

TECHNICAL MANUAL

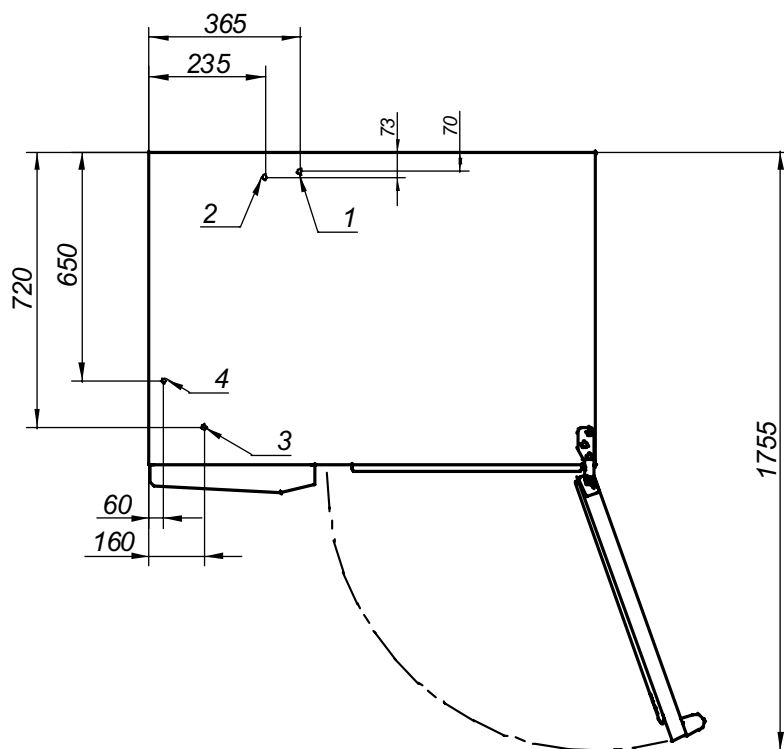
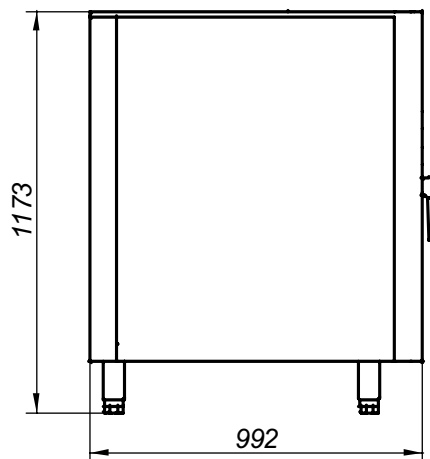
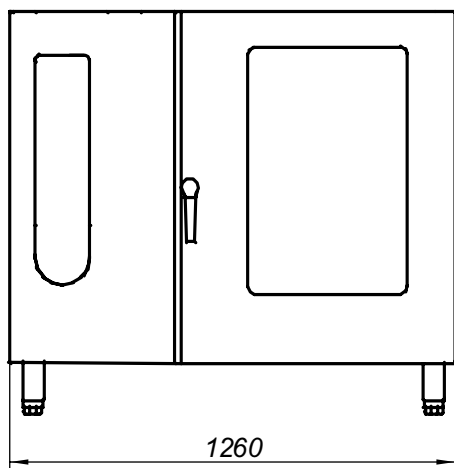
HEI, HEM Y HEP ELECTRIC OVENS

10/21



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1.- MODELS AND DIMENSIONS

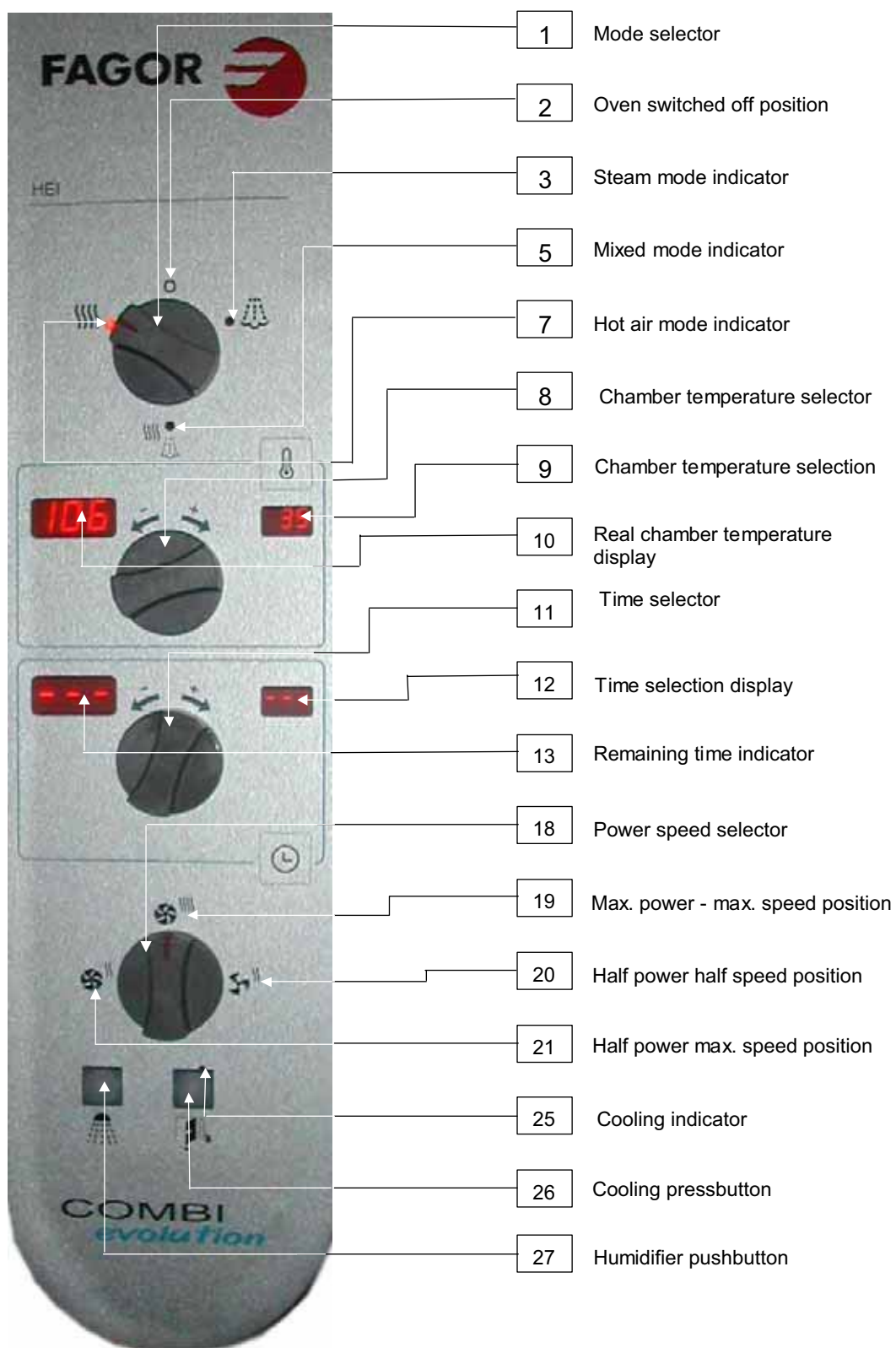


- 1 = Tapón limpieza desagüe.
- 2 = Desagüe general RG1"
- 3 = Racord entrada de alimentación eléctrica.
- 4 = Entrada de agua blanda RG 3/4".

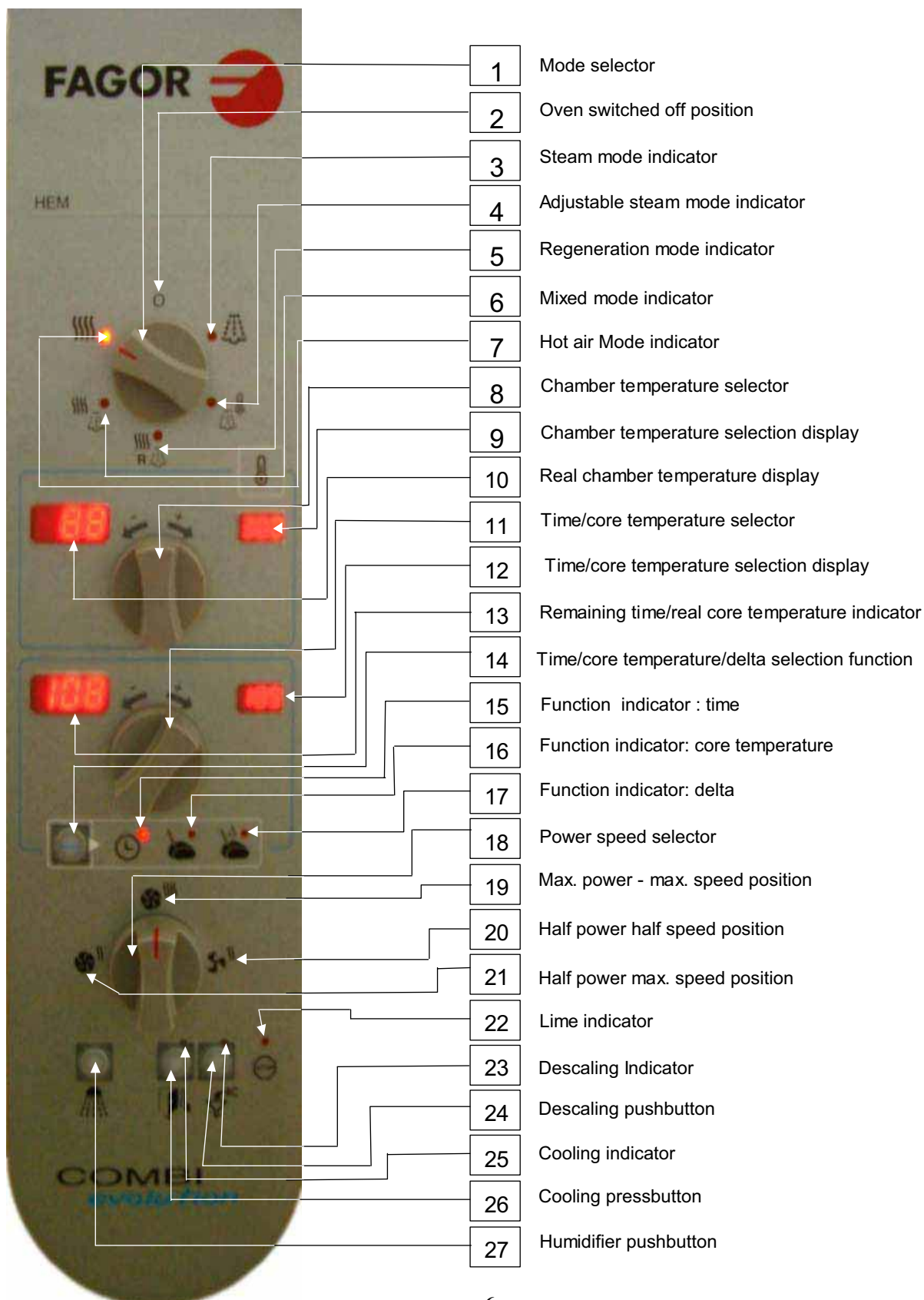
2.- TECHNICAL FEATURES

MODEL				HEI-10/21	HEM-10/21	HEP-10/21
OUTER DIMENSIONS	mm	Width X		1260	1260	1260
		Depth Y		992	992	992
		Height w/o flue pipe W		1173	1173	1173
Net weight (kg)				225 kg	239 kg	244 kg
Electrical power kW				31.5 kW	31.5 kW	31.5 kW
Power supply voltage	230 v 3~	50-60 Hz	Section Hose	3 x 25 + T		
			Int. fuse General	100 A		
			Device Differential	300 mA		
Power supply voltage	380 415 V 3~	50-60 Hz	Section Hose	3 x 10 + N + T		
			Int. fuse General	63 A		
			Device Differential	300 mA		
No. trays	GN 2-1			10	10	10
Maximum load weight kg				100	100	100
Approximate water consumption (litres/hour)				70	70	70
Water inlet pressure kg/cm				0.5 ÷ 8		

3.- CONTROL PANEL HEI OVEN

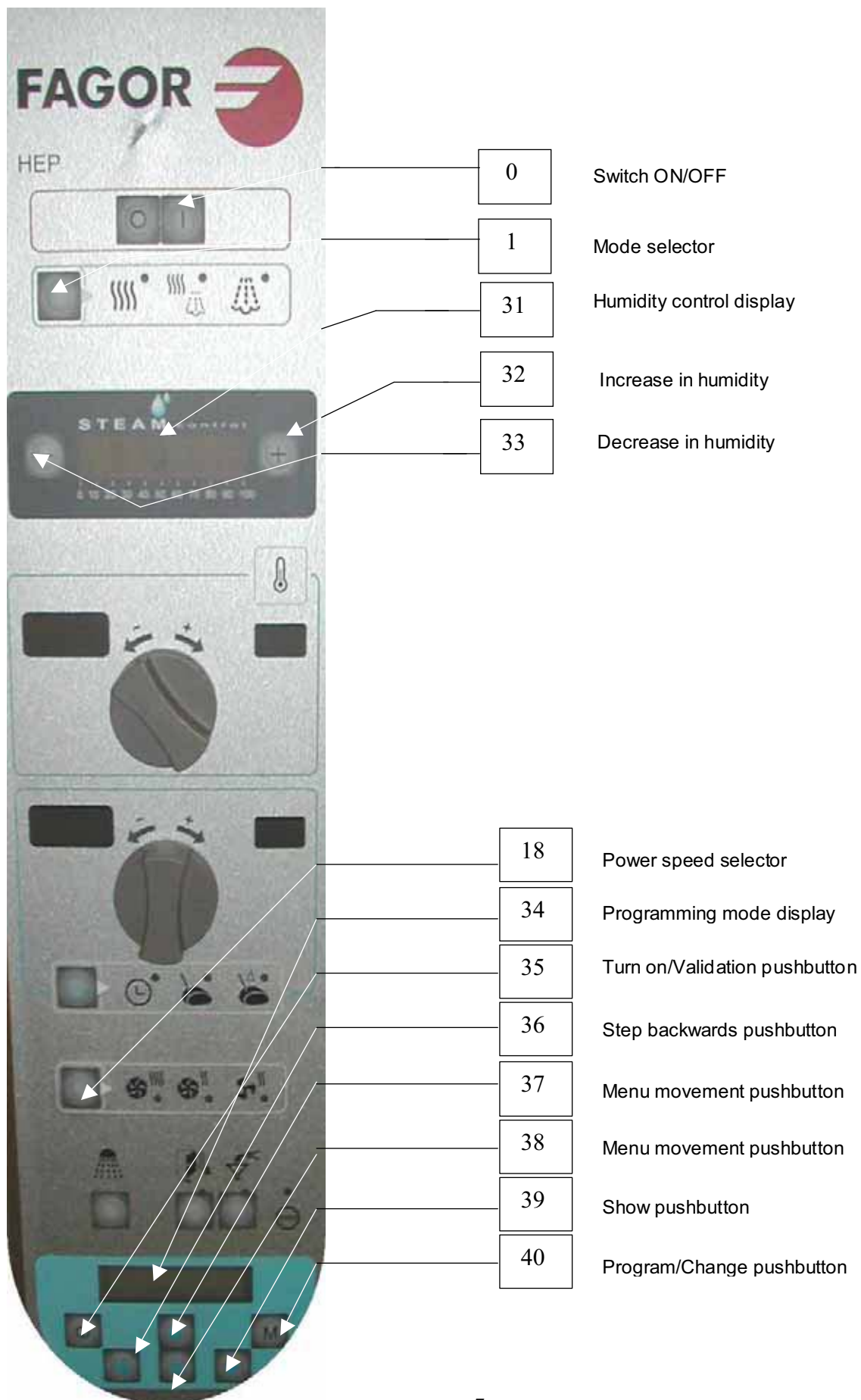


HEM OVEN



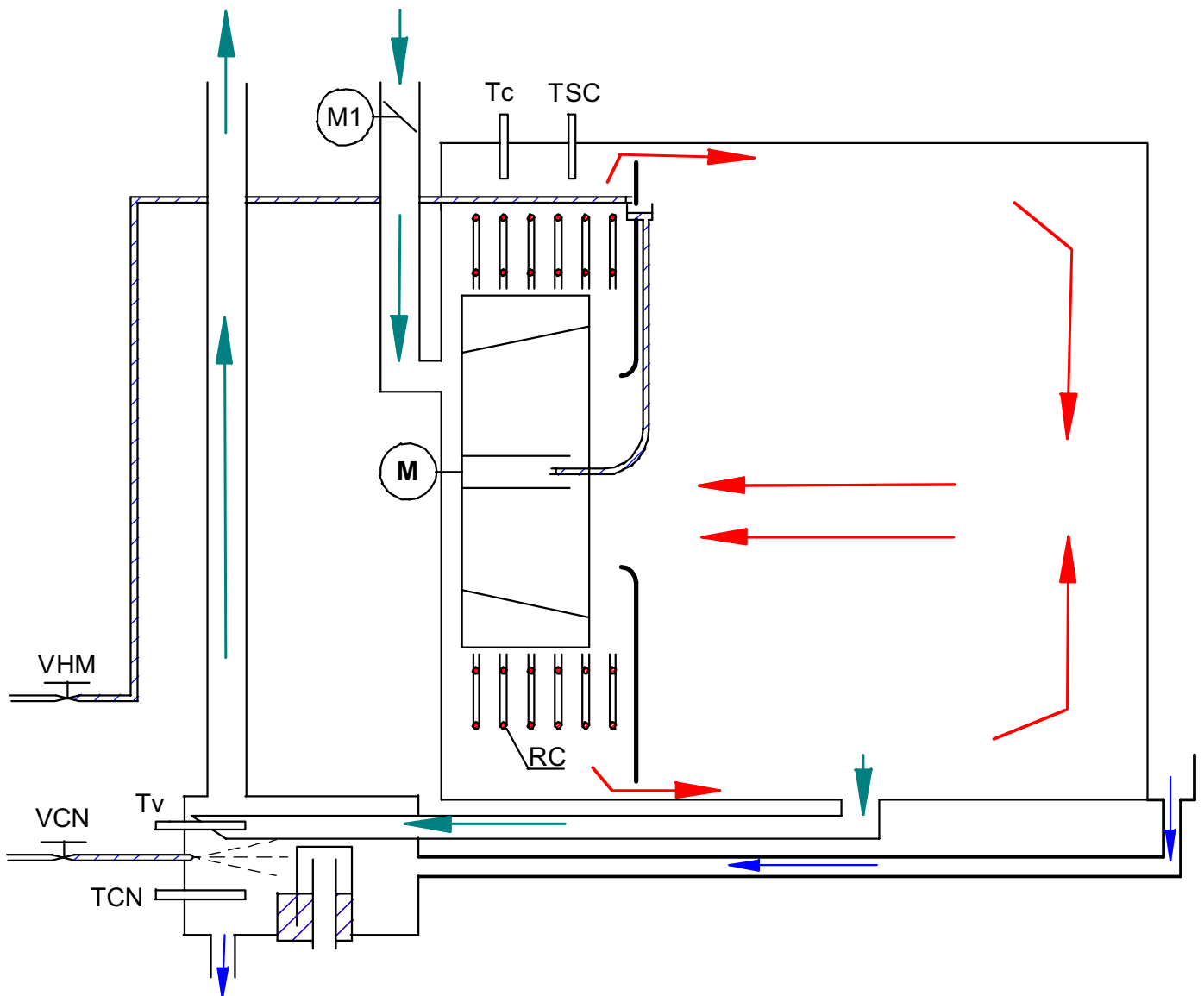
- 1 Mode selector
- 2 Oven switched off position
- 3 Steam mode indicator
- 4 Adjustable steam mode indicator
- 5 Regeneration mode indicator
- 6 Mixed mode indicator
- 7 Hot air Mode indicator
- 8 Chamber temperature selector
- 9 Chamber temperature selection display
- 10 Real chamber temperature display
- 11 Time/core temperature selector
- 12 Time/core temperature selection display
- 13 Remaining time/real core temperature indicator
- 14 Time/core temperature/delta selection function
- 15 Function indicator : time
- 16 Function indicator: core temperature
- 17 Function indicator: delta
- 18 Power speed selector
- 19 Max. power - max. speed position
- 20 Half power half speed position
- 21 Half power max. speed position
- 22 Lime indicator
- 23 Descaling Indicator
- 24 Descaling pushbutton
- 25 Cooling indicator
- 26 Cooling pressbutton
- 27 Humidifier pushbutton

HEP OVEN

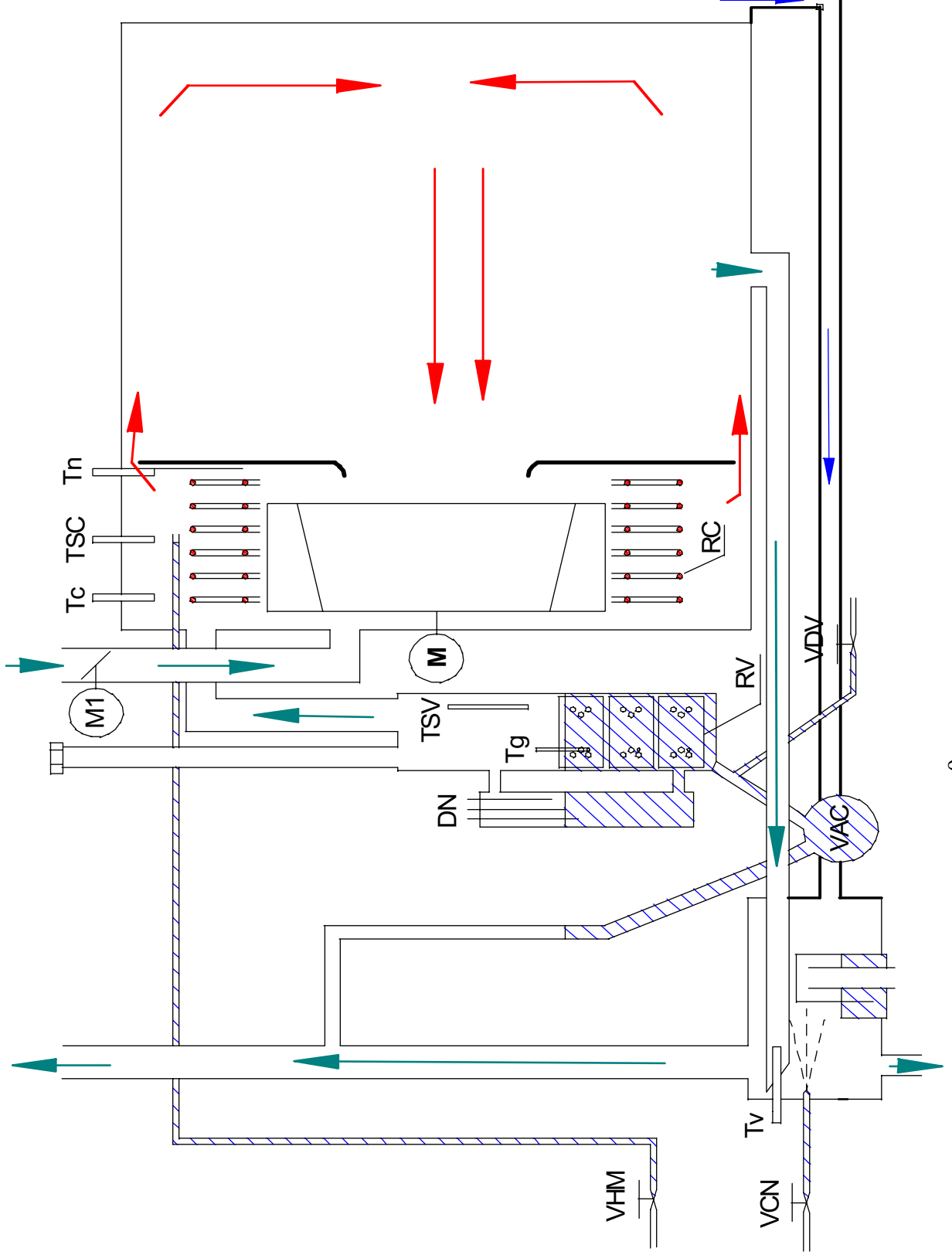


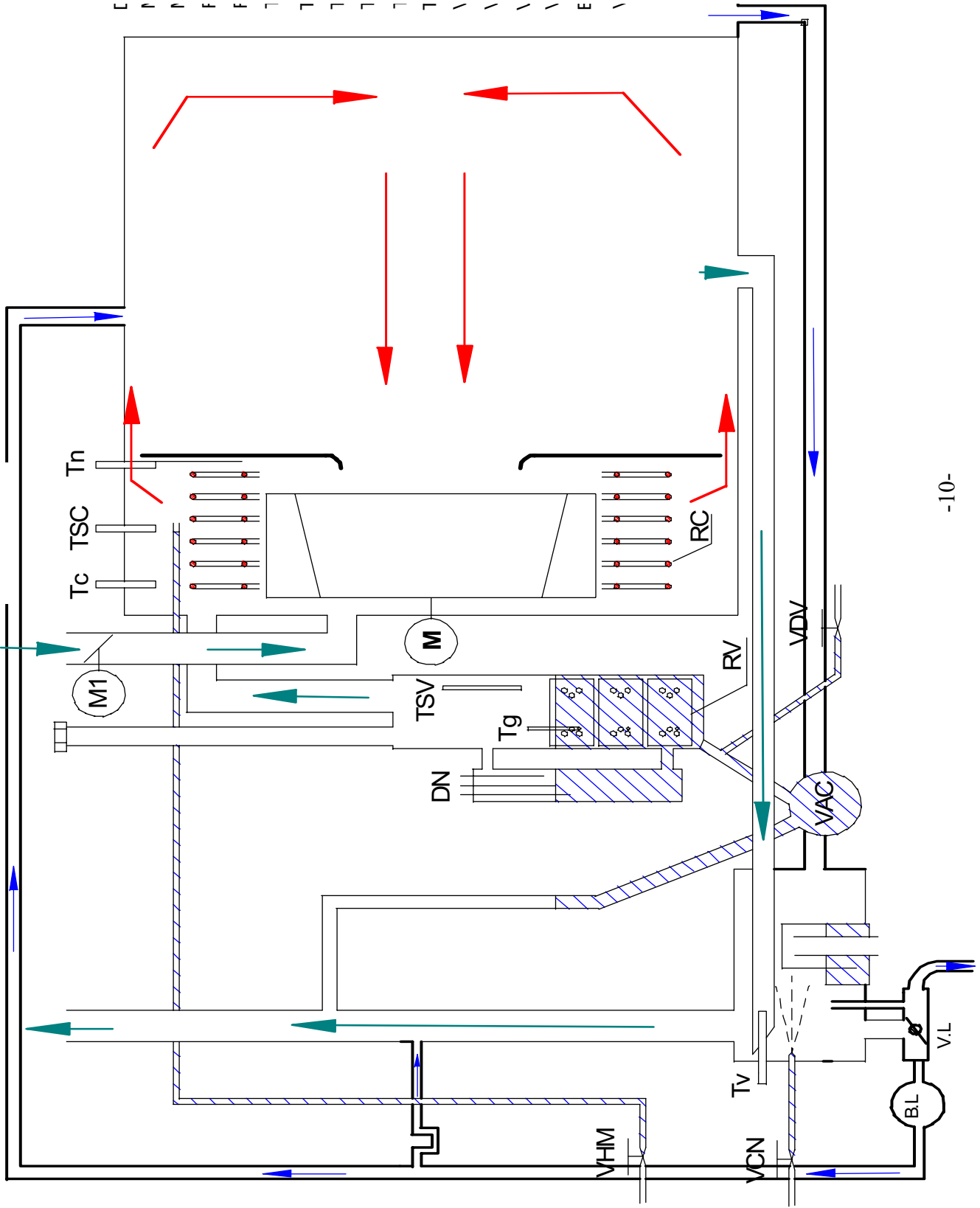
4.- FUNCTIONAL DIAGRAMS

HEI OVEN

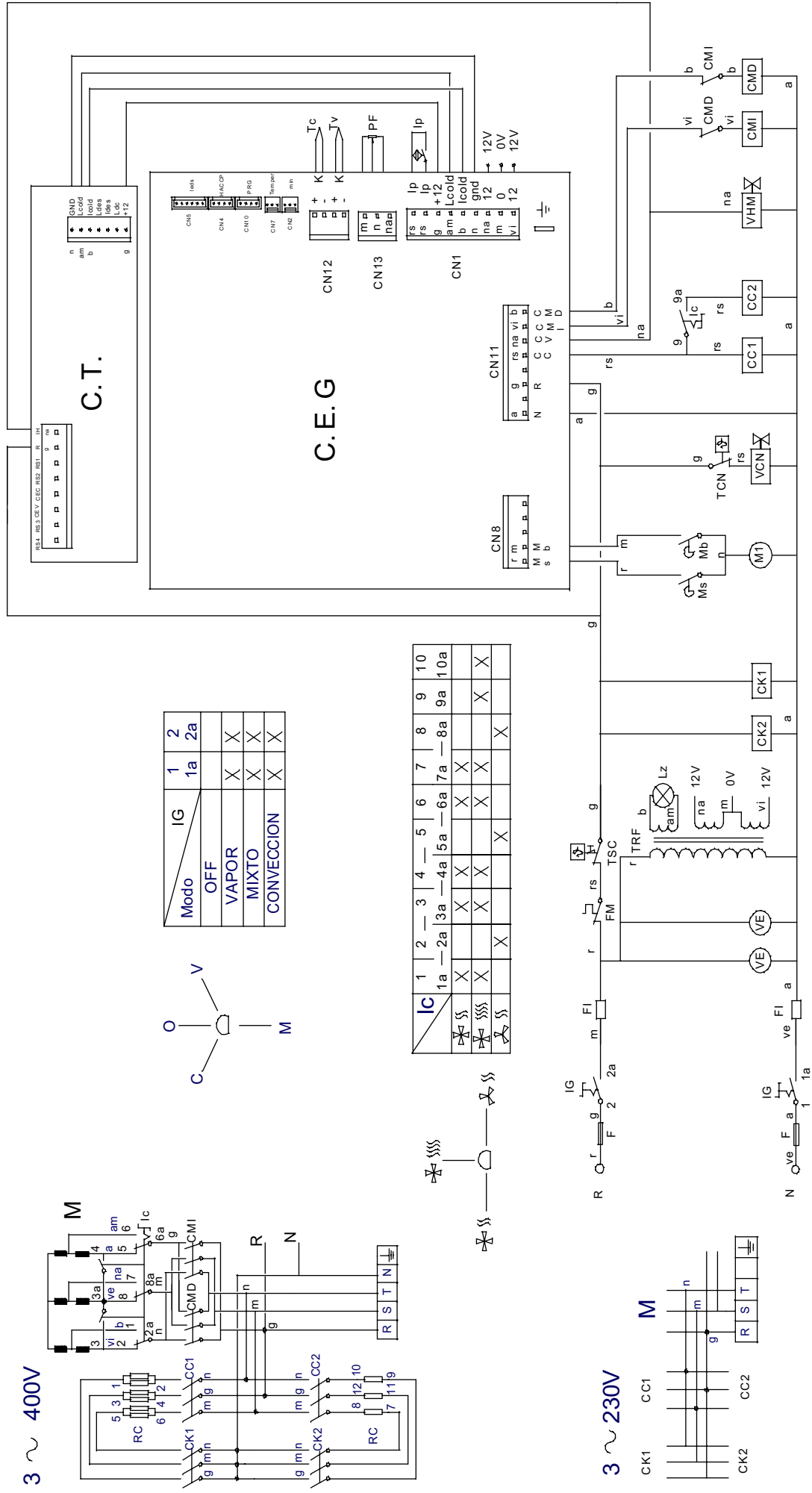


HEM OVEN

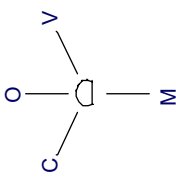




5.- THEORETICAL ELECTRICAL DIAGRAM HEI OVENS

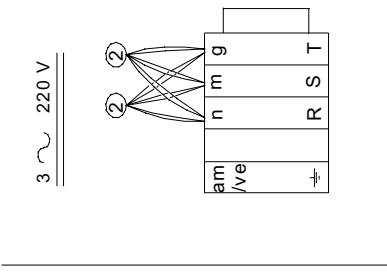


Modo	IG	1	2
OFF		1a	2a
VAPOR		X	X
MIXTO		X	X
CONVECCION		X	X

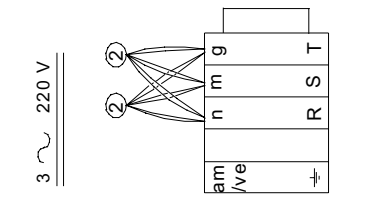
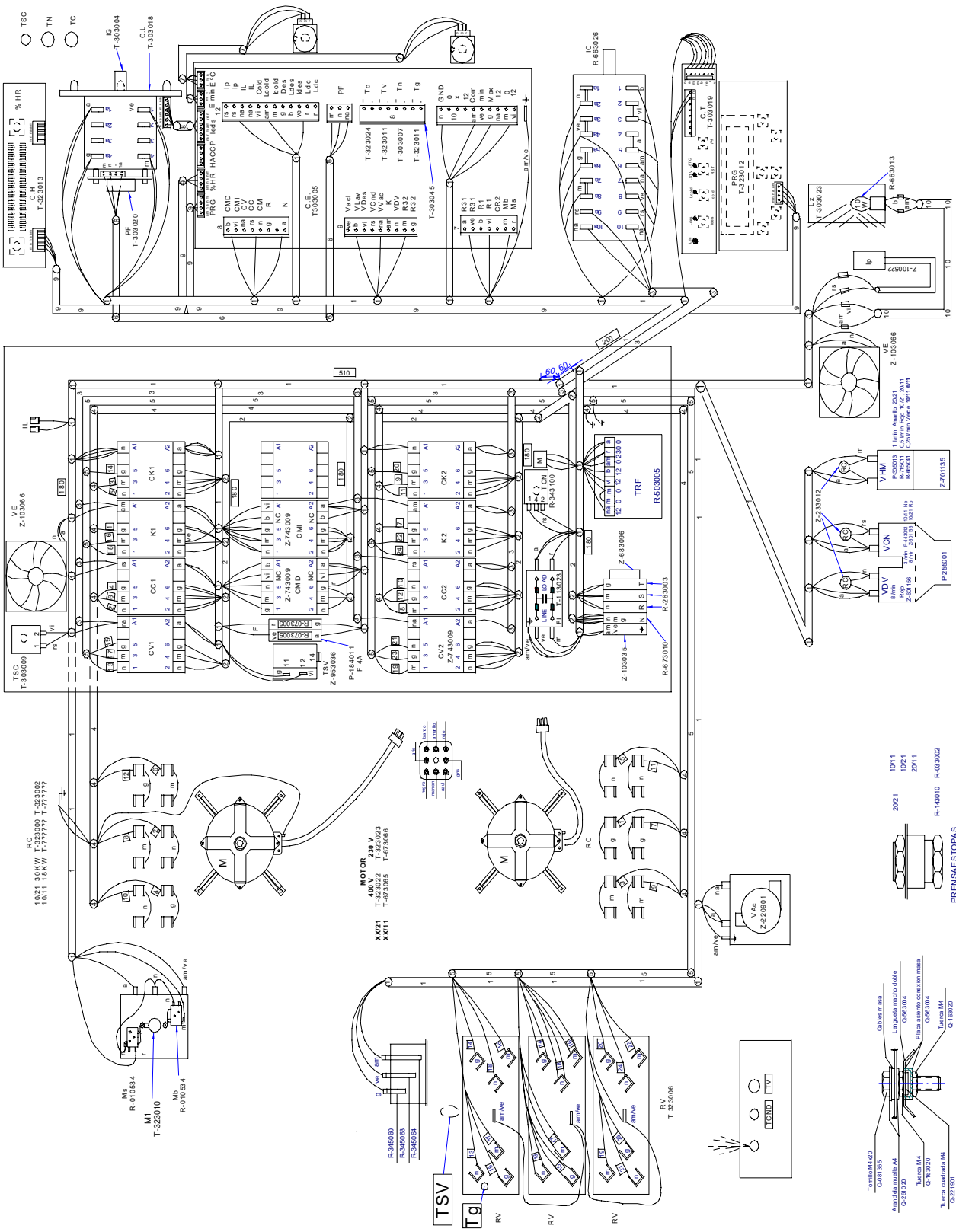


IC	1	2	3	4	5	6	7	8	9	10
1a	X	X	X	X	X	X	X	X	X	X
2a	X	X	X	X	X	X	X	X	X	X
3a	X	X	X	X	X	X	X	X	X	X
4a	X	X	X	X	X	X	X	X	X	X
5a	X	X	X	X	X	X	X	X	X	X
6a	X	X	X	X	X	X	X	X	X	X
7a	X	X	X	X	X	X	X	X	X	X
8a	X	X	X	X	X	X	X	X	X	X
9a	X	X	X	X	X	X	X	X	X	X
10a	X	X	X	X	X	X	X	X	X	X

ASSEMBLY DRAWING HEM AND HEP OVENS



1	T-323019
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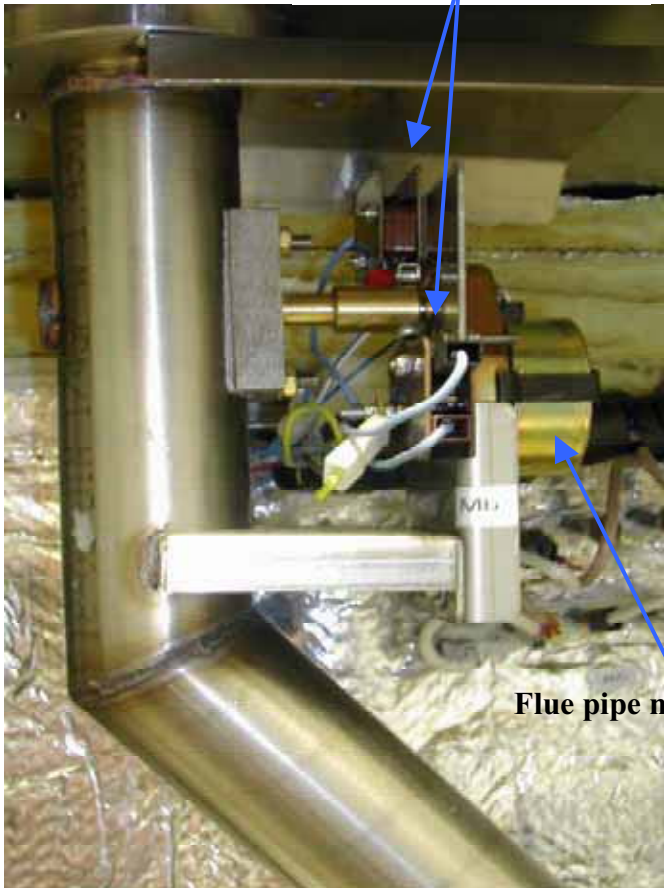
LEGEND

F A G O R I N D U S T R I A L

	ESPAÑOL	FRANÇAIS	ENGLISH	DEUTSCH	ITALIANO
BEC	Bujía Encendido Cámara	Bougie Allumage Chambre	Chamber Spark Plug	Zündkerze	Candela di Accensione Camera
BEV	Bujía Encendido Caldera	Bougie Allumage Chaudière	Boiler Spark Plug	Zündkerze	Candela di Accensione Caldaia
C.E.C	Control Combustion Cámara	Contrôle Combustion Chambre	Chamber Combustion Control	Steuerung Verbrennung Garraum	Controllo Combustione Camera
C.E.G	Control Combustion Caldera	Contrôle Combustion Chaudière	Main Electronic Control	Steuerung Verbrennung Garraum	Controllo Combustione Caldaia
C.H	Controllo Combustion Caldera	Contrôle Combustion Chaudière	Boiler Combustion Control	Steuerung Verbrennung Boiler	Controllo Combustione Caldaia
C.L	Circuito Leads	Circuit Leds	Humidity Circuit	Kreislauf Feuchtigkeit	Circuito Umidità
C.L	Circuito Leads	Circuit Leds	Led Circuit	Kreislauf LEDs	Circuito Led's
C.T	Circuito Teclado	Circuit Clavier	Keyboard Circuit	Kreislauf Tastatur	Circuito Tastiera
CC1,CC2	Contacto Resistencia Cámara	Contacteur Élément Chauffant Chambre	Chamber Heating Element Contactor	Schütz Heizwiderstand Garraum	Contactore Resistenza Camera
CMD	Contacto Motor Derecha	Contacteur Moteur Droite	Right Engine Contactor	Schutz Motor rechts	Contactore Motore Destra
CM1	Contacto Motor Izquierda	Contacteur Moteur Gauche	Left Engine Contactor	Schutz Motor links	Contactore Motore Sinistra
CR2	Relé Atranco	Relais Démarrage	Starting Relay	Relais Anlauf	Relé Accensione
CV1, CV2	Contacto Resistencias Caldera	Contacteur Élément Chauffant Chaudière	Boiler Heating Element Contactor	Schütz Heizwiderstand Boiler	Contactore Resistenza Caldaia
DEC	Detector Lama Cámara	Détecteur Flamme Chambre	Chamber Flame Detector	Flammendetektor Garraum	Rilevatore di Fiamma Camera
DEV	Detector Lama Caldera	Détecteur Flamme Chaudière	Boiler Flame Detector	Flammendetektor Boiler	Rilevatore di Fiamma Caldaia
DN	Detector Nivel Caldera	Détecteur Niveau Chaudière	Boiler Level Detector	Pegeldetektor Boiler	Rilevatore Livello Caldaia
EM	Encoder Selector Tiempo	Encodeur Sélecteur Temps	Time Selector Encoder	Encoder Zeitwählschalter	Encoder Selektore Tempo
EC	Encoder Selector Temperatura	Encodeur Sélecteur Température	Temperature Selector Encoder	Encoder Temperaturwählschalter	Encoder Selektore Temperatura
F	Fusibles	Fusibles	Fuses	Sicherungen	Fusibili
FI	Filtro Interferencias	Filtre Interférences	Interference Filter	Störungsfilter	Filtro Interferenze
FM	Térmico Motor	Thermique Moteur	Thermal Engine	Thermoschalter Motor	Termico Motore
GV1, GV2	Electro válvula Gas Cámara	Electrovanne Gaz Chambre	Chamber Gas Solenoid Valve	Elektroventil Gas Garraum	Elettrovalvola Gas Camera
GV3, GV4	Electro válvula Gas Caldera	Electrovanne Gaz Chaudière	Boiler Gas Solenoid Valve	Elektroventil Gas Boiler	Elettrovalvola Gas Caldaia
G	Selector Velocidad Potencia	Sélecteur Vitesse Puissance	Power Speed Selector	Wahlschalter Geschwindigkeit Leistung	Selettore Velocità Potenza
I	Interruptor General	Interrupteur Général	Main Switch	Hauptschalter	Interruttore generale
L	Interruptor Seguridad Lavado	Interrupteur Sécurité Lavage	Washing Safety Switch	Sicherheitsschalter Waschen	Interruttore Sicurezza Lavaggio
L	Interruptor Seguridad Puerta	Interrupteur Sécurité Porte	Door Safety Switch	Sicherheitsschalter Tür	Interruttore Sicurezza Porta
K1,K2,CK1,CK2	Relé Resistencia	Relais Élément Chauffant	Heating Element Relay	Relais Heizwiderstand	Relé Resistenza
Lz	Luz interior	Eclairage Intérieur	Inner Light	Innenbeleuchtung	Luce Interna
M	Motor Turbina	Moteur Turbine	Turbine Engine	Motor Turbine	Motore Turbina
M1	Motor Chimenea	Moteur Cheminée	Stack Engine	Motor Abluftkamin	Motore Canna
M2	Motor Válvula	Moteur vanne	Valve Engine	Motor Ventil	Motore Valvola
MBA	Bomba Lavado	Pompe Lavage	Washing Pump	Waschepumpe	Pompa lavaggio
MB	Interruptor Micro Bajada	Microrupteur Descente	Drop Microswitch	Mikroschalter Senken	Interruttore Micro Discesa
MF	Interruptor Micro Subida	Microrupteur Montée	Rise Microswitch	Mikroschalter Heben	Interruttore Micro Salita
PF	Potenciometro Selector Funciones	Potentiomètre Sélecteur Fonctions	Functions Selector Potentiometer	Potentiometer Funktionswahlschalter	Potenziometro Selettore Funzioni
PRG	Programador	Programmeur	Programmer	Programmier Vorrichtung	Programmatore
RC	Resistencia Cámara	Éléments Chauffants Chambre	Chamber Heating Element	Heizwiderstände Garraum	Resistenza Camera
RV	Resistencia Caldera	Éléments Chauffants Chaudière	Boiler Heating Element	Heizwiderstände Boiler	Resistenza Caldaia
Tc	Sonda Cámara	Sonde Chambre	Chamber Probe	Sonde Garraum	Sonda Camera
TGN	Termostato Condensación	The rmostat Condensation	Condensation Thermostat	Thermostat Kondensierung	Termostato Condensazione
Tg	Sonda Caldera	Sonde Chaudière	Boiler Probe	Boiler Probe	Sonda Caldaia
TH	Sonda Humedad	Sonde Humidité	Humidity Probe	Sonde Feuchtigkeit	Sonda Umidità
Tn	Sonda Núcleo	Sonde Noyau	Core Probe	Kerntemperatursonde	Sonda Nucleo
TRF	Transformador	Transformateur	Transformer	Transformator	Trasformatore
TSC	Termostato Seguridad Cámara	The rmostat Sécurité Chambre	Chamber Safety Thermostat	Sicherheitsthermostat Garraum	Termostato Sicurezza Camera
TSV	Termostato Seguridad Caldera	The rmostat Sécurité Chaudière	Boiler Safety Thermostat	Sicherheitsthermostat Boiler	Termostato Sicurezza Caldaia
Tv	Sonda Vapor	Sonde Vapeur	Steam Probe	Sonde Dampf	Sonda Vapore
VAC	Bomba Vacío	Pompe Vidange	Vacuum Pump	Abwasspumpe	Pompa scarico
VAcI	Electro válvula Aclarado	Electrovanne Rinçage	Rinsing Solenoid Valve	Elektroventil Klarspülen	Elettrovalvola Risciacquo
VC	Ventilador Sopiante	Ventilateur Soufflant	Blowing Fan	Ventilator Gebläse	Ventilatore Soffiante
VCN	Electro válvula Condensación	Electrovanne Condensation	Condensation Solenoid Valve	Elektroventil Kondensierung	Elettrovalvola Condensazione
VDV	Electro válvula Llenado Caldera	Electrovanne Remplissage Chaudière	Chamber Filling Solenoid Valve	Elektroventil Füllung Boiler	Elettrovalvola Riempimento Caldaia
VE	Electro válvula Llenado Caldera	Ventilateur Tableau Electrique	Fan Switchboard	Ventilator Elektrotafel	Ventilatore Quadro Elettrico
VHM	Electro válvula Humidificador	Electrovanne Humidificateur	Humidifier Solenoid Valve	Elektroventil Befeuchtungsrichtung	Elettrovalvola Umidificatore
Vlav	Electro válvula Lavado	Electrovanne Lavage	Washing Solenoid Valve	Elektroventil Waschen	Elettrovalvola Lavaggio
Vv	Variador Velocidad	Variateur Vitesse	Speed Variator	Geschwindigkeitregler	Variatore di Velocità
COLORS	COLORS	COULEURS	COLOUR	FARBEN	COLORE
Va	Azul	Bleu	Blue	Blaü	Blu
am	Amarillo	Jaune	Yellow	Gelb	Giallo
am/ve	Amarillo/Verde	Jaune / vert	Yellow / green	Gelb/grün	Giallo/verde
b	Bianco	Blanc	White	Weiß	Bianco
g	Grigio	Grey	Grey	Grau	Grigio
m	Marrón	Noir	Brown	Braun	Marrone
n	Negro	Noir	Black	Schwarz	Nero
na	Naranja	Rouge	Orange	Orange	Aranco
r	Rosa	Rose	Red	Rot	Rosso
rs	Rosa	Rose	Pink	Rosa	Roseo
ve	Verde	Vert	Green	Grün	Verde
vi	Violeta	Violet	Purple	Violett	Violeta

6.- COMPONENTS

**Micros flue pipe open
close**



Flue pipe motor

Complete flue pipe

Steam retention lid



Shower

Humidifier



**Condensation +
Washing**

Generator filling

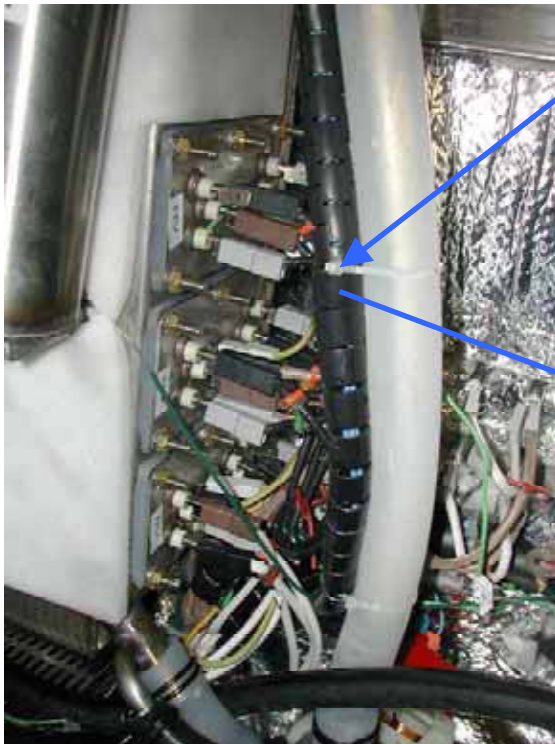
Solenoid valves

Steam generator



Level canister

**Heating element
T323006**





Convection heating element

The oven has two ring shaped convection heating elements:

T323000 Large ring

T303002 Small ring

Each heating element has a power of 15 kW

At medium power one heating element enters and at maximum power the two heating elements enter at the same time.

7.-SEQUENCE OF EVENTS

HEM ELECTRIC OVEN

Steam Mode 100 °C

No.	STEP	RESPONSIBLE SENSOR	SIGNAL	OBSERVATIONS
1	Select Steam mode	Potentiometer PF	PF= 2 VDC	
2	Select time or core temperature	Time encoder		
3	Close the door	IP Reed Contact	12 V	
4	Verification of the water level in the steam generator	DN (Com, Max, min)	230 V in VDV	The VDV solenoid valve is active when water is lacking.
5	Preheating of the steam generator up to 90 °C CV is in operation	Thermocouple Tg	CV1 and CV2 operate (230 V)	The heating stops if TG reaches 180 °C and LDC comes on
6	The cooking time starts after the preheating	C.E.G. Controller Logic		
7	Steam intake in the inside of the Cooking chamber	Thermocouple TV	230 V in CV	CV1 and CV2 operate
8	Condensation chamber set at 80 °C in the Factory	Thermocouple TV	230 V in VCN	VCN operates at intervals

Regeneration Mode 35 ... 180 °C

No.	STEP	RESPONSIBLE SENSOR	SIGNAL	OBSERVATIONS
1	Select Regeneration mode	Potentiometer PF	PF= 6 VDC	
2	Select Chamber temperature	Temperature encoder		
3	Select time or core temperature	Time encoder		
4	Close the door	IP Reed Contact	12 V	
5	Verification of the water level in the steam generator	DN (Com, Max, min)	230 V in VDV	The VDV solenoid valve is active when water is lacking.
6	Preheating of the steam generator up to 90 °C CV is in operation	Thermocouple Tg	CV1 and CV2 operate (230 V)	The heating stops if TG reaches 180 °C and LDC comes on
7	The cooking time starts after the preheating	C.E.G. Controller Logic		
8	Steam intake in the inside of the Cooking cabinet (20"ON 40"OFF)	Thermocouple TV	230 V in CV	CV1 and CV2 operate (80% steam)
9	Hot air intake in the inside of the Cooking chamber. (40"ON 20"OFF)	Thermocouple Tc	230 V in CC	CC1 and CC2 operate
10	Condensation chamber set at 80 °C in the Factory	Thermocouple TV	230 V in VCN	VCN operates at intervals

Mixed Mode 35 ... 250 °C

No.	STEP	RESPONSIBLE SENSOR	SIGNAL	OBSERVATIONS
1	Select Mixed mode	Potentiometer PF	PF= 8 VDC	
2	Select Chamber temperature	Temperature encoder		
3	Select time or core temperature	Time encoder		
4	Close the door	IP Reed Contact	12 V	
5	Verification of the water level in the steam generator	DN (Com, Max, min)	230 V in VDV	The VDV solenoid valve is active when water is lacking.
6	Preheating of the steam generator up to 90 °C CV is in operation	Thermocouple Tg	CV1 and CV2 operate (230V)	The heating stops if TG reaches 180 °C and LDC comes on
7	The cooking time starts after the preheating	C.E.G. Controller Logic		
8	Steam intake in the inside of the Cooking cabinet (20"ON 40"OFF)	Thermocouple TV	230 V in CV	CV1 and CV2 operate (60% steam)
9	Hot air intake in the inside of the Cooking chamber. (40"ON 20"OFF)	Thermocouple Tc	230 V in CC	CC1 and CC2 operate
10	Condensation chamber set at 80° C in the Factory	Thermocouple TV	230 V in VCN	VCN operates at intervals

Adjustable Steam Mode 35 ... 125 °C

No.	STEP	RESPONSIBLE SENSOR	SIGNAL	OBSERVATIONS
1	Select Steam Adjustment mode	Potentiometer PF	PF= 4 VDC	
2	Select Chamber temperature	Temperature encoder		
2	Select time or core temperature	Time encoder		
4	Close the door	IP Reed Contact	12 V	
5	Verification of the water level in the steam generator	DN (Com, Max, min)	230 V in VDV	The VDV solenoid valve is active when water is lacking.
6	Preheating of the steam generator up to 90 °C CV is in operation	Thermocouple Tg	CV1 and CV2 operate (230 V)	The heating stops if TG reaches 180 °C and LDC comes on
7	The cooking time starts after the preheating	C.E.G. Controller Logic		
8	Steam intake in the inside of the Cooking cabinet (20"ON 40"OFF)	Thermocouple TV	230 V in CV	CV1 and CV2 operate (80% steam)
9	Hot air intake in the inside of the Cooking chamber. (40"ON 20"OFF)	Thermocouple Tc	230 V in CC	CC1 and CC2 operate
10	Condensation chamber set at 80 °C in the Factory	Thermocouple TV	230 V in VCN	VCN operates at intervals

Convection Mode 35 ... 300°C

No.	STEP	RESPONSIBLE SENSOR	SIGNAL	OBSERVATIONS
1	Select Convection mode	Potentiometer PF	PF= 10 VDC	
2	Select Chamber temperature	Temperature encoder		
3	Select time or core temperature	Time encoder		
4	Close the door	IP Reed Contact	12 V	
5	Verification of the water level in the steam generator	DN (Com, Max, min)	230 V in VDV	The VDV solenoid valve is active when water is lacking.
6	The cooking time starts	C.E.G. Controller Logic		
7	Hot air intake in the inside of the Cooking chamber	Thermocouple Tc	230 V in CC	CC1 and CC2 operate
8	Condensation chamber set at 80° C in the Factory	Thermocouple TV	230 V in VCN	VCN operates at intervals



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