EQUATOR
Swiss made coffee machines

C14C

Technical Manual

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Certificate:

Norm:

EN 50581
EN 55014-1
EN 55014-2
EN 55022

EN 60335-1
EN 60335-2-75
EN 61000-3-2
EN 61000-3-3

Vending Verband Schweiz
Vending Association Suisse
Vending Associazione Svizzera

Bundesverband der Deutschen
Vending-Automatenwirtschaft e. V.

EUROPEAN
VENDING ASSOCIATION

European Vending Association

SPECIALITY COFFEE
ASSN. OF EUROPE

Speciality Coffee Association of Europe

Contents

1 Introduction

Congratulations! You purchased a premium fully automatic Aequator coffee machine.
Please read the instructions carefully and get familiar with safety instructions before installing and operating the machine. Keep the manual at hand in the transparent envelope fixed inside the front door of your machine.

The instructions tell you how to operate and maintain your machine. We do not assume any liability for damages caused by non-observance of the instructions or by improper handling of the machine.

Operation and maintenance of machines are to be made in compliance with the instructions in this manual. For damage caused by non-observance of this information or from inappropriate operation, we assume no liability

It is impossible to treat all possibilities in this short operator manual. Your service partner is glad to help you with any problem you cannot solve yourself, and to give you additional information.

Warning Danger

Warning High Voltage

1.1 Safety Instructions

For safety purposes, unplug the power connector for any operation inside the unit, e.g. cleaning!

To avoid the risk of electric shock, you must not remove or open the cover of the machine.

The machine complies with IP20 and must be operated in dry rooms only!

This table top machine must not be operated on the floor!

The machine must be placed on a horizontal surface, not exceeding 2 degrees inclination. Adjust the position with the adjustable feet.

This machine is **FOR PROFESSIONAL USE IN BUSINESS ESTABLISHMENTS ONLY**, e.g. in restaurants, hotels, motels, cafeterias, shops, offices etc.

The machine is **NOT FOR OPEN-AIR USE**.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given initial supervision or instruction concerning use of the appliance by a person responsible for their safety.

The machine is constructed for safe operation, meeting advanced engineering standards.
The machine is produced in accordance with the valid CE regulations, ISO 9001 and ISO 14001.

However, the use of the vending machine may be dangerous if ...

- you do not follow the present operator manual carefully.
- unauthorised staff installs, maintains or repairs the machine.
- there is improper use of the machine, not according to the original purpose thereof.

The above may cause:

- danger to correct, efficient and reliable working of the machine.
- danger to the machine and to further assets of the operator and the user.
- danger to life and limb.

Concerning transport, installation, maintenance and repair please consult the latest edition of the following regulations and guidelines of your country:

- Regulations of the federation of electro-technology.
- EU guidelines. (in EU countries)
- Regulations concerning the prevention of accidents.
- Guidelines of the professional union.
- Trade regulations.

The following points are to be considered:

- The prepared drinks are hot.
- Some parts of the machine are hot.
- Some parts of the machine are under high pressure (hot water).
- The water flowing out during the cleaning process is hot.
- Any change or modification of the machine is prohibited.
  AEQUATOR AG does not assume any liability in such a case.
- Store the machine in dry rooms and never in frosty environment.
- Transport it only in the original packing.

2 Handling

The manufacturer does not assume any liability for damages caused by non-observance of the instructions below.

2.1 Installation

Please check before installing the machine:

- water connection
- electricity
- degree of hardness of the water

Unpacking the Machine

Check whether the machine is undamaged. If you have any doubts, do not operate the machine.
Recycle the packaging material.

The machine complies with IP20 and must be operated in dry rooms only!

This table top machine must not be operated on the floor!

The machine must be placed on a horizontal surface, not exceeding 2 degrees inclination. Adjust the position with the adjustable feet.

Water Connection

Connect the machine to your drink water system, observing the legal regulations of your country.
The water pressure must be 0.1 to 0.8 MPa (1 to 8 bars).
Rinse the water tubes before connecting the machine, until the water is clean and clear, without dirt. Connect the machine using the hose delivered with the machine. Outside the machine there must be an easily accessible water tap to turn the water on and off.

Water Filter / Water Softener

The standard machine is delivered without filter no softener.
Phosphate filters may be used in case of hard water, or ion exchangers in case of very hard water.
A suitable water filter must be placed between the water connection and the machine.
The manufacturer does not assume any liability for damages caused due to missing or improper use of water filters or softeners respectively.
A volume counter is integrated in the machine to facilitate the handling of exchangers.

Electricity

The machine is constructed for a one phase voltage of 230V AC. Before operating the machine, make sure the specifications indicated on the label correspond to your electricity network:

- Is the voltage range within the legal limits?
- Can the fuses take the required maximum load, and is the disconnection from the net between phase and neutral conductor guaranteed with a distance of a minimum of 3 mm between the wires?

The main plug must be easily accessible.
The power cord is firmly connected to the machine and must only be removed and replaced by electrical engineers. The exclusive use of cables of type HO5 RR-F, HO5 RN-F, HO5 VV-F, HO7 RN-F, with wire size of 3 x 1.5 mm^2 is a must.
The electric safety of the machine is only guaranteed if duly connected to a network with proper earth connection.

This safety measure must be guaranteed. If you have any doubts, have your connection checked by an electrical engineer.
It is strictly forbidden to use adapters, multiple plugs or extension power cords.

Before operating the machine make sure that the water connection is properly installed and that the water tap is open.

New Machine Installation Checklist

Installation

☐	**Water hardness**	Check water hardness **(6 – 8 °dH)**
☐	**Water filter**	Install water filter if necessary
☐	**Connect machine**	Connect water and power
☐	**Fill up coffee beans**	
☐	**Fill up instant products**	Container 1 = Chocolate / Container 2 = Milk
☐	**Start-up machine**	Switch on and fill machine water system

Configuration

☐	**Time / Date**	"Operator" → "Time & Date"
☐	**Language**	Configuration: "Service" → "Installation"
☐	**Coffee Shortage**	
☐	**Waste Bucket**	
☐	**Water filter**	
☐	**Mix ratio Instant**	
☐	**Container Capacity**	
☐	**Assign Recipes**	Assign Recipes & Shift functions to keys

Calibration

☐	**Chocolate Drinks**	Preparation of 2 chocolate drinks
☐	**Milk Drinks**	Preparation of 2 milk drinks
☐	**Coffee temperature**	Measure coffee temperature **80-90°C**, set slider (2°C/step)
☐	**Coffee water flow**	Prepare 3 cups of coffee. Measure flow speed of 4th cup.
☐	**Espresso water flow**	Prepare 3 cups of espresso. Measure flow speed of 4th cup.
☐	**Grinder 1 Coarseness**	Adjust in "Service" → "Ingredient" → "Grinder 1 Servo" Coffee water flow: 120ml = 15-20s **(6-8ml/s)**
☐	**Grinder 2 Coarseness**	Adjust in "Service" → "Ingredient" → "Grinder 2 Servo" Espresso water flow: 40ml = 12-15s **(2.5-3.5ml/s)**
☐	**Grinder 1 & 2**	Calibrate in "Service" → "Ingredient" → "Grinder x Calib." Take 3 measurements: **+/- 0.5g**
☐	**Ingredients 1 & 2**	Calibrate in "Service" → "Ingredient" → "Instant x Calib."

Final Work / Final Configuration

☐	**Drink Settings**	Change drink settings (Cup size, temperature,…)
☐	**Drink Preparation**	Prepare test drinks: Each drink should be tested
☐	**Customer satisfaction**	All customer wishes fulfilled, Customer satisfied?

Customer / Staff Training

☐	**General Use**	
☐	**Refill ingredients**	Refill ingredients & Reset Waste/Instant/No Beans
☐	**Daily Cleaning**	
☐	**Weekly Cleaning**	

Operation Steps

The water system of the machine is empty at delivery. Fill it before operating the machine.

1. Filling water system:
- Press a drink button
- If water flows out of the outlet, you could stop by pressing a drink button again.

Water will come out of the outlet, max. 0.2 l

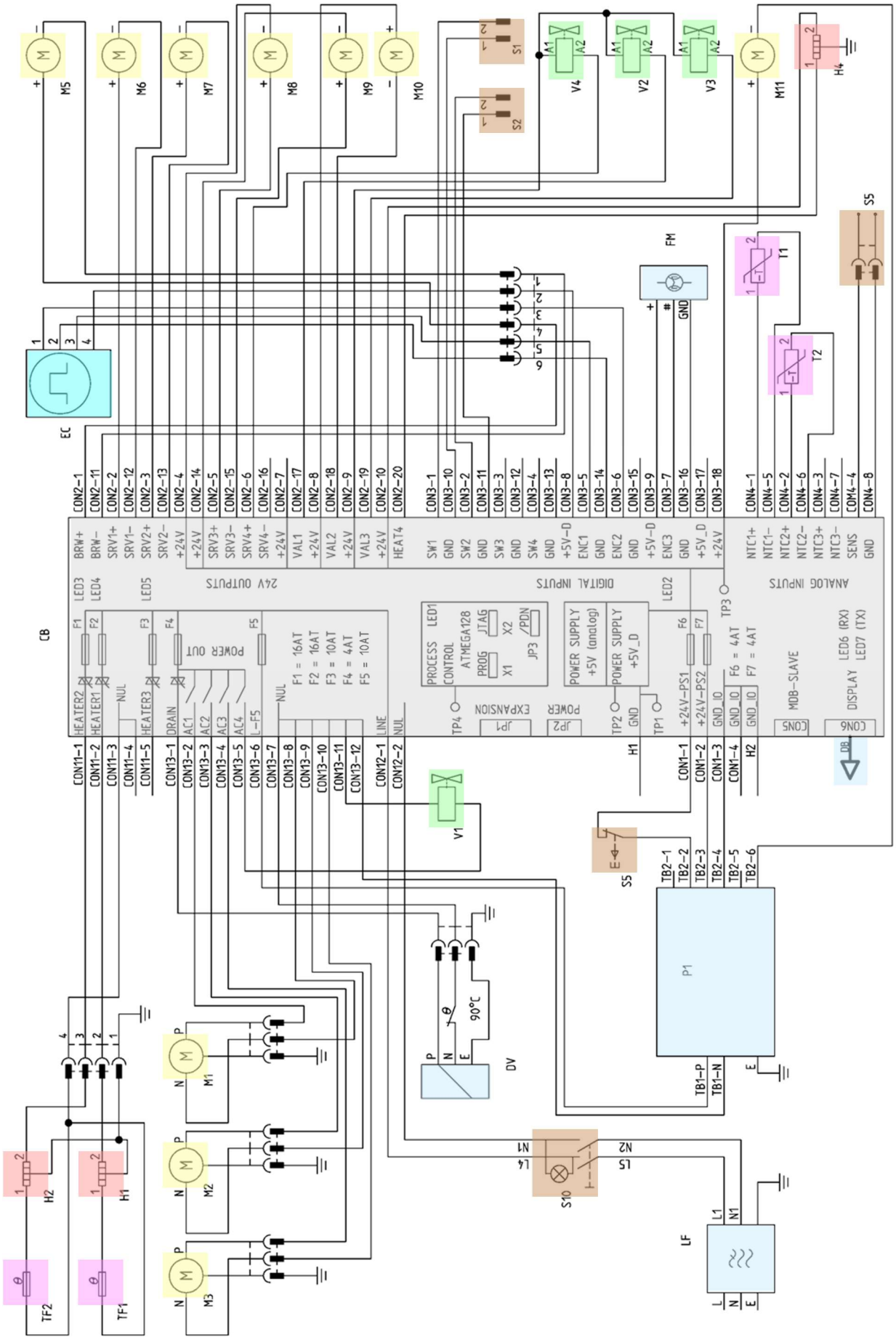
2. Brewing speed:
- Measure the pump running time during a Coffee.
- Flow calculation: Divide cup volume (e.g. 120ml) through the measured pump running time (e.g. 15sec) 120ml/15sec. = 8ml/sec.
- For brew speed high = good
- For brew speed normal or low = adjust grinder coarseness ➔„Service ingredient" ➔„Ingredient grinder1 servo" (grinder coarseness finer = brew speed slower)

3. Calibrate Instant
- Prepare scale and a container to catch the ingredients.
- Enter the service menu (see program diagram)
- Move forward to „service ingredients"
- Enter menu
- Move forward to „calibrate ingredients grinder 1"
- Calibrate the grinder following the display instructions
- Move forward to "calibrate ingredients grinder 2"
- Calibrate the grinder following the display instructions
- Move forward to „calibrate drink ingredients"
- Calibrate the ingredient motors following the display instructions

4. Calibrate Coffee:
- Make sure brew speed is right, before calibrating coffee
- Prepare scale and a container to catch the grinded coffee
- Run grinder calibration (➔"Service Ingredient") two times (catch the grinded coffee below the brew unit)
- Measure the weight of the third calibration (catch the grinded coffee below the brew unit)
- Set amount and confirm with ↵
- repeat process until difference is within +/- 0.5g

5. Machine temperature:
- Make sure brew speed is right, before setting the temperature
- Measure water temperature straight at the outlet, during coffee brewing
- Set machine temperature (bar), that coffee and temperature is between 82°C to 87°C (precise temperature depends to the coffee which is used)

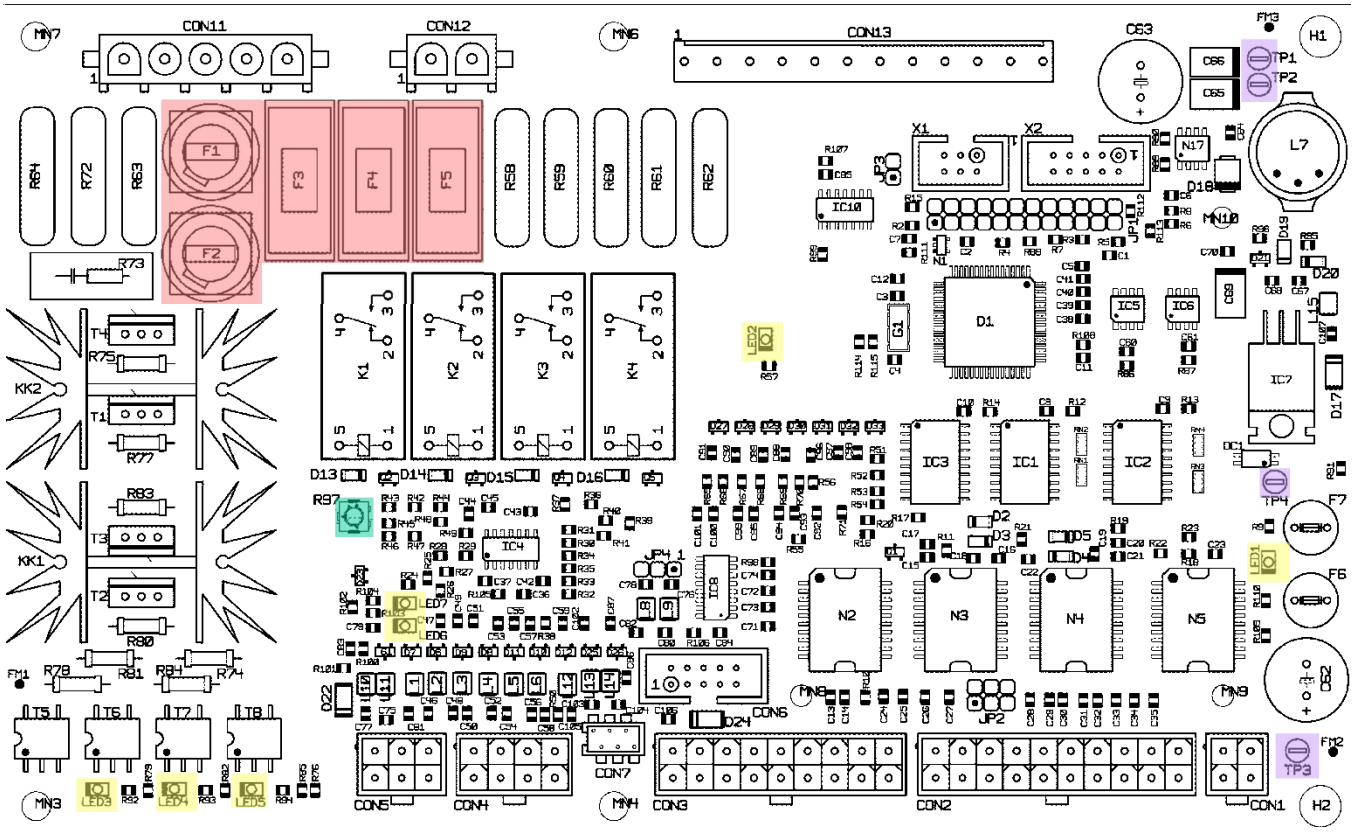
3 Electrical Connection Diagram



3.1 Description of the Electrical Connection Diagram

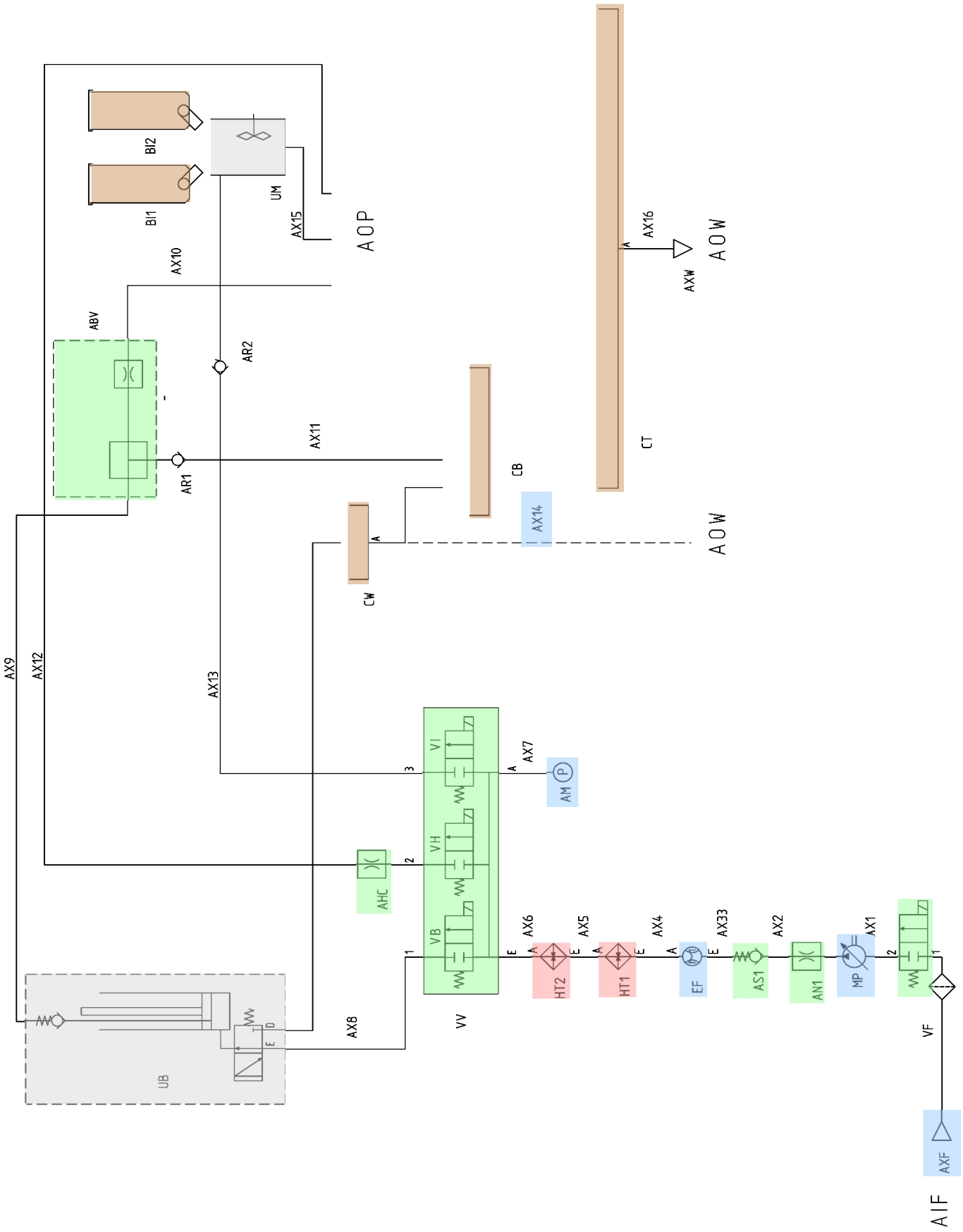
Pos.	
CB	Control Board 2
DB	Connector display board
DV	Drain valve
EC	Encoder
FM	Flow meter
H1	Thermo block 1
H2	Thermo block 2
H4	Valve block
LF	Grid filter
M1	Grinder motor 1
M2	Grinder motor 2
M3	Pump motor
M5	Brewer motor
M6	Servo motor 1
M7	Servo motor 2
M8	Ingredient motor 1
M9	Ingredient motor 2
M10	Mixer motor
M11	Fan motor
P1	Power supply 230V AC/24VDC
S1	Spare digital inputs
S2	Spare digital inputs
S5	Door switch
S5	Sensor waste water
S10	Main switch
T1	Temperature sensor thermo block 1
T2	Temperature sensor thermo block 2
TF1	Thermo fuse heater1
TF2	Thermo fuse heater2
V1	Hot water valve
V2	Inlet valve
V3	Brewer valve
V4	Instant valve

3.2 Control Board Top View



LED's			
Pos.	**Name**	**Function**	**Coulour**
LED1	RUN	System running 1Hz interrupt	yellow
LED2	FLOW METER	Flow meter impulse (water flow)	yellow
LED3	HEATER 1	Heater 1 ON	yellow
LED4	HEATER 2	Heater 2 ON	yellow
LED5	HEATER 3	Heater 3 ON	yellow
LED6	RXD	Serial data receiving	yellow
LED7	TXD	Serial data transmitting active	yellow
Potentiometer			
Pos.	**Name**	**Function**	
R97	DRIP TRAY	Adjusting drip tray sensor	
Test Points			
Pos.	**Name**	**Function**	**Level**
TP1	GND	System ground	0 VDC
TP2	+5V_D	+5VDC supplying logic points	+5.0 VDC
TP3	+24V	+24VDC supplying power output	+24 VDC
TP4	TEST	Test output	5V Logic
Fuses			
Pos.	**Name**	**Function**	**Value**
F1	HEATER 2	Power supply heater 2	16AT
F2	HEATER 1	Power supply heater 1	16AT
F3	HEATER 3	Not in use	10AT
F4	Miscellaneous	Drain valve, pump, grinder, inlet valve	4AT
F5	Power supply	Power supply 24V DC	10AT

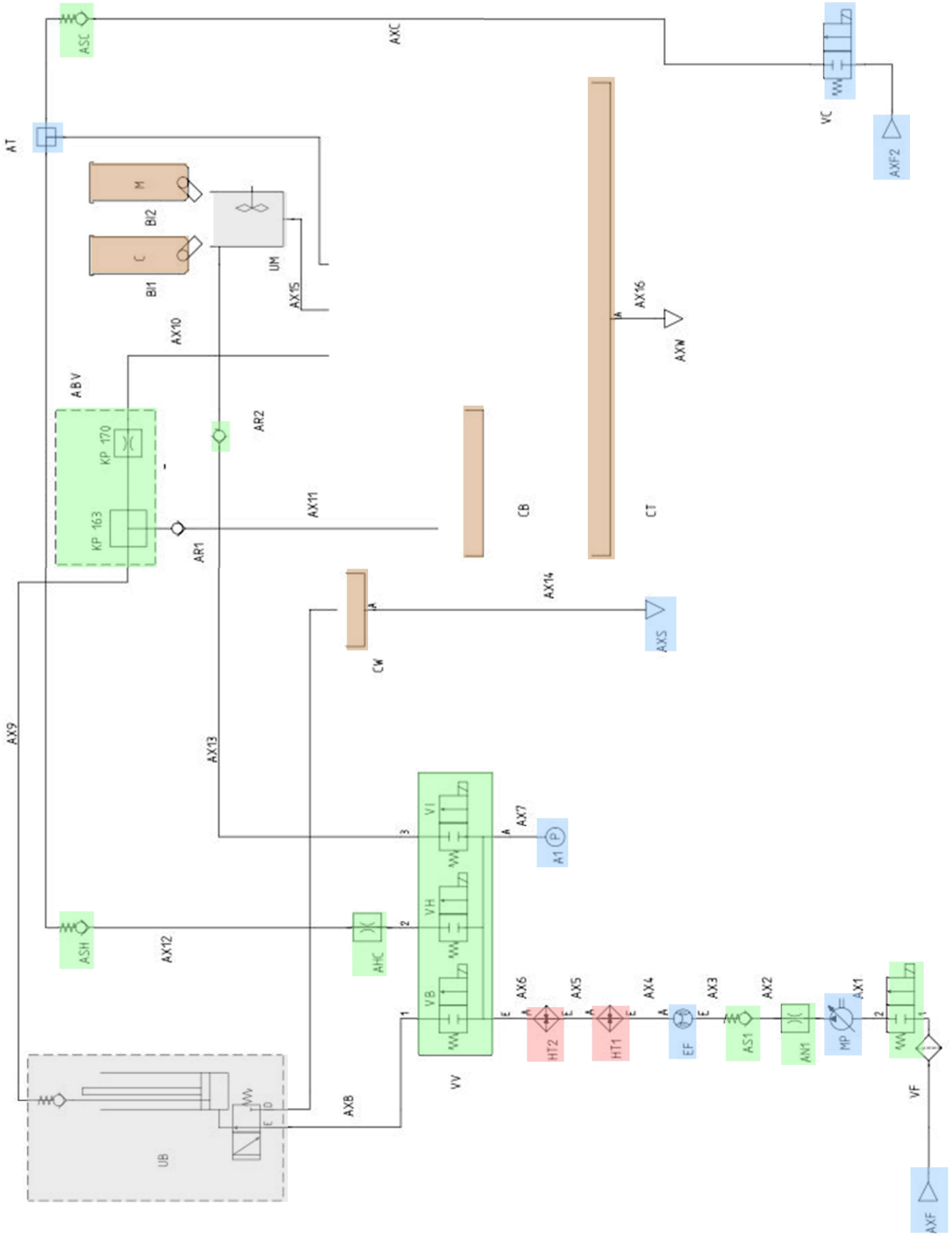
3.3 Water Flow Diagram Chassis C14C



3.4 Description of the Water Flow Diagram

Pos.	Description	Comments
AXF	Water connection	¾" Gas
AM	Pressure manometer	-1 to 24 bar
BI1	Ingredient container 1	
BI2	Ingredient container 2	
CB	Waste bucket	
CT	Drip tray	
CW	Waste water container	
AX14	Waste water connection	Ø 13 mm
AN1	Nozzle	0.7 mm
AHC	Hot water smoothing	
EF	Flow meter	⅛" outside
HT1	Thermo block	1400W
HT2	Thermo block	1400W
MP	Pump	
UB	Brewing unit	
ABV	Y-piece with nozzle coffee outlet	
UM	Mixer	
VF	Inlet valve	180°
AS1	Clap valve water supply	
VV	3 valve module (valve block)	
AR1	Clap valve	air venting
AR2	Clap valve	mixer unit back-flow

3.5 Water Flow Diagram Chassis C14C (with cold water option)



3.6 Description of the Water Flow Diagram (with cold water option)

Pos.	description	Comments
AXF	Water connection	¾" Gas
AXF2	Water connection for cold water	¾" Gas
A1	Pressure manometer	-1 to 24 bar
BI1	Ingredient container 1	
BI2	Ingredient container 2	
CB	Waste bucket	
CT	Drip tray	
CW	Waste water container	
AXS	Waste water connection	Ø 13 mm
AN1	Nozzle	0.7 mm
AHC	Hot water smoothing	
EF	Flow meter	⅛" outside
HT1	Thermo block	1400W
HT2	Thermo block	1400W
MP	Pump	
UB	Brewing unit	
ABV	Y-piece with nozzle coffee outlet	
UM	Mixer	
VF	Inlet valve	180°
AS1	Clap valve water supply	
VV	3 valve module (valve block)	
AR1	Clap valve	air venting
AR2	Clap valve	mixer unit back-flow
ASH	Clap valve hot water	
ASC	Clap valve cold water	
AT	Y-piece water coupler	
VC	Cold water valve	Valve of e.g. cold water dispenser (external)

4 Declaration of Conformity

AEQUATOR
Swiss made coffee machines

EU DECLARATION OF CONFORMITY
EU KONFORMITÄTSERKLÄRUNG
UE DÉCLARATION DE CONFORMITÉ

Product model/product:
Produktmodell/ Produkt:
Modèle de produit/produit:

COFFEE MACHINE F14
Brasil, Honduras, Guatemala, Venezuela, Rio, Costa Rica, Sao Paulo, Salvador, Ecuador, Mexico, Peru

Name and address of the manufacturer or his authorised representative:
Name und Anschrift des Herstellers oder seines Bevollmächtigten:
Nom et adresse du fabricant ou de son mandataire:

AEQUATOR AG
St. Gallerstrasse 229
CH-9320 Arbon
SWITZERLAND

This declaration of conformity is issued under the sole responsibility of the manufacturer.
Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.

Object of the declaration:
Gegenstand der Erklärung:
Objet de la déclaration :

Machine for dispensing hot drinks
Maschine zur Ausgabe heisser Getränke
Machine pour la distribution de boissons chaudes

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der Union:
L'objet de la déclaration décrit ci-dessus est conforme à la législation d'harmonisation de l'Union applicable:

EMC Directive 2014/30/EU
LVD Directive 2014/35/EU
RoHS Directive 2011/65/EU

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:
Angabe der einschlägigen harmonisierten Normen, die zugrunde gelegt wurden, oder Angabe der anderen technischen Spezifikationen, in Bezug auf die die Konformität erklärt wird:
Références des normes harmonisées pertinentes appliquées ou des autres spécifications techniques par rapport auxquelles la conformité est déclarée:

EN 50581:2012	EN 60335-1:2012
EN 55014-1:2015	EN 60335-75:2012
EN 55014-2:2015	EN 61000-3-2:2014
EN 55022:2010	EN 61000-3-3:2014

Signed for and on behalf of:
Unterzeichnet für und im Namen von:
Signé par et au nom de:

Arbon, 14.04.2016

Marcel Lendenmann, CEO

5 Your Service Partner