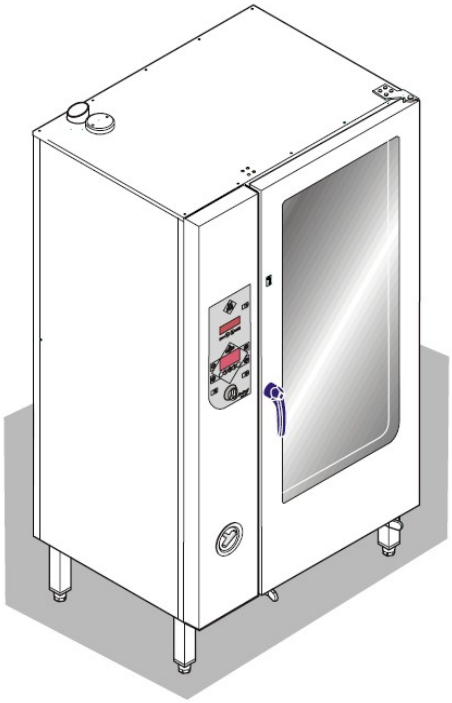
CE & UL Version

Service manual

Electric and Gas Combi



Model	Serial-No. / date	
	from	thru
Electric:		
ESC 615	07020594	
ESC 620	07020594	
ESC 115	07020594	
ESC 120	07020594	
ESC 215	07020594	
ESC 220	07020594	
Gas:		
GSC 615	07020594	
GSC 620	07020594	
GSC 115	07020594	
GSC 120	07020594	
GSC 215	07020594	
GSC 220	07020594	

From software 3.00

2011/12/29 SEV/KA

Preposition

The documentation may address the ovens as 6.x, 10.x and 20.x.
These represent the size of the units in regards as the number of rails.

Henny Penny is using the following model numbers
615
620
115
120
215
220

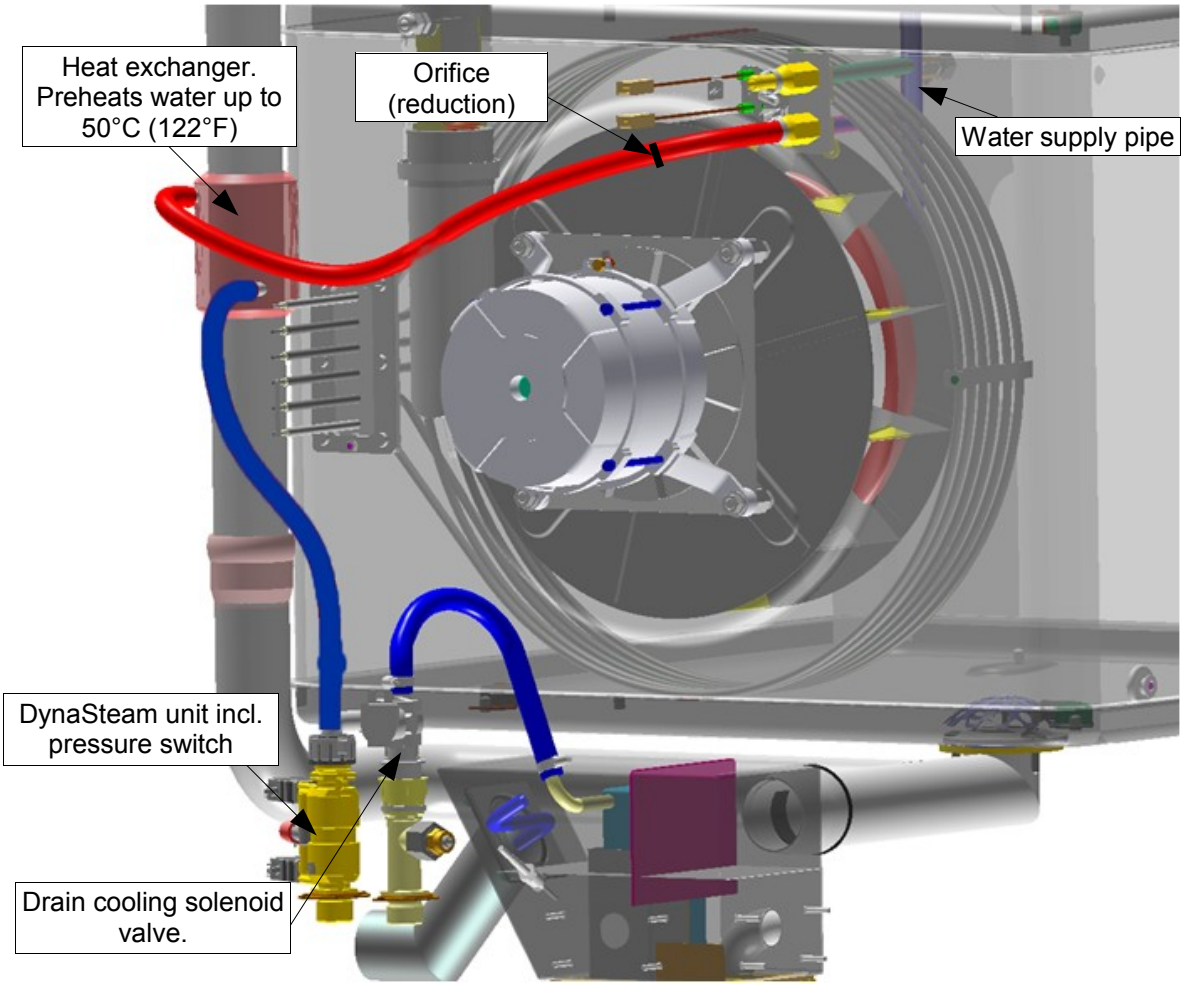
These are equivalent to the following
6.1 (61) – 615
6.2 (62) – 620
10.1 (101) – 115
10.2 (102) – 120
20.1 (201) – 215
20.2 (202) – 220

DynaSteam =AST (AdvanceSteamTechnology)
AutoChef = SmartMenu
CombiPilot = CombiDial

Contents

Preposition....2
Functional diagram of the DynaSteam technology....5
The automatic cleaning system WaveClean II....6
How to open the Front Panel and the Side Walls....8
Parts location 6.x / 10.x (left side view)....9
Parts location 6.x / 10.x Gas (left side view)....10
Parts location 20.x Electric (left side view)....11
Parts location 20.x Electric (front view)....12
DynaSteam unit documentation....13
Basics of the gas technology....16
Diagram of the heating process „regular operating“....19
Diagram of the heating process „no gas present“....20
Diagram of the heating process „gas present, no flame detection“....21
CO2 Gas value calibration....22
Gas orifices and fan speeds CSA....24
Gas orifices and fan speeds CE....25
Internal gas supply check....26
Check-up of the connection pressure (operating pressure)....27
Rearrangement of the gas type 28
Adjustment of the cabinet door....29
Overview and compatibility summary of temperature probes....30
Description of the frequency controller....31
The main menu (Password overview & diagnosis memory) 33
Service menu of the electronic (Configuration menu)....34
Settings area (basic settings)....44
Generally measurement mask for electric units....48
Generally measurement mask for gas units....50
How to activate and disable the demo mode 52
Reset of the electronic....52
Connecting a performance optimization system (LOA) 52
Connection of external facilities to the potential-free contact 52
How to change the display language....53
Layout of relay pcb A1 Electric & Gas CE-Version....54
Layout of relay pcb Electric & Gas UL-Version....56
Layout of keyboard pcb A2 Electric 58
Layout of keyboard pcb A2 Gas 59
Fuse protection schematic for CE units....60
Fuse protection schematic for UL Electric-Units (208V)....61
Fuse protection schematic for UL Gas-Units (120V)....62
Reserve relay K 17 rewiring instructions....63
240V UL unit Set Up....65

Functional diagram of the DynaSteam technology



- The pcb controls the DynaSteam unit which is responsible for the amount of injected water. The incoming water flow pressure must be between 1,5 (21,75 psi) and 6 bar (87,00 psi). The pressure switch controls the availability and the pressure of water.
- The heat exchanger heats the steam water up to 50°C (122°F) by the heat from the exhaust pipe.
- The preheated water runs in a hose to the water supply pipe located in the chamber. Inside the hose there is an orifice to stabilize the pulsed water flow from the water steaming unit.
- The water supply pipe injects the water on an centrifuge at the PHI fan wheel. The heating elements surround the fan wheel heats it up. The water gets to steam now and by the speed of the fan wheel tiny drops are flung against the chamber. Surplus water runs into the drain.
- At a temperature <107°C (225°F) the steaming unit decreases the amount of water (electronic controlled).

At units which have been produced before August 2011, the heat exchanger is located at the drain pipe underneath the cabinet.

Water consumption during permanently steaming at 100°C (212°F):

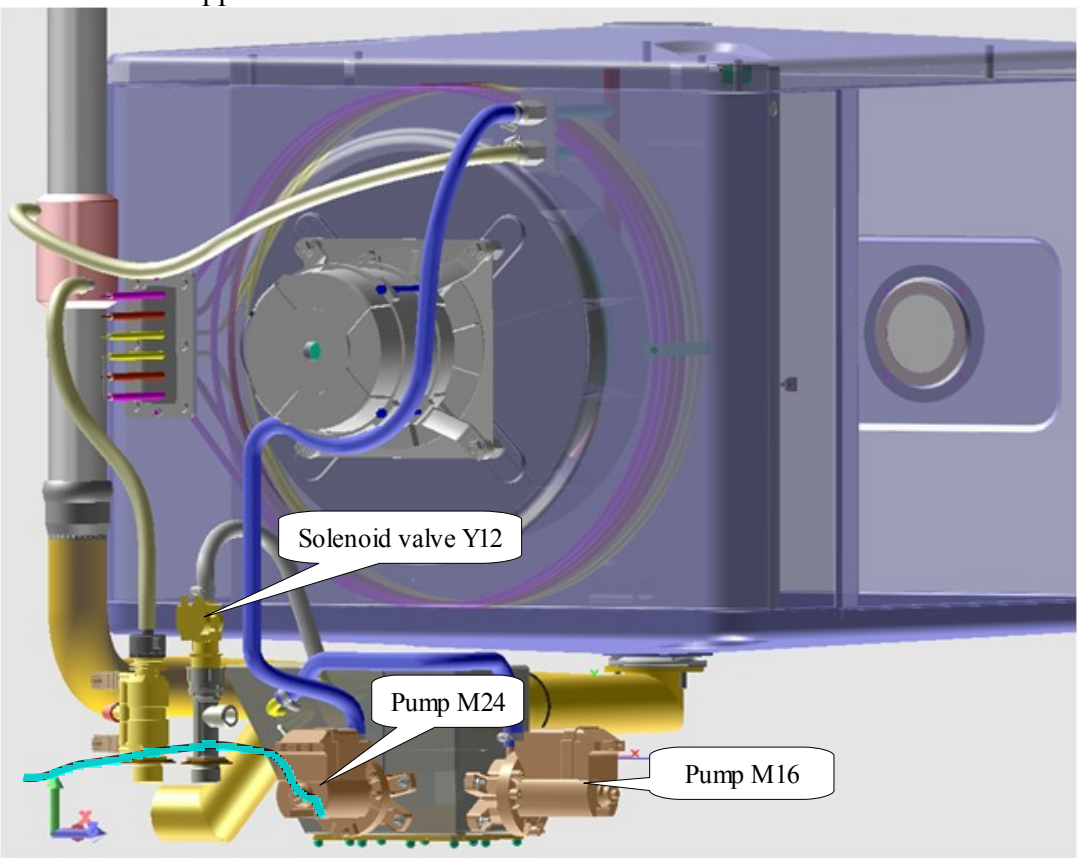
Unit size:	6.23 Junior	6.1 Compact	6.1	6.2	10.1	10.2	20.1	20.2
Water consumption in ml/h	7500	10000	16000	21000	18000	24000	18000 18000	24000 24000

The automatic cleaning system WaveClean II

Operational sequence of the cleaning system

The automatic cleaning system WaveClean provides three different programs:

- Short: Duration approx. one hour
- Normal: Duration approx. two hours
- Extra: Duration approx. three hours



Step	Function
01	- Depending on the cabinet temperature, the unit cools down to 55°C (131°F)
02	- Siphon rinsing by solenoid valve Y12. - Siphon cleaning by double water exchange. The drain pump M24 removes the water from the siphon. Afterwards the siphon gets filled by solenoid valve Y12.
03	- Cabinet pre-cleaning by active cycle pump M16 and fan motor. Afterwards one more siphon cleaning by water exchange.
04	- The cleaninig process - Fan motor and cycle pump M16 are active. - The heating element heats the unit up to 70°C (158°F). - The blue wax layer melts and the cleaning agent drops down. - The WaveClean pump circulates the cleaning water permanently. - To reach all positions, the fan runs in fast/slow and in right/left direction. - The duration of the cleaning sequence depends on the selected cleaning program.

Continuation description WaveClean II

Step	Function
05	- The rinsing process - Siphon (trap) cleaning by water exchange. - The drain pump removes the water from the siphon. - The siphon gets filled with fresh water by the solenoid valve Y12 - One more water exchange to ensure that clean water is available for the rinsing cycle. - Fan motor and WaveClean cycle pump M16 are active.. - The heating element heats the cabinet up to 92°C (198°F). - The sencond (yellow) wax layer melts and rinsing agents drops down. - The WaveClean pump circulates the rinsing water permanently. - To reach all positions the fan runs in fast/slow mode as well in right/left direction. - Final siphon water exchange by drain pump and solenoid valve. - When selected normal or extra program, the cabiinet gets dried by an additional dry-heat step.
06	- The unit switches off automatically after the cleaning program. - „Remove cartridge“ appears after switching the oven on again. This must be confirmed by pushing the „confirm“ button. - The total water consumption is approx. 50 Liter – independent from the selected cleaning program! - Approx. 3 Liter water running through the water steaming unit into the cabinet.

Note:

At an interruption of the power supply the cleaning process stopped automatically. A "cancellation program" which rinses the cabinet is started with a duration of 14 minutes.
This program is carried out also at a manual cancellation.
An entry is written down in the diagnosis and HACCP memory.

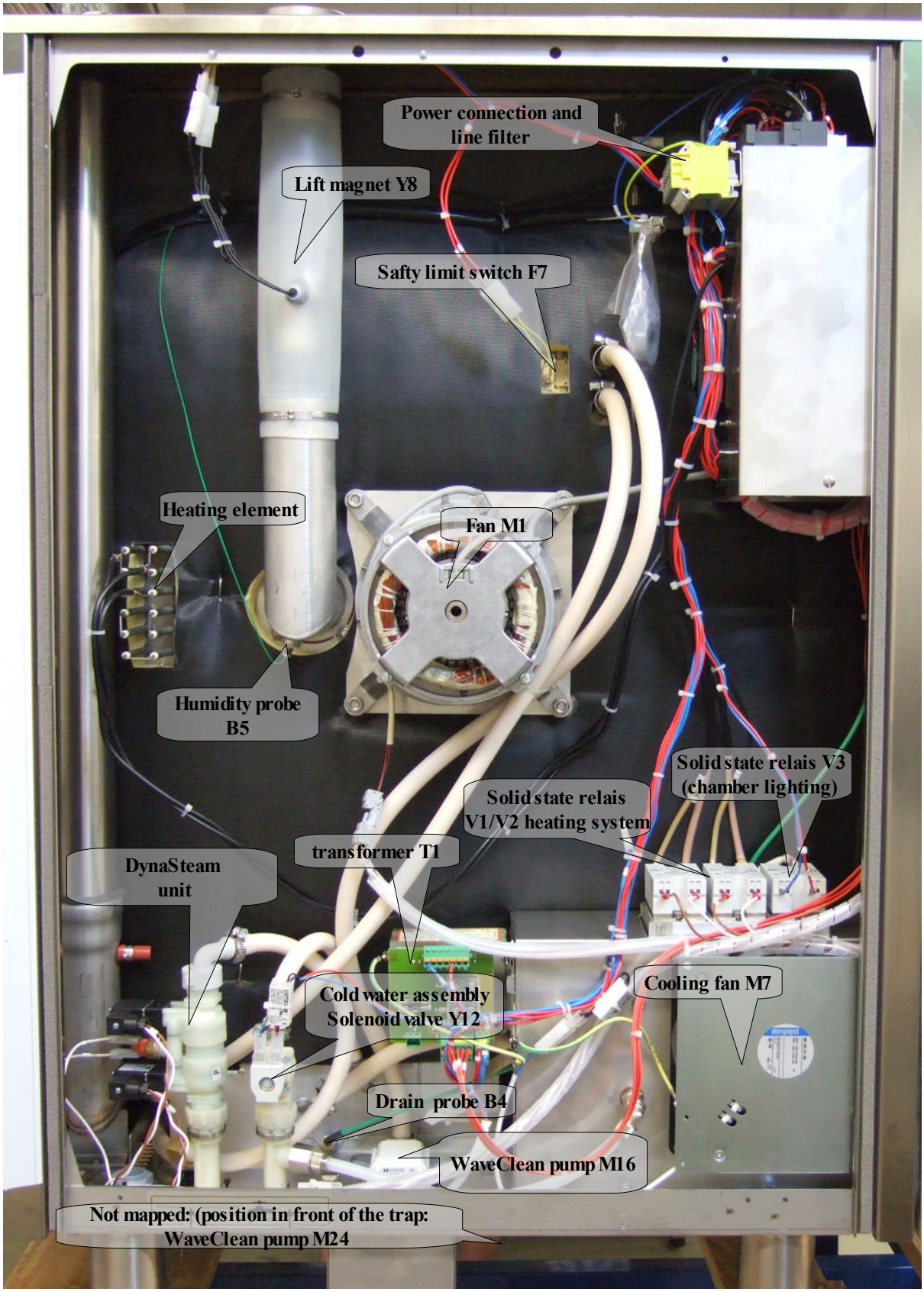
How to open the Front Panel and the Side Walls

Dismounting of Side Walls:
After dismounting of the two screws, the respective side wall can be removed.

Opening of the Front Panel:
The Front Panel will be unlocked by turning the hexagon socket clockwise. Lift up the Front Panel careful and open it.

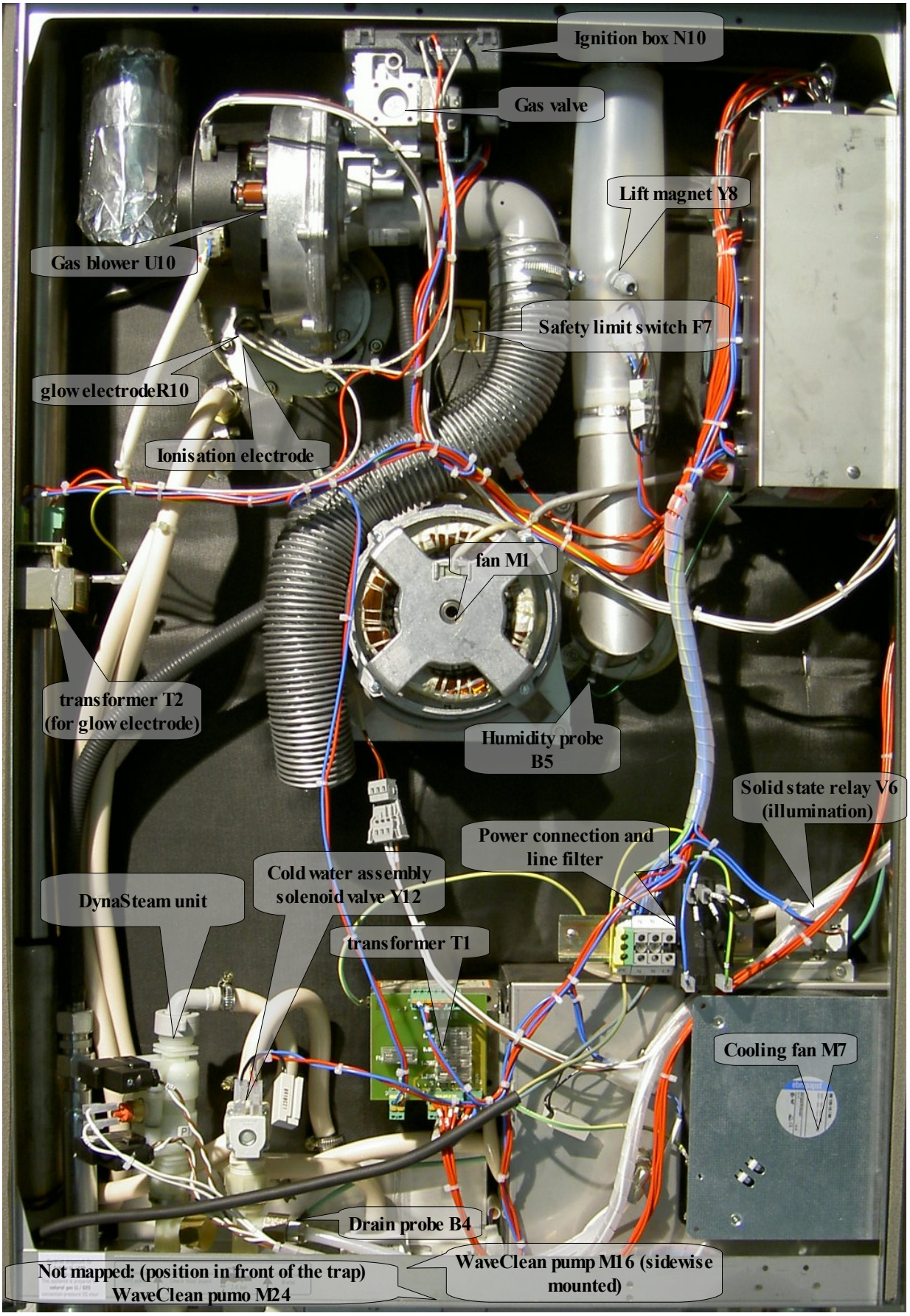
Parts location 6.x / 10.x (left side view)

CE Version



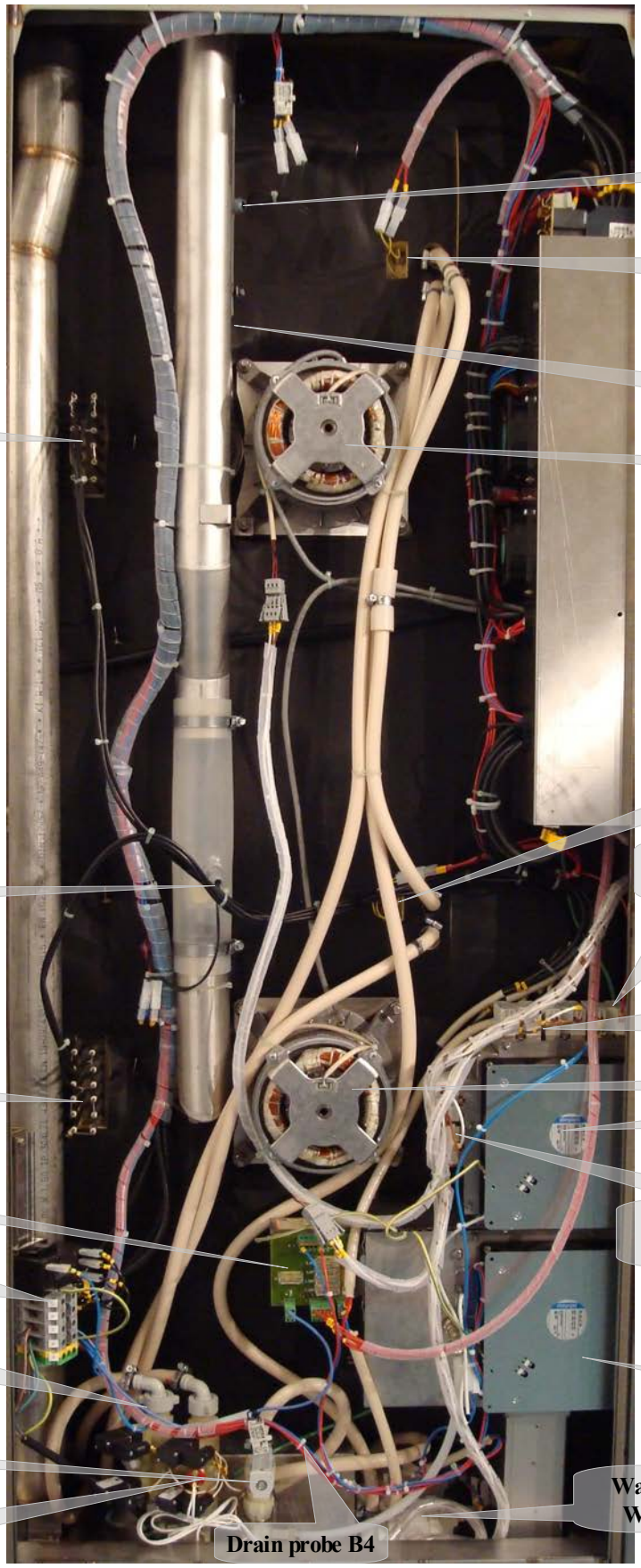
Parts location 6.x / 10.x Gas (left side view)

CE Version



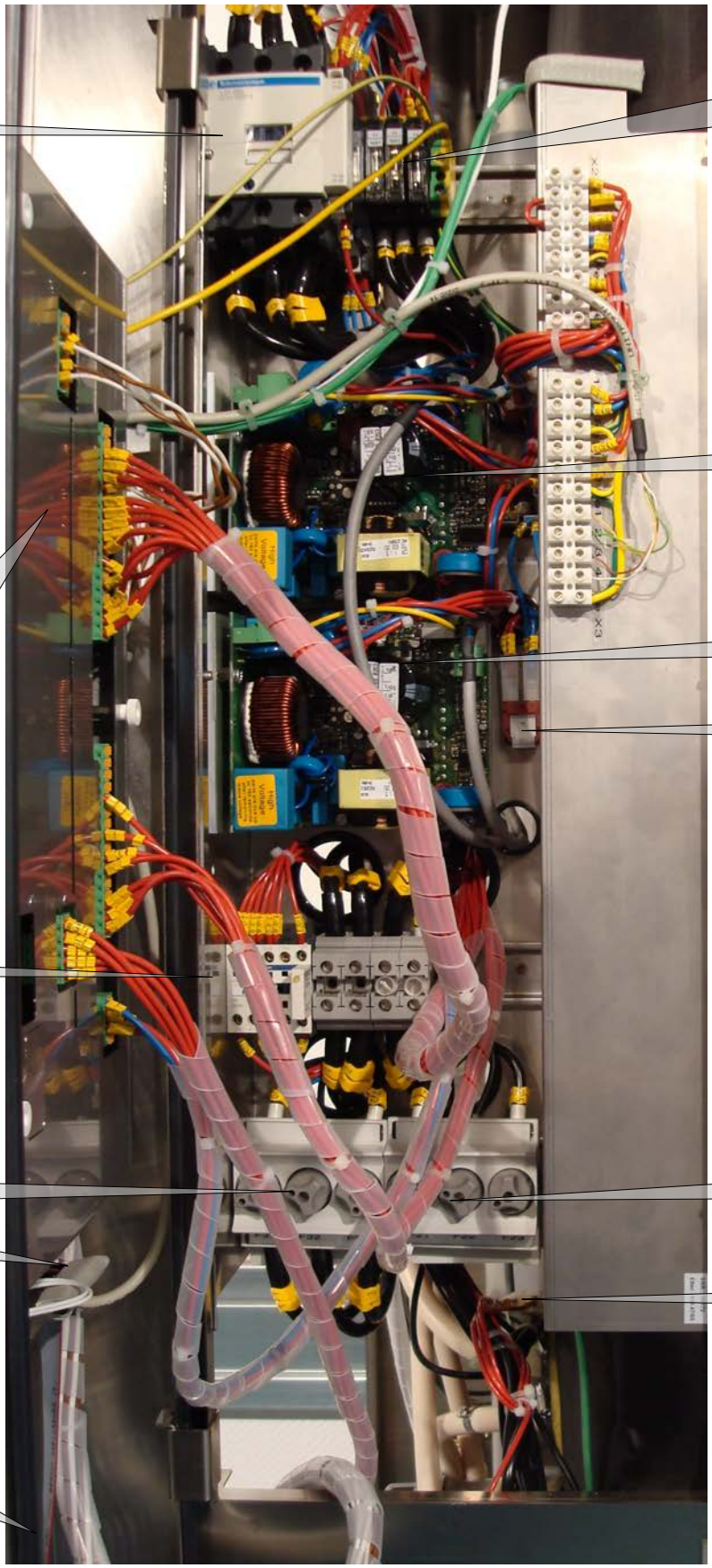
Parts location 20.x Electric (left side view)

CE Version

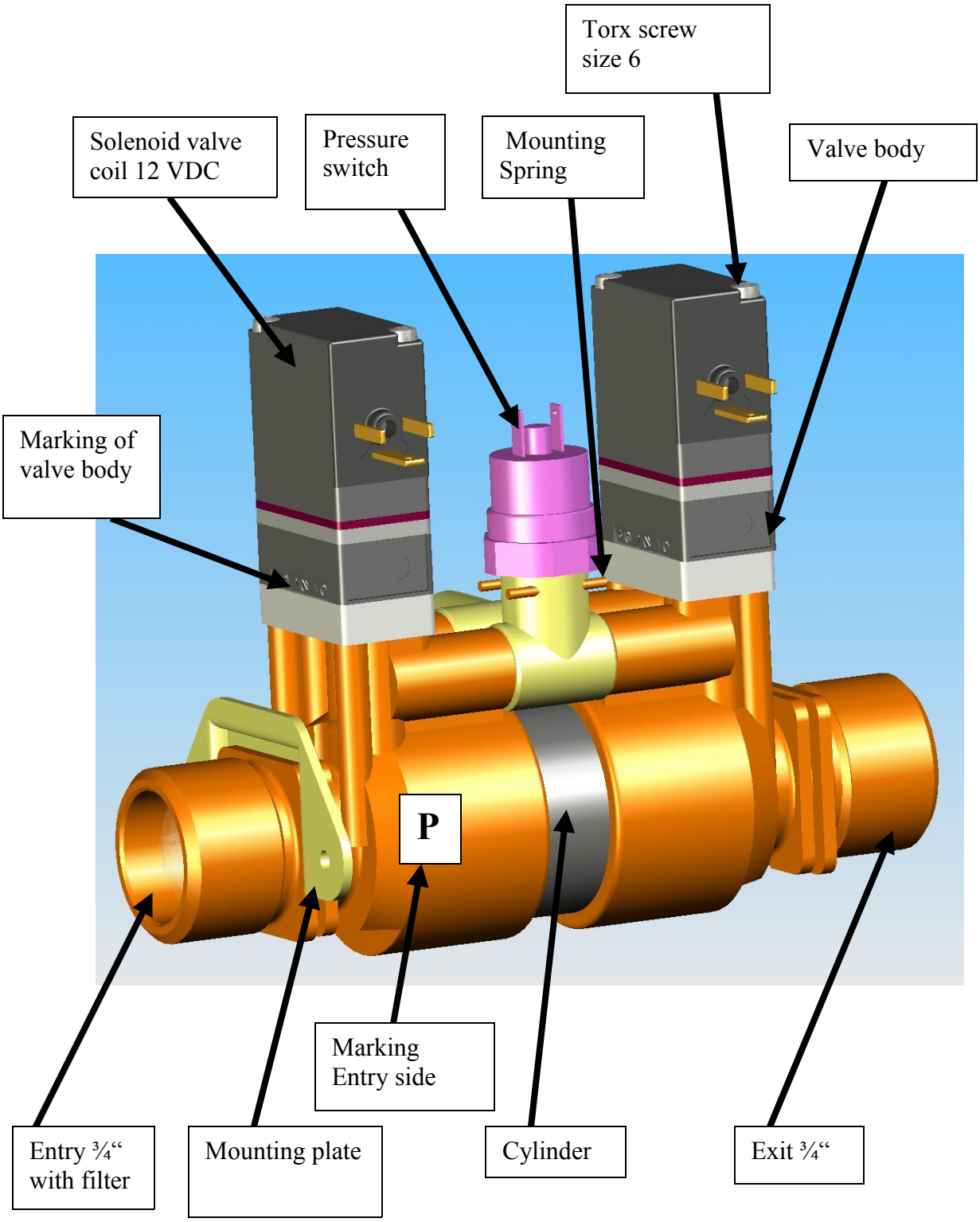


Parts location 20.x Electric (front view)

CE Version



DynaSteam unit documentation



Description

The unit is a volumetric proportion system for liquid substances. The unit produces a constant flow rate , independent from the incoming water pressure . The flowrate only depends on the frequency applied to the solenoids. The unit can have a water pressure switch to detect water pressure. The software of the machine determines the flow rate by adapting the frequency o the solenoids. A calibration is not needed nor possible. This technology has been engineered and patents applied by MKN.

Function

The unit consists of a cylinder with a double sided piston. The incoming water pressure drives the piston to one or the other side, depending which valve is active. The piston drives a specific volume of water to the outlet. Directly before the water enters the cooking chamber there is a orifice mounted inside the tube and held with a clamp. Do not operate the unit without that orifice.
Due to the transparent cylinder the piston (seals) can be seen in motion.
The solenoids are supplied with 12 V DC.
The pressure switch is set for a pressure of 1 bar (14.5 psi). Operation of the unit is guaranteed up to 6 bar (87 psi)entry pressure. Higher entry pressure requires a pressure reducing valve in front of the unit.

Technical data
Normal Pressure Range: 1.5 – 6 bar (21.8 – 87 psi)
burst pressure: >20 bar (>290 psi)
Maximum flow rate: 28l/h
Volume of cylinder: 7ml
Electrical supply: 24V DC

Functioning Test

This setting starts a unit functioning test. In the menu “water calibration”, a defined volume flow of water is emitted. The authorised volume is shown in the main display, the actual flow must be determined by a measuring jug. To increase the water volume for better a measurement, this procedure may be repeated several times.
The actual flow may deviate of the authorised flow by +/- 8% (e.g. for an authorised volume of 140ml, the minimum and maximum volumes are 129ml and 150ml respectively.
The Summary information mask indicates the power supply of the unit by the signs B1 (energized) And B0 (not energized).
Dual chamber units incorporate two units, which are parallel energized.
Tip:
During the cooking process, the volume flow cannot be determined because it frequently changes during the process.
At delivery of the combisteamer the water system is empty. This may warrant more time until water reaches the cooking chamber. During this time, multiple calibration cycles may be initiated.

Functional Troubles

Notice:
This unit allows the replacement of the pressure switch, the filter and the solenoid valves. Any further dismantling is not allowed (possible water damage, guarantee). After each replacement, a water proof test is obligatory.

Replacement Of Solenoid Valves

Shut off water supply. Release pressure in the entry lines. Unscrew the solenoid valves.
Pay attention to the three O-rings mounted to the valve body. Take apart the valve body and clean the valve socket and openings. Carefully clean the valve membrane of sediments. Reassemble the valve unit (it fits only in easily the correct way). Check the correct location of the three O-rings. The valve unit must be assembled with the script heading towards the entry opening. Mount the valve body with a torque of 0.6 +/- 0.1Nm. Assemble the solenoid with the electric connector at the side of the decal P with a torque of 0.1 – 0.2Nm. Connect the electric supply to the solenoid valve. Mixing up the electrical valve connections is without consequences. Open the water supply and check the unit water proof.

Fault Indication “No Water”

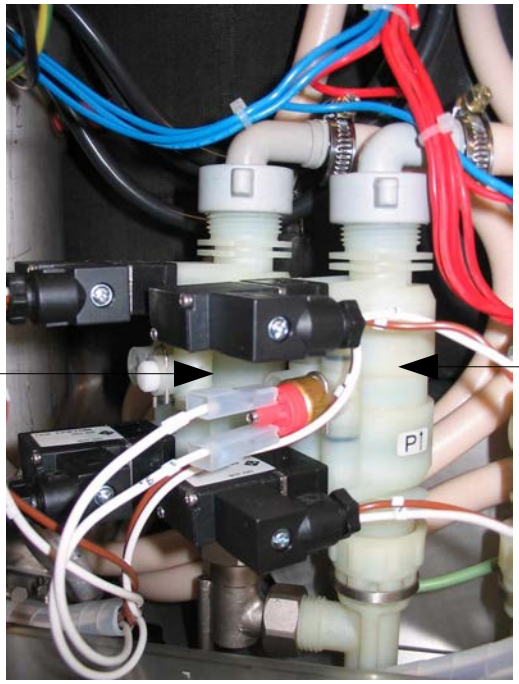
Units with a pressure switch display the fault “No Water” in case the pressure switch is still open. Check entry water pressure. Check electrical connections. The pressure switch opens at 1bar.The switch point is adjusted by the inner hexagonal nut incorporated in the pressure switch.

Replacement Of Pressure Switch

Shut off water supply. Release pressure in the entry line. Depending of type, disassemble metering unit. Turn the pressure switch to allow access to the mounting spring. Remove mounting spring with a small screw driver. Now the pressure switch can be removed. Lightly lubricate the O-ring of the replacement switch and insert it into the socket. Reconnect the mounting spring by pushing slightly on the pressure switch. The open side of the mounting spring points toward the entry side of the unit. The mounting spring must be completely inserted. Reconnect electric power and reassemble the metering unit if necessary. Open the water supply and test water proof.

Installation location 20.x:

DynaSteam unit without pressure switch (Order- No. #203831) responsible for the lower chamber.



DynaSteam unit with pressure switch (Order- No. #203832) responsible for the upper chamber.

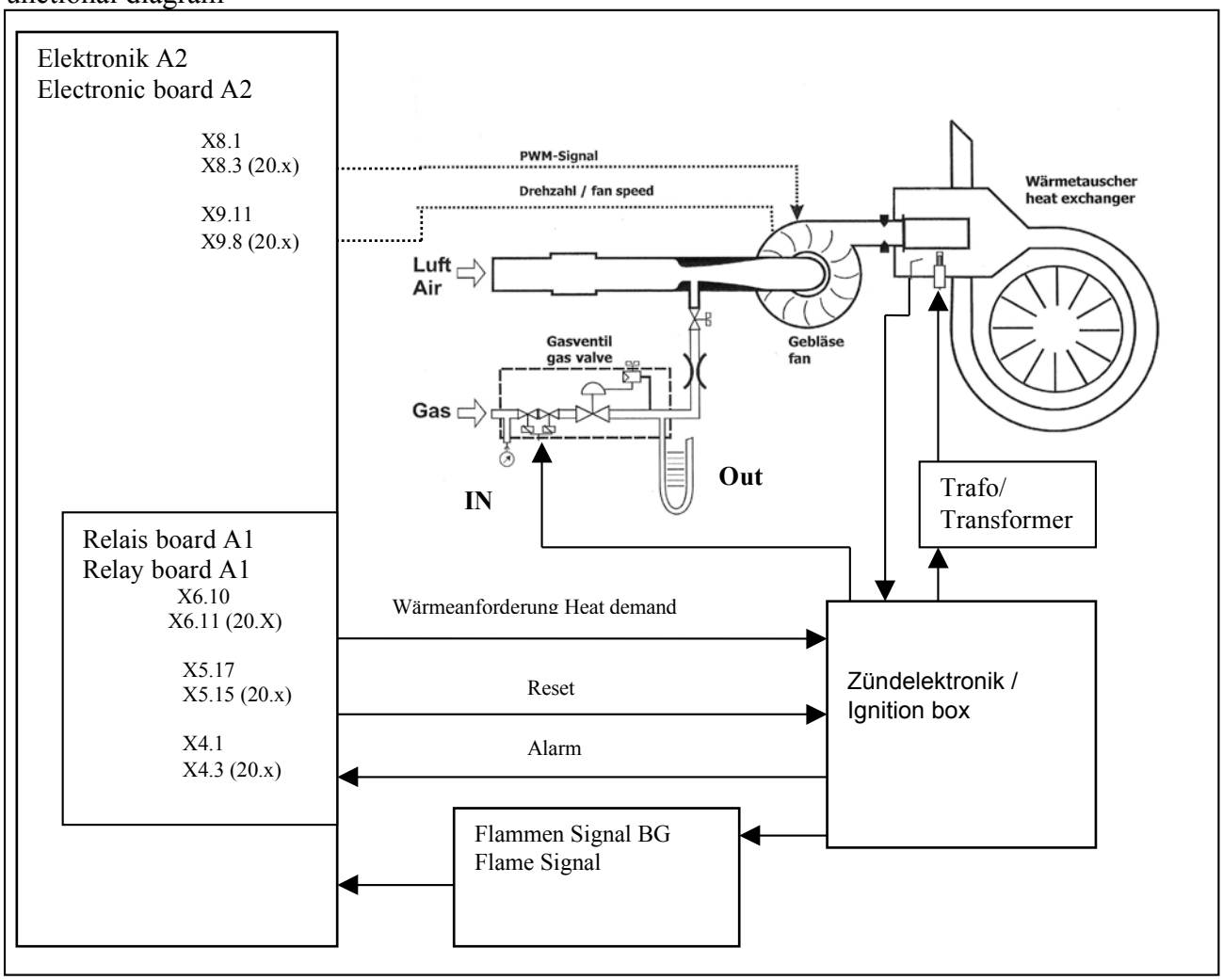
Gas technology

Basics of the gas technology

Operation of the gas burner:

- The electronic (pcb) gives a heat demand (relay K14 and K15) to the burner control.
- The electronic (pcb) regulates the speed of the gas fan and supervises these.
- The complete igniting process is handled by the burner control.
- At a failure of the flame signal from the burner control to the electronic the appliance is nevertheless ready for use. There is an electrical failure of the signal which safety-related is quite safe as long as no alarm is reported. (The burner control has recognized the flame (In this case there is "just"an error to transmit information to the electronic The burner control itself has already detected the flame).

Functional diagram



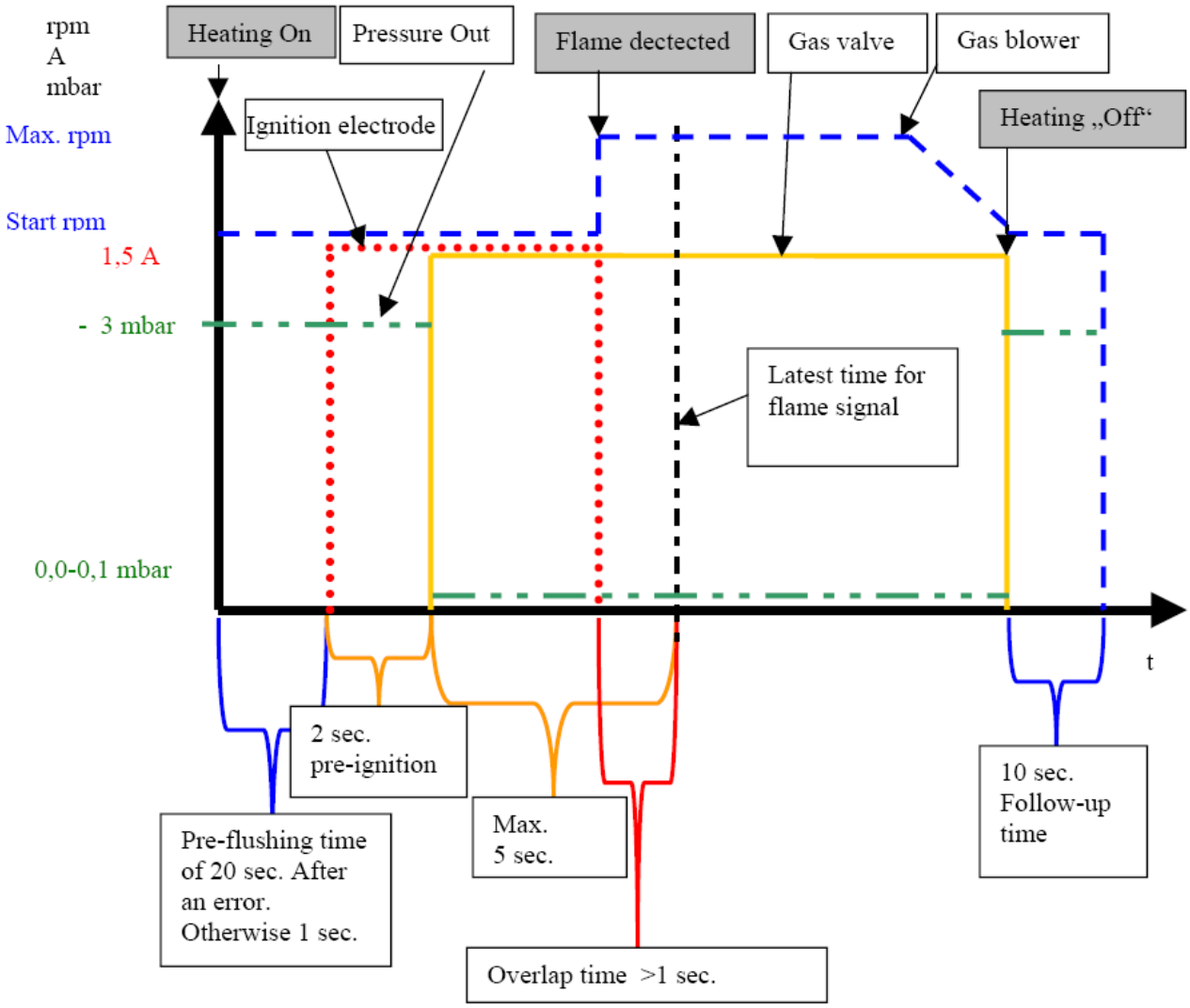


Diagram of the temporal sequence of a heating process

The gas fan

The gas fan promotes the air-/ gas mixture into the burner. The promoting volume and the performance are dependent on the speed of the gas fan. This is steered and supervised by the electronic. The speed only can be changed in a defined speed window which is dependent on the kind of gas and unit size. The speed window is basis of the equipment admittance and may not be changed. This regulation ensures that the gas fan speed works independently of outer influences (temperature and supply voltage).

Fan speed control:

The gas fan is / are controlled by a PWM signal (pulse width modulation) from the electronic A2, terminal X8.1 (6.x, 10.x, lower chamber at 20.x) and terminal X8.3 (upper chamber at unit size 20.x). Without PWM signal and with available supply voltage the gas fan runs for safety reasons with full speed. The gas fan transmit the fan speed to the electronic A2, terminal X9.11 (6.x, 10.x, 20.x lower chamber) and terminal X9.8 (only 20.x upper chamber) as a re-registration. The gas blower is regulated on set rotation speed by a software regulator. This can be check with the help of the configuration menu (service menu), step 9 "gas calibration".

A speed fluctuation up to 50 rpm is normal.

The ignition electrode
The ignition electrode serves to ignite the gas/air mixture and is supplied by a separate transformer

The flame control
The flame control induces an ionization current (approx. 5 µA) after the igniting process and passes this to the burner control. If this confirmation is not available, the error message "no gas" appears and a reset of the burner control is necessary.

The overlap-time
A sufficient overlap-time is important to ensure or a safety ignition process. This time can be controlled in the generally measurement mask.
When heating request of the temperature regulator is available, the display changes from G0 to G1. At first F0 is still shown because there is no flame detected. At latest after 7 seconds F1 must shown on display, otherwise appears the error message "no gas".
If the "flame OK" signal is permanently not available the unit goes into an emergency program, because there no safety risks represents.
In this case F0 does not change to F1 into the measurement mask, even though the flame is present (The unit heats up). There is only a risk / error, if within the heat demand (active operating) the "flame OK signal" changes repeatedly from F1 to F0.

Diagram of the heating process „regular operating“

All gas units

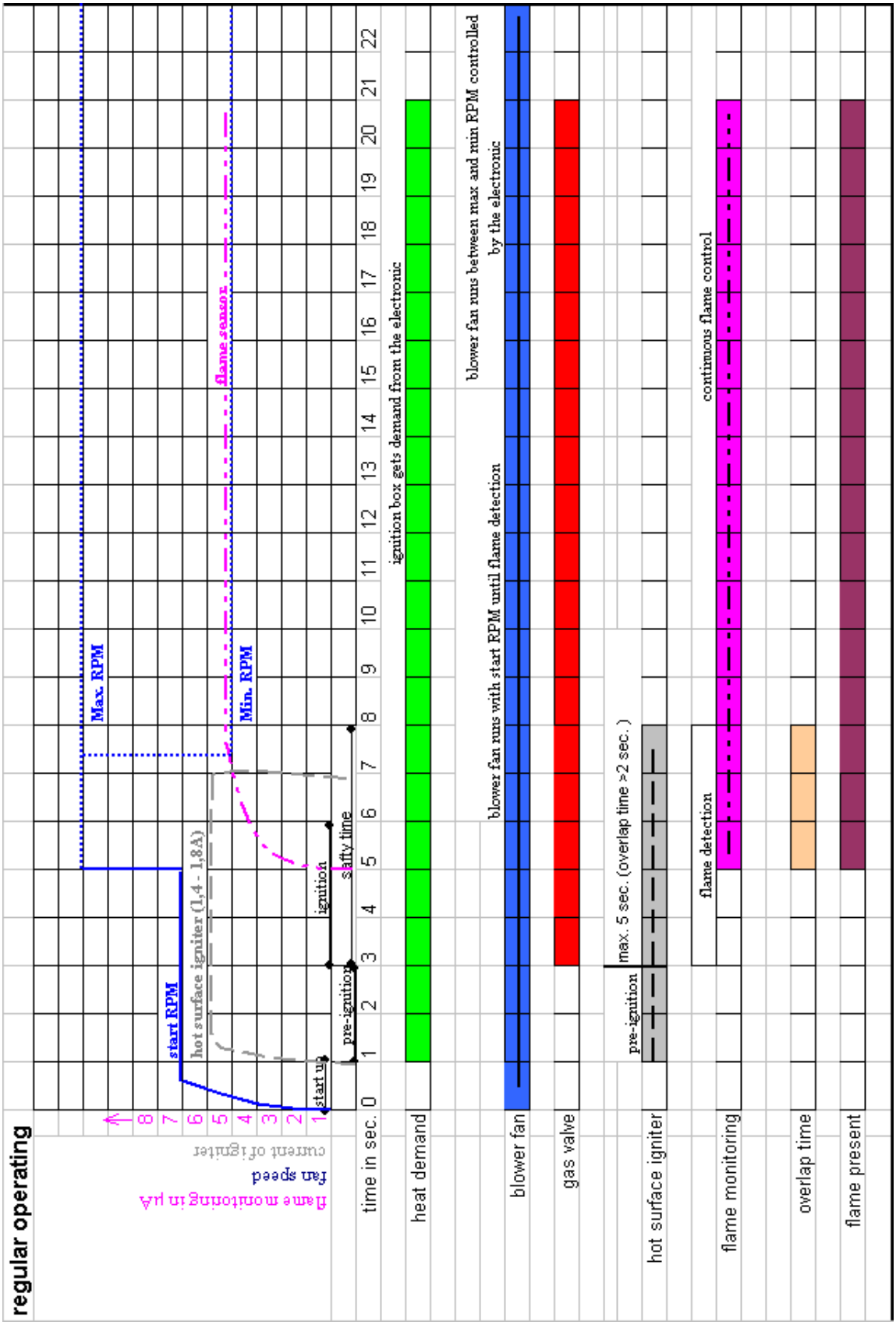


Diagram of the heating process „no gas present“

All Gas units

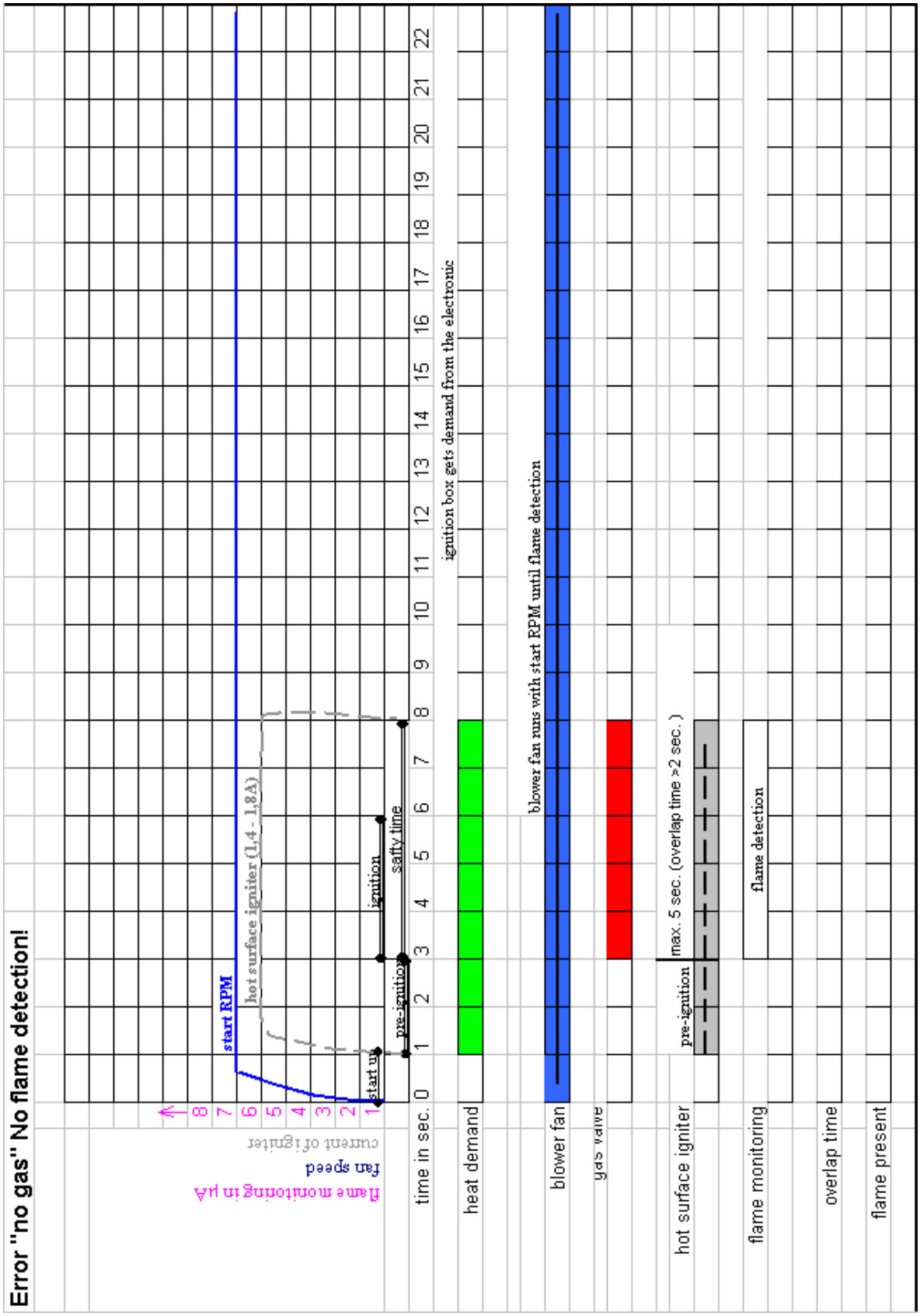
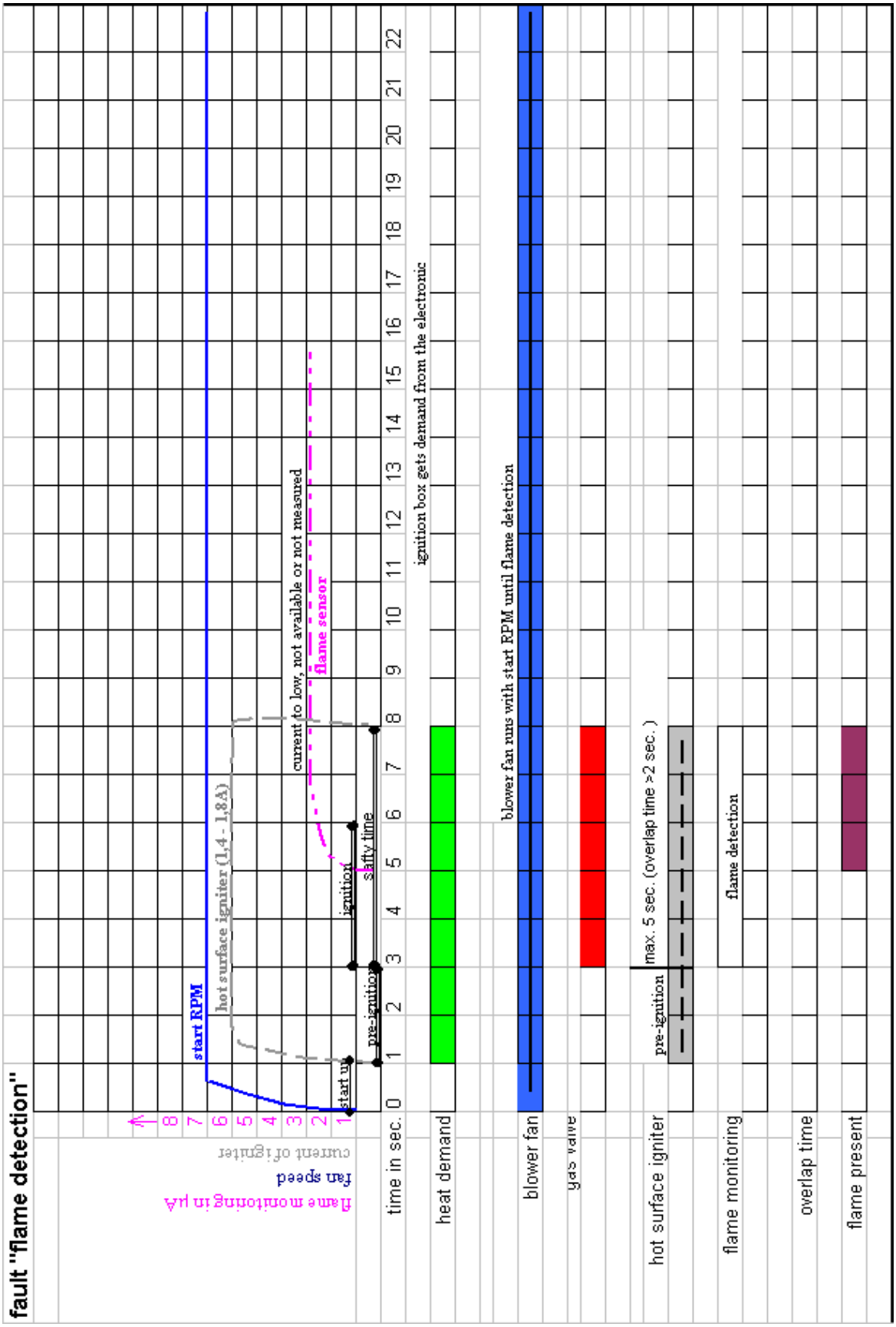


Diagram of the heating process „gas present, no flame detection“

All Gas units



CO_2 Gas value calibration

6.x–20.x

Basics
Definition of CO2 (carbon dioxide) and CO (carbon monoxide):

Carbon dioxide is a colourless and odourless gas and supplies a chemical union made of carbon and oxygen. Carbon dioxide arises at the burning of substances containing carbon (gasses) if enough oxygen is available. At an oxygen deficiency CO (carbon monoxide) arises.

CO_2 value calibration
Caution: This adjustment is crucial for the safe operation of the appliance. After leak testing, the CO2 content of the exhaust gas requires calibration and the CO content is to be checked.

- Switch on the combi steamer by pressing the on /off button.
- Press left button Menu to enter the menu.

Time / Date
Menu | ΔT / NT

- Select 4 Setup by turning the CombiPilot an push to confirm.

Menu
4 Setup
5 Diagnosis
back | confirm

- Enter password 999 with the CombiPilot. Confirm these with the start / stop button.

Enter
password
999
back | language

- Start CO2 calibration process with the start / stop button.
- CO2 value should be measured first at high power mode. F0 / F1 indicates the flame detection. (F0 = no flame, F1 = flame detected)

9 Gas CO2 calibration
Press start
back

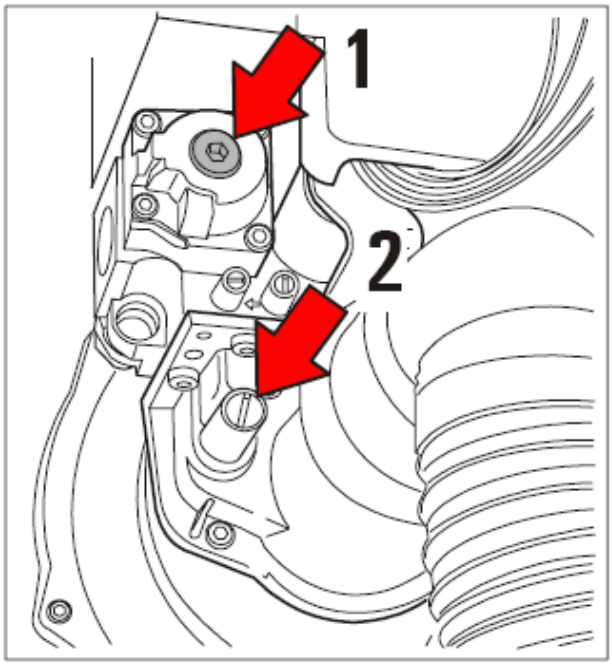
- The oven chamber should have a temperature of approx. 150°C (300°F) during the measurement. The current oven chamber temperature is appears also in the display. The C02 value has to be according the current spreadsheet located behind the front panel.

9 Gas CO2 calibration 148
1 High Power °C
- 6700 6709 - F0
config-menu

- Afterwards change to the low power mode by pushing the CombiPilot button. The C02 value has to be according the current spreadsheet

- With floor standing units, you can switch between the upper and the lowerchambers with the select button Change chamber. The selected chamber is indicated by anarrow next to the gas fan speed.

9 Gas CO2 calibration	148
1 Low Power	°C
- 6700 6709 - F0	
0 0 - F0	
config-menu	Change chamber



If the measured value differs from the values given in the table, the CO2 content must be adjusted to match the values given in the orifice spreadsheet. Unscrew the cap [1] on the gas valve and adjust the
CO2 content using the adjustment screw behind it during low power operation.

If the low power CO2 value has been changed, the high power value should be checked and if necessary readjusted. Adjust the CO2 content using the adjustment screw [2].
In general an adjustement on the high power screw is not needed, because this value is well-defined by the gas orifice

Preset information:
Connect a digital pressure gauge to the gas valve outlet port before starting the calibration process. Change to “low power” and adjust the plastic screw on the gas valve [1] until the outlet pressure is slightly negative at approx -0.2mbar (-20Pa) and start with the CO2 adjustment afterward. This is especially important after converting the oven to a different gas type as the gas valve setting is likely to be significantly out of range. Note, that the pre-adjustement by gas pressure is only to speed up the calibration process! It will not replace the calibration!

Please see also the installation manual for all safety notes and advises!

Gas orifices and fan speeds CSA

Gas orifice and fan speeds

Orifice de gaz et vitesse ventilateur à gaz

09. February 2009

SN ≥ 09020158

Valid for Combisteamer GSC/GCC/ valable pour de fours mixtes GSC/GCC CSA Version

Gas orifice/orifice de gaz in/en mm/100 and /air baffle/déflecteur d'air in en mm/10

CSA

Unit size taille de l'appareil	Orifice Natural Gas gaz naturel	Orifice LP Gas Propane Gaz propane liquéfié		Orifice air baffle déflecteur d'air	
	Gas A	Gas E		Orifice size	Part No.
615	680	470		200	855224
115	590	420		220	855254
215	590	420		220	855254
620	600	470		300	855234
120	580	420		280	855229
220	580	420		280	855229

Speed gas fan / vitesse ventilateur à gaz in/en rpm				Orifice size	Part No.
	Max	Start	Min	680	201195
615	5050	5000	4800	600	201190
115	5050	4000	2800	590	201229
215	5050	4000	2800	580	201230
620	6700	5000	4800	470	201189
120	6700	4000	2800	420	201185
220	6700	4000	2800		

CO2 [%]	at max. gas fan speed / power à la vitesse maximum	at min. gas fan speed / power à la vitesse minimum
Natural gas gaz naturel	8,6 - 9,6%	0,5-1% lower as maximum setting 0,5-1% moins qu'au maximum
liquid gas propane Propane liquéfié	10,0 - 11,0%	0,5-1% lower as maximum setting 0,5-1% moins qu'au maximum
liguid gas butane butane liquéfié	11,7 - 12,7%	0,5-1% lower as maximum setting 0,5-1% moins qu'au maximum

After a gas type conversion, the new gas type has to be marked permamanently visible on the unit.

Après conversion en un autre type de gaz, il faut marquer visiblement le nouveau type de gaz sur l'appareil.

Caution, the gas supply shall be shut off prior to disconnecting the elctrical power, before proceeding with the conversion

Attention. Avant d´effectuer la conversion, couper d´abord l´alimentation en gaz, ensuite couper l´alimentation électrique

WARNING	AVERTISSEMENT
This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, an explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's instructions supplied with the kit.	Cette trousse de conversion doit être instalée par un service d'entretien qualifié, selon les instructions du fabricant et selon toutes les exigences et tous les codes pertinents de l'autorité compétente. Assurez-vous de bien suivre les instructions dans cette notice pour réduire au minimum le risque d'incendie, d'explosion ou la production de monoxyde de carbone pouvant causer des dommages matériels, des blessures ou la mort. Le service d'entretien qualifié est responsable de l'installation de cette trousse. L'installation n'est pas adéquate ni complète tant que le bon fonctionnement de l'appareil convertit n'a pas été vérifié selon les instructions du fabricant fournies avec la trousse.

Gas orifices and fan speeds CE

Gasblenden und Gasgebläsedrehzahlen
Gas orifice and fan speeds
Orifice de gaz et vitesse ventilateur à gaz

22. Januar 2009

SN ≥ 09020158

HENNY PENNY® Global Foodservice Solutions

Gültig für Combidämpfer GSC / Valid for Combisteamer GSC, valable pour de fours mixtes GSC
Gasblenden/Gas orifice/orifice de gaz in/en mm/100 and und et Restriktionsflansch/air baffle/déflecteur d'air in en mm/10

Gerätegröße unit size taille de l'appareil	Erdgas Natural Gas LL gaz naturel	Erdgas Natural Gas H gaz naturel	Flüssiggas LP Gas B/P gaz combustible liquéfié		Restriktionsflansch air baffle déflecteur d'air	
	G25	G20, NG174, NGN	G30/31, FL50, BP29, PX275		Blendengröße Orifice size	Teile Nr. Part No.
6.1	720	650	470		200	855224
10.1	650	565	420		220	855254
20.1	650	565	420		220	855254
6.2	680	600	460		300	855234
10.2	630	565	420		280	855229
20.2	630	565	420		280	855229

Drehzahl Gasgebläse / speed gas fan / vitesse ventilateur à gaz in/en rpm					Blendengröße Orifice size	Teile Nr. Part No.
	Max	Start	Min		720	201191
6.1	5050	5000	4800		680	201195
10.1	5050	4000	2800		650	201188
20.1	5050	4000	2800		630	201187
6.2	6700	5000	4800		600	201190
10.2	6700	4000	2800		565	201186
20.2	6700	4000	2800		470	201189
					460	201194
					420	201185

CO2 [%]	bei max. Leistung, at max. gas fan speed	bei min. Leistung, at min. gas fan speed
Erdgas, Natural Gas gaz naturel	8,6 - 9,6%	0,5-1% niedriger als bei max. /lower as maximum setting 0,5-1% moins qu'au maximum
Flüssiggas Propan Propane liquéfié	10,0 - 11,0%	0,5-1% niedriger als bei max. /lower as maximum setting 0,5-1% moins qu'au maximum
Flüssiggas Butan	11,7 - 12,7%	0,5-1% niedriger als bei max. /lower as maximum setting 0,5-1% moins qu'au maximum

Nach Umbau auf eine andere Gasart ist die eingestellte Gasart auf dem Gerät dauerhaft sichtbar zu vermerken

After a gas type conversion, the new gas type has to be marked permamanently visible on the unit.

Après conversion en un autre type de gaz, il faut marquer visiblement le nouveau type de gaz sur l'appareil.

Achtung, vor dem Umbau auf eine andere Gasart, soll die Gaszufuhr und die Spannungsversorgung unterbrochen werden

Caution, the gas supply shall be shut off prior to disconnecting the elctrical power, before proceeding with the conversion

Attention. Avant d´effectuer la conversion, couper d´abord l´alimentation en gaz, ensuite couper l´alimentation électrique

WARNUNG	WARNING	AVERTISSEMENT
Dieser Umrüstsatz darf nur von einem authorisierten Fachmann durchgeführt werden. Die durchführende Person ist verantwortlich für die korrekte Durchführung des Umbaus. Bei einer mangelhaften Durchführung des Umbaus besteht Explosionsgefahr oder Erstickungsgefahr durch Kohlenmonoxid.	This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. If the information in these instructions is not followed exactly, a fire, an explosion or production of carbon monoxide may result causing property damage, personal injury or loss of life. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of the converted appliance is checked as specified in the manufacturer's insturctions supplied with the kit.	Cette trousse de conversion doit être instalée par un service d'entretien qualifié, selon les instructions du fabricant et selon toutes les exigences et tous les codes pertinents de l'autorité compétente. Assurez-vous de bien suivre les instructions dans cette notice pour réduire au minimum le risque d'incendie, d'explosion ou la production de monoxyde de carbone pouvant causer des dommages matériels, des blessures ou la mort. Le service d'entretien qualifié est responsable de l'installation de cette trousse. L'installation n'est pas adéquate ni complète tant que le bon fonctionnement de l'appareil convertit n'a pas été vérifié selon les instructions du fabricant fournies avec la trousse.

Internal gas supply check

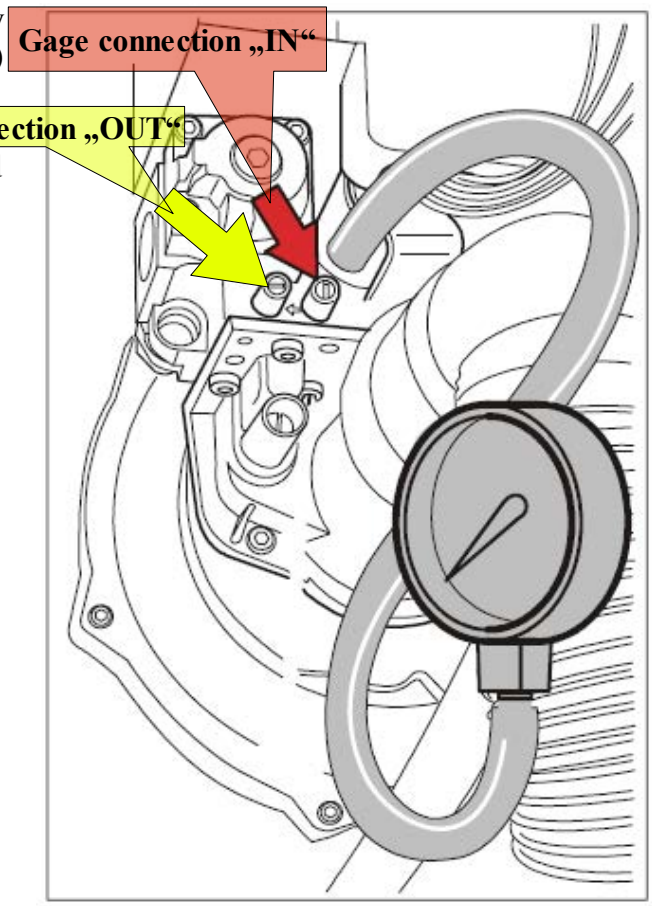
6.x– 20.x

Leakage test
Prior to checking the connection pressure, all connection points both outside and inside the appliance must be checked for leaks according to the technical regulations governing gas installations (TRGI) (using a gas detector or leak spray).

Use only TGRI-approved, foam forming agents! Do not spray leak spray onto the wires of the ignition electronics!

Internal gas supply check of the gas blower

- Close the on site gas valve.
- Disconnect the unit from the power supply (remove fuses or pull the connection-plug)
- Unscrew the two screws which are located down on the left to remove the left side panel.
- Unscrew the sealing screw from the pressure measurement connection on the gas valve **„OUT“** and connect a manometer. The manometer used should be accurate to at least 0.1 mbar.
- Open the on site gas valve and connect power supply.
- Sart up the appliance.
- If the gas blower runs on start speed and the gas valve is still closed, a negative pressure of approx. 3 mbar must be there. The gas blower blast air and the Venturi becomes a negative pressure.
- After opening of the gas valve the negative pressure breaks in. A small negative pressure of approx.. < 0,5 mbar persists.



- After measuring the pressure and with the shut-off valve still closed, refit the sealing screw in the pressure measuring point and check for leaks.

Check-up of the connection pressure (operating pressure)

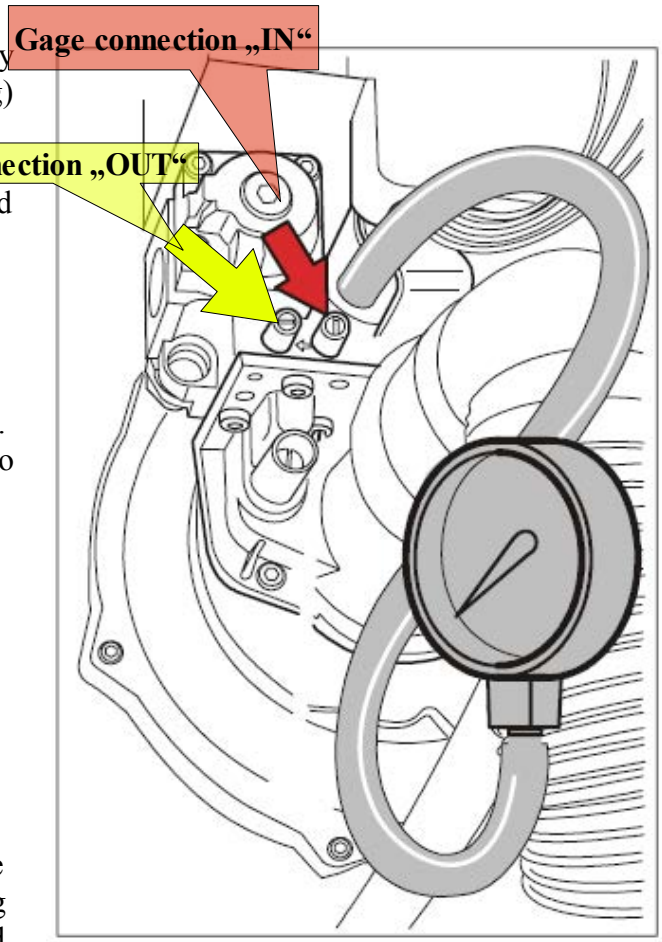
6.x–20.x

Leak test
Prior to checking the connection pressure, all connection points both outside and inside the appliance must be checked for leaks according to the technical regulations governing gas installations (TRGI) (using a gas detector or leak spray).

Use only TGRI-approved, foam forming agents! Do not spray leak spray onto the wires of the ignition electronics!

Checking the connection pressure

- Close the on site gas valve.
- Disconnect the unit from the power supply (remove fuses or pull the connection-plug)
- Unscrew the two screws which are located down on the left to remove the left side panel.
- Unscrew the sealing screw from the pressure measurement connection on the gas valve **„IN“** and connect a manometer. The manometer used should be accurate to at least 0.1 mbar.
- Open the on site gas valve and connect power supply.
- Start-up the appliance.
- Measure the connection pressure and compare it to the table below.
- After measuring the pressure and with the shut-off valve still closed, refit the sealing screw in the pressure measuring point and check for leaks.



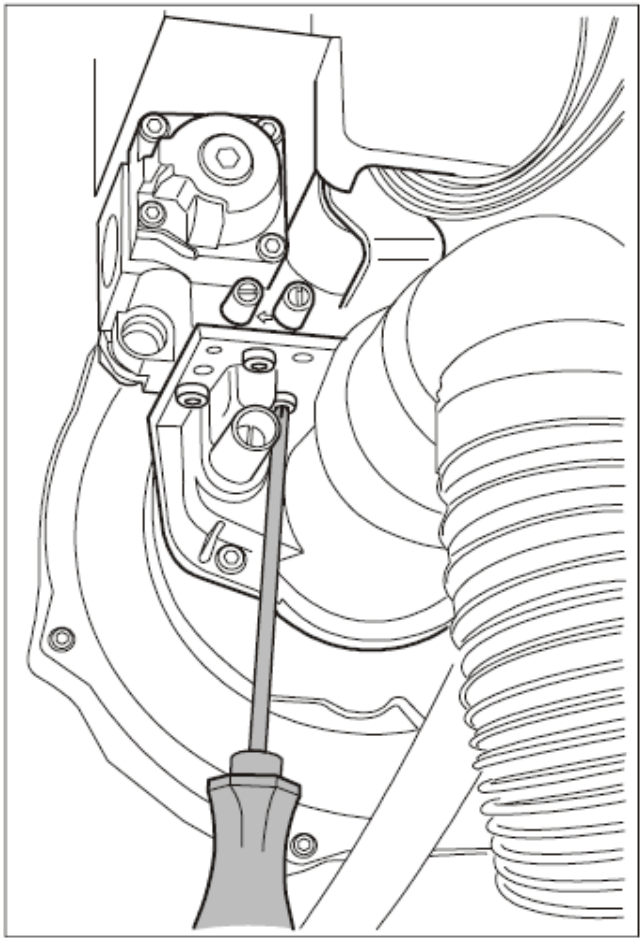
Type of gas Nominal connection pressure	Measured connection pressure
Natural Gas E, LL (20 mbar)	15,0 – 25,0 mbar
Liquid gas B, P (50 mbar)	15,0 – 57,5 mbar

Rearrangement of the gas type

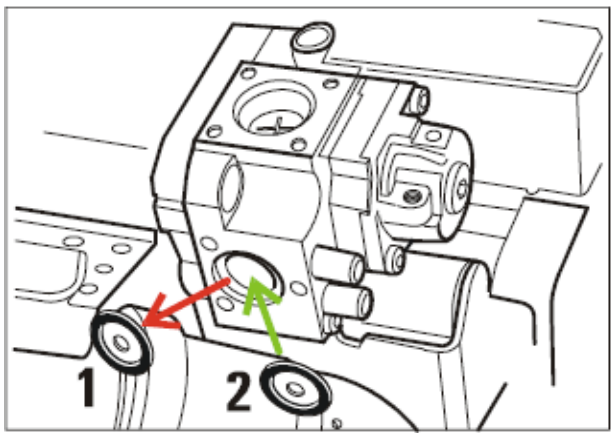
6.x–20.x

To convert to another gas type, the burner restrictor must be changed. The restrictors with a restrictor table are stored in a plastic bag behind the left side wall.

- Close the on site gas valve.
- Disconnect the unit from the power supply (remove fuses or pull the connection-plug)
- Unscrew the two screws which are located down on the left to remove the left side panel.
- Unscrew the three screws of the gas valve.
- Remove gas valve.
- Remove gas restrictor with the seal [1]

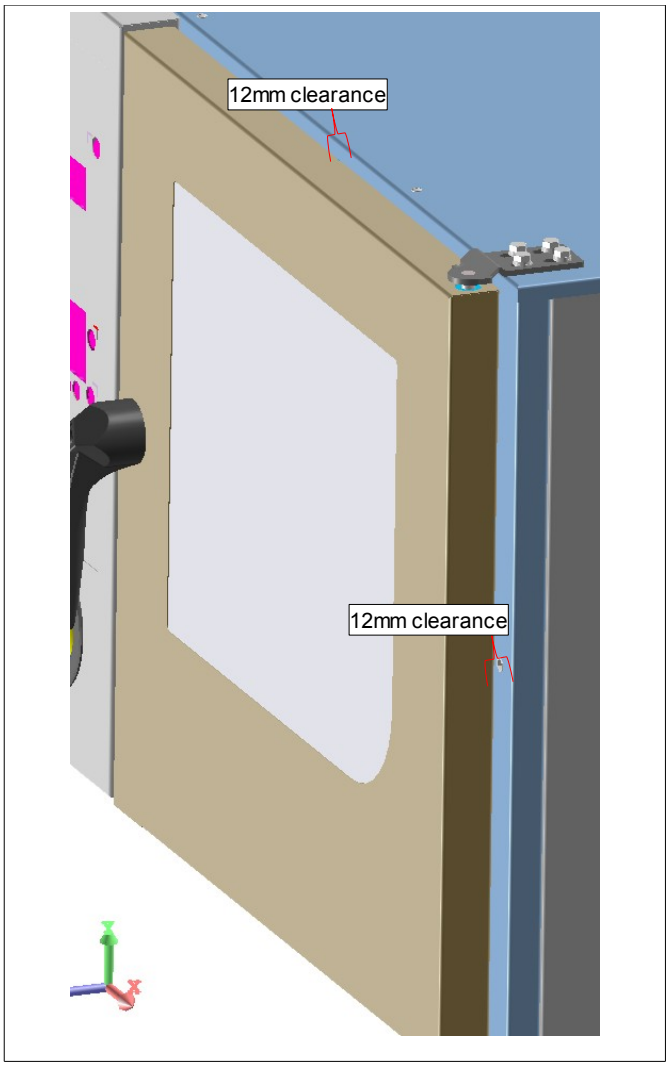


- Select a restrictor with the help of the table and refit it by using an **undamaged** seal. [2].
- Set up and mount the gas valve.
- Open the on site gas valve.
- Switch on the power supply
- After the conversion continue with **leak testing**, **checking of the connection pressure** and **calibration of the CO2/CO-values.**



Adjustment of the cabinet door

The door should be adjusted so that it is easy to close but is still impermeable. This can be achieved by adjusting the hinges and fastening blocks. To assist in this the hinges should be adjusted so that the seal edge touches the door, when it is open wide enough so that the seal can just be seen between the operating console and the seal on the hinge side. It is important that the seal touches the door uniformly over its full height; to achieve this both hinges can be adjusted.
The door must be level; otherwise proper locking of the door cannot be guaranteed (alignment of blocks and locking lever).The upper edge of the door must run parallel to the front panel.
After loosening the counter nut, the fastening blocks can be turned in or out. After correction tighten the counter nut and check closure, if necessary adjust again. Make sure that the fastening blocks are level.
Note:
On 20.x floor units the lock pulls the door to within approx.4mm of the seal (from April 2005).
On the appliances which open to the right make sure that the gap between the operating console and the door is not too big (adjustment of hinge) otherwise the dry reed contact for the door may not be able to function properly.



Default factory adjustment

At the factory-provided adjustment, the door has a **clearance of 12mm to the chassis**, which is also valid for service. To avoid damages at the plastic trays, the adjustment should be not below this value.
If the clearance is less than 12mm, the door seal should be replaced.

Cleaning the door seal
Animal fats together with high temperatures can destroy the door seal in a short time if it is not cared for properly. For this reason, it is important to clean the door seal regularly to ensure a long service life.

1. Clean fats from the door seal after operation using a mild soap solution.
2. Also clean the door seal in breaks during operation if the unit is mainly used for roasting.

When cleaning with “WaveClean” and system-supported manual cleaning, the outside of the door seal is not cleaned. The door seal must be cleaned separately after each cleaning.
Do not use aggressive cleaners!

Overview and compatibility summary of temperature probes

Overall summary of original probes

MKN No.	description	6.23	6.1	6.2	10.1	10.2	20.1	20.2
203697	CT- probe 760 mm long, 4 point	+	+	+	+	+	-	-
203688	CT- probe 1160 mm long, 4-point	-	-	-	-	-	+	+
203689	Chamber probe 3200 mm long, black shrink hose.	-	+	+	+	+	+	+
203991	Humidity probe (gold) chamber probe (Junior) 1600 mm long, yellow or transparent shrink hose.	+	+	+	+	+	+	+
203693	Vapour probe1500 mm long, green silicon coating.	+	+	+	+	+	-	-
203990	Vapour probe2150 mm long, green silicon coating.	-	-	-	-	-	+	+

.

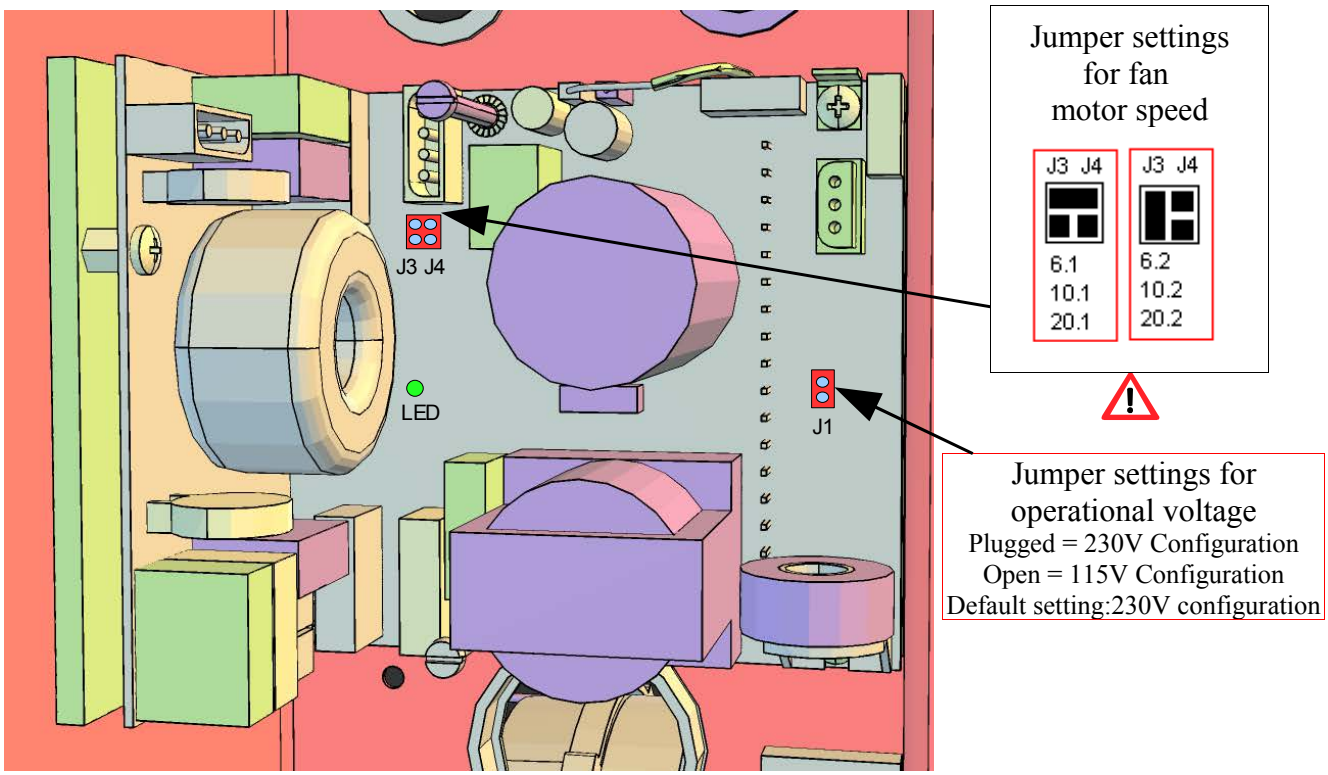
Compatibility summary

-	-	6.23	6.1	6.2	10.1	10.2	20.1	20.2
Humidity probe	original	203991	203991	203991	203991	203991	203991	203991
	alternative	203689*	203689	203689	203689	203689	203689	203689
Vapour probe	original	203693	203693	203693	203693	203693	203990	203990
	alternative	203990	203990	203990	203990	203990	-	-

- Note: After installation the sensor typ #203689 on junior must be bent 180° upwards.

Note: There is a danger of confusion when replacing with an alternative sensor, because the colour markings are then not correct and it can be confusing at the plug. Please mark the sensor accordingly at the plug and after installing check that it has been correctly installed.

Description of the frequency controller



Sample on a 1-phase (90Veff – 264Veff) controller

Installation instructions

Disconnect the unit from the power and gas supply. Wait at least 3 minutes until the capacitors on the controller have unloaded themselves!

The frequency converter is fitted with a wide range input.
The input voltage can be configured with the link plug (Jumper) J1
Input voltage at the mains terminal inlet can be measured according to the following Jumper status.
To be measured are:
J1 Plugged: Area 200V-240V (-10%, +15%) **Despatch status!!!**
J1 Open : Area 100V-120V (-10%, +15%)
The voltage (live) phase L must be led through the Ferrite core before the mains terminal in the cable harness, to avoid EMC-interferences in the appliance.

For the appliance sizes 6.1, 10.1 and 20.1 the Jumper J3 is not plugged (**open, despatch status**). Therefore the Jumper must be plugged between J3 and J4 (horizontally). The fan runs max.. 1500 rpm´s.
In the appliance sizes 6.2, 10.2 and 20.2 the Jumper J3 must be plugged (left Jumper vertically). The fan runs max. 1800 rpm`s

Continuation frequency controller description

Functional test

The three control lines on the control connection terminal are wired according to the following table, whereby status „1“ means 230V. This can be measured and compared to ”N”.

D2	D1	D0	Function
0	0	0	Fan motor is not running
1	1	1	Right rotation, slow fan speed
1	1	0	Right rotation, medium fan speed
0	1	0	Right rotation, fast fan speed
1	0	0	Left rotation, slow fan speed
1	0	1	Left rotation, medium fan speed
0	0	1	Left rotation, fast fan speed

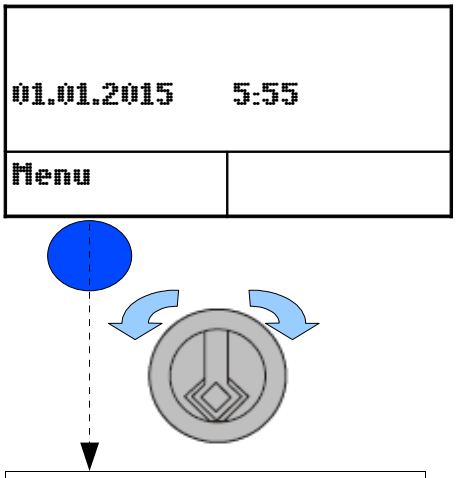
The output voltage on the motor outlet terminal is 230V 60Hz when in use.
When turned on, this function can also be controlled with the green LED which is on the controller.

LED status	Description	Steps to take.
On	Frequency converter is working perfectly	-
Off	Frequency converter is not working	Control input voltage if necessary replace frequency converter.
3 flashes/period	Overheating of frequency converter.	Test fan function, if necessary replace frequency converter.
6 flashes /period	Short circuit in motor	Test motor, replace if necessary.
7 flashes/period	Frequency converter does not start	Jumper J1 is configured incorrectly.

Fan speed overview (rpm):

Speed mode	Fan speed 6.1 / 10.1 /20.1	Fan speed 6.2 / 10.2 / 20.2
fast	1440	1600
medium	750	1000
slow	450	600

The main menu (Password overview & diagnosis memory)



1. Manual cleaning

Half automatic cleaning program with presetted steps. If the cooking chamber is too hot, the appliance will be cooled automatically. If it is too cold, it is heated to the soaking temperature. Further actions(spraying cleaner, rinsing) are displayed at the respective time.

2. WaveClean

Automatic cleaning system. Three programs can be selected: (short approx. 1 hour; normal approx. 2 hours; extra approx. 3 hours)

3. HACCP

The unit saves up to 200 HACCP logs, depending on the number of program steps. The logs can be transmitted to the USB-port (from software 4.00; S/N 09021482; July 2009)

4. Setup

Password for basic adjustments: **111**
If the password for settings area is unknown, the area can be also entered by pushing the CombiSteam and Preheat button at the same time
Password for service area :**777** Enter password with the Combi dial and confirm by pushing Start/ Stop button.

5. Diagnosis

The diagnosis memory saves current and former error messages. These are represented historically according to the date and time. Turn the Combi dial to scroll inside the diagnosis memory.

6. Cookbook -> USB

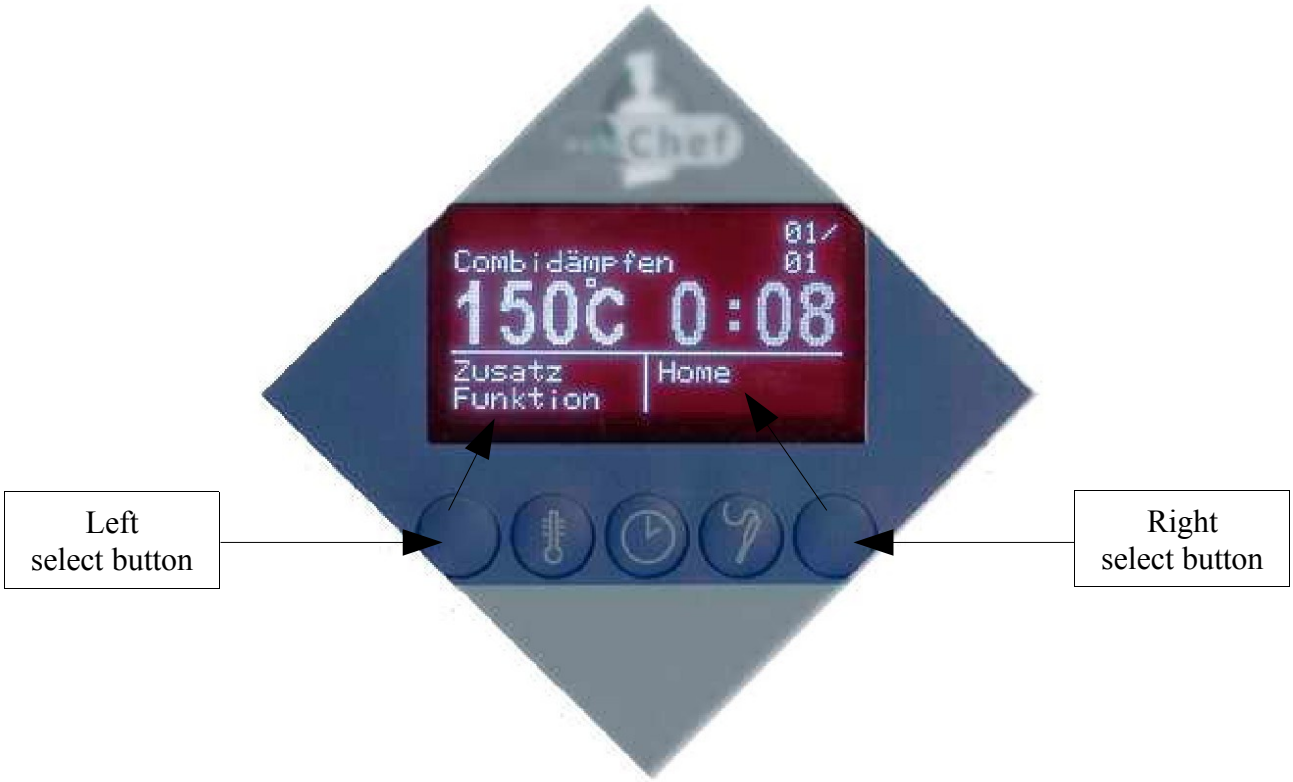
7. USB -> Cookbook

Up- and download of recipes to / from a USB stick. Only available at units with USB-port (from software 4.00; S/N 09021482; July 2009)

Service menu of the electronic (Configuration menu)

The service menu (configuration menu) serves for the check and analysis of all electronic components. These can be test one by one or by summarized test programs.
If once the flash module should be exchanged, then this must be configured completely. In this case all steps must be carried out as well as a petition of equipment specific information is necessary.
A module preprogrammed by MKN can alternatively be installed. In this case the serial number must be announced with the order.

Access the configuration menu as follows:
- Select menu on the left select button
- Select 1 setup with the CombiPilot
- Push CombiPilot
- Enter password 777 with the CombiPilot (enter number, push CombiPilot, enter next number) and confirm with “start/stop”
- Select test step and confirm with the CombiPilot.



Tabular overview of the service level (configuration I):

Name of step	Short description/function
1 Software-Status	Shows the installed software version and text version .
2 Display-Test	Display functional test of all dots.
3 LED-Test	Individual check of the LED´s on the keyboard pcb.
4 Button-Test	Individual check of all keyboard buttons and the CombiPilot button.
5 Relay-Test	Separate check of the relays on the relay pcb. Electrical components as well as the relays can be checked on function. Display of counter readings, such as operation hours.
6 Unit configuration	Input area for all unit details, such as the size of unit.
7 WaveClean-Test	Test run of the automatic cleaning system for component as well functional test.
8 Fan-Test	Check of all fan speeds and direction of rotation.
9 E/2- Test	Only at electrical versions. Heating performance test as well as check of the function " reduced heat".
9 Gas CO2 Calibration	Only at gas versions. Calibration of the gas combioven. *See also CO2 Calibration. Identical with password area "999"*
10 Water-Calibration	Functional test for the DynaSteam unit.
11 Drain cooling Test	Functional test of the the solenoid valve and drain probe from the drain cooling system.
12 100°C+CT Calib.	Calibration step for chamber and core temperature probe.
13 Humidity Calibration	Calibration step for the the humidity probe.
14 Empty watersystem	Water emptying function if the water connections are connected to compressed air. Made for internal use.
15 Delete error	Deletes the complete diagnosis memory **(not the current Error message -> see reset of electronic!).**
16 Delete HACCP	Deletes the complete HACCP memory
17 Delete cooking book	Deletes ALL recipes from the cooking book (incl. The default recipes!).
18 Upload cooking book	Coming soon.
19 Service Tel.	This is shown by push the **autoChef®** button while the unit is off.
20 Print counters	Print out of all counter readings of relay test by the HACCP port.

In context of the technical further development test steps can be added or renamed.
State: Software version 3.01

Detailed description of the service area

1 Software-Status

The software versions of the
- Booter
- Application (software version)
- Text list

are displayed.
The application version is important for equipment functionality.
Application = software

2 Display-Test

Test patterns appear in the following cycle:
- Fully activated
- Chess board 1
- Chess board 2
- Fully de-activated

Pressing the CombiPilot button allows the individual steps to be accessed. When completed **finished** appears on the display.

3 LED-Test

The "ON" LED does not need to be tested, because it is already switched on. The remaining 5 LED´s (4 cooking modes and start/stop) are tested by repeated pressing of the combi-pilot.
When completed **finished** appears on the display.

4 Button-Test

In the button test all buttons are pressed one after the other (including the select-buttons and the CombiPilot). CAUTION: Do not start with the "ON/OFF" button. Only after all buttons have pressed once it is possible to return to the configuration menu. When completed **finished** appears on the display.
Every button is confirmed by the accompanying number on the display.
If a button should be faulty the power supply must be switched off, because a return from this test is not possible anymore.

5 Relay Test + Counter readings

A menu is offered with all relays of the relay pcb (K01 - K24). By pushing the CombiPiloten the current condition of the chosen relay is switched over.
This can be checked with the LED next to each relay. The LED signals the status on the input side of the relay (LED on = energized, LED off = not energized).
The load side (output) can be controlled by measuring the outcoming voltages on terminal X5 and X6.
Caution! During this test the reed contact-switch for the door is out of order!
By a configuration of a new flash module a test of all relays is not required.

After the relay has selected, it can be checked by pressing the CombiPilot. A counter of each relay (down on the right) is shown on the display in addition. A reset of the counter is not possible.

Actor	Name of step	Description/ function if pushing the CombiPilot button
K01	Main contactor	The relay is switched on about X6.2 and can not be switched over (the unit would switches off itself).
K02	FC D0 / Fan 1	Input D0 on the frequency converter becomes a 230V signal about X5.3. The fan motor starts on the left direction in fast speed mode.
K03	FC D1 / Fan 2	Input D1 on the frequency converter becomes a 230V signal about X5.5. The fan motor starts on the right direction in fast speed mode.
K04	FC Fan 2 / l/r	Contactor K3 is energized by X5.7. The upper fan is added-on (Only 20.x)
K05	FC D2 / Fan s/l	Input D2 on the frequency converter becomes a 230V signal about X5.9. The fan motor starts on the left direction in slow speed mode.
K06	Illumination	The relay turns the chamber illumination off/on by X5.2.
K07	Cooling fan	The relay switches the cooling fan on/off by X5.10.
K08	Freash air pipe	The relay energizes the lift-magnet (fresh air flap) by X6.3 (via rectifiers V8).
K09	Ext. Hood	Contact for an external hood (Contact closes for 60 seconds after opening the door).
K10	Solenoid steam 1	Energizing of the DynaSteam unit by X8 (not from a relay)
K11	Solenoid steam 2	Energizing of the DynaSteam unit by X8 (not from a relay)
K12	Solenoid drain cooling	The relay switches on the solenoid valve Y12 by X6.6 for drain cooling.
K13	Signal	The relay switches on the buzzer H13 by X5.13.
K14	Gas On 1	Energizes signal board N11 / ignition box N10 by X6.10. The ignition electrode R10 glows up *(Only Gas)*.
K15	Gas On 2	Energizes signal board N21 / ignition box N20 by X6.11. The ignition electrode R20 glows up *(Only Gas)(Only 20.x)*.

Continuation relay test

Actor	Name of step	Description/ function if pushing the CombiPilot button
K16	Pump WaveClean	The relay switches on the pump M16 by X6.12. The water is pumped out of the trap into the chamber. **Caution! Only carry out this step if the chamber cooled down!**
K17	Reserve Relay	--> *see documentation reserve relay*
K18	n.u.	- not in use -
K19	n.u.	- not in use -
K20	LOA B	Output for the connection of an energy optimization system (terminal X2/B).
K21	Pot. free. LOA (only at electric units)	Potential free contact for an energy optimizing system (terminal X2.15 and X2.16)
K21	Gas Reset 2 (only at gas units)	Reset Signal from X5.15 to ignition box N20 *(Only at 20.x)*
K22	Door lock (only at electric units)	- not in use for this units -
K22	Gas Reset 1 (only at gas units)	Reset Signal from X5.17 to ignition box N10
K23	n.u.	- not in use -
K24	Pump Siphon (trap)	The relay switches on the pump M24 by X6.9. The water is pumped out of the trap into to drainage.

Counter readings in the relay test:

Hours electronic	Connected hours on the power supply.
Hours unit on	Hours which the device was in standby.
Hours cooking	Hours of operating
Powerfail	Number of powerfails (longer than 10 sec.) during operation.

6 Unit configuration

The following steps must be adjusted by the service engineer only at a new configuration of the flash modul.

Step	Parameter	Value range	Comment
6-1	Unit size/type	6.1;6.2;10.1;10.2;20.1; 20.2;6.23 (Junior)	Adjustment of the unit size
6-2	Heating source	electric, gas	Adjustment of the heating source
6-3	M.-Nr. (unit no.)	each 0-9	Enter the no. by turning the CombiPilot; Confirmation of each number by pushing the CombiPilot. Finally confirmation by pressing the start/stop button..
6-4	WaveClean	On / Off	Activation / deactivation WaveClean. Default „on“
6-5	CT 4x	On / Off	Multi-point core temperature probe On / Off. “Off” = single-point Defaul setting „on“
6	PID-Parameter	-	Not in use
6	Fan motor type	Contactor 2 speed (HansDampf 6.1;10.1;20.1 contactors controlled)	Adjustment of the fan motor type. Default setting „FC 3 speeds.
		Contactor 1 speed (only 6.23 (Junior)	
		FC 2 speeds (all units with 2 speed frequency fan controller)	
		FC 3 speeds (all units with 3 speed frequency fan controller)	
	PHI DynaSteam	On / Off	On = soft water assembly with steaming unit Off = soft water assembly with pressure reducer and solenoid valve. Default setting „on“
	RackControl	On/ Off	Activation / deactivation RackControl. Default setting „on“
6-6	Function code	-	Not in use

7 WaveClean Test

Press start appears on the display. Push the Start/ Stop button or the CombiPilot to start the WaveClean test. The pump M24 pumps out the water from the trap. The trap gets filled with water by the solenoid valve Y12. This process repeats two times. The pump M16 and also fan M1 / M2 *(only 20.x)* switches on and cycles the water from the trap permanently. The test can be interrupt by **cancel** any time. <u>At the end of the test the trap is pumped out and filled again twice.</u>

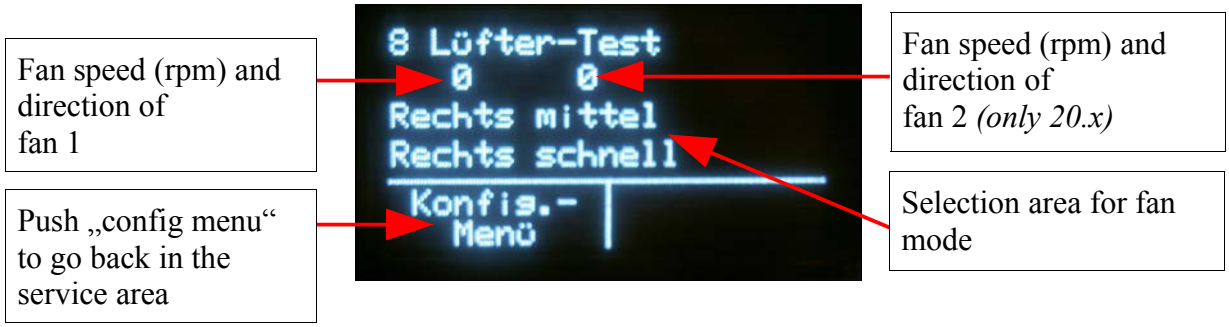
8 Fan Test

A menu with the following fan modes is offered:

- Right slow
- Right medium
- Right fast
- Left slow
- Left medium
- Left fast

Push the CombiPilot to start with **right slow**. The fan speed and direction is shown on the display during the fan runs. To change an other fan mode turn the CombiPilot and push the CombiPilot to confirm. Push left select button **configuration menu** to go back in the service area.

Explanation:



9 E/2- Test **(only at electric units)**

The following menu is displayed:

- E/2 (half heating power)
- E (full heating power)

Press the CombiPilot to start the E/2 mode. On units 6.x and 10.x only one heating circuit is activated, on the20.x the lower heating circuit is completely switched off.

E-mode can selected by turning CombiPilot to left. All heating circuits are supplied now (Complete heating power).

9 Gas CO2 Calibration **(only at gas units)**

Calibration of the gas CO2 values.

See CO2 Calibration. Identical with password area "999"

10 Water calibration

Push the CombiPilot to start.140 ml of water coming through the water supply pipe into the chamber now. At the unit size 20.x both DynaSteam units are energized at the same time. This steps allows to check the function of the DynaSteam unit. The amount of water can be control with a measuring box. A deviation of +10 ml is within the possible tolerance. A calibration is not possible/necessary because this component is complete controlled by the electronic.
If the CombiPilot is pushed once more, 140 ml are added up on the value on the display and another 140 ml run through the water water supply pipe.

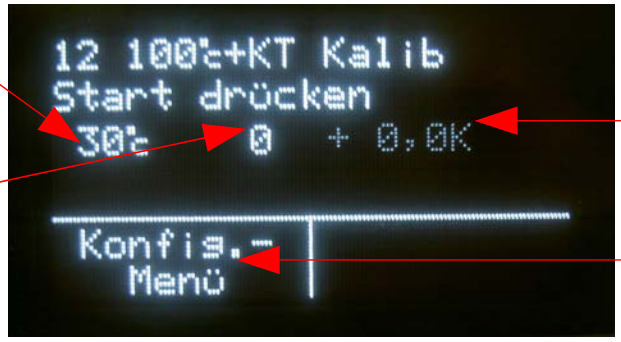
11 Drain cooling test

The display shows the current drain temperature. Push the CombiPilot to start test. Push and hold right select button **Drain cooling** . The manually cooling function starts and the drain temperature drops down.

12. 100°C + CT probe calibration

Caution! The CT probe and an external sensor (from temperature measuring meter) must be located in the centre of the cooking chamber.
We recommend that the sensor is hung on the grill grid. The sensor tip must point upwards in order to avoid drops forming on the sensor tip.
The following values are shown on the display:

At one chamber units (6.x/10.x):



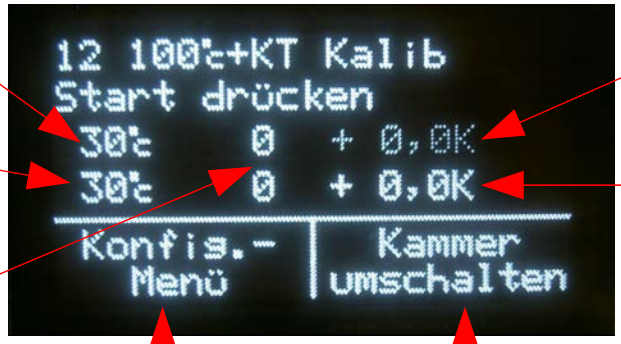
Current chamber temperature

Turn on time of heating circuit.
(max. 1000 = 100%)

Temperature-Offset in 0,1 °K – steps

Back to service menu

At two chamber units (20.x):



Current chamber temperature 1 (upper probe)

Current chamber temperature 1 (lower probe)

Turn on time of both heating circuit.
(max. 1000 = 100%)

Temperatur-Offset for the upper heating circuit / probe in 0,1 °K – steps

Temperature-Offset for the lower heating circuit / probe in 0,1 °K – steps

Back to service menu

Selection between upper and lower chamber

Continuation probe calibration

For one and two-chamber units:
Pressing the Combi-Plot starts the 100 °C (212°F) calibration. Before setting the offset factor for the first time, wait at least 30 minutes. When the current probe temperature shows 100 °C (± 1°C) on the display and the external temperature sensor indicates a value of between 99 °C and 99.5 °C, the unit is correctly calibrated. If the external device does not reach the temperature range specified, the temperature offset should be adjusted accordingly by turning the CombiPilot.
Caution! After any change to the offset setting, always wait approx. 10 minutes to allow the change to affect the cooking chamber temperature (temperature on external temperature sensor should remain stable).
Only at two-chamber units (20.x):
In the case of two-chamber units, the right select button (chamber selection) can be used to switch between both offset values. During the offset measurements, the chambers must separated from each other (with a baking tray for example). The upper and lower probes now have to be calibrated separately.
To carry out this, use two external temp. probes, one placed in the upper chamber centre and the other in the lower chamber centre . We recommend an external temperature measurement meter using two temperature sensors (or a dual-channel unit). Always ensure the calibration is performed such that both chambers have an approximately equal contribution. This can be checked on the value of the heat time (Turn on time). These displays should show approximately the same value.
For all units:
When the actual temperature is at 100 °C ± 1 K, the core temperature sensor is automatically also calibrated when the calibration is finalised. If the actual temperature is outside of the specified tolerance, the following message appears: **KT sensor not calibrated**. *For finishing the calibration press the left select button* **cancel**

13 Humidity calibration

The unit is heated for 8 minutes at 180°C (356°F). The ventilation flap opens and the values measured by the humidity sensor are automatically saved as calibration settings.
Caution! Please wait until the message **finished** appears on the display.

14 Empty water system

This step serves to empty the water inside (like valves and hoses) the system. The unit has connected to air pressure at both water connections. Now the program has to be started.
This program step was conceived to avoid frost damages while transportation and is basically made for internal use.

15 Delete error

Push the right select button **delete** to delete the complete diagnosis momory. Press the left select key **config menu** to return to the configuration menu This step should be just executed at a change of ownership of the device to hold a history of all error messages from the past. This program step does not delete current faults but only the diagnostic memory! Current error messages are deleted by a reset of the electronic.

16 Delete HACCP

On the display appears **delete**. Press the right select button to delete. Press the left select button **config menu** to return to the configuration menu. This step should be only done at a change of ownership of the device to delete the whole HACCP documentation.

17 Delete cooking book

On the display appears **delete**. Press the right select button to delete. Press the left select button **config menu** to return to the configuration menu. This step should be only done at a change of ownership of the device to delete the complete cooking book including all preprogrammed recipes!

18 Upload cooking book

At present, this program step is for the internal use only.

19 Service Tel.

This function allows to enter a service phone number.
Later on the number is shown on the display by push the **autoChef®** button while the unit is off.

20 Print counters

All counter readings are (below the front panel) distributed by pressing the CombiPilot at the serial interface.

Settings area (basic settings)

The HansDampf electronics are set to standard parameters on delivery. These standard parameters can be changed individually within defined limits.

To enter the settings area the following steps have to be carried out:

- Turn on the unit.
- Push the left soft button **Menu**.
- Select **4 Setup** by turning the Combi dial.
- Confirm by pushing the Combi dial.
- Enter password 111 with the Combi dial (enter number, push Combi dial, enter next number)
- and confirm with “start/stop”.
- You are now in the settings area. With the Combi dial the desired step can be chosen. By pushing the Combi dial this is selected.

Description	No.	Setting range	Explanation / function
Time / Date	000	Time and date	Push Combi dial button to change time & date. Push Combi dial = selection Turn Combi dial = Change value
Temperature reading in	006	°C / °F	Adjustment between temperature readings in °C or °F
Illumination blinking	023	On / Off (default = On)	Illumination flashes at the end of a program (in addition with the buzzer)
Preheat factor %	082	0 – 30 % (default =15 %)	Preheat factor if using "ready2cook". The factor will added to the selected temperature (example: 100°C adjusted = preheating up to 115°C). This happens under consideration of the maximum temperature values.
Water maintenance liter	076	0 – 90000 liter in 100 liter-steps (default = 0 (Off))	Attitude of the water softener capacity. Only the following situations possible: – Separate water softener for the unit – Only the soft water connection is connected at the filter. After the adjusted water quantity has flowed through the DynaSteam unit, a maintenance request appears on the display.
Format of date	144	Change of the shown format of date 12/24 hour reading	TT = day MM = month JJJJ = year 12 = 12 hour reading 24 = 24 hour reading
Cookbook	097	Open / Locked / Fully locked (default = open)	Open: Saving, changing & deleting of recepis in cooking book possible. Locked: Saving, changing & deleting of recepis in cooking book not possible. However, changes are possible after selecting recipe (before operation). Fully locked: Similar to „locked", but no changes possible after selecting recipe (before operation).

Description	No.	Setting range	Explanation / function
Time delay fan	032	Off / On (default = off)	Push Combi dial button to change setting. Push Combi dial = selection Turn Combi dial = Change value When "On", the fan runs during the time delay to cool the oven chamber with a block of ice in the bottom drawer. For this purpose, place the perforated container in the closed container, fill with approximately 4 litres of water and allow to freeze. Insert the ice block into the perforated container at the lowest level. This allows a temperature of 14°C to be maintained for up to 6 hours.
Cooling water	024	Minimal / Normal / Maximal (default = normal)	Setting minimal: Less water consumption but higher drain temperature and more steam from the exhaust pipe. Setting maximal: More water consumption but lower drain temperature and less steam from the exhaust pipe.
Time ext. hood	083	0 – 600 seconds (default = 60 seconds)	Time where the external condensation hood runs to maximum performance after the chamber door was opened.
Time signal (s)	084	0 – 180 seconds (default = 20 seconds)	Time of the buzzer/ flashing illumination at the end of a program. 0= buzzer off. In addition to the buzzer the flashing illumination can deactivated / activated. See also parameter 023.
Altitude	015	0-500 m; 501 – 1000 m; 1001 – 1500 m; > 1500 m (default = 0)	Altitude adjustment (above sea level).
Password	096	000 – 500 (default = 111)	Individual passwords can be set up in this here.
Scroll direction	225	Normal / Clockwise (default = normal=)	The direction of the Combi dial can be adjusted as required in the menus and cookbook.

Description	No.	Setting range	Explanation / function
Temp. Steam	235	30 – 130 °C (86 - 266°F) (default = 100°C, 212°F)	The default temperatures can be individually set up for the cooking process within the limits shown here
Temp. Combi	236	30 – 250 °C (86 - 482°F) (default = 130°C, 266°F)	
Temp. Convection	237	30 – 300 °C (86 - 482°F) (default = 180°C, 358°F)	
Temp. Perfection	238	30 – 180 °C (86 - 356°F) (default = 120°C, 248°F)	
Temp. LTC	239	60 – 100 °C (140 - 212°F) (default = 60°C, 140°F)	
Temp. Delta	240	1 – 100 °C (34 - 212°F) (default = 20°C, 68°F)	
Temp. DT-Core	241	30 – 99 °C (86 - 210°F) (default = 60°C, 140°F)	
Cooking book history	242	0 – 10 (default = 10)	With the history function the last used programmes from the cooking book memory can be displayed (Push Smart Menu -> history)
Default category	397	Cooking book; Meat, Poultry, Fish, Vegetables, Side dishes, Bakery products, Overnight cooking, MyChef – Special;Perfection (default = Cooking book)	
Cooking book no.	403	0: Only your own recipes 1: German 2: English GB 3: Italian 4: French 5: Dutch 6: Spanish 7: Polish 8: Danish 9: Russian 10: Czech 11: Lithuaniab 12: Lativan 22: Turkish 100: HennyPenny english	Different country-specific cookbooks can be loaded via cookbook switching. Deleted Auto-Chef cooking programs can also be restored here. For this purpose, select cookbook number and then save. Press "Save" after switching the cookbook. "analysis" appears for up to 5 minutes. Cooking programs created on the appliance remain when the cookbook is changed. For further information and languages see also operation manual!

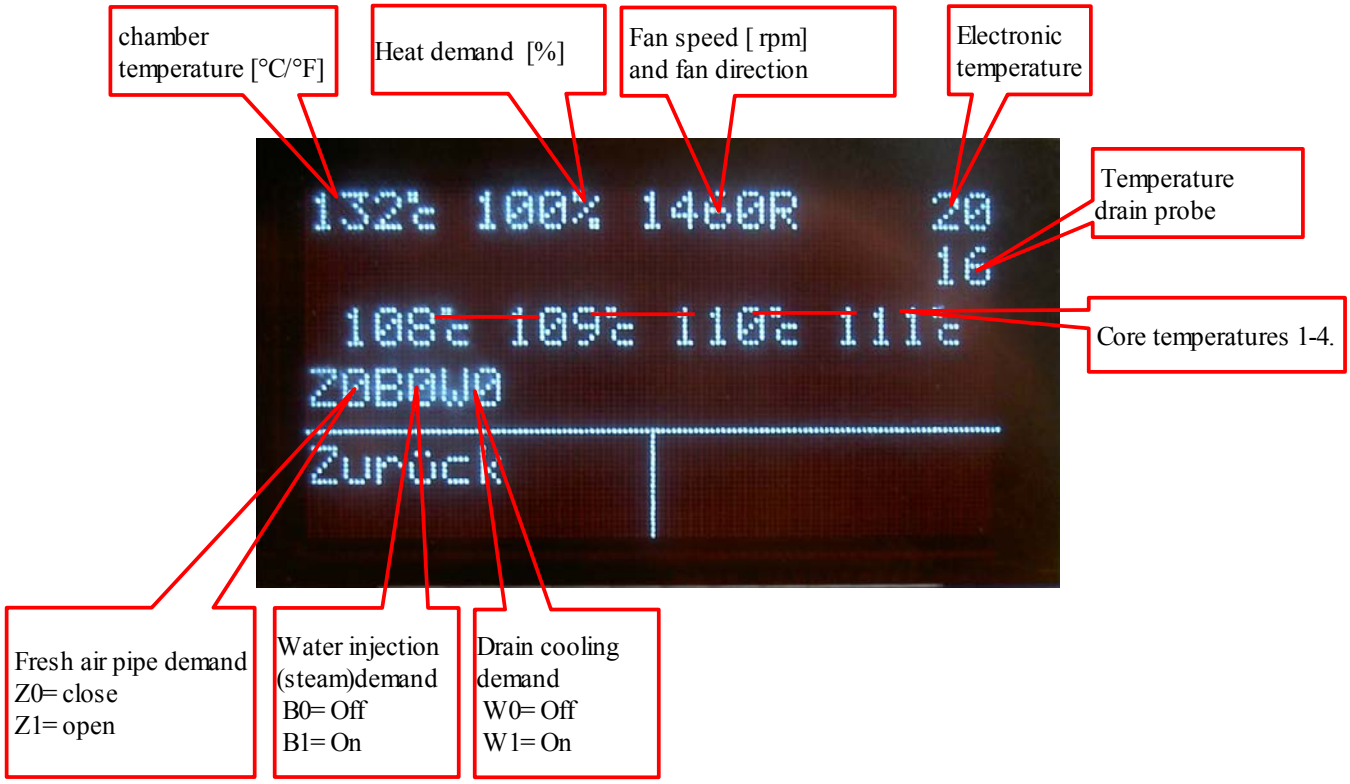
Finally push the select button save to save changes or push back to leave the settings area without saving any changes.

Generally measurement mask for electric units

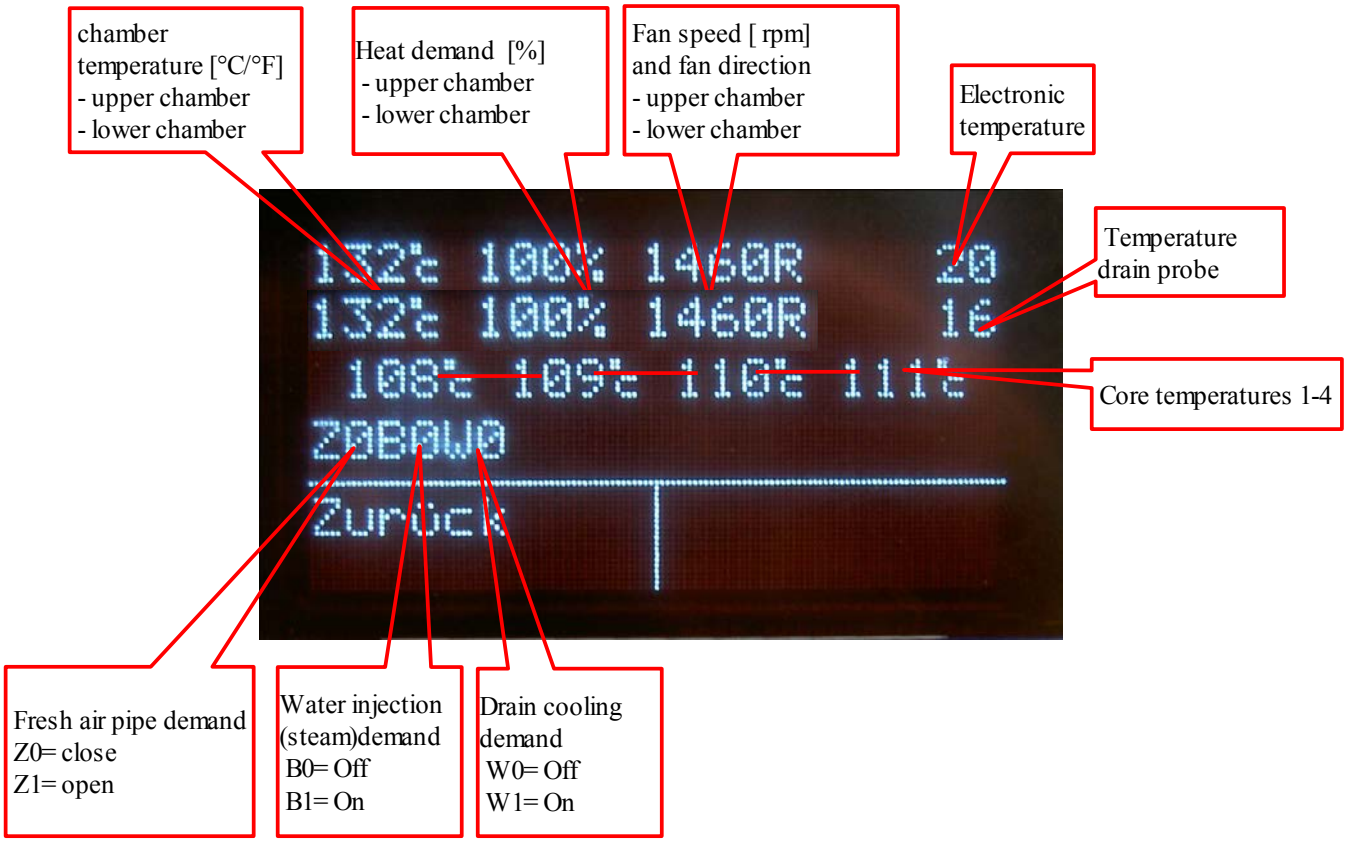
This mask shows you a summary of measurement information during preheating and cooking process.

By press and hold the combi pilot during operation for a short time, you can see the following information until pushing the the left soft key „back“.

6.x / 10.x



20.x



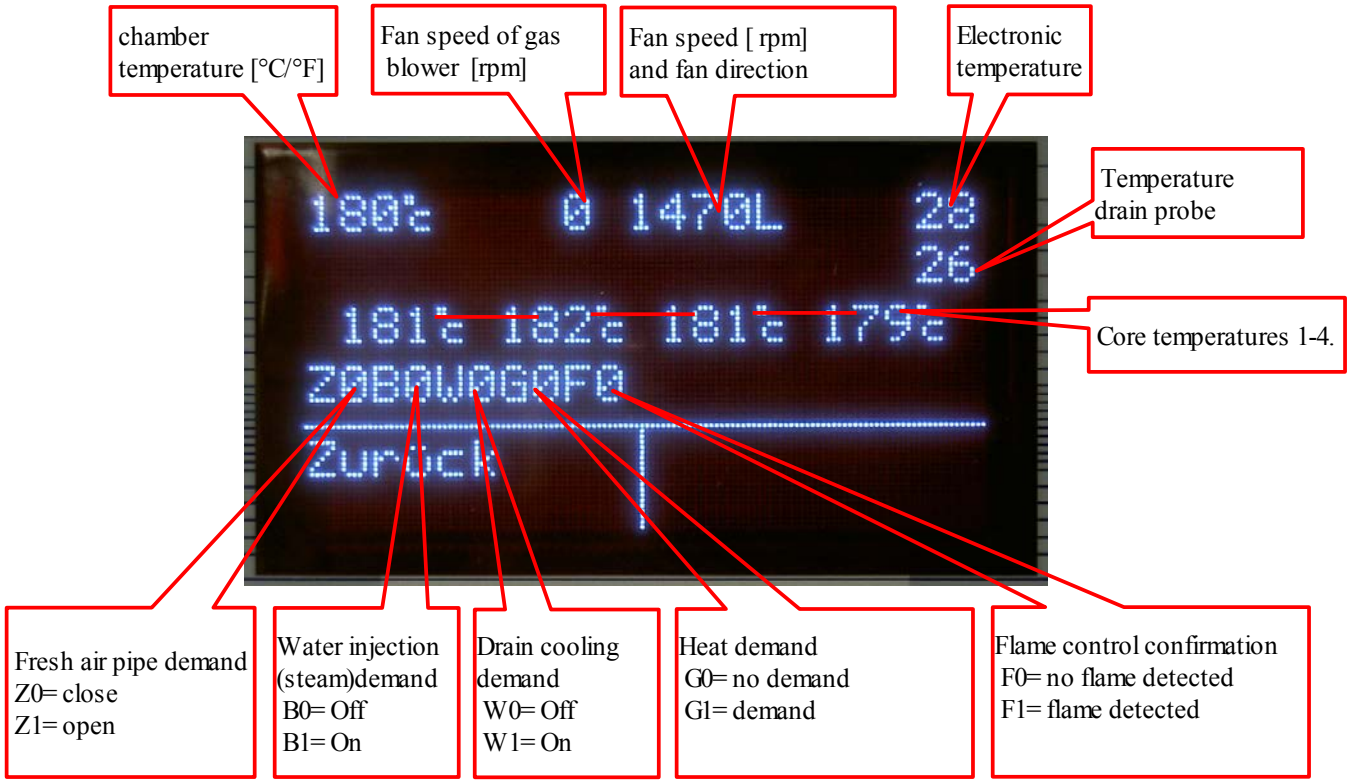
The measurements are updated circular. A short delay of the displayed information is therefore possible. Broken (disconnected) probes could be shown at the mask with “999”.

Generally measurement mask for gas units

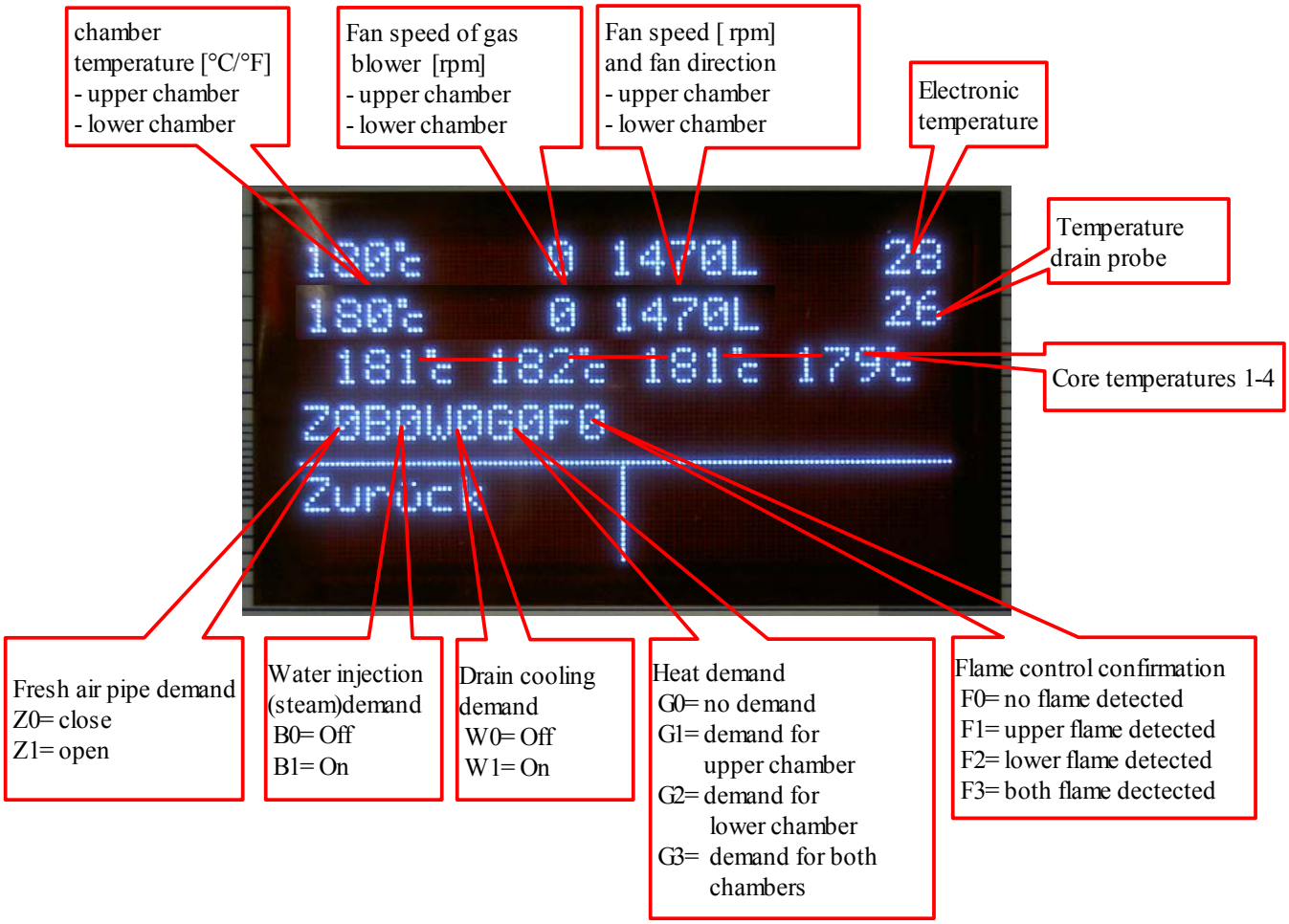
This mask shows you a summary of measurement information during preheating and cooking process.

By press and hold the combi pilot during operation for a short time, you can see the following information until pushing the the left soft key „back“.

6.x / 10.x



20.x



The measurements are updated circular. A short delay of the displayed information is therefore possible. Broken (disconnected) probes could be shown at the mask with “999”.

How to activate and disable the demo mode

Activate demo mode:

Press & hold the ON / OFF button for 16 seconds during the appliance is switched off. The unit changes now into the demo mode

Disable demo mode:

Press & hold the ON / OFF button for 16 seconds during the appliance is switched off. The unit changes now back into the normal (operation) mode.

Reset of the electronic

Press & hold the ON / OFF button for 8 seconds during the appliance is on. The electronic resets now.
After 8 seconds "Loading Flash data" appears on the display. The electronic transmits the data's from the flash modul to the RAM.

Connecting a performance optimization system (LOA)

Connection

Connect the performance optimization system on the terminal behind the front panel.
Remove the bridge on terminal X2 between clamp "B" and "C".
Connect the performance optimization cable at clamp "B" and "C"
The cable has to be installed according to the installation instructions.
→ See also installation manual

How it works

Unit size 6.x / 10.x: (single chamber):
If the performance optimization is active, the heating elements are not energized.

Unit size 20.x (two chamber):
If the performance optimization is active, just the lower heating element cuts off. So the power input will be cut in half.

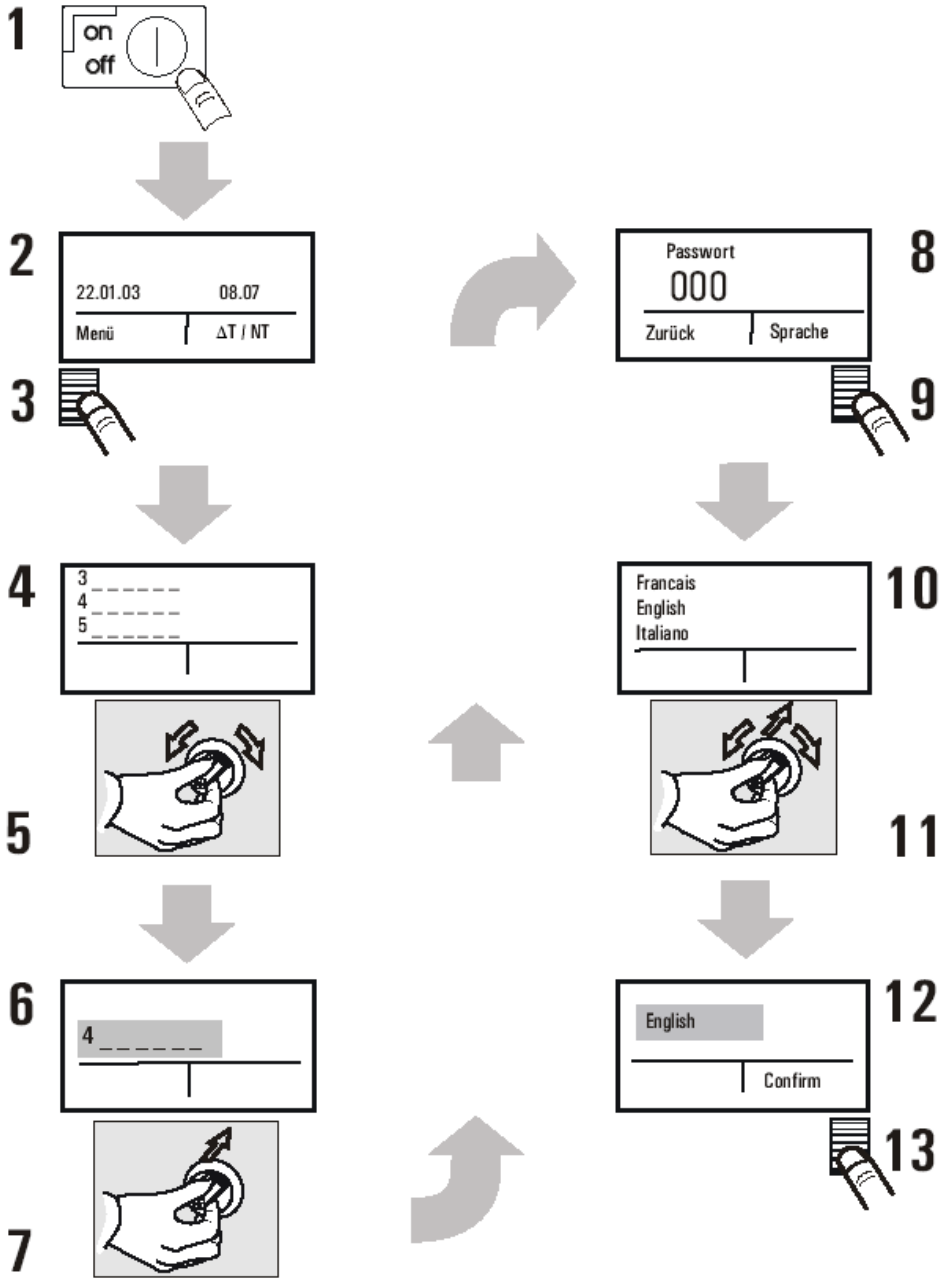
Connection of external facilities to the potential-free contact

The connections for the potential-free contact are on the electric assembly behind the front panel (terminal X2, clamp 15 and 16).

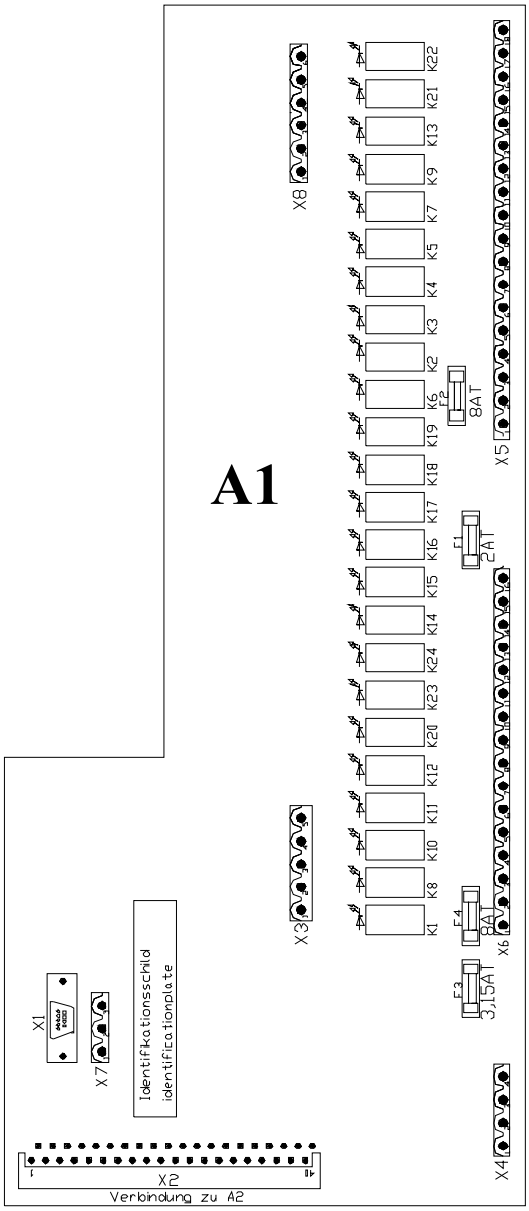
How to change the display language

For changing the display language, please do the following steps:

- Switch the unit on by pressing the “ON/Off” button.
- Press the left soft key “Menu”
- Then select step 4 “settings” with the combi pilot.
- If you press the right soft key “Language” you can change the display language with the combi pilot.
- Please confirm the requested language by pressing the right soft key “save”.
- Then press the right soft key twice.
  Now you are back in the main menu



Layout of relay pcb A1 Electric & Gas CE-Version



X1:
Serial RS232 port for software update.

X3:

No.	description
1	Input 21 Volt Electronic supply
2	Input 21 Volt Electronic supply
3	Input 21 Volt Electronic supply
4	Input 4,2 Volt Display supply
5	Input 4,2 Volt Display supply

X4:

No.	description
1	-
2	Monitoring „safety cut off (230V)
3	Monitoring „LOA C“ (230V)(optimisation system)
4	Input neutral (N)

X5:

No.	description	fuse on board
1	Input 230 Volt	
2	Output to SSR V6 illumination	F1
3	Output to D0 at frequency converter	F2
4	-	
5	Output to D1 frequency converter	F2
6	-	

X5 *(continuation)*:

No.	description	fuse on board
7	Output to K3 *(only 20.x)*	
8	Input 230 Volt	
9	Output to D2 Frequency converter	F2
10	Output to M7 / M7.x*(only 20.x)*	F2
11	Connection for external exhaust hood (signal contact)	
12	Connection for external exhaust hood (signal contact)	
13	Output to buzzer H13	
14	Input 230 Volt (buzzer supply)	
15	Output to ignition box N20 *(Gas Reset 2) (only 20.x Gas)*	
16	Input 230 Volt from transformer T1 *(only 20.x Gas)*	
17	Output to ignition box N10 *(only Gas units)*	
18	Input 230 Volt from transformer T1 *(only Gas units)*	

X6:

No.	description	fuse on board
1	Input 230 Volt	
2	Output to F7 limit switch /main contactor	F3
3	Output to V8 rectifier / Y8 lift magnet	F4
4	-	F4
5	-	F4
6	Output to solenoid valve Y12	F4
7	Output for Energy optimisation system	
8	-	F4
9	Output to cleaning pump M24	F4
10	Output to ignition box N10 (Control signal glow electrode) *(only Gas units)*	F4
11	Output to ignition box N20 (Control signal glow electrode) *(only 20.x Gas units)*	F4
12	Output to cleaning pump M16	F4
13	Output to reserve relay K17	
14	-	
15	-	
16	-	

X7:

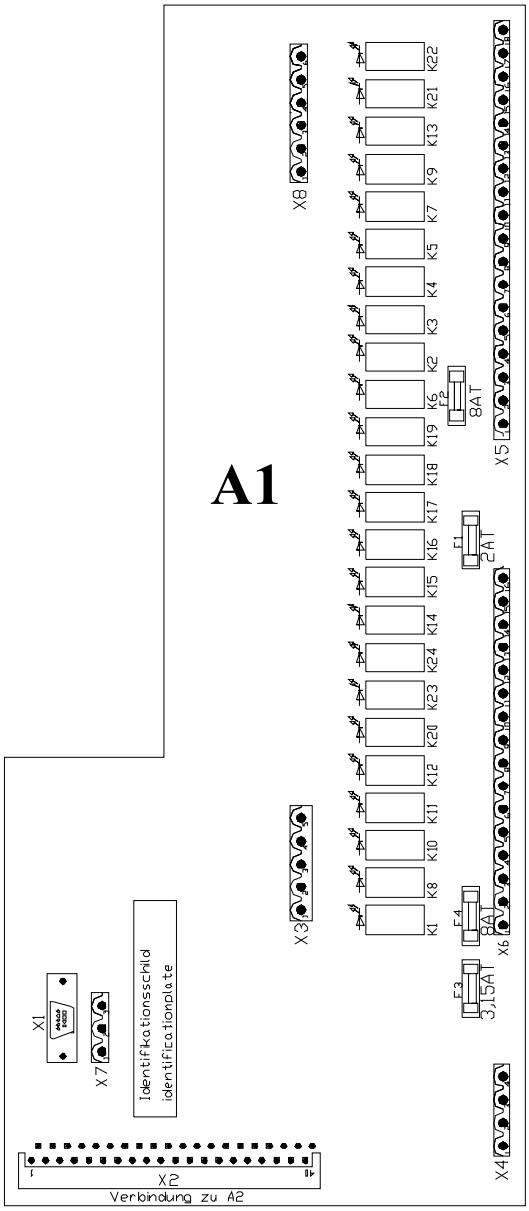
No.	description
1	Not in use
2	Not in use

X8:

No.	description
1	Output signal DynaSteam unit Y10 / Y20 (Y20 only 20.x)
2	Output signal DynaSteam unit Y10 / Y20 (Y20 only 20.x)
3	Output to signal pcb N11 *(only gas)*
4	Output signal DynaSteam unit Y11 / Y21 (Y21 only 20.x)
5	Output signal DynaSteam unit Y11 / Y21 (Y21 only 20.x)
9	Output to signal pcb N21 *(only 20.x gas)*

Fuses: F1: 2A Slow blow #203474; F2,F4: 8A Slow blow #203741; F3: 3,15A Slow blow #203742

Layout of relay pcb Electric & Gas UL-Version



X1:
Serial RS232 port for software update.

X3:

No.	description
1	Input 21 Volt Electronic supply
2	Input 21 Volt Electronic supply
3	
4	Input 4,2 Volt Display supply
5	Input 4,2 Volt Display supply

X4:

No.	description
1	-
2	Monitoring „safety cut off (230V)
3	Monitoring „LOA C“ (230V)(optimisation system)
4	Input neutral (N)

X5:

No.	description	fuse on board
1	Input 230 Volt	
2	Output to SSR V6 illumination	F1
3	Output to D0 at frequency converter	F2
4	-	
5	Output to D1 frequency converter	F2
6	-	

X5 *(continuation)*:

No.	description	fuse on board
7	Output to K3 *(only 20.x)*	
8	Input 230 Volt	
9	Output to D2 Frequency converter	F2
10	Output to M7 / M7.x*(only 20.x)*	F2
11	Connection for external exhaust hood (signal contact)	
12	Connection for external exhaust hood (signal contact)	
13	Output to buzzer H13	
14	Input 24 Volt (buzzer supply)	
15	Output to ignition box N20 *(Gas Reset 2) (only 20.x Gas)*	
16	Input 230 Volt from transformer T1 *(only 20.x Gas)*	
17	Output to ignition box N10 *(only Gas units)*	
18	Input 230 Volt from transformer T1 *(only Gas units)*	

X6:

No.	description	fuse on board
1	Input 230 Volt	
2	Output to F7 limit switch /main contactor	F3
3	Output to V8 rectifier / Y8 lift magnet	F4
4	-	F4
5	-	F4
6	Output to solenoid valve Y12	F4
7	Output for Energy optimisation system	
8	-	F4
9	Output to cleaning pump M24	F4
10	Output to ignition box N10 (Control signal glow electrode) *(only Gas units)*	F4
11	Output to ignition box N20 (Control signal glow electrode) *(only 20.x Gas units)*	F4
12	Output to cleaning pump M16	F4
13	Output to reserve relay K17	
14	-	
15	-	
16	-	

X7:

No.	description
1	Buzzer supply voltage to X5.14
2	Buzzer supply voltage

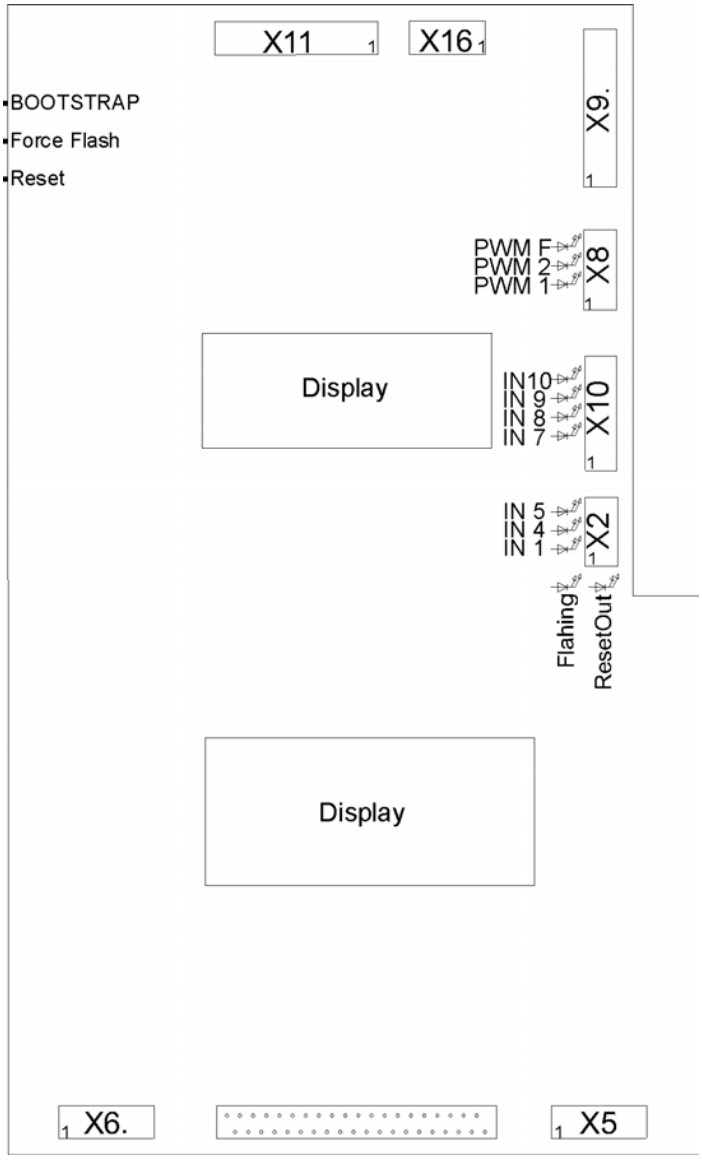
X8:

No.	description
1	Output signal DynaSteam unit Y10 / Y20 (Y20 only 20.x)
2	Output signal DynaSteam unit Y10 / Y20 (Y20 only 20.x)
3	-
4	Output signal DynaSteam unit Y11 / Y21 (Y21 only 20.x)
5	Output signal DynaSteam unit Y11 / Y21 (Y21 only 20.x)
9	-

Fuses: F1: 2A Slow blow #203474; F2,F4: 8A Slow blow #203741; F3: 3,15A Slow blow #203742

Layout of keyboard pcb A2 Electric

Keyboard pcb A2



Flashing LED:	1	0	1	0
ResetOut LED:	1	0	0	1
	Booter activ	no software	Booter activ	no software
If the flashing LED flashes equally (in 1 Hz-time) the processor runs.				
If the flashing LED has a higher flash frequency, reset the electronic.				

X9:

No.	description
1	speed control fan M1
2	speed control fan M1
3	speed control fan M1
4	speed control fan M2 *(only 20.x)*
5	speed control fan M2 *(only 20.x)*
6	speed control fan M2 *(only 20.x)*
7	-
8	-
9	-

X11:

No.	description
1	Chamber probe B2 (*black)*
2	Chamber probe B2 *(brown)*
3	Chamber probe B3 (*black) (only 20.x)*
4	Chamber probe B3 *(brown)(only 20.x)*
5	Drain probe B4 *(white)*
6	Drain probe B4 *(green)*
7	Humidity probe B5 (*black)*
8	Humidity probe B5 *(brown)*

X16:

No.	description
1	Core temperature probe B1 *(white)*
2	Core temperature probe B1 *(green/red)*
3	Core temperature probe B1 *(green/blue)*
4	Core temperature probe B1 *(green/yellow)*
5	Core temperature probe B1 *(green)*

X5: Supply do HACCP port;
X6: Supply to CombiPilot

X2:

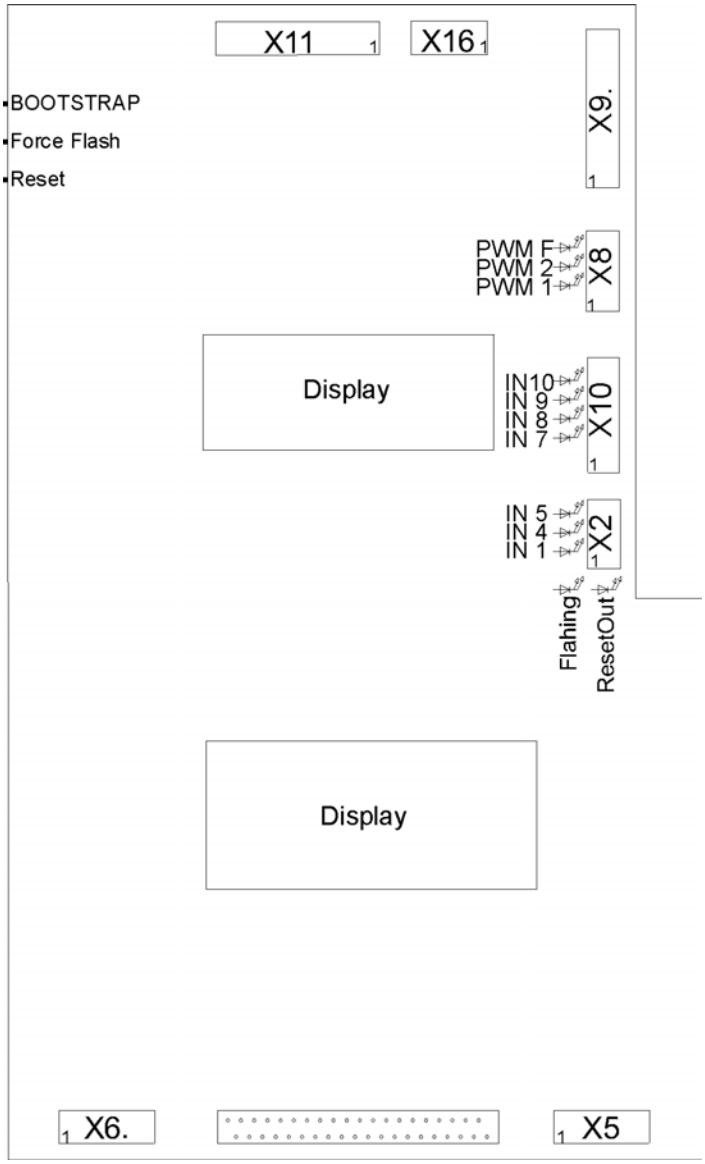
No.	description	LED on board
1 / 2	Reed contact / magnetic switch S1	IN 1 (LED “On” = closed contact)
3 / 4	Pressure switch B10	

X8:

No.	description	LED on board
1	solid state relay V1 Solid state relay V3 *(only20.x)*	PWM 1 (LED “On” = Solid state relay energized)
2	Solid state relay V1 Solid state relay V3 *(only 20.x)*	PWM 1 (LED “On” = Solid state relay energized)
3	Solid state relay V2 Solid state relay V4 *(only 20.x)*	PWM 2 (LED “On” = Solid state relay energized)
4	Solid state relay V2 Solid state relay V4 *(only 20.x)*	PWM 2 (LED “On” = Solid state relay energized)

Layout of keyboard pcb A2 Gas

keyboard pcb A2



Flashing LED:	1	0	1	0
ResetOut LED:	1	0	0	1
	Booter activ	no software	Booter activ	no software
If the flashing LED flashes equally (in 1 Hz-time) the processor runs.				
If the flashing LED has a higher flash frequency, reset the electronic.				

X9:

No.	description
1	speed control fan M1
2	speed control fan M1
3	speed control fan M1
4	speed control fan M2 *(only 20.x)*
5	speed control fan M2 *(only 20.x)*
6	speed control fan M2 *(only 20.x)*
7	-
8 /9	Speed control gas fan U20 *(only 20.x)*
10	-
11/12	Speed control gas fan U10

X11:

No.	description
1	Chamber probe B2 (*black)*
2	Chamber probe B2 *(brown)*
3	Chamber probe B3 (*black) (only 20.x)*
4	Chamber probe B3 *(brown)(only 20.x)*
5	Vapour probe B4 *(white)*
6	Vapour probe B4 *(green)*
7	Humidity probe B5 (*black)*
8	Humidity probe B5 *(brown)*

X16:

No.	description
1	Core temperature probe B1 *(white)*
2	Core temperature probe B1 *(green/red)*
3	Core temperature probe B1 *(green/blue)*
4	Core temperature probe B1 *(green/yellow)*
5	Core temperature probe B1 *(green)*

X5: Supply do HACCP port;
X6: Supply to CombiPilot

X2:

No.	description	LED on board
1 / 2	Reed contact / magnetic switch S1	IN 1 (LED “On” = closed contact)
3 / 4	Pressure switch B10	

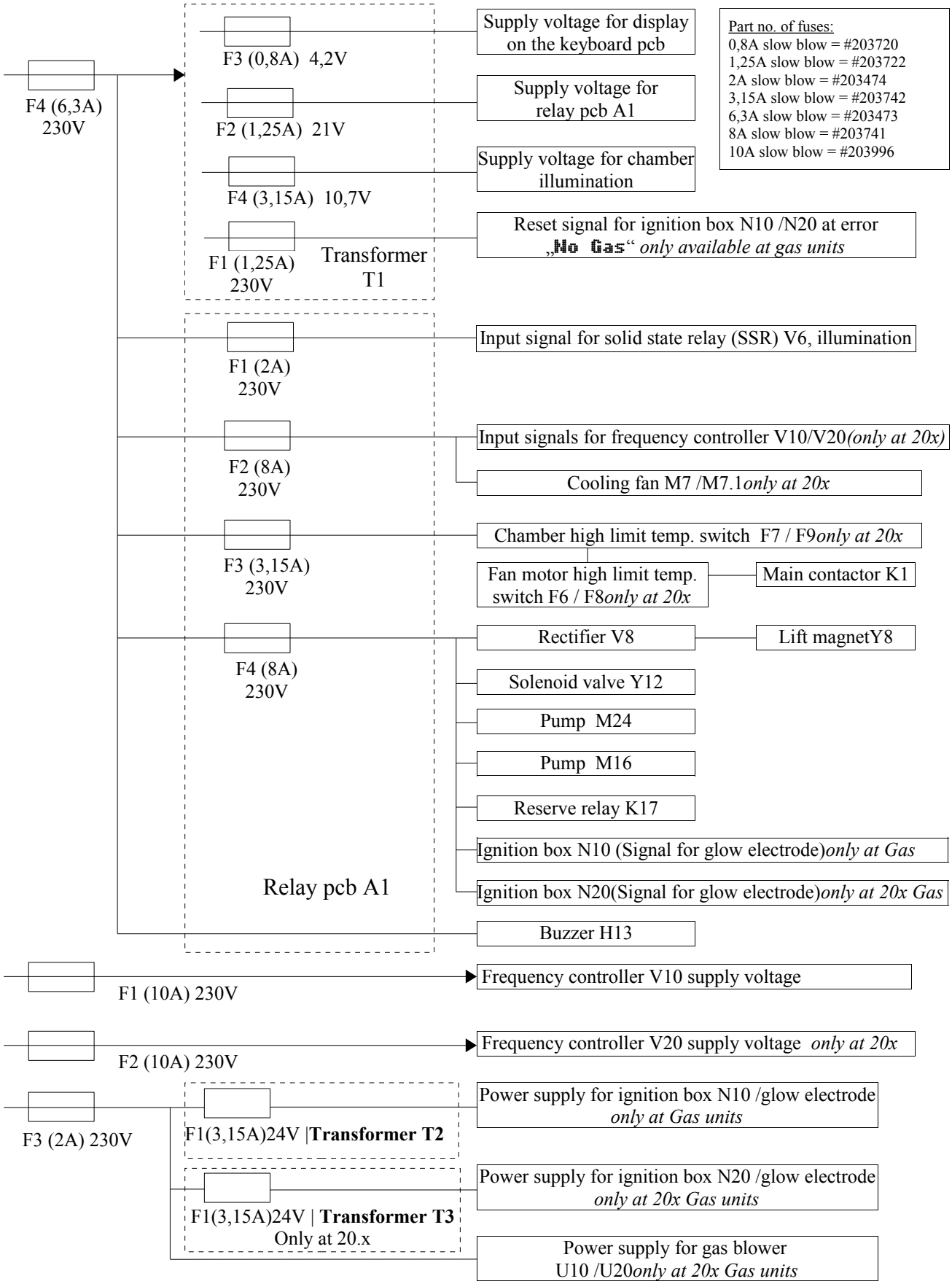
X8:

No.	description	LED on board
1	Output to gas fan U10 (speed signal)	PWM 1
2	-	-
3	Output to gas fan U20 (speed signal)*(only 20.x)*	PWM 2
4	-	-

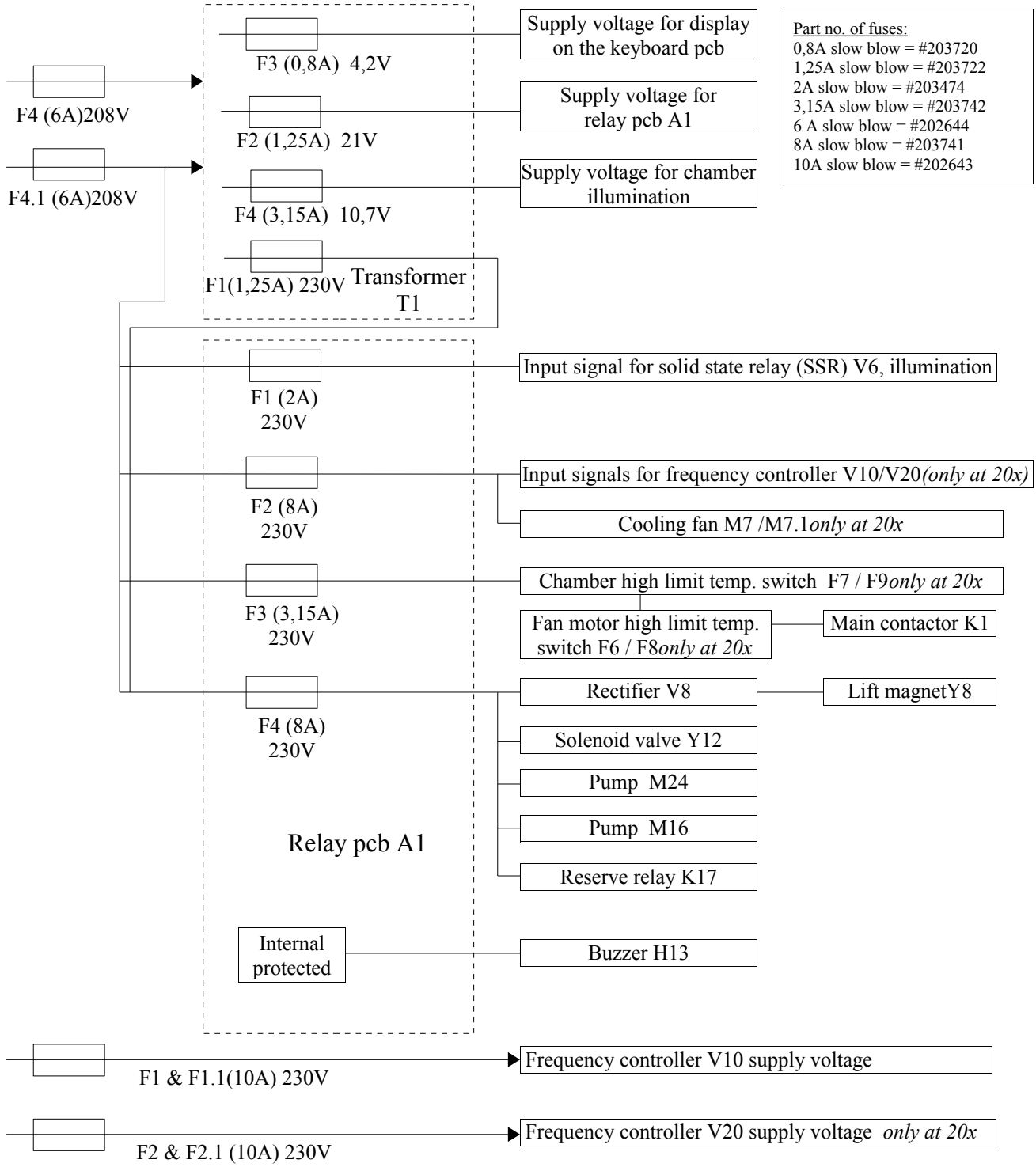
X10:

No.	description	LED on board
6 / 7	Output to flame signal pcb N11	-
8 / 9	Output to flame signal pcb N21 *(only 20.x)*	-

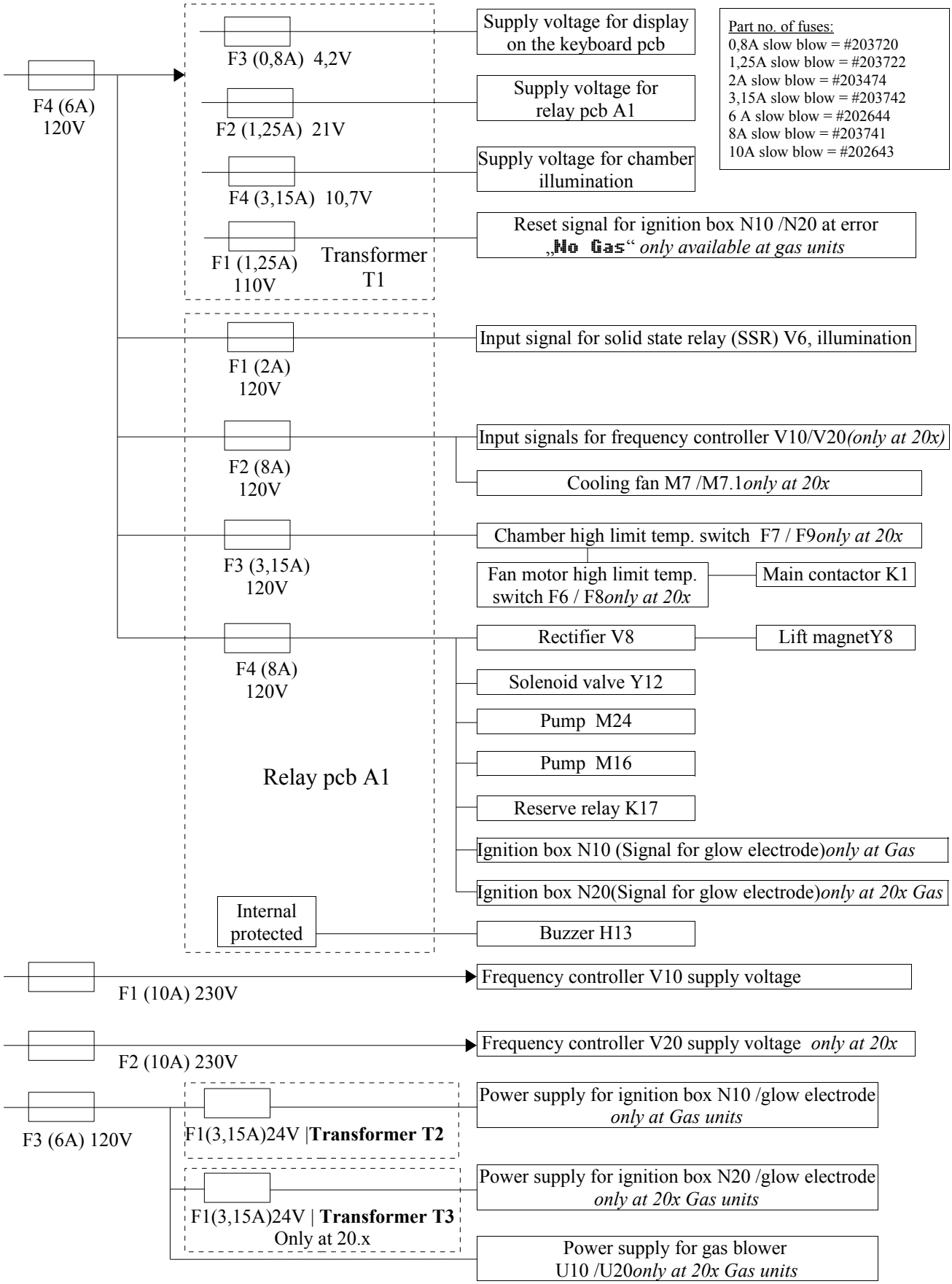
Fuse protection schematic for CE units



Fuse protection schematic for UL Electric-Units (208V)



Fuse protection schematic for UL Gas-Units (120V)



Reserve relay K 17 rewiring instructions

The power board is equipped with a reserve relay which can be covered at a relay failure. This concerns only closing contacts these are not potential-free. The assignment happens in the relay test of the configuration menu. It is to proceed as follows:

- Identifying faulty relay by using the relay test.
- Assigning the reserve relay by pressing the reserve button.
- Leaving the relay test by pressing the Config menu button.
- Press save button and leave the configuration menu with the back button.
- Rewire in accordance with table.

Please, after the cable became rewired in accordance with table, write on it !!

Terminal connection on control board	Contact type	Protected by / potential-free	Actor name	Actor	Comments / rewiring instructions
X5.1	Input	F4	230V input on F11 and F2		Protection by F4 power board
X5.2	N. O.	F1	illumination	K6	Rewire cable from X5.2 to X6.13 and assign reserve relay.
X5.3	N. O.	F2	Frequency controller D0	K2	Rewire cable from X5.3 to X6.13 and assign reserve relay.
X5.4	N. C.		-		Not in use
X5.5	N. O.	F2	Frequency controller D1	K3	Rewire cable from X5.5 to X6.13 and assign reserve relay.
X5.6	N. C.				
X5.7	N. O.	F2	Fan 2 left/right direction *(only 20.x, to contactor K3)*	K4	Rewire cable from X5.7 to X6.13 and assign reserve relay.
X5.8	Input				
X5.9	N. O.	F2	Frequency controller D2	K5	Rewire cable from X5.9 to X6.13 and assign reserve relay.
X5.10	N. O.	F2	Cooling fan	K7	Rewire cable from X5.10 to X6.13 and assign reserve relay.
X5.11	N. O.	Potential-free	External hood	K9	Not possible for reserve relay assignment
X5.12	Input				
X5.13	N. O.	Potential-free	Buzzer	K13	Not possible for reserve relay assignment
X5.14	Input				
X5.15	N. O.	Potential-free	Gas Reset 2 to Ignition Box N20	K21	Not possible for reserve relay assignment
X5.16	Input				
X5.17	N. O.	Potential-free	Gas Reset 1 to Ignition Box N10	K22	Not possible for reserve relay assignment
X5.18	Input				
X6.1	Input	F4	230V input on F3 and F4		Protection by F4 power board
X6.2	N. O.	F3	Main contactor	K1	Rewire cable from X6.2 to X6.13 and assign reserve relay.
X6.3	N. O.	F4	Lift magnet	K8	Rewire cable from X6.3to X6.13 and assign reserve relay.
X6.4	N. O.	F4	-	K10	-
X6.5	N. O.	F4	-	K11	-

Terminal connection on control board	Contact type	Protected by / potential-free	Actor name	Actor	Comments / rewiring instructions
X6.6	N. O.	F4	Solenoid valve drain cooling	K12	Rewire cable from X6.6 to X6.13 and assign reserve relay.
X6.7	N. O.	F4	Energy optimisation system (B)	K20	Rewire cable from X6.7 to X6.13 and assign reserve relay.
X6.8	N. O.	F4	-	K23	-
X6.9	N. O.	F4	Siphon pump (trap pump)	K24	Rewire cable from X6.9 to X6.13 and assign reserve relay.
X6.10	N. O.	F4	Gas On 1 *(only at gas units)*	K14	Rewire cable from X6.10 to X6.13 and assign reserve relay.
X6.11	N. O.	F4	Gas On 2 *(only at gas units)*	K15	Rewire cable from X6.11 to X6.13 and assign reserve relay.
X6.12	N. O.	F4	WaveClean pump	K16	Rewire cable from X6.12 to X6.13 and assign reserve relay.
X6.13	**N. O.**	**F4**	**Reserve relay**	**K17**	**Reserve relay X6.13**
X6.14	N. O.	F4	Not in use	K18	Not in use
X6.15	N. C.	F4	Not in use	K19	Not in use
X6.16	N. O.				Not in use

N. C. = normally closed contact
N. O. = Normally open contact

Reorganisation and reprogramming into the default situation

To „charge“ the reserve relay not unnecessary,an exchange of the relay circuit board to the default situation should be established again.

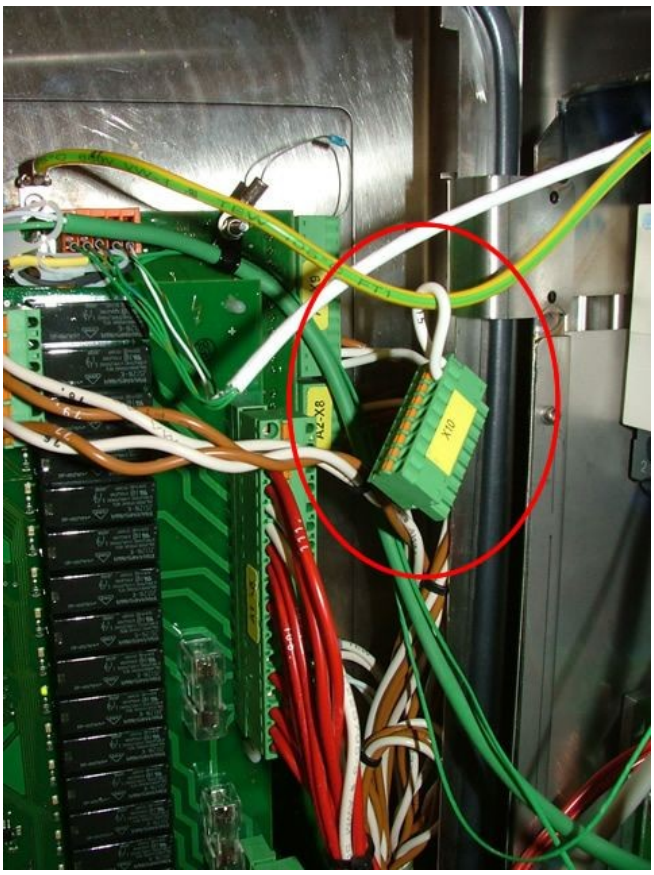
Procedure:

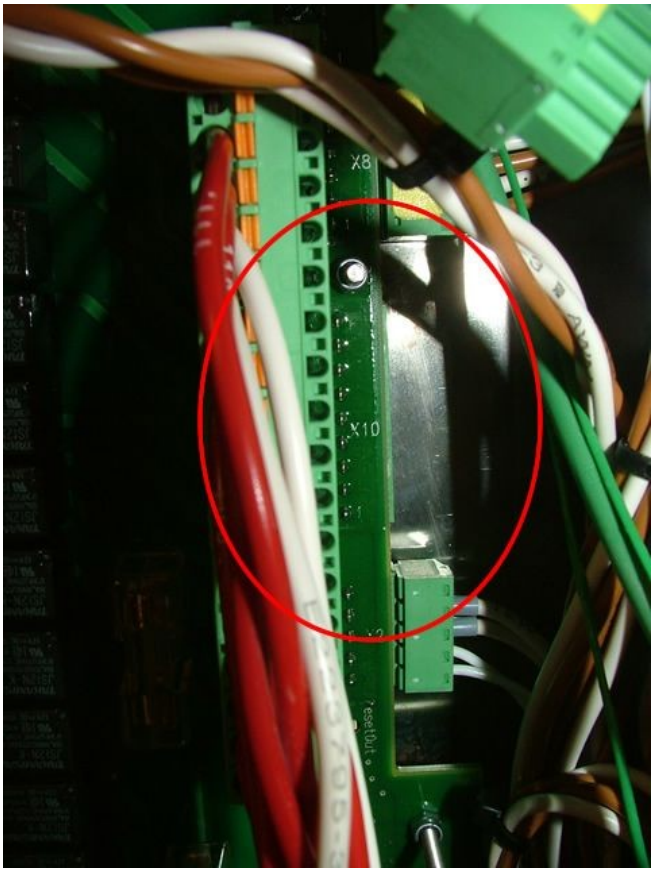
- Establish original state of the wiring (from X6.13 back to X ...) .
- Select `relay test` in the configuration menu.
- Select relay K17 and push the `reserve` button.
- Leave the relay test by pushing the `config-menu` button.
- Push `save` and leave the configuration menu with `back`.

240V UL unit Set Up

All North American SmartCombis come with the oven configured to 208V.
If your voltage supply is 240V it is a simple procedure to change it to 240V
It is very important that this procedure be done. If not the oven will be over powered and the cooking characteristics will be different.

	Remove the left side panel. There are two Allen screws at the bottom of the side panel
	You will see a label showing what must be done. **A wire on the transformer must be moved to the 240V tap.** **A connector must be added to the control board at X10**

	Using a small screwdriver or pen press the orange tab and remove the wire in the 208V terminal. **Press the orange spring terminal and place the red wire in the 240V terminal.**
	**The X10 connector comes with every oven shipped in North America.**

	**Place the connector on the X10 terminal on the Main Control Board**