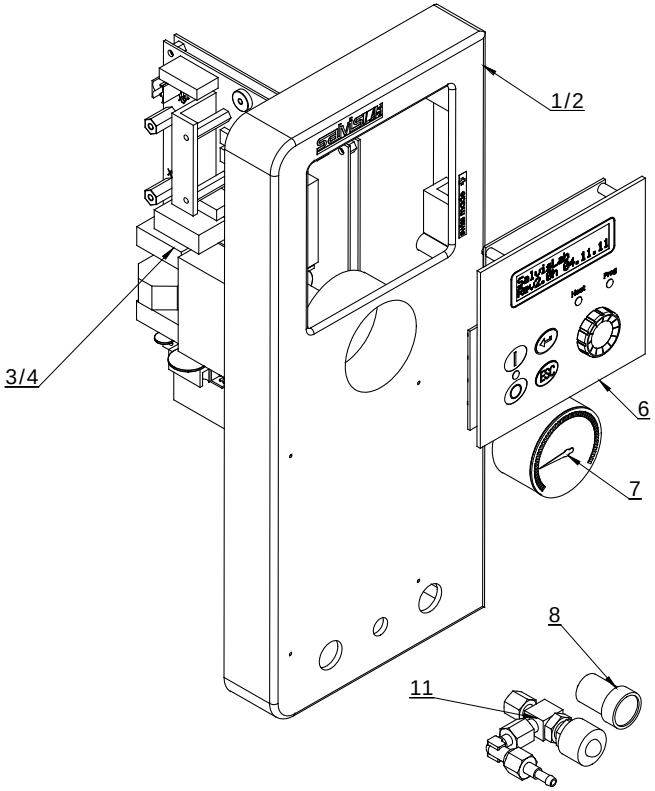
Appendix E

Drawing VC 50



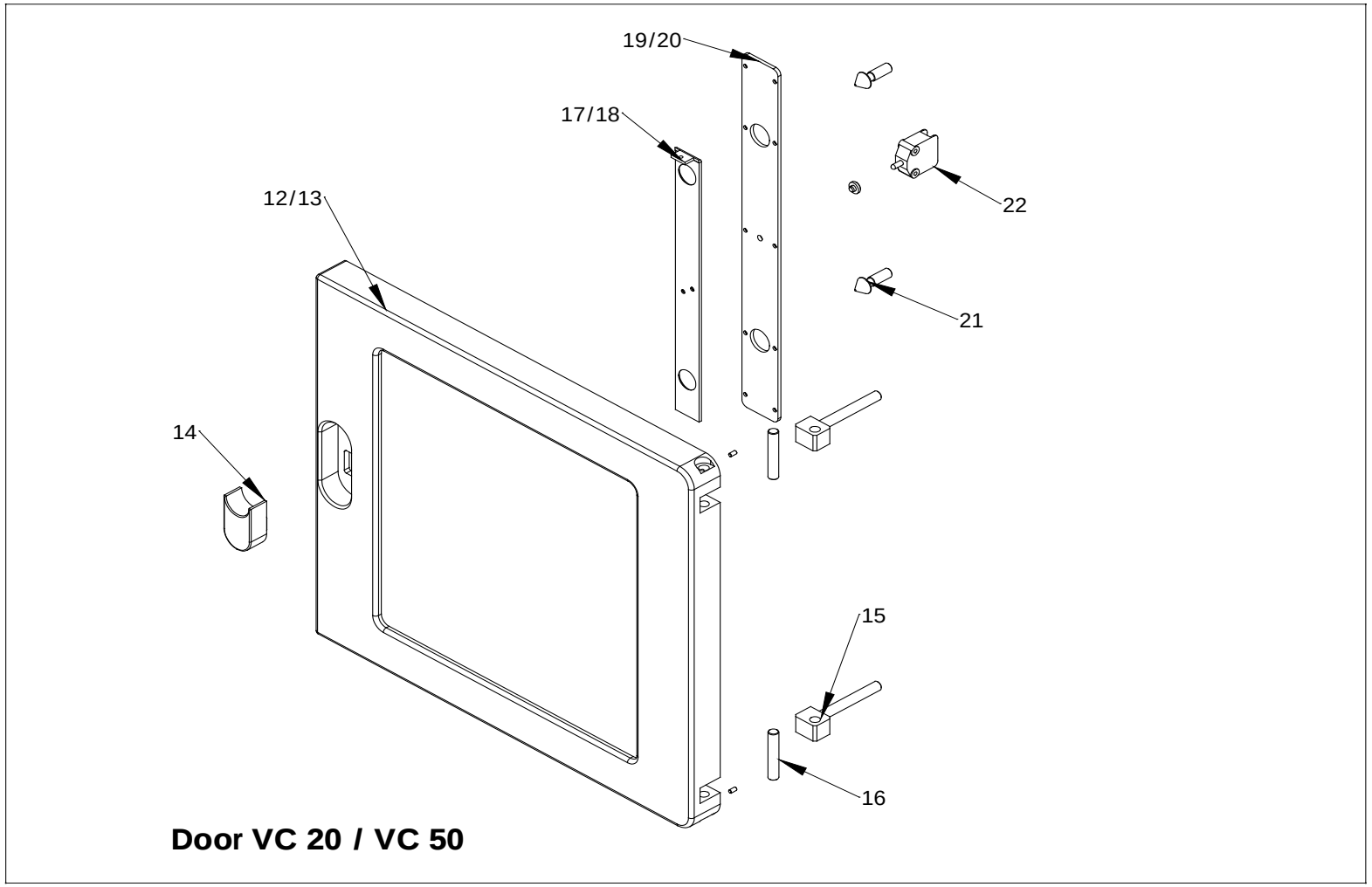
Appendix F

Drawing spare parts panel



Appendix G

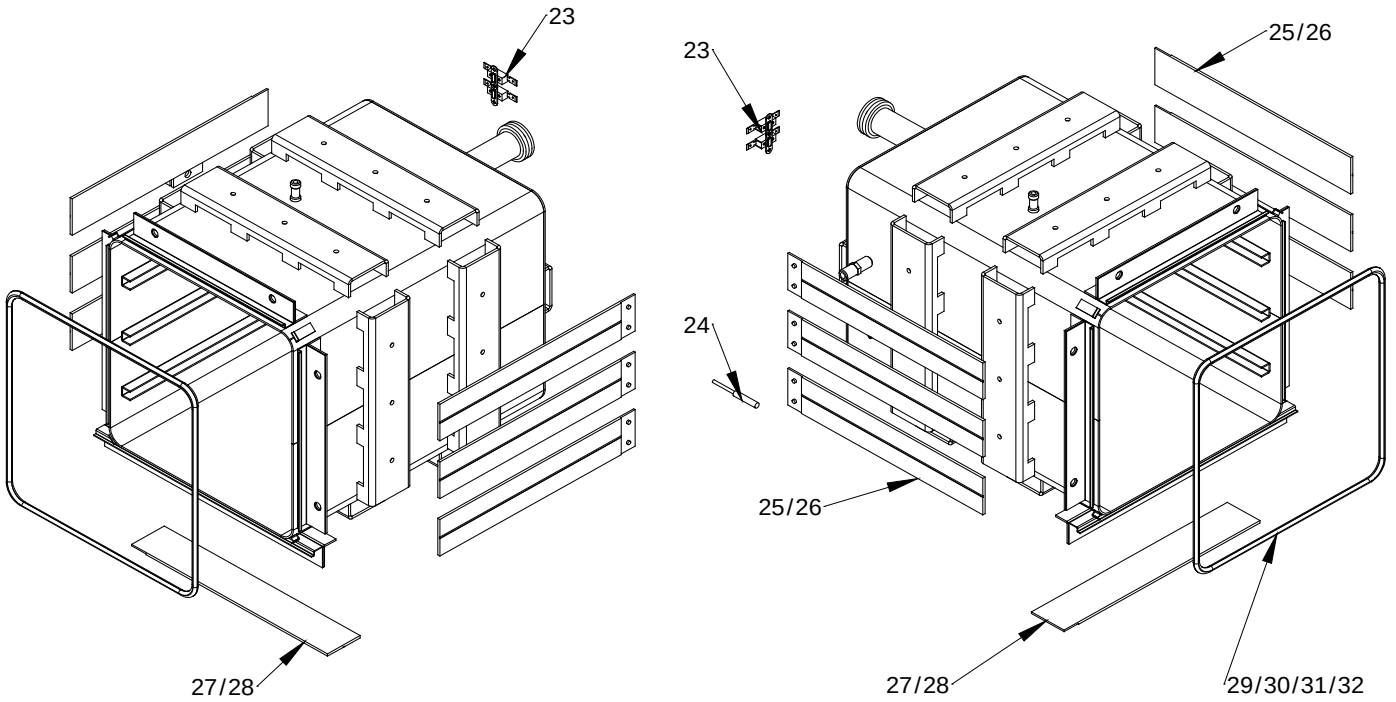
Drawing spare parts door



Door VC 20 / VC 50

Appendix H

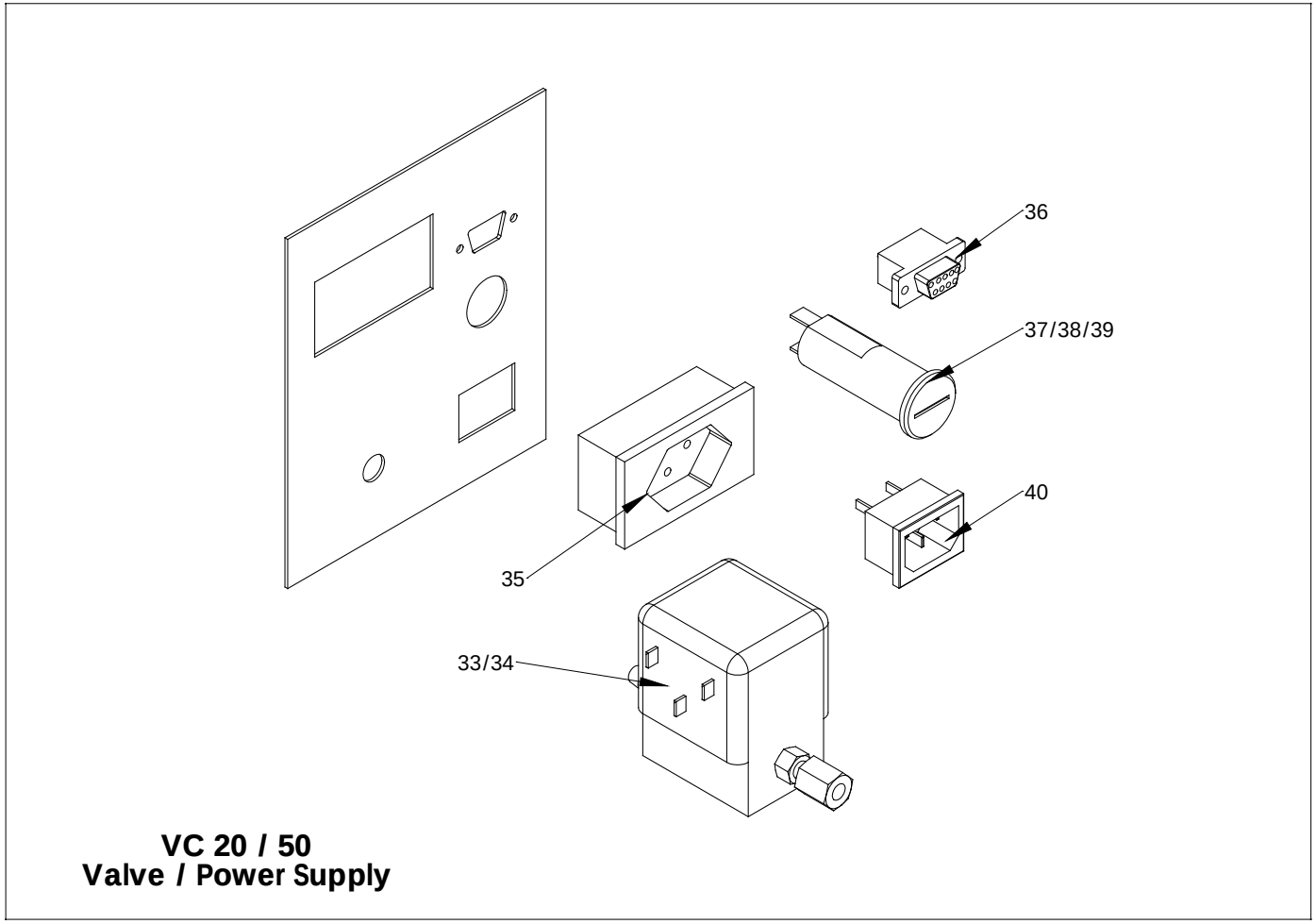
Drawing spare parts chamber



Inner Chamber VC 20/50

Appendix I

Drawing spare parts valve / power supply



Appendix J

Spare part numbers

Position	Part number	Description
1	31W04172015	Panel for VC-50
2	31W04172014	Panel for VC-20
3	31W04144154	Main PCB VC-20/50 230V/10A
4	31W04144153	Main PCB VC-20 115V/10A
6	31W04144155	Touch panel 115V/230V
7	31W04942315	Gauge
8	31W04960705	Vacuum switch complete
11	31W04942306	Inlet valve for air / Inert gas complete
12	31W04141035	Door complete VC 20
13	31W04171012	Door complete VC 50
14	31W04174019	Door handle VC 20 / 50
15	31W04174095	Hinge bolt VC 20 / 50
16	31W04174200	Pin to hinge
17	31W04173010	Locking plate VC 20
18	31W04173011	Locking plate VC 50
19	31W04173009	Cover plate VC 20
20	31W04172002	Cover plate VC 50
21	31W04174096	Locking pin
22	31W04960700	Door switch
23	31W04962507	Over temperature fuse
24	31W04144123	Temperature probe PT100
25	31W04870018	Flat heating element 230V / 110 Watt for VC-20/50
26	31W04962923	Flat heating element 115V / 110 Watt for VC-20/50
27	31W04870019	Flat heating element 230V / 133 Watt for VC-50
28	31W04962924	Flat heating element 115V / 133 Watt for VC-50

Spare part numbers

Position	Part number	Description
29	31W04943208	Door seal white VC 20 (starting with S/N 317.061)
30	31W04943209	Door seal white VC 50 (starting with S/N 317.061)
31	31W04174090	Door seal black VC 20 (until S/N 317.060)
32	31W04174091	Door seal black VC 50 (until S/N 317.060)
33	31W04848069	Single solenoid valve 230V/50Hz
34	31W04942340	Single solenoid valve 115V/60Hz
35	31W04884001	Power plug for vacuum pump (only option 31F04302)
36	31W04144146	D-Sub 9 connector
37	31W04881007	Fuse holder
38	31W04881008	Closing cap to fuse holder
39	31W04881010	Fuse 10 A
40	31W04961470	Appliance coupler