MAGIC ROMA
MAGIC FAMILY
MAGIC COLLECTION
MAGIC DE LUXE 1/2
MAGIC DE LUXE RD
MAGIC COMFORT
MAGIC COMFORT RD
MAGIC COMFORT+
MAGIC COMFORT+ RD

SERVICE MANUAL

Rev. 5

Saeco

Table of contents

CHAPTER 1
INTRODUCTION

1. Documents required

The following documents and requirements are necessary to qualify for an authorised repair.

- Service manual
- Operating instructions where available

2. Tools

In addition to an electrical workshop, the following standard tools are necessary:

	Description	Comments
1	Special screwdriver (Pozi)	Size: PZ1
1	Special screwdriver (Pozi)	Size: PZ2
1	Special screwdriver (Torx)	Size: T10
1	Temperature measuring device	Temperature range > 150ºC Suitable for point measurements

3. Material

Description	Comments	Brand
Heat conductive paste	Temperature resistance ≥ 200°	User's choice
Bolt adhesive	Temperature resistance ≥ 200°	User's choice
Descaler		Saeco
Grease solvent		User's choice
Silicone grease (food safe)		Saeco

4. Safety instructions

All prescriptions and regulations in force regarding the repair of electrical equipment must be observed!

The machine must be disconnected from the main power supply before performing repair work. Switching the machine off is not an adequate measure.

The Royal coffee machine is classified under Protection Class 1. Protective devices must be tested once the repair work has been completed.

5. Overview of product range

Magic de luxe 2

Magic Comfort

Magic Comfort +

Magic Roma RD

Magic de luxe RD

Magic Comfort RD

Magic Comfort + RD

TYPE	Pre-grinding	Pre-brewing	Powder coffee compartment	Rapid steam	Display
Roma *		x			Dial control
Family	x	x			6 buttons
Collection1			x		8 buttons
Collection2	x	x	x		6 buttons
De luxe1			x		8 buttons
De luxe2	x	x	x		6 buttons
De luxe RD*	x	x	x		6 buttons
Comfort	x	x	x		x
Comfort RD*	x	x	x		x
Comfort+	x	x	x	Ph**	x
Comfort+ RD*	x	x	x	Ph**	x

* RD: Redesign
**Ph: Pipe heating

CHAPTER 2
TECHNICAL DATA

1. Technical data (Magic Family, Roma, Roma RD)

Magic (Roma)	
Technical data	
Power supply/output:	**230V 50Hz 1250W**
Safety system:	**170°C Safety thermostat for boiler**
Temperature monitoring:	**KTY Temperature sensors transmit respective temperatures to electronic system**
Continuous flow thermoblock:	**Coffee and hot water boiler (1090 W)**
Pump:	**Ulka reciprocating piston pump with angle connector and thermostat 48 W, 230V, 50 Hz, Type EX5, 20 l/h**
Safety valve:	**Conventional safety valve connected to pump**
Water filter:	**Installed in machine in front of the turbine and pump.**
Gearmotor:	**Direct current, 30 - 35 V**
Cup warmer/Gear resistor:	**Approx. 437W / 130Ω (only activated when gears are operational)**
Grinder (conical):	**Plastic grinding screw, galvanised steel grinding cone and grinding disc**
Motor:	**260 V Direct current**
Doser:	**230 V - Magnet coil**
Power consumption:	**During heating - approx. 4.5 A**
Pump pressure:	**Max. 15 bar**
Dimensions W x D x H in mm:	**330/385/395**
Weight:	**Approx. 14 kg**
Coffee bean container capacity:	**Approx. 300g**
Water tank capacity:	**Approx. 2.4 l max.**
Boiler capacity:	**Approx. 1.0 ccm, 10 ml volume**
De-aeration time:	**Approx. 1 - 2 sec. for initial start-up**
Heating time:	**Approx. 80 sec. with water at 10°C to operating temperature**
Re-heating time:	**None due to boiler**
Steam heating time:	**From coffee temperature to 127°C - Approx. 50 sec.**
Coffee dispensing temperature:	**Approx. 86° C**
Grinding time:	**Initial grinding with completely empty machine: Approx. 15 sec. / subsequent grinding: approx. 5.5 sec.**
Time to make expresso:	**Approx. 28 sec. for 50 ml**
Time to make cup of coffee:	**Approx. 40 sec. for 100 ml**

2. Technical data (Magic Collection/old/new/de luxe1)

Magic (Collection/old/new/de luxe1)	
Technical data	
Power supply/output:	**230V 50Hz 1250W**
Safety system:	**170°C Safety thermostat for boiler**
Temperature monitoring:	**KTY Temperature sensors transmit respective temperatures to electronic system**
Continuous flow thermoblock:	**Coffee and hot water boiler (1090 W)**
Pump:	**Ulka reciprocating piston pump with angle connector and thermostat 48 W, 230V, 50 Hz, Type EX5, 20 l/h**
Safety valve:	**Conventional safety valve connected to pump**
Water filter:	**Installed in machine in front of the turbine and pump.**
Gearmotor:	**Direct current, 30 - 35 V**
Cup heater/Gear resistor:	**Approx. 437W / 130Ω**
Grinder (conical): **Motor:**	**Plastic grinding screw, galvanised steel grinding cone and grinding disc** **Direct current, 260 V**
Doser:	**230 V - Magnet coil**
Second Doser:	**Doser for powder coffee, 230 V - Magnet coil**
Power consumption:	**During heating - approx. 4.5 A**
Pump pressure:	**Max. 15 bar**
Dimensions W x D x H in mm:	**330/385/395**
Weight:	**Approx. 14 kg**
Coffee bean container capacity:	**Approx. 300g**
Water tank:	**Approx. 2.4 l max.**
Boiler - Capacity:	**Approx. 1.0 ccm, 10 ml volume**
De-aeration time:	**Approx. 1 - 2 sec. for initial star-up**
Heating time:	**Approx. 80 sec. with water at 10°C**
Re-heating time:	**None due to boiler**
Steam heating time:	**From coffee temperature to 127°C - Approx. 50 sec.**
Coffee dispensing temperature:	**Approx. 86° C**
Grinding time:	**Initial grinding with completely empty machine: Approx. 15 sec. / subsequent grinding: approx. 5.5 sec.**
Time to make expresso:	**Approx. 28 sec. for 50 ml**
Time to make cup of coffee:	**Approx. 40 sec. for 100 ml**

3. Technical data (Magic de luxe2, Comfort, Comfort+)

Magic (de luxe2, Comfort, Comfort+)	
Technical data	
Power supply/output:	**230V 50Hz 1250W**
Safety system:	**170°C Safety thermostat for boiler**
Temperature monitoring:	**KTY Temperature sensors transmit respective temperatures to electronic system**
Continuous flow thermoblock: **Rapid steam system (only Comfort +)**	**Coffee and hot water boiler (1090 W)** **Pipe heating (1090 W) for steam dispensing**
Pump:	**Ulka reciprocating piston pump with angle connector and thermostat** **48 W, 230V, 50 Hz, Type EX5, 20 l/Std, 15 bar**
Safety valve:	**Conventional safety valve connected to pump**
Water filter:	**Installed in machine in front of the turbine and pump.**
Gearmotor:	**Direct current, 30 - 35 V**
Cup heater/Gear resistor:	**Approx. 437W / 130Ω**
Grinder (conical): **Motor:**	**Plastic grinding screw, galvanised steel grinding cone and grinding disc** **260 V Direct current**
Doser:	**Coffee dose adjustable by means of lever (6 - 9g) outside housing** **230 V - Magnet coil**
Second doser:	**Doser for powder coffee, by means of measuring spoon**
Power consumption:	**During heating - approx. 4.5 A** **Standby - Approx. 0.04 A**
Pump pressure:	**Max. 15 bar**
Dimensions W x D x H in mm:	**385/450/395 Magic Comfort / de luxe 2 silver** **330/385/395 Magic de luxe 2**
Weight:	**Approx. 14 kg**
Coffee bean container capacity:	**Approx. 300g**
Water tank capacity:	**Approx. 2.4 l max.**
Boiler - Capacity:	**Approx. 1.0 ccm, 10 ml volume**
De-aeration time:	**Approx. 1 - 2 sec. for initial start-up**
Heating time:	**Approx. 80 sec. with water at 10°C**
Re-heating time:	**None due to boiler**
Steam heating time:	**From coffee temperature to 127°C - Approx. 50 sec.**
Coffee dispensing temperature:	**Approx. 86° C**
Grinding time:	**Initial grinding with completely empty machine: Approx. 15 sec. / subsequent grinding: approx. 5.5 sec.**
Time to make expresso:	**Approx. 28 sec. for 50 ml**
Time to make cup of coffee:	**Approx. 40 sec. for 100 ml**

4. Technical data (Magic de luxe RD, Comfort RD, Comfort+RD)

Magic (de luxeRD, Comfort RD, Comfort+RD)	
Technical data	
Power supply/output:	**230V 50Hz 1250W**
Safety system:	**170°C Safety thermostat for boiler**
Temperature monitoring:	**KTY Temperature sensors transmit respective temperatures to electronic system**
Continuous flow thermoblock:	**Coffee and hot water boiler (1090 W)**
Rapid steam system (Comfort + RD)	**Pipe heating (1090 W) for steam dispensing**
Cup warmer:	**PTC - Heat resistance approx. 30 W at 60°C**
Pump:	**Ulka reciprocating piston pump with angle connector and thermostat 48 W, 230V, 50 Hz, Type EX5, 20 l/Std, 15 bar**
Safety valve:	**Defibration valve max. (17 bar)**
Water filter:	**Installed in machine in front of the turbine and pump and at the water tank outlet.**
Gearmotor:	**Direct current, 30 - 35 V**
Gear resistor:	**Second heating by boiler approx. 437W / 130Ω**
Grinder (conical): **Motor:**	**Plastic grinding screw, galvanised steel grinding cone and grinding disc 260 V Direct current**
2nd Doser:	**Coffee dose adjustable by means of lever (6 - 9g) outside housing 230 V - Magnet coil**
2. Second doser:	**Doser for powder coffee, by means of measuring spoon**
Power consumption:	**During heating - approx. 4.5 A Standby - Approx. 0.04 A**
Pump pressure:	**Max. 15 bar**
Dimensions W x D x H in mm:	**385/450/395**
Weight:	**Approx. 14 kg**
Coffee bean container capacity:	**Approx. 300g**
Coffee bean container capacity:	**Approx. 2.4 l max.**
Boiler - Capacity:	**Approx. 1.0 ccm, 10 ml volume**
De-aeration time:	**Approx. 1 - 2 sec. for initial star-up**
Heating time:	**Approx. 80 sec. with water at 10°C**
Re-heating time:	**None due to boiler**
Steam heating time:	**From coffee temperature to 127°C - Approx. 50 sec.**
Coffee dispensing temperature:	**Approx. 86° C**
Grinding time:	**Initial grinding with completely empty machine: Approx. 15 sec. / subsequent grinding: approx. 5.5 sec.**
Time to make Expresso:	**Approx. 28 sec. for 50 ml**
Time to make cup of coffee:	**Approx. 40 sec. for 100 ml**

CHAPTER 3
OPERATION

1. Operation (Magic Roma, Roma RD)
1.1. Operating instructions (quick reference)

	Action	Comments	HS LED	Temp. LED	Steam LED
	Getting started				
1	Unpack machine.	Check for damage.			
2	Fill water tank.				
3	Fill coffee beans container.				
4	Connect mains plug.				
5	Turn on main switch.		On	Flashes	
6	De-aerate water circuit.	Open hot water pressure valve until water flows.	On	Flashes	
		Heating stage (approx. 80 sec.)	On	Flashes	
		Ready	On	On	
	Making coffee				
7	Select coffee quantity using the control dial.	Depending on cup size.	On	On	
8	Place cup under dispenser.		On	On	
9	Press start button (coffee button).	Press once = 1 cup of coffee.	On	Flashes once	
		Press twice = 2 cups of coffee.		Flashes twice	
	Dispensing steam				
10	Press steam button.	Heating stage.	On		Flashes
11		Ready	On		On
12	Steam dispensing Open HWS valve	To warm coffee. To froth milk.	On		On
13	Press steam button / deactivate steam function.	Cooling stage (can be accelerated by de-aerating)	On	Flashes	Flashes
		Ready (to make coffee)	On	On	

Cleaning	
Empty dregs drawer	Storage capacity of 30 tablespoons (no need to empty)
Empty drip tray	After 30 servings
Clean water tank.	As required.
Clean coffee bean container.	As required.
Clean the housing.	As required.
Rinse brewing unit	1 x per week
Clean brewing unit and lubricate Clean filer	1 x per month
Descaling	Depending on water hardness.

Descaling		
Water hardness	**Descaling frequency**	**Boiler – J**
Very hard water (over 21°dH)	About every 4 weeks	About 2 - 4 weeks
Hard water (14°-21°dH)	About every 6 weeks	About 4 - 6 weeks
Medium water (15°-21°dH)	About every 2 months	About every 2 months
Soft water (up to 7°dH)	About every 3 months	About every 3 months
Soft water (0 to 3°dH)	About every 6 months	About every 6 months
	With Aqua Prima always descale at subsequent interval.	

Descaling procedure:

1. Place Saeco descaler into fresh water tank.
2. Fill with about one litre of hot water.
3. Make 2-3 coffees to descale coffee circuit.
4. Remove the remaining descaler mixture in cupfuls via the hot water pressure valve in intervals of about 5 – 10 min (turn machine off during this process).
5. Rinse the machine with about 2 litres of fresh water. Make 2-3 coffees to rinse coffee circuit (brewing unit filer(s) must be cleaned before descaling).

Troubleshooting		
Faul	**Possible cause**	**Remedy**
Machine does not function	No power	Check mains plug / mains circuit breaker / Ensure machine door is closed.
Brewing unit does not turn on (alarm LED flashes)	Brewing unit not properly installed or not closed.	Install brewing unit correctly.
	Coffee grinds container not properly installed.	Install brewing unit correctly.
Brewing unit does not turn on (alarm LED on)	Coffee bean container is empty.	Fill coffee beans container.
	Water tank is empty.	Fill water tank.
Brewing unit does not turn on (steam LED flashes)	After steam dispensing the system is not or is insufficiently de-aerated.	De-aerate machine.
No water / steam	Air in the circuit.	De-aerate
	Steam nozzle blocked.	Free opening using a thin needle.
The coffee flows too quickly	Beans ground too coarsely.	Select lower grinding level; e.g. change from 5 to 3.
The coffee flows too slowly	Beans ground too finely.	Select higher grinding level; e.g. change from 5 to 7.
Coffee has no froth.	Unsuitable coffee blend.	Change brand of coffee.
	Coffee is no longer freshly roasted.	Use fresh coffee.
	Beans ground too coarsely or finely.	Change grinding level.
Longer heating time or less hot water.	The machine is calcified.	Decalcify machine.
The brewing unit cannot be removed.	The brewing unit is not in home position.	Turn machine on, close service door and check dregs drawer. (the brewing unit goes automatically to home position)

2. Operation (Magic Collection new, Magic de luxe 2, Magic de luxe RD)

2.1. Operating instructions (quick reference)

	Action	Comments	Temperature LED
	Getting started		
1	Unpack machine.	Check for damage.	
2	Fill water tank.		
3	Fill coffee beans container.		
4	Connect mains plug.		
5	Turn on main switch.		OFF
6	De-aerate water circuit.	Open hot water pressure valve until water flows.	OFF
		Heating stage (approx. 80 sec.)	OFF
		Ready	ON
	Making coffee		
7	Programme coffee quantity for each selection button. • Expresso lungo • Coffee • Expresso	Depending on cup size. Programme by keeping the coffee selection button pressed until the desired quantity is reached.	ON
8	Place cup under dispenser.		ON
9	Elect programme and press appropriate button.	Press once = 1 cup of coffee. Press twice = 2 cups of coffee. (The button LED flashes once or twice during brewing depending on selection) Press button again to terminate.	ON
	Dispensing steam		
10	Press steam button.	Heating stage.	OFF
11		Ready	ON
12	Steam dispensing Open HWS valve	To warm coffee. To froth milk.	ON
13	Press steam button / deactivate steam function.	Cooling stage (can be accelerated by de-aerating)	FLASHES Over-heating
	De-aerate		FLASHES
		Ready (to make coffee)	ON

Cleaning	
Empty dregs drawer	Storage capacity of 30 tablespoons (Reset - empty only when indicated)
Empty drip tray	After 30 servings
Clean water tank.	As required.
Clean coffee bean container.	As required.
Clean the housing.	As required.
Rinse brewing unit	1 x per week
Clean brewing unit and clean oil filer(s).	1 x per month
Descaling	Depending on water hardness.

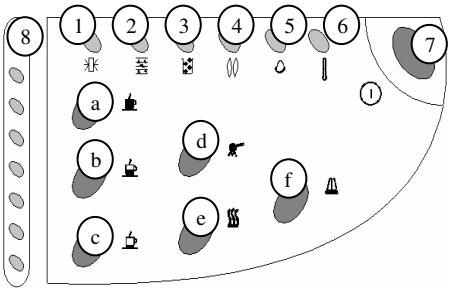
Descaling procedure:

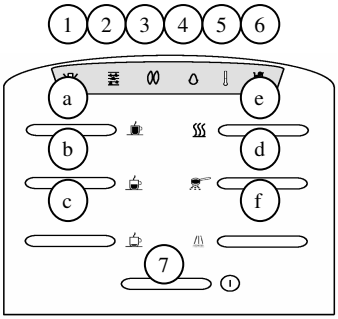
Automatic:
1. Place Saeco descaler into fresh water tank.
2. Fill with about one litre of hot water.
3. Make 2-3 coffees to descale coffee circuit. (Activate powder coffee button.)
4. Access User Menu. (See Section 2.2 S5 for menu access)
5. Open the HWS valve. The descaling programme runs automatically.
6. Rinse the machine with about 2 litres of fresh water (via brewing unit and HWS valve).

Reset descaling indicator: Keep the Steam button pressed for about 5 seconds.

Troubleshooting		
Faul/Indicator	**Possible cause**	**Remedy**
Machine does not function.	No power	Check: mains plug / mains circuit breaker /door is closed.
Automatic coffee dispensing does not start:		
LED1 for brewing unit lights up.	Brewing unit not properly installed or not closed.	Install brewing unit correctly.
LED3 for grinds container lights up.	Grinds container full	Empty grinds container
LED3 for grinds container flashes.	Coffee grinds container not properly installed.	Install brewing unit correctly
LED4 Coffee Beans Low lights up.	Coffee bean container is empty.	Fill coffee beans container.
LED4 Coffee Beans Low flashes	Grinder obstructed.	Clean grinder.
LED5 Water Low lights up	Water tank is empty.	Fill water tank.
LED5 Water Low flashes.	Pump doesn't draw water.	De-aerate
LED6 Temperature indicator flashes.	After dispensing steam, the system is not de-aerated.	De-aerate machine.
Only water is dispensed instead of coffee.	Coffee powder selection button is pressed, but no coffee powder is dispensed.	Add one level measure of coffee powder.
No water / steam.	Steam nozzle blocked.	Free opening using a thin needle.
The coffee flows too quickly.	Beans ground too coarsely.	Select lower grinding level; e.g. change from 5 to 3.
The coffee flows too slowly.	Beans ground too finely.	Select higher grinding level; e.g. change from 5 to 7.
The coffee is cold.	The cups are cold.	Pre-heat cups.
	Operating temperature has not been reached.	Wait until ready LED stays on.
Coffee has no froth.	Unsuitable coffee blend.	Change brand of coffee.
	Coffee is no longer freshly roasted.	Use fresh coffee.
	Beans ground too coarsely or finely.	Change grinding level.
Longer heating time or less hot water.	The machine is calcified.	Decalcify machine.
The brewing unit cannot be removed.	The brewing unit is not in home position.	Turn machine on, close service door and check dregs drawer. (the brewing unit goes automatically to home position)

2.2. User programme (Magic Collection new, Magic de luxe 2, Magic de luxe RD)





Led	(RD)	Indicator/Function	Light on	Light flashing
1	1	Brewing unit	Not detected	Blocked
2	2	Descaling	Need to descale	
3	6	Grinds container	Empty	Insert
4	3	Coffee beans low.	Fill	Blocked
5	4	Water low.	Fill	De-aerate
6	5	Temperature/Standby	Ready for operation	Over-heating
7	7	Standby	Machine ON	Standby
8		Coffee programme advance		
Button				
a		Expresso lungo		Activated
b		Coffee		Activated
c		Expresso		Activated
d		Powder coffee	Activated	
e		Cup warmer	Activated	
f		Steam	Activated	

The table below indicates the various settings and programmes which can be selected through the user programme options.

Selection entry: A selection is entered by pressing simulaneously the following button combination.

Magic deluxe	**Expresso**	**Steam**	**HS/Standby**
Magic deluxe RD	**Coffee**	**Steam**	**HS/Standby**

Function	Button	Setting Magic deluxe	Setting Magic deluxe RD	LED indicator
Water hardness Descaling indicator	Expresso lungo	Very hard water 80l Hard water 150l Medium hard water 300l Soft water 500l	Soft water 500l Medium hard water 300l Hard water 150l Very hard water 80l	Led:1 Led:1+2 Led:1+2+3 Led:1+2+3+4
Pre-grinding	Cup warmer	ON / OFF (lights up = activated)		Cup warmer LED
Pre-brewing Magic deluxe	Coffee	ON / OFF (lights up = activated)		Coffee button LED
Pre-brewing Magic deluxe RD	Expresso	ON / OFF (lights up = activated)		Expresso button LED

3. Operation (Magic Comfort, Magic Comfort RD)

3.1. Operating instructions (quick reference)

	Action	Comments	Display
	Getting started		
1	Unpack machine.	Check for damage.	
2	Fill water tank.		
3	Fill coffee beans container.		
4	Connect mains plug.		
5	Turn on main switch.		Self test/ heating
6	De-aerate water circuit.	Open tea nozzle until water flows.	Heating
		Heating stage (approx. 80 sec.)	Heating
		Ready	Select product Ready for operation
	Making coffee		
7	Programme coffee quantity for each selection button. • Expresso lungo • Coffee • Expresso	Depending on cup size. Programme by keeping the coffee selection button pressed until the desired quantity is reached.	Quantity programme
8	Place cup under dispenser.		Select product Ready for operation
9	Select programme and press appropriate button.	Press once = 1 cup of coffee Press twice = 2 cups of coffee.	1 Coffee 2 Coffees
	Dispensing steam		
10	Press steam button.	Heating stage.	Steam Heating
11		Ready	Steam Ready for operation
12	Steam extraction. Open HWS valve	To warm coffee. To froth milk.	Steam
13	Press steam button / deactivate steam function.	Cooling stage (can be accelerated by de-aerating)	Overheating.
	De-aerate		Hot water Overheating.
		Ready (to make coffee)	Ready for operation

Cleaning	
Empty dregs drawer	Storage capacity of 30 tablespoons (Reset - empty only when indicated)
Empty drip tray	After 30 servings
Clean water tank.	As required.
Clean coffee bean container.	As required.
Clean the housing.	As required.
Rinse brewing unit	1 x per week
Clean brewing unit and Clean oil filer	1 x per month
Descaling	Depending on water hardness.

Descaling procedure:

Automatic:
1. Place Saeco descaler into fresh water tank.
2. Fill with about one litre of hot water.
3. Make 2-3 coffees to descale coffee circuit. (Activate powder coffee button.)
4. Confirm descaling item with Enter.
5. Open the HWS valve. The descaling programme runs automatically.
6. Rinse the machine with about 2 litres of fresh water. (via brewing unit and HWS valve).

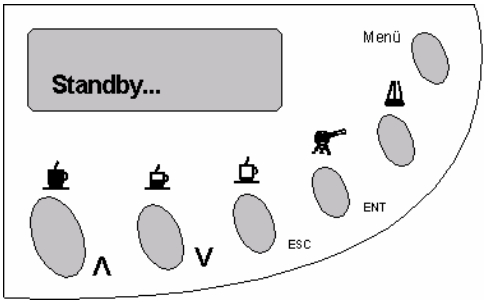
Reset descaling indicator: In descaling item indicator.

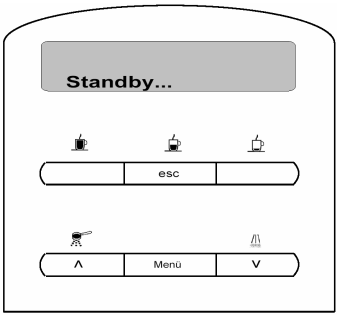
Troubleshooting		
Faul/Indicator	**Possible cause**	**Remedy**
Machine does not function	No power	Check: mains plug / mains circuit breaker / door is closed.
Automatic coffee dispensing does not start:		
BREWING UNIT NOT DETECTED	Brewing unit not properly installed or not closed.	Install brewing unit correctly.
GRINDS CONTAINER NOT DETECTED	Coffee grinds container not properly installed.	Install brewing unit correctly.
COFFEE BEAN CONTAINER EMPTY	Coffee bean container is empty.	Fill coffee beans container.
FILL WATER DE-AERATE	Water tank is empty.	Fill water tank
OVERHEATING	After steam dispensing the system is not de-aerated.	De-aerate machine.
GRINDER OBSTRUCTED		Clean grinder.
DE-AERATE	Air in water system.	Open water nozzle.
Instead of coffee, only water is dispensed.	Powder coffee selection button is pressed, but no coffee powder is dispensed.	Add one level measure of coffee powder.
No water / steam	Steam nozzle blocked.	Free opening using a thin needle.
The coffee flows too quickly	Beans ground too coarsely.	Select lower grinding level; e.g. change from 5 to 3.
The coffee flows too slowly	Beans ground too finely.	Select higher grinding level; e.g. change from 5 to 7.
The coffee is cold.	The cups are cold.	Pre-heat cups.
	Boiler temperature too low.	Increase temperature in user programme.
Coffee has no froth.	Unsuitable coffee blend.	Change brand of coffee.
	Coffee is no longer freshly roasted.	Use fresh coffee.
	Beans ground too coarsely or finely.	Change grinding level.
Longer heating time or less hot water.	The machine is calcified.	Decalcify machine.
The brewing unit cannot be removed.	The brewing unit is not in home position.	Turn machine on, close service door and check dregs drawer. (the brewing unit goes automatically to home position)

3.2. User programme (Magic Comfort, Magic Comfort RD)

The table below indicates the various values, settings and programmes which can be read and selected through the user programme options.
Various cleaning programmes can also be activated.

Selection entry: Selection entry via menu button.





Menu procedure:

1. Select desired programme using the cursor buttons (arrow buttons).
2. Access appropriate item using the ENTER/MENU (in RD) button.
3. Use the arrow buttons to handle each item.
4. Confirm by using the ENTER/MENU (in RD) button.
5. Exit programme by using the ESC button.

Item	Setting/Indicator	Standard	Function
Standby			
Rinse	ON/OFF	OFF	Rinses after draining residual water from the circuit/brewing unit (only when machine is turned on and temperature of boiler is below 50°C).
Language	Country	German	Display language
Water hardness	1 – 500 l	3	Change in coffee quantity until descaling required (1-4).
	2 – 300 l		
	3 – 150 l		
	4 – 80 l		
Heating plate	ON/OFF		Activate / deactivate heating plate.
Temperature	Maximum	Medium	Adjustment of coffee temperature (±2°C).
	High		
	Medium		
	Low		
	Minimum		

Item	Setting/Indicator	Standard	Function
Pre-brewing	ON	ON	Coffee is moistened before actual brewing (better aroma)
	LONG		
	OFF		
Pre-grinding	ON/OFF	OFF	Pre-grinds the next coffee dose.
Total coffee	Quantity		Indicates coffee quantity (not resettable)
Descaling			Activate descaling programme (duration approx. 45 minutes)
Scale indicator	YES/NO		Counter reset / Scale indicator reset
Timer	0:00-12:45Std 0:15-03:00Std for RD	00:00 03:00	Machine switches to standby mode if not used within the programmed time. (Standby mode can also be activated at any time via the menu buttons.)
Cleaning cycle	YES/NO		Activates the cleaning programme for the brewing unit (rinses / cleans brewing unit).
Factory settings	YES/NO		Initialises the standard user programme settings.

4. Operation (Magic Comfort +, Magic Comfort + RD)

4.1. Operating instructions (quick reference)

	Action	Comments	Display
	Getting started		
1	Unpack machine.	Check for damage.	
2	Fill water tank.		
3	Fill coffee beans container.		
4	Connect mains plug.		
5	Turn on main switch.		Self test/ Heating
6	De-aerate water circuit.	Press hot water button.	Heating
		Heating stage (approx. 80 sec.)	Heating
		Ready	Select product Ready for operation
	Making coffee		
7	Programme coffee quantity for each selection button. • Expresso lungo • Coffee • Expresso	Depending on cup size. Programme by keeping the coffee selection button pressed until the desired quantity is reached.	Quantity programme
8	Place cup under dispenser.		Select product Ready for operation
9	Select programme and press appropriate button.	Press once = 1 cup of coffee Press twice = 2 cups of coffee.	1 Coffee 2 Coffees
	Dispensing steam		
10	Steam dispensing. Open HWS valve	To warm coffee. To froth milk.	Steam
	Hot water		
11	Hot water	Press the hot water button briefly to start hot water dispensing; press again to stop.	Hot water
16	Hot water quantity programming	Keep the hot water button pressed for the desired time. The last programme entered is saved (only when hot water is activated in the user programme).	Hot water Quantity programme
17	Hot water Quantity programme	The last programme saved is activated by pressing the hot water button briefly.	Hot water

Cleaning	
Empty dregs drawer	Storage capacity of 30 tablespoons (Reset - empty only when indicated)
Empty drip tray	After 30 servings
Clean water tank.	As required.
Clean coffee bean container.	As required.
Clean the housing.	As required.
Rinse brewing unit	1 x per week
Clean brewing unit and Clean oil filer	1 x per month
Descaling	Depending on water hardness.

Descaling procedure:

Automatic:
1. Place Saeco descaler into fresh water tank.
2. Fill with about one litre of hot water.
3. Make 2-3 coffees to descale coffee circuit. (Activate powder coffee button.)
4. Confirm descaling item with Enter.
5. Open the HWS valve. The descaling programme runs automatically.
6. Rinse the machine with about 2 litres of fresh water. (via brewing unit and HWS valve).

Reset descaling indicator: In descaling item indicator.

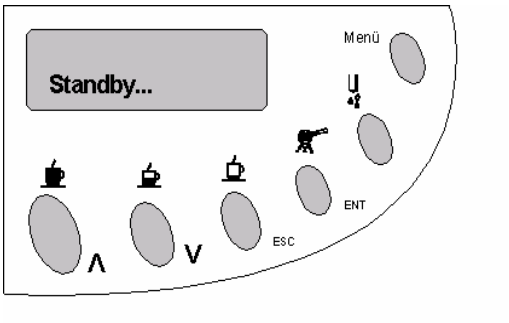
Troubleshooting		
Faul/Indicator	**Possible cause**	**Remedy**
Machine does not function	No power	Check mains plug / mains circuit breaker / door is closed.
Automatic coffee dispensing does not start:		
BREWING UNIT NOT DETECTED	Brewing unit not properly installed or not closed.	Install brewing unit correctly.
GRINDS CONTAINER NOT DETECTED	Coffee grinds container not properly installed.	Install brewing unit correctly.
COFFEE BEAN CONTAINER EMPTY	Coffee bean container is empty.	Fill coffee beans container.
FILL WATER DE-AERATE	Water tank is empty.	Fill water tank
OVERHEATING	After steam dispensing the system is not or is insufficiently de-aerated.	De-aerate machine.
GRINDER OBSTRUCTED		Clean grinder.
DE-AERATE	Air in water system.	Open water nozzle.
Only water is dispensed instead of coffee.	Coffee powder selection button is pressed, but no coffee powder is dispensed.	Add one level measure of coffee powder.
No water / steam	Steam nozzle blocked.	Free opening using a thin needle.
The coffee flows too quickly	Beans ground too coarsely.	Select lower grinding level; e.g. change from 5 to 3.
The coffee flows too slowly	Beans ground too finely.	Select higher grinding level; e.g. change from 5 to 7.

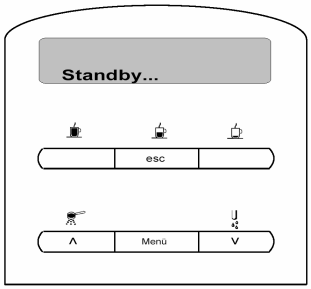
Troubleshooting		
Faul/Indicator	**Possible cause**	**Remedy**
The coffee is cold.	The cups are cold.	Pre-heat cups.
	Boiler temperature too low.	Increase temperature in user programme.
Coffee has no froth.	Unsuitable coffee blend.	Change brand of coffee.
	Coffee is no longer freshly roasted.	Use fresh coffee.
	Beans ground too coarsely or finely.	Change grinding level.
Longer heating time or less hot water.	The machine is calcified.	Decalcify machine.
The brewing unit cannot be removed.	The brewing unit is not in home position.	Turn machine on, close service door and check dregs drawer. (the brewing unit goes automatically to home position)

4.2. User programme (Magic Comfort +, Magic Comfort + RD)

The table below indicates the various values, settings and programmes which can be read and selected through the user programme options.
Various cleaning programmes can also be activated.

Selection entry: Selection entry via menu button.





Menu procedure:

1. Select desired programme using the cursor buttons (arrow buttons).
2. Access appropriate item using the ENTER/MENU (in RD) button.
3. Use the arrow buttons to handle each item.
4. Confirm by using the ENTER/MENU (in RD) button.
5. Exit programme by using the ESC button.

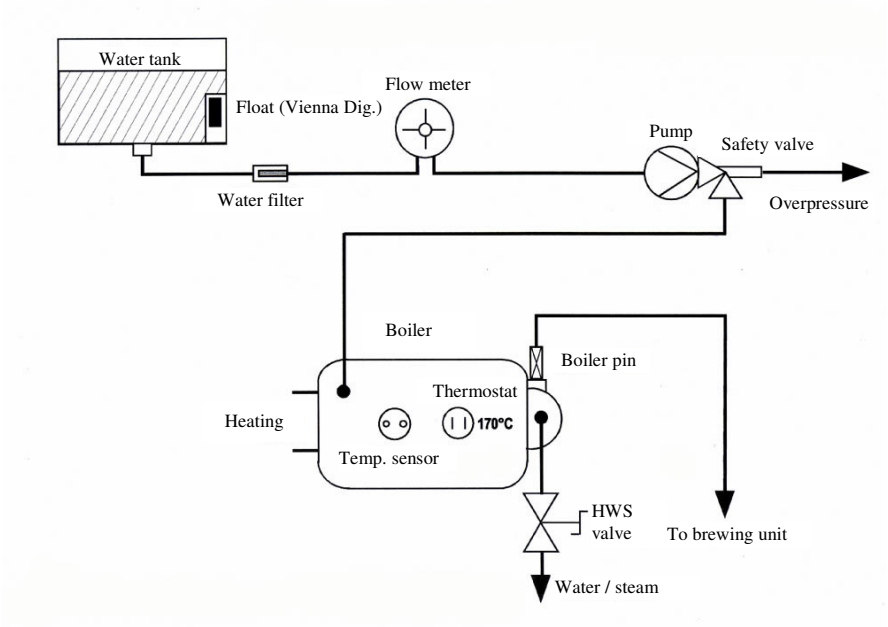
Item	Setting/Indicator	Standard	Function
Standby			
Rinse	ON/OFF	OFF	Rinses after every residual water draining from circuit/brewing unit (only when machine is turned on and temperature of boiler is below 50°C).
Language	Country	German	Display language
Water hardness	1 – 500 l	3	Change in coffee quantity until descaling required (1-4).
	2 – 300 l		
	3 – 150 l		
	4 – 80 l		
Heating plate	ON/OFF		Activate / deactivate heating plate. Heating plate
Expresso lungo Temperature	Maximum	Medium	Adjustment of coffee temperature (±2ºC).
	High		
	Medium		
	Low		
	Minimum		
Coffee Temperature	See Expresso lungo	Medium	Adjustment of coffee temperature (±2ºC).
Expresso Temperature	See Expresso lungo	Medium	Adjustment of coffee temperature (±2ºC).

Item	Setting/Indicator	Standard	Function
Pre-brewing	ON	ON	Coffee is moistened before actual brewing (better aroma)
	LONG		
	OFF		
Pre-grinding	ON/OFF	OFF	Pre-grinds the next coffee dose.
Hot water programme	ON/OFF	OFF	If ON, quantity can be programmed via the hot water button as with the coffee programme button. If OFF, functions like on/off switch.
Total coffee	Quantity		Indicates coffee quantity (not resettable)
Descaling			Activate descaling programme (duration approx. 45 minutes)
Scale indicator	YES/NO		Counter reset / Scale indicator reset
Timer	0:00-12:45Std 0:15-03:00Std for RD	00:00 03:00	Machine switches to standby mode if not used within the programmed time. (Standby mode can also be activated at any time via the menu buttons.)
Cleaning cycle	YES/NO		Activates the cleaning programme for the brewing unit. (rinses / cleans brewing unit)
Factory settings	YES/NO		Initialises the standard user programme settings.

CHAPTER 4
FUNCTIONS AND TIMING

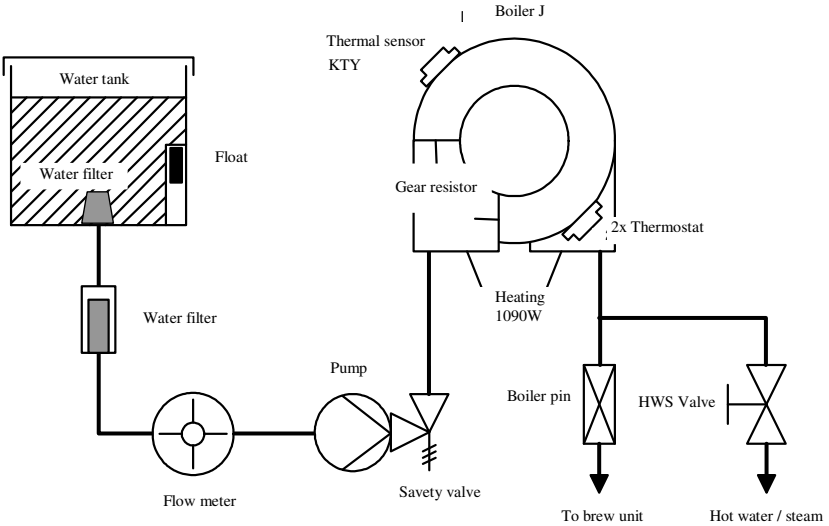
1. Water system

1.1 Water system (Magic Roma/Collection/de luxe)



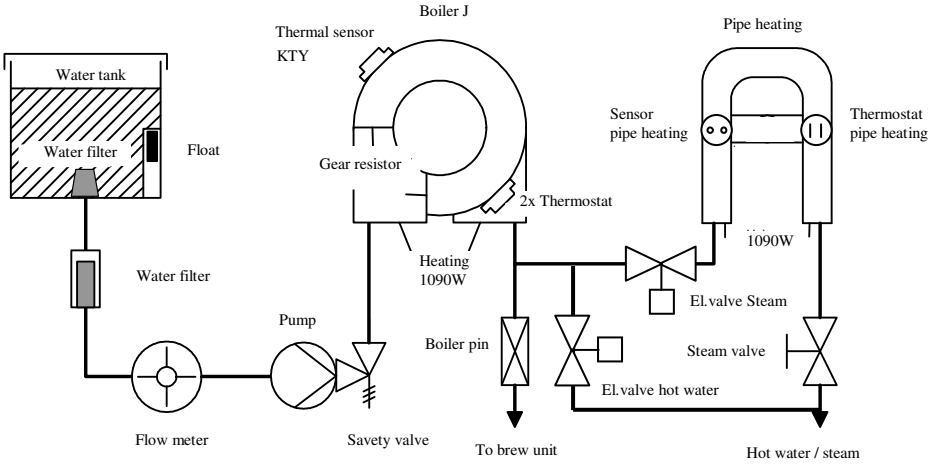
	Component	Function
1	Water tank	Water supply
2	Float	Water level monitoring
3	Water filter	Water cleaned of solid matter
4	Flow meter (turbine)	Measure flow rate
5	Pump	Water flow/Pressure build-up (13 to15 bar)
6	Safety valve	Protect instantaneous water heater against overpressure (opens at 17 bar)
7	Instantaneous water heater/Heating	Heats water to approx. 84°C (for brewing process)
8	Sensor (KTY)	Transmits current temperature value to electronic system
9	Thermostat	Alternates current supply for heating system in event of overheating.
10	Boiler pin (valve plug)	Opens when brewing unit is aligned with water circuit to the unit itself.
11	HWS valve	For hot water and steam dispensing

1.2 Water system (Magic de luxe RD)



	Component	Function
1	Water tank	Water supply
2	Float	Water level monitoring
3	Water filter	Water cleaned of solid matter
4	Flow meter (turbine)	Measure flow rate
5	Pump	Water flow/Pressure build-up (13 to15 bar)
6	Overpressure valve	Protect instantaneous water heater against overpressure (opens at 17 bar)
7	Instantaneous water heater/Heating	Heats water to approx. 84°C (for brewing process)
8	Sensor (KTY)	Transmits current temperature value to electronic system
9	Thermostat	Interrupts current supply for heating system in event of overheating.
10	Boiler pin (valve plug)	Opens when brewing unit is aligned with water conduit to the unit itself.
11	HWS valve	For hot water and steam dispensing

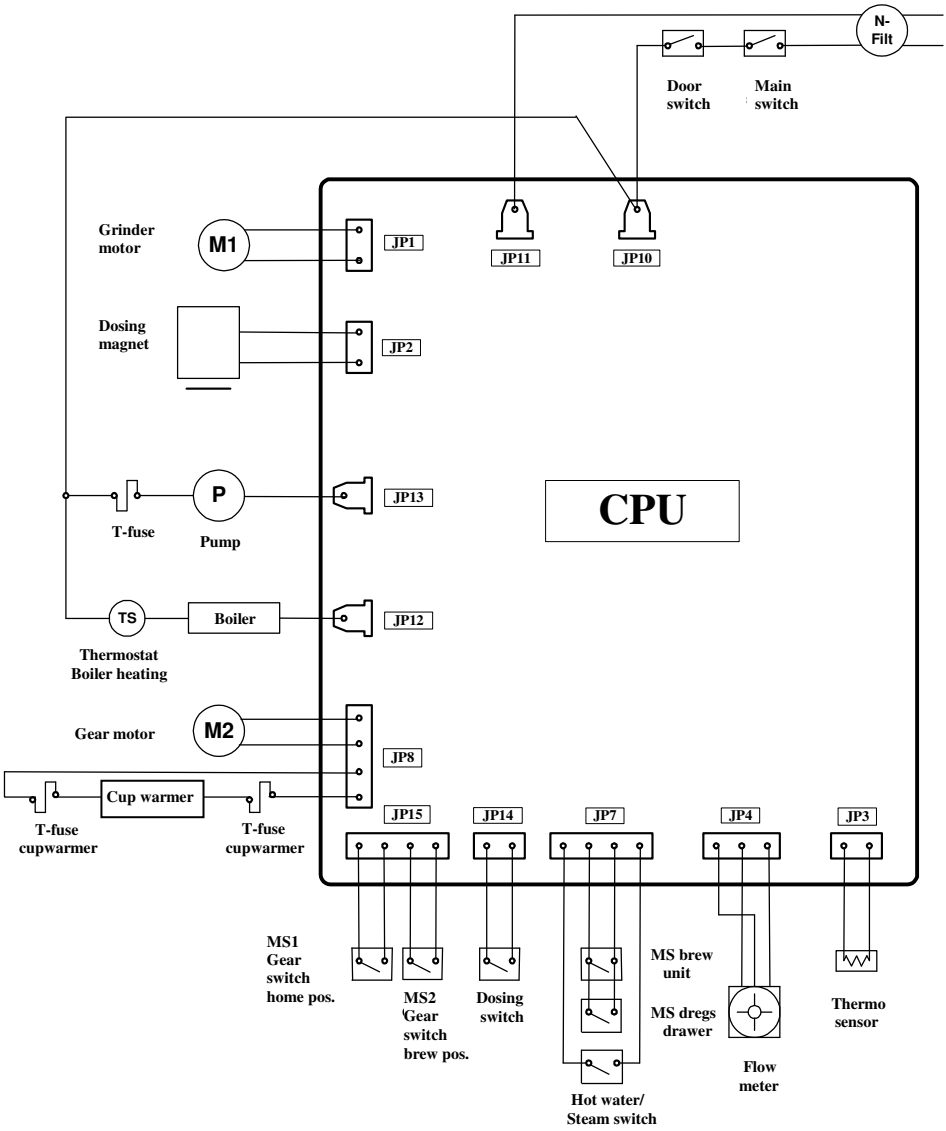
1.3. Water system (Magic Comfort Plus / Comfort Plus RD)



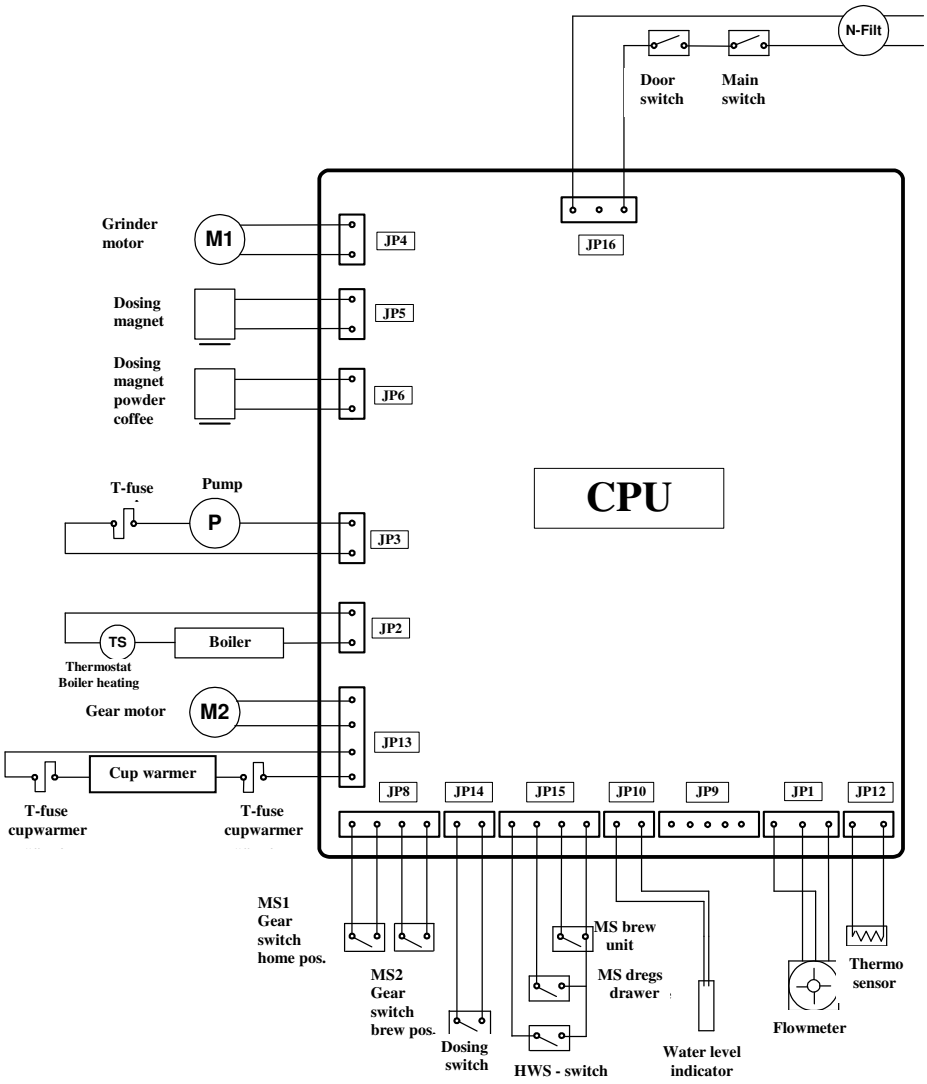
	Component	Function
1	Water tank	Water supply
2	Float	Water level monitoring
3	Water filter	Water cleaned of solid matter (either in tank or before flow meter)
4	Flow meter (turbine)	Measure flow rate
5	Pump	Water flow/Pressure build-up (13 to15 bar)
6	Overpressure valve	Protect instantaneous water heater against overpressure (17 bar)
7	Instantaneous water heater/Heating (coffee/hot water)	Heats water to approx. 84°C (for brewing process and hot water preparation)
8	Pipe heating	Steam generation / Temperature approx. 130°C
9	Sensor (KTY) Instantaneous water heater	Transmits current temperature value to electronic system
10	Thermostat Instantaneous water heater	Interrupts current supply for heating system in event of overheating.
11	Sensor (KTY) Pipe heating	Transmits current temperature value to electronic system
12	Thermostat Pipe heating	Interrupts current supply for heating system in event of overheating.
13	Boiler pin (valve plug)	Opens when brewing unit is aligned with water conduit to the unit itself.
14	Steam valve	For hot water and steam dispensing
15	Valve (water)	Solenoid valve for water dispensing
16	Valve (steam)	Solenoid valve for filling pipe heating system

2. Electrical system

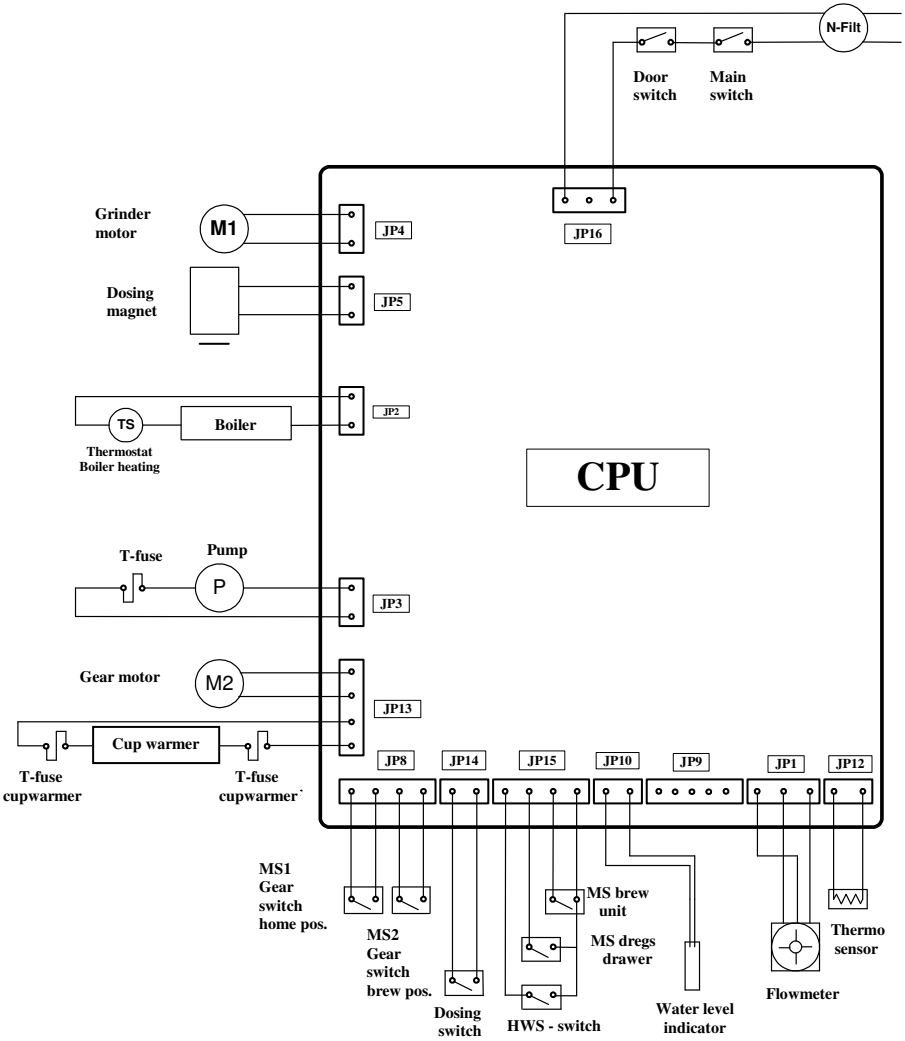
2.1. CPU – IN / OUT (Magic Roma)



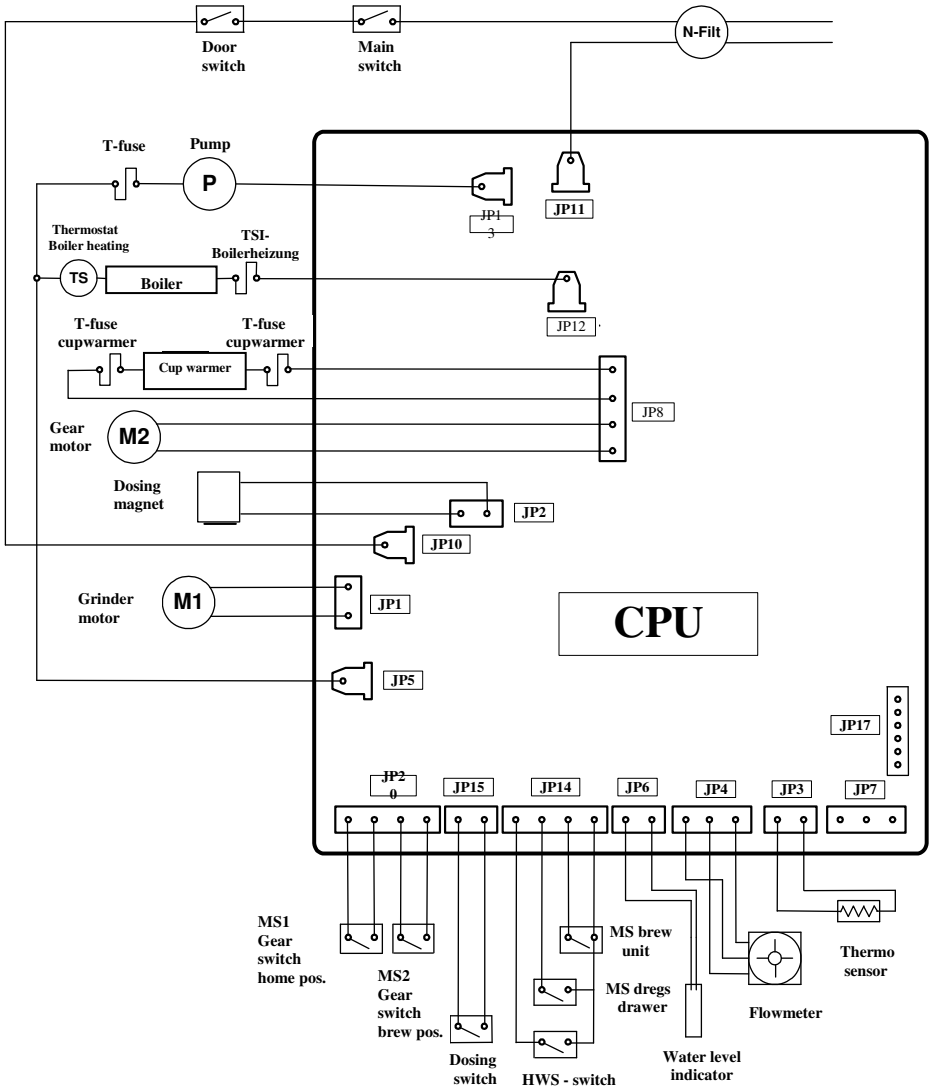
2.2. CPU – IN / OUT (Magic Collection old / de luxe 1)



2.3. CPU – IN / OUT (Magic Collection new / de luxe 2)

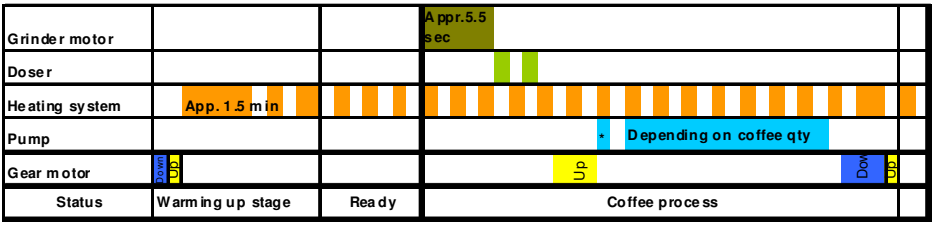


2.4. CPU – IN / OUT (Magic Comfort)



3. Timing

The following time chart indicates the functions of the individual components in terms to time (excluding Magic Roma, see chart for Vienna)



Note: * only in machines with pre-brewing systems

Explanation:

Two processes start when the main switch is activated:

Firstly, the gearmotor is initialised. The gears move to MS1 (lower limit switch), change rotating direction, leave MS1 and move to the home position (about 2 mm after MS1).

Exception: Magic Roma – functions like Vienna.

The instantaneous water heater is then activated for about 1 min 30 sec., heating the water to operating temperature, whereby heating takes place for about 60 sec. continuously and then is alternated for the rest of the time.

After activating the start button:

1. The grinder starts operating (about 5.5 sec.).
2. The doser is activated twice.
3. The gears move to brewing position.
4. Depending on the type of machine, pre-brewing begins (brief pump activation).
5. Main brewing process (duration of pump activation depending on selected coffee quantity).
6. The gears move to home position.

Comments:

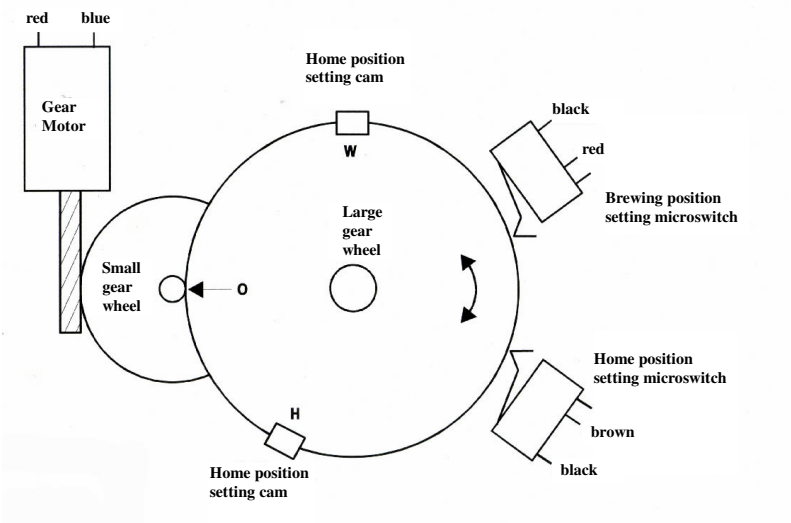
If the machine is disconnected from the main power supply during operation (power failure/side doors opened), the gears will complete the function commenced but without brewing (if the interruption occurs before brewing, the coffee will be dispensed dry).

If operation is interrupted by removal of the dregs drawer, the machine will continue its function unrestricted once the drawer is returned.

4. Functioning

4.1. Gears

The gearmotor is a direct current motor and is controlled by the CPU at approx. 30 – 35 V.
In order to perform forward and backward movements, the gearmotor is controlled alternately with a positive and negative half wave.
In the event of overload the motor's electronic system switches off after 8-10 sec. and the machine is stopped. This situation is indicated by the flashing brewing unit indicator light. In digital indicator systems - display indicator: brewing unit locked.



Important: During installation of the large gear wheel care must be taken that the marking on the large gear wheel always faces the direction of the small gear wheel axis, and that both limit switches are positioned in the larger segment between both switching cams.
If the motor is replaced, it is important that the blue cable (-) is fitted onto the motor connection near the writing "Italy" (+ and – are not marked).

4.2. Heating plate / Gear resistor
4.2.1. Magic

The heating plate is operated with a wave packet control system. The ratio of the power-on time is approx. 1:40 (0.1 sec on, 3.9 sec. off). The heating plate is turned on by means of the corresponding button on the control panel. It is only active when the machine is not operational. The heating plate output is approx. 437 W.
In order to reduce the total power output of the machine, the heating plate is turned off during the heating stage.
The heating plate can act as a resistor for the gearmotor. In the event that several coffees are brewed consecutively, the heating plate warms up without being turned on. The heating plate is protected against overload by 2 thermal fuses.
If one of the thermal fuses is compromised or the heating plate is defective, the gearmotor also does not function.

4.2.2. Magic RD

With the introduction of the Redesign Series the cup warmer is based on PTC output, which has a continuous voltage of 220 V when the cup warmer is turned on.

The gear resistor in the Redesign Series is found on the instantaneous water heater with the standard values of 130 Ω / 437 W.

4.3. Water level indicator

The water level in the water tank is monitored by a float fitted with a magnet core. If the water level is too low, the magnet is no longer within the range of the reed contact, which transmits the low water level signal to the CPU.

4.4. Flow meter (Turbine)

The machine is also equipped with a flow rate monitoring system. The system checks whether the water monitoring flow meter (turbine) turns. If no pulses are generated from the turbine within 10 seconds, the current cycle is interrupted. The fault is indicated by the water low indicator (machine without float) or by the de-aerate indicator in machines with float (reed sensor). If this control mechanism is activated, the machine must be de-aerated. During these signals, the pump operates at maximum output. As soon as the pump has created sufficient flow, the pump output is reduced to approx. 20 l/hr.
The water quantity is generally controlled according to the coffee quantity programmed through the flow meter (turbine) pulses.

4.5. HWS valve (steam operation)

The HWS valve is required for water and steam dispensing, as well as during de-aeration (machines without rapid steam systems).

If the HWS valve is opened during brewing, the coffee flow is interrupted and the Water Low De-aerate indicator (machines without float) or the message Close Dial (machines with display) appears. As soon as the HWS valve is closed, the brewing process will continue.

The operating temperature during steam dispensing is approx. 125°C. The steam button is pressed to activate steam production. Steam dispensing occurs via the HWS valve (machines without rapid steam systems).

The pump pulses the steam dispensed. This means that constant steam dispensing is ensured over a long period of time. The flow rate of the pump is adjusted on the basis of the thermoblock temperature. If the temperature is too low, the pump pulses are slowed down. This may occur, for instance, when the steam is dispensed before the steam temperature is reached.

Once the steam has been dispensed, the HWS valve closes and the steam button must be pressed for normal operating mode (machines without rapid steam or instant steam systems). The temperature indicator flashes until the machine has cooled (the message Overheating appears in machines with digital display) and the machine cannot dispense coffee. Cooling can be achieved by dispensing hot water. The pump functions at maximum output and the heating remains turned off as long as the Overheating signal remains or temperature indicator flashes. These measures ensure that the cooling process is accelerated and the flashing indicator or overheating signal will disappear after a few seconds.

4.6. Temperature sensor (KTY 10)

The temperature sensor is a temperature-sensitive resistance mechanism, converting the instantaneous water heater temperature into an electrical signal which is measurable by the CPU.
The CPU compares this signal with the programmed reference signal and, depending on the outcome of the comparison, controls the instantaneous water heater output.
The resistance applied has a positive temperature coefficient; i.e. higher instantaneous water heater temperature - higher sensor resistance.

The table below indicates the trend in resistance values in relation to the temperature.

Measured values:

Temperature	Resistance (Ω)	Resistance trend (Ω)
0	1629	0
15	1845	216
20	1922	77
40	2246	324
90	3168	922
100	3366	198
130	3979	613
140	4188	209

At room temperature the resistance is 1.9KΩ.

Comments: A cold start is possible for the following models (brewing started independently of the current instantaneous water heater temperature):

Magic Collection old
Magic de luxe1
Magic de luxe 2

4.7. Grinder

The grinder is a conical grinder with upper and lower grinding discs. The grinding level is set by adjusting the height of the upper grinding disc by means of the screw thread.
If the grinding discs are drawn apart by turning the grinding level adjusting ring (anti-clockwise), the grinding is coarser, while turning the adjusting ring clockwise will result in a finer grind.

ATTENTION: Adjust the grinding level only when the grinder is in operation!

The grinder operates with a direct current motor and the grinding disc rotation speed is determined by a gearmotor. The grinder motor operates with a voltage of 260 V.

4.8. Doser

The coffee quantity for the current coffee process is portioned (dosed) in the doser chamber; a higher dose results in a stronger (more concentrated) coffee. A lower dose results in a weaker (less concentrated coffee).

The doser is controlled by a microswitch. The ground coffee is transferred from the grinder and is pressed into the dosing chamber; when the dosing chamber is full, the microswitch is activated and transmits the signal to the CPU to turn the grinding motor OFF.
Grinding is stopped, the dosing magnet engages, opens the dosing flap and the coffee falls into the brewing unit.
If the dosing microswitch is not activated within 20 seconds from start of the grinder motor, the coffee beans low signal appears.

The dosing quantity is set automatically by shifting the doser housing wall together with its microswitch.

Depending on the machine type, the setting mechanism may be accessible to the customer or only to a technician.

CHAPTER 5
SERVICE PROGRAMME

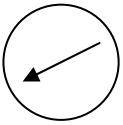
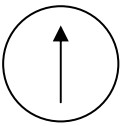
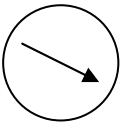
1. Service programme Magic Roma / Magic Roma Redesign (RD)

1.1. Test mode

Access: Access the test mode by turning on the machine and simultaneously pressing the coffee and steam buttons.

Various test functions can be activated in the service mode by activating either the coffee or steam buttons in conjunction with various coffee quantity settings.

Programme table

Function	Button	Control setting	LED Indicator
Pump/Turbine *	Coffee		Fault LED (flow meter pulses)
Brewing unit (Gearmotor) 	Steam		Coffee LED Gear switch (brewing setting)
Heating	Coffee		
Brewing unit (Gearmotor) 	Steam		Coffee LED Gear switch (home position)
Dosing magnet	Coffee		
Grinder	Steam		Steam LED Doser full
HWS microswitch			Steam LED

* The HWS valve must be open..

The current boiler temperature can be read in service mode by pressing the coffee and steam buttons at the same time.
Each combination of LEDs provides an indication on the current boiler temperature (see table below).

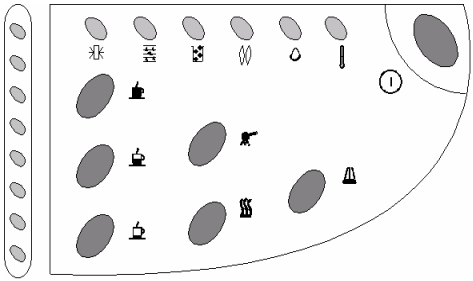
Temperature table

Temperature status	Coffee LED	Steam LED	Fault LED
T ≤ 94ºC			X
T = 95ºC	X		X
T = 96ºC	X		
T = 97ºC	X	X	
T ≥ 98ºC		X	

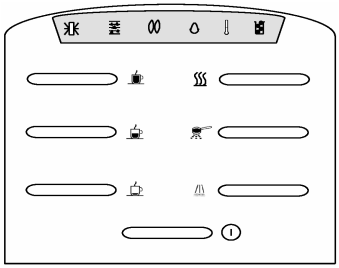
2. Service programme (Magic de luxe / de luxe RD)

2.1. Functions programme

Access: Access the service mode by turning on the machine and simultaneously pressing the powder coffee and steam buttons (HWS valve closed - dregs drawer inserted).



Magic de luxe



Magic de luxe RD

The various functions indicated in the table can be checked by pressing the buttons (combinations) listed below.

Programme table (functions programme)

Buttons	Expresso lungo	Coffee	Expresso	Powder coffee	Cup warmer	Steam	LED Indicator
Unit up	**x**						**Expresso lungo**
Unit down		**x**	**(x)**				**Coffee**
Grinder		**(x)**	**x**				**Coffee beans low (doser full)**
Pump/Flow meter				**x**			**Temperature**
Doser					**x**		
Heating					**x**	**x**	
LEDs above functions indicator						**x**	
LEDs left cup fill level						**x + HWS**	

Magic deluxe RD (x)

Microswitch test	LED Indicator
Brewing unit	Brewing unit
HWS valve	Descaling
Grinds container	Grinds container empty
Reed switch	Water low
Doser switch	Coffee beans low

Exit: Switch the machine off at the main switch.

2.2. Diagnosis menu (diagnosis box)

Application of diagnosis system

The diagnosis system makes it possible to read data and enter settings into the coffee machine without the display.
ATTENTION: Before connecting the diagnosis box, it is important to ensure that you have read the operating instructions.

Programme table (diagnosis menu)

Function/Standard	Setting range	Increment	Comments
EXPRESSO LUNGO No. PULSES 600	50 - 1,000 Pulses	+/- 1	Number of flow meter pulses for each saved cup fill volume, where 300 pulses correspond to approx. 100 ml.
EXPRESSO No. PULSES 195	50 - 1,000 Pulses	+/- 1	
COFFEE No. PULSES 360	50 - 1,000 Pulses	+/- 1	
----HEATING---- PARAMETER K1 7	1 - 50	+/- 1	**Do not change!**
----HEATING---- PARAMETER K2 30	1 - 50	+/- 1	**Do not change!**
NORMAL TEMP. °C 86	70- 130°C	+/- 1	Normal temperature is used if not more than 6 min. have elapsed since last coffee dispensed.
HIGH TEMP. °C 92	70- 130°C	+/- 1	If no coffee is dispensed for an extended time (over 6 min.), the next coffee will be heated to a higher temperature to compensate for cooling of the brewing unit and the associated temperature loss.
TEMP. OF 1st COFFEE ° C 94	70- 130°C	+/- 1	Used when dispensing the first coffee after the machine has been turned on, to compensate for the high temperature loss due to the cold brewing unit and water pipes.
STEAM TEMP. °C 130	70- 135°C	+/-1	Boiler temperature for steam function.
TEMP. INCREASE °C 10	0-50°C	+/-1	The boiler temperature is increased by a set value shortly before brewing in order to pre-heat the boiler, and compensate for the temperature drop during the first water flow.

Funktion	Einstellbereich	Schrittweite	Bemerkung
GRINDS COUNTER Number	0-50	+/-1	Counts number of coffee cycles. When this value reaches the Grinds Stop value, "GRINDS CONTAINER EMPTY" will be displayed. (Reset by removing dregs drawer for emptying - min. 6 sec.)
GRINDS MAXIMUM 30	5-50	+/-1	Number of cycles until "EMPTY GRINDS CONTAINER" is displayed.
--TOTAL COFFEE-- CYCLES Number	----------	----------	Total number of coffee cycles - not resettable.
--TOTAL WATER-- (ml) Number	----------	----------	Total water flow volume (in ml) / not resettable
WATER DESCALING (ml)	----------	----------	Total water flow (in ml) since last descaling / resettable
HOT WATER FLOW (L/H) 20	6 - 34 1/h	+/- 2 1/h	The **pump delivery rate** for hot water can be expressed in litres per hour.
--HOT WATER--- PUMP ADJUST. 63000	58,000 - 65,500	+/- 1	The pump delivery rate is adjusted in relation to the HOT WATER FLOW setting by means of a phase controlled modulator. Pump tolerances can thus also be adjusted. An equivalent value is saved under HOT WATER PUMP ADJUSTMENT.
DESCALING--- FLOW (L/H) 8	6 – 34 1/h	+/- 2 1/h	The flow rate for the descaling programme is limited to 8 L/h.
--DESCALING--- PUMP ADJUST. 61000	58,000 – 65,500	+/- 1	Pump adjustment as with hot water.
MACHINE STATUS	0 – 255		160
--DATE OF MANUF--- DAY	----------	----------	This date indicates the date on which the machine was manufactured. This date cannot be changed, printed.
--DATE OF MANUF--- MONTH	----------	----------	
--DATE OF MANUF--- YEAR	----------	----------	

Function	Setting range	Increment	Comments
--SERVICE DATE--DAY	0 - 31	+/- 1	The service date indicates the date of the machine's last service. This date can be changed and must be updated at each service.
--SERVICE DATE--MONTH	0 - 12	+/- 1	
--SERVICE DATE--YEAR	1996 - 2050	+/- 1	

Examples

a. New instantaneous water heater

---Diagnosis box---

Internal data

Service date
01-01-1998

Manual Coffee
Pulses 600

Small coffee
Pulses 200

Large coffee
Pulses 350

Heating
Parameter K1 7
Parameter K2 30

Temperature
Normal 86
High 92
Cold start 94
Steam 130
Increase 10

b. Old instantaneous water heater

---Diagnosis box---

Machine data

Date of manufacture
01-12-1997

Service date
01-01-1998

Manual Coffee
Pulses 600

Small coffee
Pulses 200

Large coffee
Pulses 350

Heating
Parameter K1 7
Parameter K2 11

Temperature
Normal 94
High 102
Cold start 104
Steam 140
Increase 10

---Diagnosis box---

Grinds counter 0
Grinds counter 0
Grinds minimum 30

Total coffee
0

Total Water
(ml) 0

Water descaling
(ml) 0

Hot water
Flow rate (l/h) 20
Pump adjustment 61000

Descaling
Flow rate (l/h) 8
Pump adjustment 59000

Water hardness 2

---Diagnosis box---

Grinds minimum 30

Total coffee
7

Total Water
(ml) 400

Water descaling
(ml) 400

Hot water
Flow rate (l/h) 20
Pump adjustment 62355

Descaling
Flow rate (l/h) 8
Pump adjustment 59500

Water hardness 2

3. Service programme (Magic Collection alt / de luxe 1 – 8 buttons)

3.1. Functions programme

Access: Access the service mode by turning on the machine and simultaneously pressing the double expresso and steam buttons.
The various functions indicated in the table can be checked by pressing the buttons listed below.

Programme table (functions programme)

Function	Button	Comments
Gears/ up	Coffee / expresso lungo	The **brewing unit** gears move in the **brewing position** direction until the upper microswitch is activated.
Gears/ down	Expresso	The **brewing unit** gears move in the **home position** direction until the lower microswitch is activated.
Grinder	Coffee	The **grinder** operates until the doser is filled and the doser microswitch is activated. When the doser if full the indicator lights up to indicate that coffee beans are low.
Pump	Double expresso	The **pump** is operational. The temperature indicator starts to flash as soon as the water volume detection turbine starts to turn.
Doser	Double coffee	The **doser coil for the grinder** is activated.
Second doser (powder coffee)	Powder coffee	The **doser coil for the powder coffee** is activated.

Exit: Switch the machine off at the main switch.

3.2 Diagnosis menu (diagnosis box)

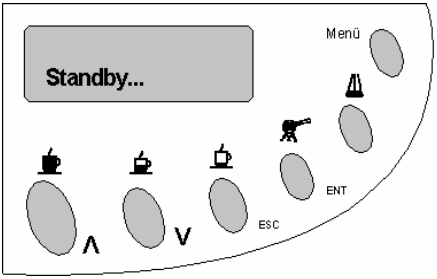
The diagnosis menu is operated as in the Magic de luxe 2 Series.

Machine status: 32

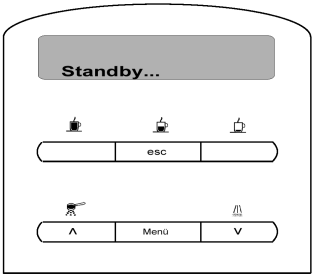
4. Service programme Magic Comfort / Comfort Redesign (RD)

4.1. Test mode

Access: Access the test mode from the standby mode (Menu + Enter / for the RD model press the Menu button twice) by keeping the EXPRESSO and STEAM button pressed simultaneously and pressing the MENU button.



Magic Comfort



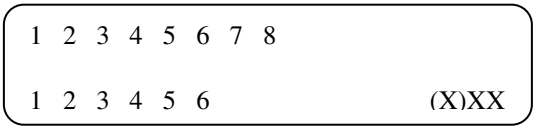
Magic Comfort RD

The various functions indicated in the table can be checked by pressing the buttons (combinations) listed below.

Programme table (functions programme)

RD Buttons	**S1 Expresso lungo**	**S2 Coffee**	**S3 Expresso**	**S4 Powder**	**S6 Menu**	**S5 Steam**
Buttons	**S1 Expresso lungo**	**S2 Coffee**	**S3 Expresso**	**S4 Powder**	**S5 Steam**	**S6 Menu**
Unit up	**x**					
Unit down		**x**				
Grinder			**x**			
Pump (HWS valve open)	**x**					**x**
Doser				**x**		
Heating plate	**x**				**x**	
Heating 1050 W instantaneous water heater		**x**			**x**	
Temperature indicator				**x**	**x**	**x**

Display in test mode:



Upper display line:
Indicates the status of the microswitch (see table).

Lower display line:
Indicates the status of the operating buttons.

Grinder rate
If no button is activated, a three-digit number appears bottom right referring to the grinder rate. This value must be between 125 - 135.

Flow rate
If the pump is activated during test mode and the hot water valve opened, a two-digit number appears bottom right indicating the flow rate. This value must be between 40 - 60 (should not be below 40).

All CPU input signals from the machine appear in the first line of the display.	**All CPU input signals from the control board appear in the second line of the display.**	
	Magic Comfort	Magic Comfort RD
1 = Brewing unit in brewing position (brewing unit microswitch activated) 2 = Brewing unit in at-rest position (at-rest position microswitch activated) 3 = Doser chamber full (doser microswitch activated) 4 = HWS valve microswitch activated 5 = grinds container microswitch activated 6 = brewing unit microswitch activated 7 = Water tank filled (reed contact not activated) 8 = Flow meter pulse system 1 (Water) (indicator flashes when magnet passes Hall generator)	1 = Expresso lungo 2 = Coffee 3 = Expresso 4 = Powder coffee 5 = Steam 6 = Standby	1 = Expresso lungo 2 = Coffee 3 = Expresso 4 = Powder coffee 5 = Steam 6 = Menu

Exit: Switch the machine off at the main switch.

4.2. Diagnosis menu

The values below can be read and adjusted in the diagnosis menu as shown in the table.

Access: Access via the Standby mode by keeping the EXPRESSO LUNGO, EXPRESSO and STEAM buttons simultaneously pressed, and pressing the MENU button. (The user programme is also available in this mode.)

Using the ▲ button, scroll to the menu item "Diagnosis" and confirm using ENTER/MENU.

Changing programme values: Access appropriate item using the ENTER/MENU button.
Change value with ARROW buttons
Save value by using ENTER/MENU.

Programme table (diagnosis menu)

Parameter /RD	Setting range	Increment	Comments
EXPRESSO LUNGO No. PULSES 600	50 - 800 Pulses	+/- 1	Number of flow meter pulses for each saved cup filling volume, where 300 pulses correspond to approx. 100 ml.
EXPRESSO N° PULSES 195/200	50 - 800 Pulses	+/- 1	
COFFEE N° PULSES 360/350	50 - 800 Pulses	+/- 1	
----HEATING---- PARAMETER K1 7/8	1 – 50	+/- 1	K1 changes the characteristic of the temperature adjustment.
----HEATING---- PARAMETER K2 30	1 – 50	+/- 1	K2 changes the temperature adjustment based on flow rate.
----HEATING---- SENSOR ADJUST. 96 **Comfort RD only**	86 – 106	+/- 1	To adjust processor tolerances. If the temperature in test mode with a set measuring resistance of 3246Ω exceeds or falls short of the specified temperature value (96°C) by more than 1°C, the value indicated in test mode must be applied to adjust the sensor. **No measuring resistance: Do not change!**
NORMAL TEMP. °C 86/82	70- 130°C	+/- 1	Normal temperature is used if not more than 6 min. have elapsed since last coffee dispensed.
HIGH TEMP. °C 92/93	70- 130°C	+/- 1	If no coffee is dispensed for an extended time (over 6 min.), the next coffee will be heated to a higher temperature to compensate for cooling of the brewing unit and the associated temperature loss.

Parameter /RD	Setting range	Increment	Comments
TEMP. OF 1st COFFEE ° C 94/99	70- 130°C	+/- 1	Used when dispensing the first coffee after the machine has been turned on, to compensate for the high temperature loss due to the cold brewing unit and water pipes.
STEAM TEMP. °C 130/125	70- 135°C	+/-1	The temperature for steam operation is entered separately using the Steam Temp. parameter.
TEMP. INCREASE °C 10 **Not for RD model**	0-50°C	+/-1	The boiler temperature is increased by a set value shortly before brewing in order to pre-heat the boiler and compensate for the temperature drop during the first water flow.
GRINDS COUNTER Number	0-50	+/-1	Counts number of coffee cycles. When this value reaches the Grinds Stop value, "GRINDS CONTAINER EMPTY" will be displayed. (Reset by removing dregs drawer for emptying - min. 6 sec.)
GRINDS STOP 30	5-50	+/-1	Number of cycles until "EMPTY GRINDS CONTAINER" is displayed.
--TOTAL WATER-- (ml) Number	----------	---------- ------	Total water flow volume (in ml) / not resettable
WATER DESCALING (ml)	----------	---------- ------	Total water flow (in ml) since last descaling / resettable
HOT WATER FLOW (L/H) 20/16	6 - 34 1/h	+/- 2 1/h	The **pump delivery rate** for hot water can be expressed in litres per hour.
--HOT WATER--- PUMP ADJUST. 63000	58,000 - 65,500	+/- 1	The pump delivery rate is adjusted in relation to the HOT WATER FLOW setting by means of a phase controlled modulator. Pump tolerances can thus also be adjusted. An equivalent value is saved under HOT WATER PUMP ADJUSTMENT.

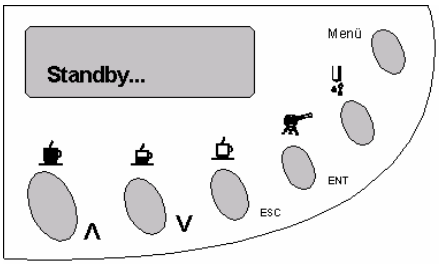
Parameter /RD	Setting range	Increment	Comments
WATER RESERVE NUMBER N° PULSES NUMBER	1-2500 **Comfort RD only**		When the water tank is full, the value from WATER RESERVE STOP is applied. The flow meter pulses are counted from the switching of the reed switch and deducted from the value. If a beverage is chosen for which the saved pulse number is higher than the remaining impulses, the message FILL WATER TANK appears.
WATER RESERVE STOP N° PULSES 1000	1-2500 **Comfort RD only**		Water reserve from switching of the reed switch in pulses.
MACHINE STATUS	0 - 255		100/36
--DATE OF MANUF---DAY	----------	----------	This date indicates the date on which the machine was manufactured. This date cannot be changed.
--DATE OF MANUF---MONTH	----------	----------	
--DATE OF MANUF---YEAR	----------	----------	
--SERVICE DATE--DAY	0 - 31	+/- 1	The service date indicates the date of the machine's last service. This date can be changed and must be updated at each service.
--SERVICE DATE--MONTH	0 - 12	+/- 1	
--SERVICE DATE--YEAR	1996 - 2050	+/- 1	

Exit: Use the ESC button or the main switch.

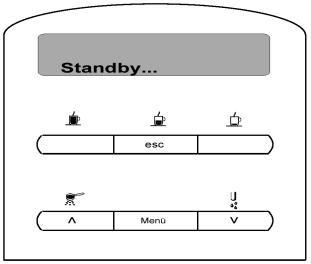
5. Service programme (Magic Comfort + / Comfort + RD)

5.1. Test mode

Access: Access the test mode from the standby mode (Menu + Enter / for the RD model press the Menu button twice) by keeping the EXPRESSO and WATER button pressed simultaneously and pressing the MENU button.



Magic Comfort +



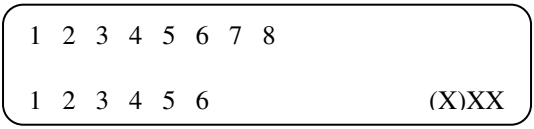
Magic Comfort + RD

The various functions indicated in the table can be checked by pressing the buttons (combinations) listed below.

Programme table (functions programme)

RD Buttons	**S6 Expresso lungo**	**S5 Coffee**	**S4 Expresso**	**S3 Powder**	**S1 Menu**	**S2 Water**
Buttons	**S1 Expresso lungo**	**S2 Coffee**	**S3 Expresso**	**S4 Powder**	**S5 Water**	**S6 Menu**
Unit up	**x**					
Unit down		**x**				
Grinder			**x**			
Doser				**x**		
Pump (HWS valve open)	**x**					**x**
Heating plate	**x**				**x**	
Heating 1050 W Boiler		**x**			**x**	
Heating 1050 W Pipe heating				**x**	**x**	
Heating 437W Gear resistor			**x**		**x**	
Temperature indicator				**x**	**x**	**x**
Magnet valve water	**x**				**x**	**x**
Magnet valve steam		**x**			**x**	**x**
Pump + Magnet valve steam			**x**			**x**
Pump + Magnet valve water		**x**				**x**

Display in test mode:



Upper display line:
Indicates the status of the microswitch (see table).

Lower display line:
Indicates the status of the operating buttons.

Grinder rate
If no button is activated, a three-digit number appears bottom right referring to the grinder rate. This value must be between 125 - 135.

Flow rate
If the pump is activated during test mode and the hot water valve opened, a two-digit number appears bottom right indicating the flow rate. This value must be between 40 - 60 (should not be below 40).

All CPU input signals from the machine appear in the first line of the display.	**All CPU input signals from the control board appear in the second line of the display.**	
	Magic Comfort +	Magic Comfort + RD
1 = Brewing unit in brewing position (brewing unit microswitch activated) 2 = Brewing unit in at-rest position (at-rest position microswitch activated) 3 = Doser chamber full (doser microswitch activated) 4 = HWS valve microswitch activated 5 = grinds container microswitch activated 6 = brewing unit microswitch activated 7 = Water tank filled (reed contact not activated) 8 = Flow meter pulse system 1 (Water) (indicator flashes when magnet passes Hall generator)	1 = Expresso lungo 2 = Coffee 3 = Expresso 4 = Powder coffee 5 = Hot water 6 = Standby	1 = Menu 2 = Hot water 3 = Powder coffee 4 = Expresso 5 = Coffee 6 = Expresso lungo

Exit: Switch the machine off at the main switch.

5.2. Diagnosis menu

The values below can be read and adjusted in the diagnosis menu as shown in the table.

Access: Access via the Standby mode by keeping the EXPRESSO LUNGO, EXPRESSO and HOT WATER buttons simultaneously pressed, and pressing the MENU button.
(The user programme is also available in this mode.)

Using the ▲ button scroll to the menu item "Diagnosis" and confirm using ENTER/MENU.

Changing programme values: Access appropriate item using the ENTER/MENU button.
Change value with ARROW buttons
Save value by using ENTER/MENU.

Programme table (diagnosis menu)

Parameter /RD	Setting range	Increment	Comments
EXPRESSO LUNGO No. PULSES 600	50 - 800 Pulses	+/- 1	Number of flow meter pulses for each saved cup fill volume, where 300 pulses correspond to approx. 100 ml.
EXPRESSO N° PULSES 195/200	50 - 800 Pulses	+/- 1	
COFFEE N° PULSES 360/350	50 - 800 Pulses	+/- 1	
HOT WATER No. PULSES 360	1 – 50	+/- 1	
----HEATING---- PARAMETER K1 7/8	1 – 50	+/- 1	**Do not change!**
----HEATING---- PARAMETER K2 30/35	1 – 50	+/- 1	**Do not change!**
----HEATING---- SENSOR ADJUST. 96	86 – 106 **Comfort + RD only**	+/- 1	To adjust processor tolerances. If the temperature in test mode with a set measuring resistance of 3246Ω exceeds or falls short of the specified temperature value (96°C) by more than 1°C, the value indicated in test mode must be applied to adjust the sensor. **No measuring resistance: Do not change!**
NORMAL TEMP. °C 86/82	70- 130°C	+/- 1	Normal temperature is used if not more than 6 min. have elapsed since last coffee dispensed.
HIGH TEMP. °C 92/94	70- 130°C	+/- 1	If no coffee is dispensed for an extended time (over 6 min.), the next coffee will be heated to a higher temperature to compensate for cooling of the brewing unit and the associated temperature loss.

Parameter /RD	Setting range	Increment	Comments
TEMP. OF 1st COFFEE ° C 94/98	70- 130°C	+/- 1	Used when dispensing the first coffee after the machine has been turned on, to compensate for the high temperature loss due to the cold brewing unit and water pipes.
STEAM TEMP. °C 130/115	70- 135°C	+/-1	Steam temperature 110°C only in Redesign models with STEAM TEMP. INCREASE.
TEMP. INCREASE °C 10	0-50°C **Comfort + only**	+/-1	The boiler temperature is increased by a set value shortly before brewing in order to pre-heat the boiler and compensate for the temperature drop during the first water flow.
STEAM TEMP. INCR. °C 15	70- 135°C **Comfort + RD only**	+/-1	In Redesign models the constant temperature of 110°C is increased by 15°C during steam dispensing.
STEAM °C 35/30	70- 135°C	+/-1	Pulsing of pump during steam dispensing.
GRINDS COUNTER Number	0-50	+/-1	Counts number of coffee cycles. When this value reaches the Grinds Stop value, "GRINDS CONTAINER EMPTY" will be displayed. (Reset by removing dregs drawer for emptying - min. 6 sec.)
GRINDS STOP 30	5-50	+/-1	Number of cycles until "EMPTY GRINDS CONTAINER" is displayed.
TOTAL WATER S1 (ml) Number	----------	----------	Total water flow volume (in ml) / not resettable
WATER DESCALING S1 (ml)	----------	----------	Total water flow (in ml) since last descaling / resettable
TOTAL WATER S2 (ml) Number	----------	----------	Total water flow volume (in ml) / not resettable
WATER DESCALING S2 (ml)	----------	----------	Total water flow (in ml) since last descaling / resettable
HOT WATER FLOW (L/H) 20/18	6 - 34 1/h	+/- 2 1/h	The **pump delivery rate** for hot water dispensing can be expressed in litres per hour.

Parameter /RD	Setting range	Increment	Comments
--HOT WATER--- PUMP ADJUST. 63000	58,000 - 65,500	+/- 1	The pump delivery rate is adjusted in relation to the HOT WATER FLOW setting by means of a phase controlled modulator. Pump tolerances can thus also be adjusted. An equivalent value is saved under HOT WATER PUMP ADJUSTMENT.
WATER RESERVE NUMBER N° PULSES NUMBER	1-2500 **Comfort + RD only**		When the water tank is full, the value from WATER RESERVE STOP is applied. The flow meter pulses are counted from the switching of the reed switch and deducted from the value. If a beverage is chosen for which the saved pulse number is higher than the remaining pulses, the message FILL WATER TANK appears.
WATER RESERVE STOP N° PULSES 1000	1-2500 **Comfort + RD only**		Water reserve from switching of the reed switch in pulses.
MACHINE STATUS	0 - 255		100/36
--DATE OF MANUF--- DAY	----------	---------- --------	This date indicates the date on which the machine was manufactured. This date cannot be changed.
--DATE OF MANUF--- MONTH	----------	---------- --------	
--DATE OF MANUF--- YEAR	----------	---------- --------	
--SERVICE DATE-- DAY	0 - 31	+/- 1	The service date indicates the date of the machine's last service. This date can be changed and must be updated at each service.
--SERVICE DATE-- MONTH	0 - 12	+/- 1	
--SERVICE DATE-- YEAR	1996 - 2050	+/- 1	

Exit: Use the ESC button or the main switch.

6.1. Operating instructions (diagnosis box)

6.1.1. Application of diagnosis system

The diagnosis system makes it possible to read data and enter settings into the Magic de Luxe / Profi / Family coffee machines. The data set transferred to the coffee machine each time a button is pressed is contained in the diagnosis system. The data in the coffee machine can also be individually edited. The internal data set and the machine data can be printed using the built-in thermoprinter.

6.1.2 Power supply

The diagnosis device requires no batteries. Power supply is through the connection cable via the mains.

6.2. CONTROL PANEL

INIT MACHINE	The machine is initialised with the internal data set.
MACHINE DATA	The coffee machine data is indicated and can be edited.
INTERN DATA	The internal data set is indicated and can be edited.
SUBMENU	Various auxiliary functions can be called up via the Submenu (internal test programme, etc.).
CHANGE DATA flashes.	The edit mode is activated. The cursor is visible and
SAVE DATA flashing.	The changed data is saved. Exit edit mode and cursor stops
UP ARROW	Selects the previous data item in internal and machine data. The selected value is increased in the edit mode.
DOWN ARROW	Selects the next data item in internal and machine data. The selected value is decreased in the edit mode.
LINE FEED	The thermoprinter paper is moved one line forward.
PRINT MACHINE DATA	The machine data is printed.
PRINT INTERN DATA	The internal data set is printed.
ON-OFF	The diagnosis device is placed in STANDBY mode. The coffee machine is automatically turned on. When button is pressed again the diagnosis device is activated and the coffee machine automatically turned off.

6.3. OPERATION and connection of diagnosis device

6.3.1. Connection of diagnosis device

The diagnosis device is connected to the coffee machine via the cable supplied. The terminal plug is located on the printed circuit board (deluxe JP 9 / deluxe RD JP 19).

ATTENTION: Before connecting the diagnosis device, disconnect the machine from the mains and ensure that the mains power circuit of the diagnosis device is not connected.
High voltage may be transmitted through the diagnosis device plug connector pins when the cable is connected to the machine.

6.3.2 Switching on (switching off in inverse order)

1. Connect the data cable of the diagnosis box to plug JP9 of the CPU.
2. Connect the diagnosis device to the main power supply.
3. Connect the machine to the main power supply (ensure that the door of the device is closed).
4. Turn on the expresso machine.
5. Turn on the diagnosis box.

Press the ON/OFF button to activate the diagnosis device; the middle two LEDs light up on the display (grinds container and low coffee beans). The diagnosis device changes from Standby mode to machine data.

STANDING BY ....

--DIAGNOSIS BOX--
--V 1.13--

MANUAL COFFEE M
(Pulses 600)

Press the corresponding button at any time to toggle between machine data and internal data. Similarly, other functions such as print, initialise and auxiliary function can be accessed.
Press the ON/OFF button again to return to Standby mode:

STANDING BY ....

6.3.3. Editing data

Use the **MACHINE DATA** button to change to the machine data Menu. All machine data, i.e. coffee quantity, temperatures, heating parameters, flow rates and consumption rate, can be accessed and edited here. In order to distinguish the internal data sets, a light **"M"** on a dark background appears top right of display which in enlarged form resembles:

M

If the **INTERNAL DATA** button is pressed, the same data for the internal data sets can be edited. In order to distinguish this data from machine data, a light **"I"** on a dark background appears top right of display which in enlarged form resembles:

I

Use the **CHANGE DATA** button to activate the edit mode (cursor flashes). The value indicated can be changed with the arrow button. Use the Save button to memorise the changed value or another button to exit the edit mode without saving the value.
In the Royal Profi the following values are code protected when editing data.

6.3.4. Description of data

a. Product quantity:

Product description	MANUAL COFFEE
Number of turbine pulses	No. PULSES 600

The water quantity can be entered here for the three types of coffee **EXPRESSO LUNGO, EXPRESSO, COFFEE**. The value indicates the number of turbine pulses, where 300 pulses correspond to approx. 1dl.

b. Heating parameter:

Two parameters can be used to adjust heating

Description	----HEATING----
Parameter K1 or K2	PARAMETER K1 7

K1 is the value for the rate of the adjustment where a higher value indicates a steeper rate. K2 is the parameter which determines the affect of water flow rate on the adjustments. A higher value will have a lesser affect on the adjustment.
The following are used as the standard values: K1 = 7 K2 = 30

c. Temperatures:

Temperature designation	NORMAL TEMP.
Value in degrees Celsius	° C 86

Five different temperatures can be set. The standard values are provided on Page 10.
Normal temperature is used when several coffees are made. If no coffee is made for an extended period, the machine heats to a higher temperature after about 6 minutes to compensate for the cooling of the central unit when the next coffee is made.
The cold start temperature is used for the first coffee made after the machine has been turned on in order to heat all elements as fast as possible.
The temperature for steam operation is entered separately using the Steam Temp. parameter.
A temperature increase option is also available. This value is added to the current temperature during dosing and upward movement of the brewing unit. The thermoblock is heated once again to create a hot flow in the aluminium structure.

d. Ground coffee residue:

Current count or minimum	GRINDS COUNTER
Amount of coffee grinds	8

A counter adds the number of coffees prepared since the last time the grinds container was emptied. The maximum value (grinds minimum) can be set. The grinds container emptying indicator signals when this value is reached.

e. Counter:

Counting mode	TOTAL COFFEE
Unit and value	0

The machine performs various statistical calculations which have the following meaning:

Count type	**Meaning**
TOTAL COFFEE	Total of all coffee cycles, cannot be reset
TOTAL WATER	Total water quantity (in ml) flowing through machine. Cannot be reset.
TOTAL DESCALING	Total water quantity (in ml) flowing through machine since last descaling, cannot be reset.

f. Flow rates:

Description	**--HOT WATER---**
Operating mode and value	**FLOW (L/H) 20**

The **pump delivery rate** for hot water can be expressed in litres per hour. A value under the item Pump Delay, can be entered to adjust the pump setting. This value is used at the start for the phase angle control of the pump. The control unit changes this value until the required flow rate is reached. The changed value is saved by the machine at the end of the hot water dispensing process. Pump tolerances can thus also be adjusted.

Description	**--DESCALING---**
Operating mode and value	**FLOW (L/H) 8**

A specific flow rate adjustment (8 l/h) applies to the descaling process and a corresponding pump adjustment.

g. Water hardness:

Description **WATER HARDNESS**
Value **3**

The water hardness can be set at four levels. Depending on the setting, a different quantity of water flows through the machine until it requires descaling.

The following levels apply:

Level 1 approx. 80 L water
Level 2 approx. 150 L water
Level 3 approx. 300 L water
Level 4 approx. 500 L water

h. Machine status:

Description **MACHINE STATUS**
Value **36**

This value provides information on various statuses of the machine. The value is expressed in binary code. At initialisation of the machine this value of 36.

MAGIC :

- Water low	Bit0	$2^{\circ} = 1$	If the machine status is
- Pre-grinding on/off	Bit1	$2^{1} = 2$	36, the following Bits apply:
- Heating plate on/off	Bit2	$2^{2} = 4$	
- Doser full/empty	Bit3	$2^{3} = 8$	Bit2 + Bit5 $\Rightarrow$ 4 + 32 = 36
- not allocated	Bit4	$2^{4} = 16$	
- Standby mode on/off	Bit5	$2^{5} = 32$	
- Steam dispensed	Bit6	$2^{6} = 64$	

i. Date of manufacture

Description **--DATE OF MANUF---**
Day, month and year **MONTH 9**

This date indicates the date on which the machine was manufactured. This date cannot be changed, printed.

f. Service date:

Description **--SERVICE DATE--**
Day, month and year **MONTH 9**

The service date indicates the date of the machine's last service. This date can be changed and must be updated at each service.

6.3.5. Machine initialisation

Press the INIT MACHINE button to initialise the machine with the internal data set. All data from the internal memory will then be transmitted to the machine memory.
Once the data has been transferred, the following will be displayed:

- PROGRAMMING
- SUCCESSFUL

If an error occurs during initialisation, the display will indicate the following flashing message:

-NOTE EEPROM
---WRITING ERROR---

The display flashes until a button is pressed. The following message appears:

- PROGRAMMING
- UNSUCCESSFUL

Another function can be selected by pressing the corresponding button.

6.3.6. Auxiliary functions

The SUBMENU button can be used to recall various auxiliary functions via the following submenus:

1 DISPLAY TEST *
2 PRINTER TEST
3 LANGUAGE
4 INIT INTERN
5 CORRECTIONS
6 EXIT

Using both arrow buttons, one of these auxiliary functions can be selected. The asterisk in the right display margin will be positioned near one of the functions and activated with the SAVE button.

a. Display test:

This function starts a test routine for the display, control panel and printer. All indications for this test appear on the display.

b. Printer test:

The printer function test is activated here. Use the ON/OFF button to cancel the test (press for extended period).

c. Language:

This function selects one of the languages available for the display and printer texts. German, French, Italian, English, Spanish and Portuguese are available.

d. Init. intern:

This function indicates the standard values of the internal data set. These must be checked and adapted to the current production values.

e. Corrections:

The number of independently performed programme corrections in EEPROM can be called up here. The EEPROM machine corrections appear first and when a button is pressed, the internal EEPROM corrections are displayed. Press the button again to exit. If the machine is not connected to the diagnosis device, only the internal EEPROM corrections are shown.

f. Exit:

Use the SAVE button to exit the submenu without recalling the function.

6.3.7. Printing

Use the PRINT MACHINE DATA button to print all machine data (only when the machine is connected). The data of the internal data set can be printed by pressing the PRINT INTERN DATA button.

6.3.8. Paper load

The diagnosis device must be connected in order to load the paper. After connecting the diagnosis device, press the LINE FEED button. As the printer operates, the paper is drawn into the paper slot. As soon as the printer is able to draw the paper independently, the paper is released. Release the LINE FEED button when about 5 mm of the paper is visible.

ATTENTION: Only special thermopaper 37 mm wide can be used. The paper can only be printed on one side. The printing head can be damaged if the printer is started without paper. Therefore, before commencing a print run, check that there is sufficient paper. The end of the paper roll is indicated with a red stripe running along the paper.

CHAPTER 6
FAULTS

1. Faults:

The following table indicates the most common faults, listed by component.

Part	Fault	Cause
Electronics	Do not function Indicator light contactor does not turn on (no display)	SI on mains filter (Magic old) defective
		SI on electronic system (Magic Silicone) defective
		Electronic system defective
		Door switch defective
		Main switch defective
Heating system	Cold coffee Standby LED lights up continuously	KTY defective
		Electronic system defective
	Temperature differences No froth	KTY defective
		Electronic system defective
	Heating remains cold Standby LED does not light up	Heating - Interruption
		Heating plug connection
		Thermal fuse
		Fusible cut-out
Doser	Water instead of coffee	(No grinder function) Doser switch constantly activated / Dirt
		Defective doser rinse
	Weak coffee	Dose quantity too low
		Dose chamber - coffee residues
	Fault LED (coffee beans low) lights up constantly - Brewing unit overfull - Gearmotor obstructed	Doser switch does not work
		Electronic system defective

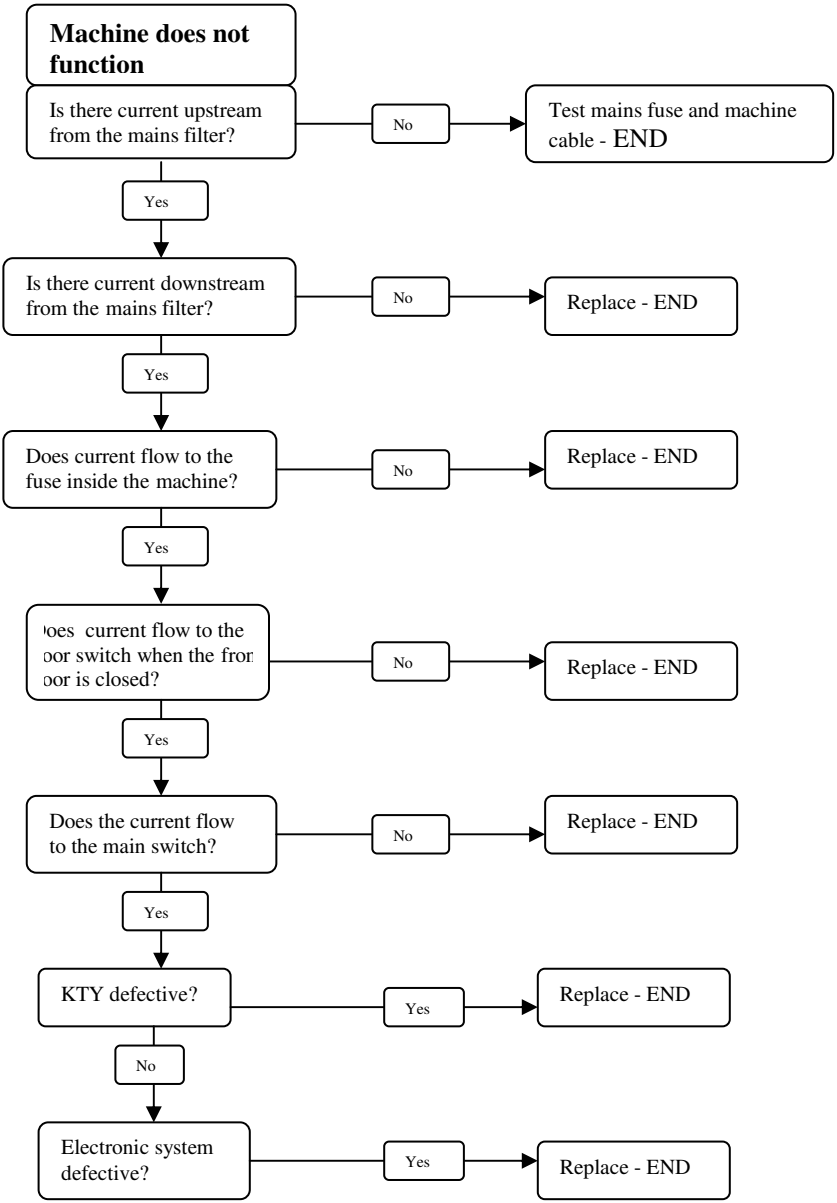
Part	Fault	Cause
Grinder	Coffee too strong / flows too slowly	Grind set too finely
	Coffee too weak / flows too fast, no froth	Grind set too coarsely
		Grinder motor not properly installed
	Grinder functions until fault LED (coffee beans low) lights up (insufficient beans in bean container)	Grinding disc worn
		Water in grinder
		Grinding set too finely
	Grinder does not work	Motor defective
		Electronic system defective
		Doser switch constantly activated
Gearmotor	Brewing unit malfunctions - does not move to home position	MS defective
		Motor defective
		Cup warmer defective
		Fusible cut-out Cup warmer defective
		Gear wheel defective
		Electronic system defective
Brewing unit	Sluggish / obstructed	Plunger stiff
		Piston O-ring swollen
		Gasket of valve plug swollen (black O-ring)
		Grinding too coarse
		Over-dosage
HWS system	HWS valve does not open (no water or steam dispensing possible)	Securing tab on tea nozzle spout broken / bent
	Water drips from steam pipe (with closed valve)	Valve gasket calcified
	Water drips from steam pipe shaft	Fracture in steam pipe
	Water leakage from HWS spout	Defective O-ring
	Water leakage at joint	Defective O-ring
		Hairline crack in HWS valve threaded joint

Part	Fault	Cause
Overpressure valve	Varying cup filling volume	Overpressure valve does not seal / calcified
	More water in drip tray	
Pump	Dry coffee in dregs drawer / water low indicator (fault LED)	Defective pump
		Thermal fuse defective
	Water leakage at overpressure valve threaded joint	Hairline crack in joint area
Turbine	Varying coffee quantity Water low indicator flashes	Turbine calcified / other deposits
		Hall sensor defective
Float	Water low indicator lights up (water level over reserve)	Float not watertight
		Float jammed
		Magnet in float too weak
		Electronic system defective

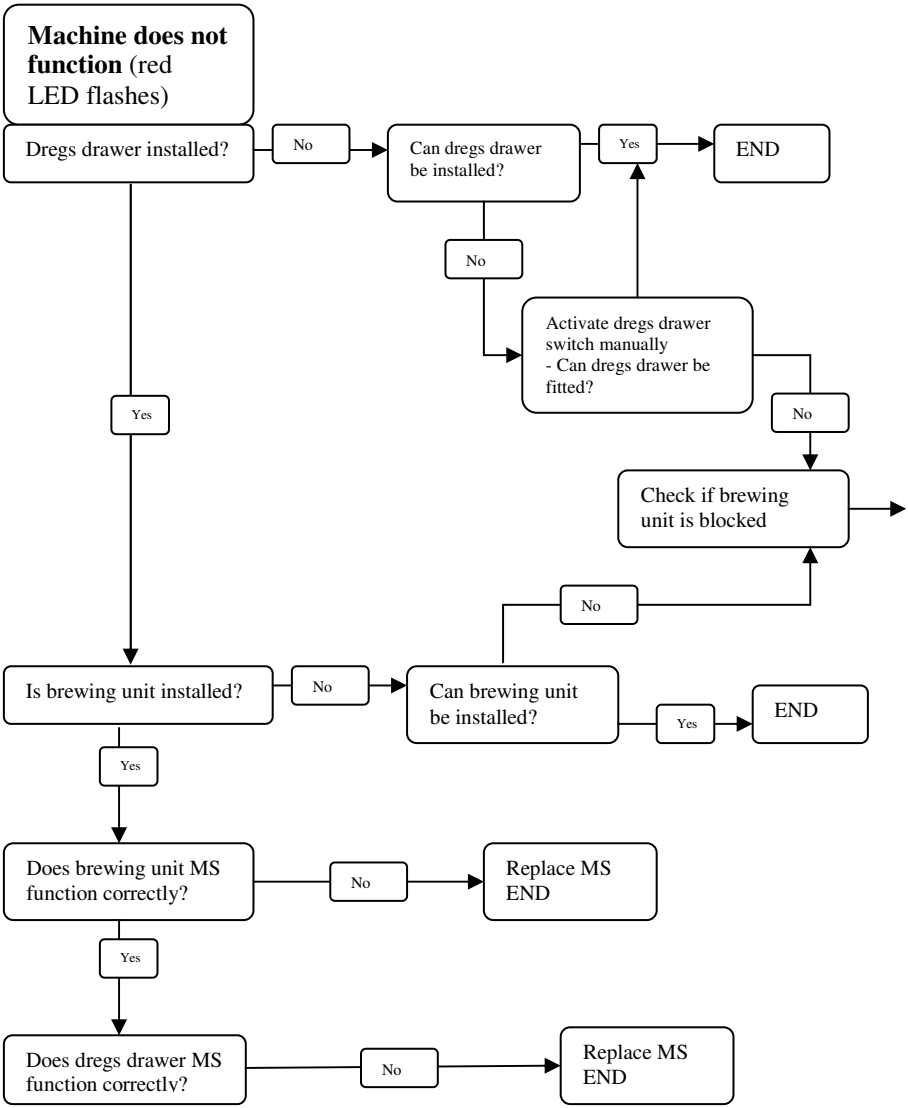
CHAPTER 7
FAULT DIAGNOSIS

1. Fault diagnosis (Magic Roma)

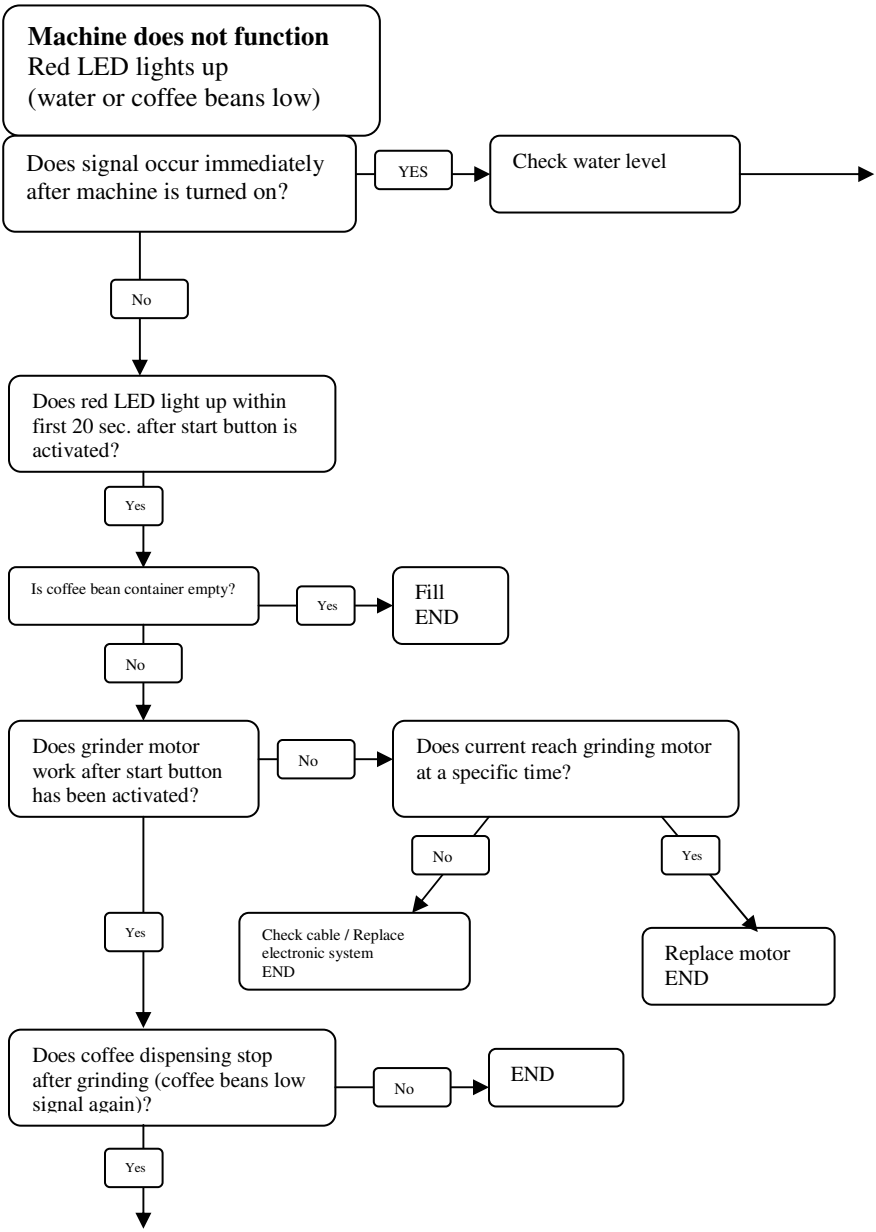
1.1 Machine does not function

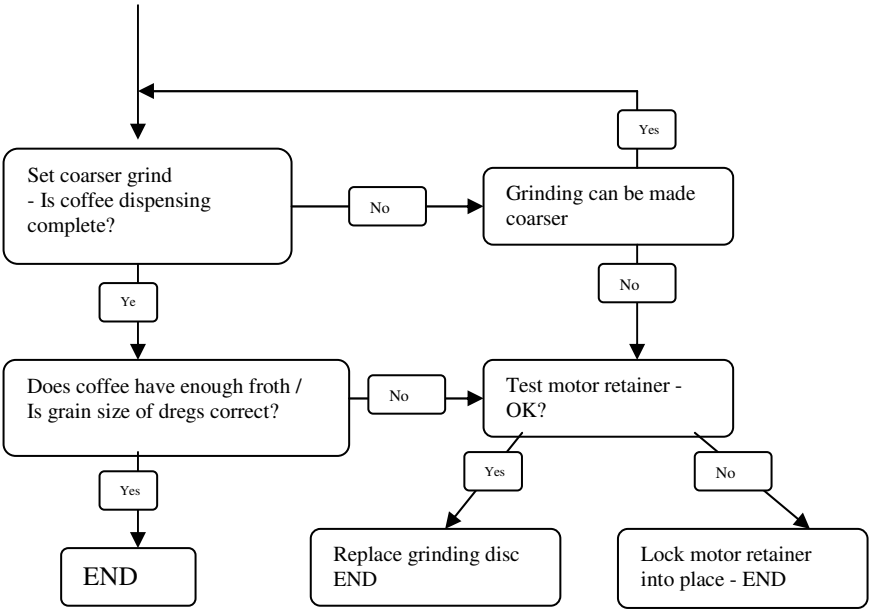


1.2. **Machine does not function** (red LED flashes)

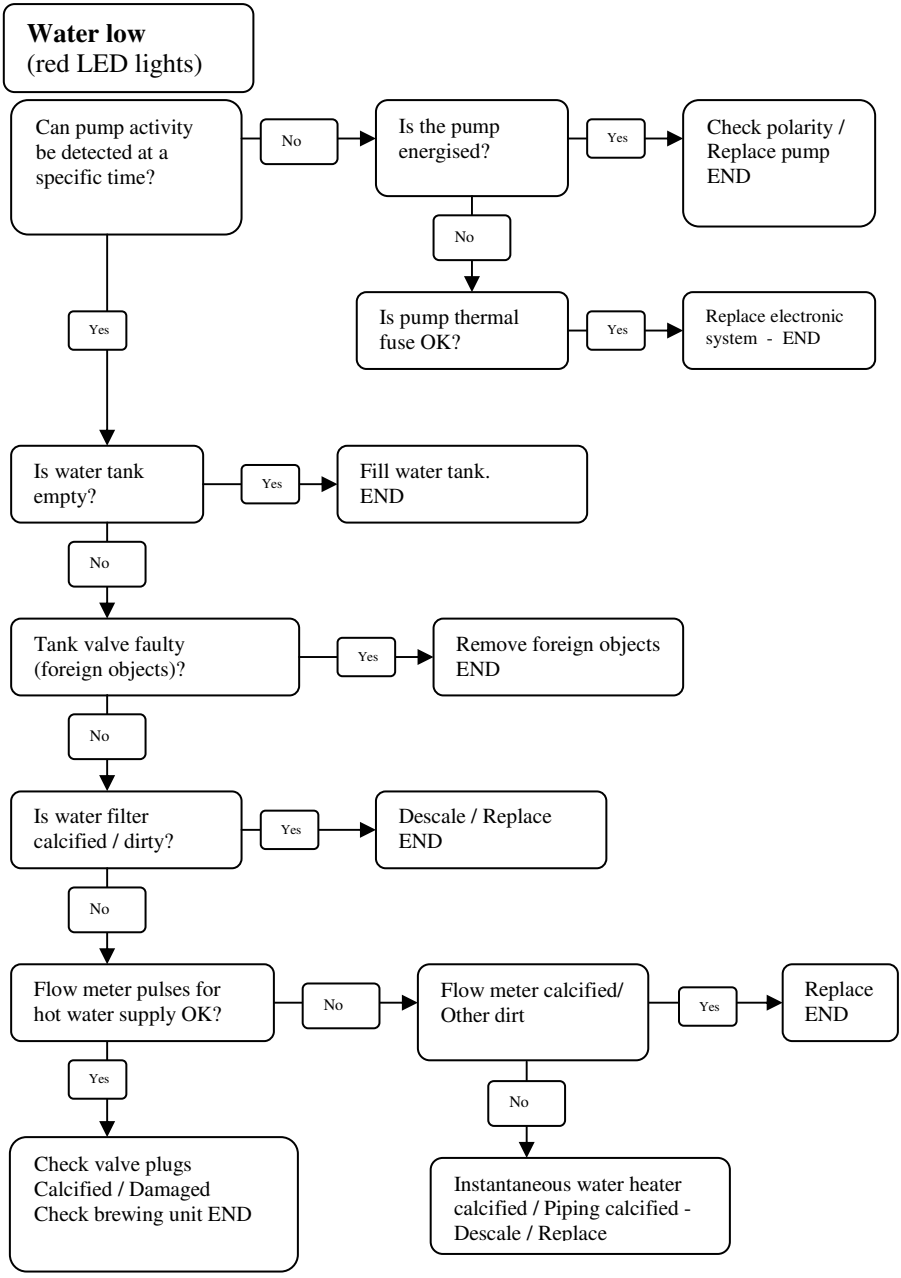


1.3. Machine does not function (red LED lights up)

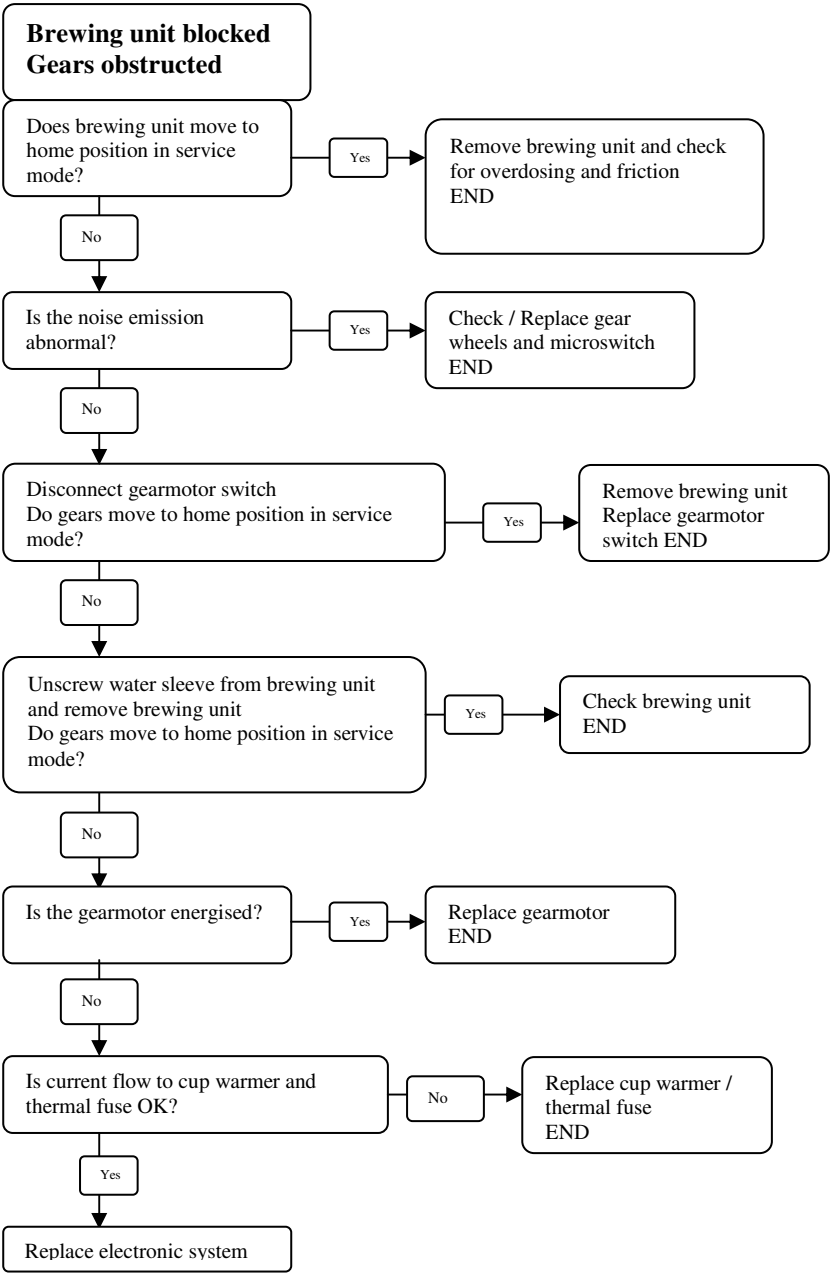



Yes
Set coarser grind
- Is coffee dispensing
complete?
No
Grinding can be made
coarser
No
Ye
Does coffee have enough froth /
Is grain size of dregs correct?
No
Test motor retainer -
OK?
Yes
Yes
No
END
Replace grinding disc
END
Lock motor retainer
into place - END

1.4. Water low (red LED lights up)

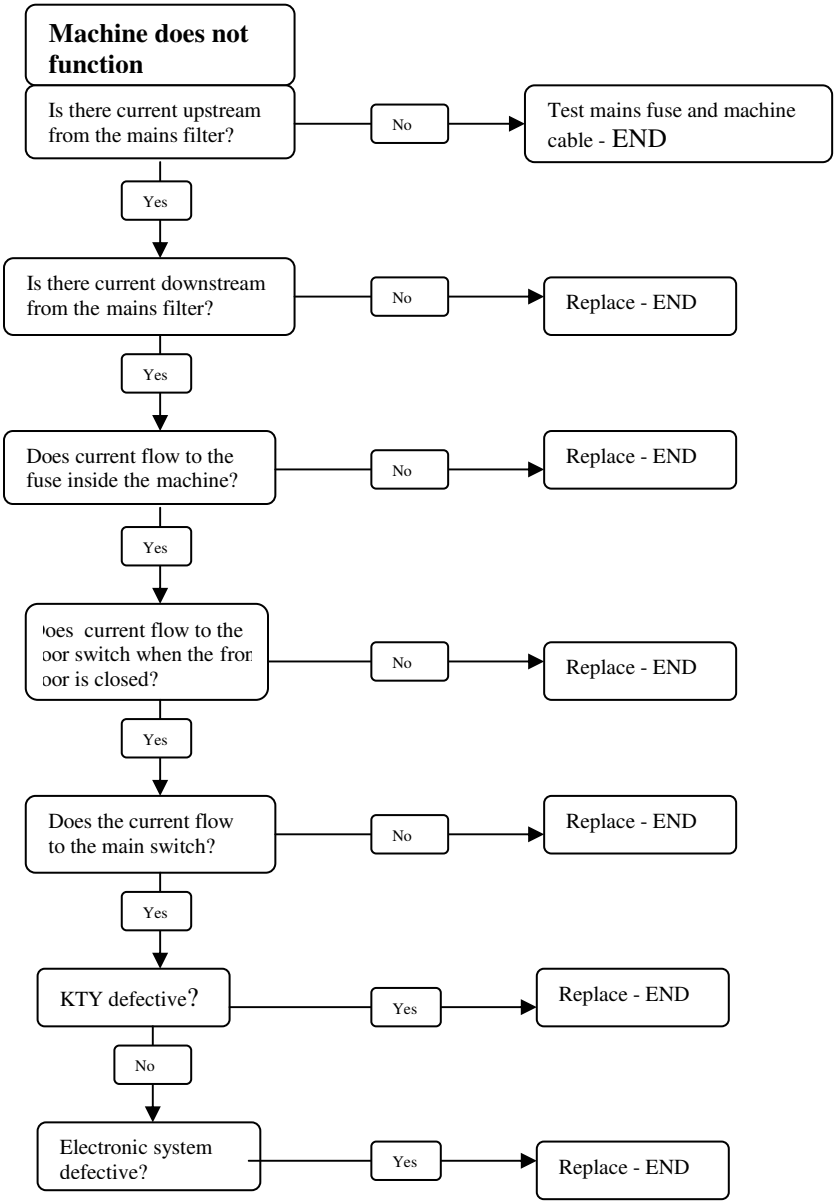


1.5. Brewing unit blocked / Gears blocked

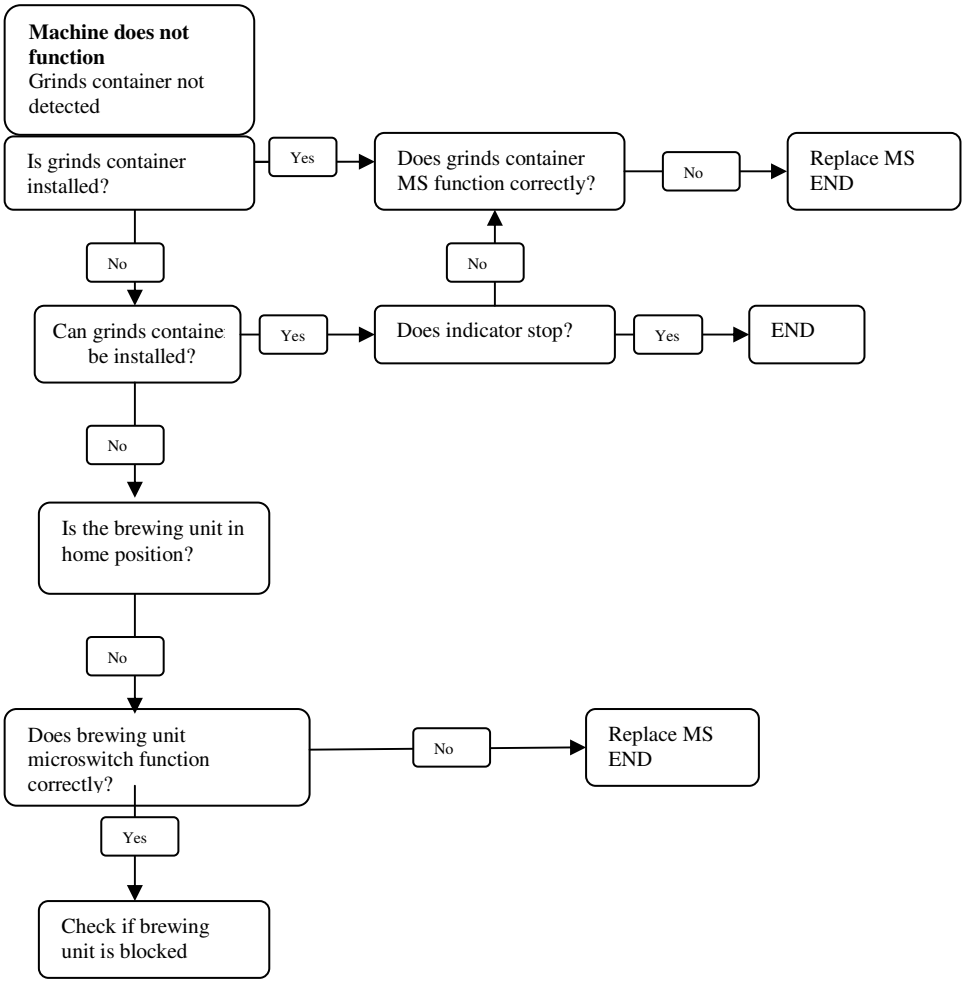


2. Fault diagnosis (Magic de luxe, Comfort and Comfort+)

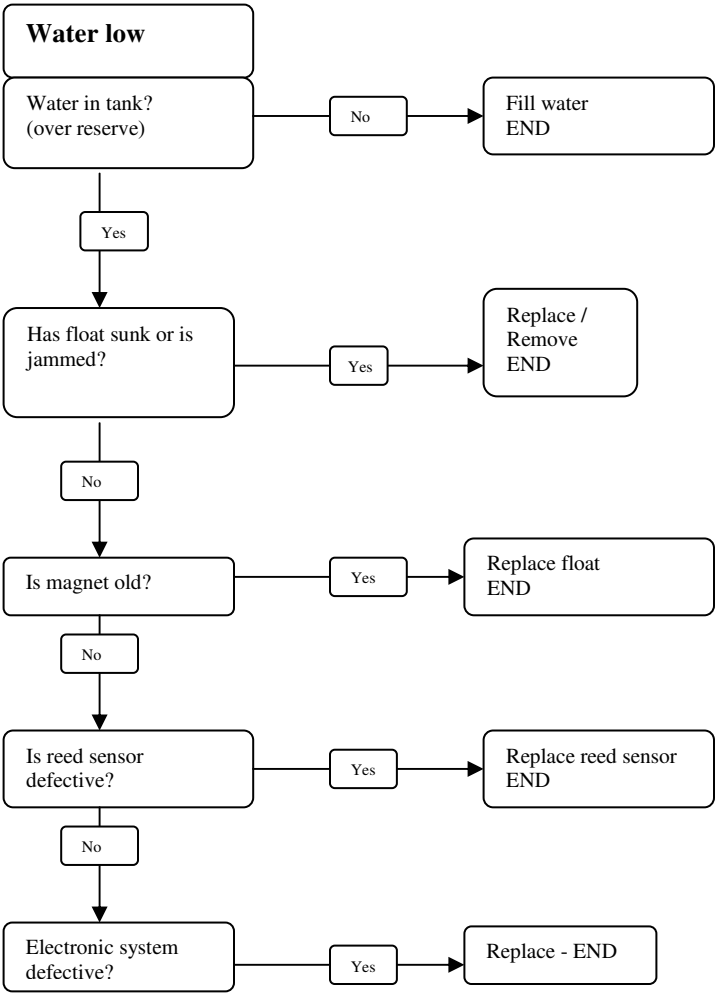
2.1. Machine does not function



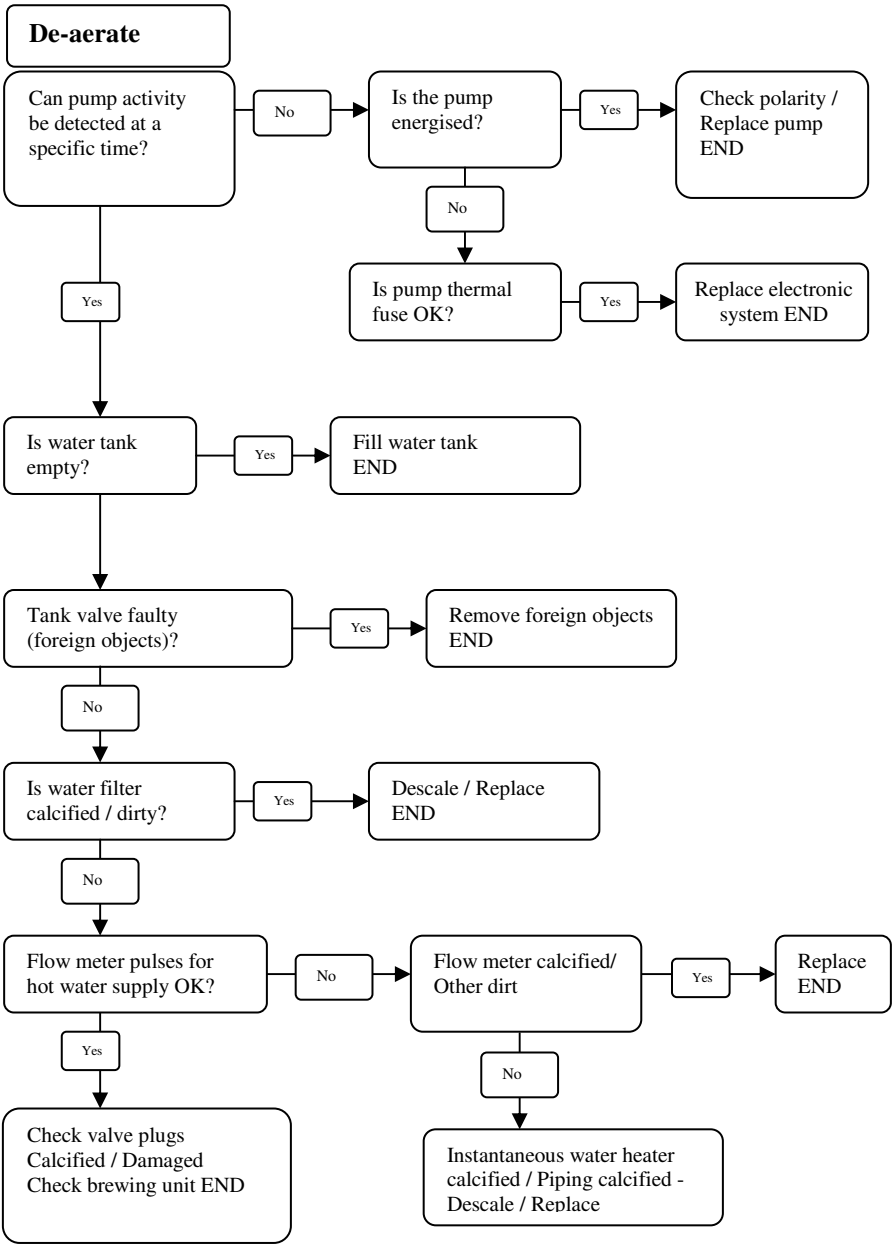
2.2. Machine does not function (Indicator: grinds container not detected)



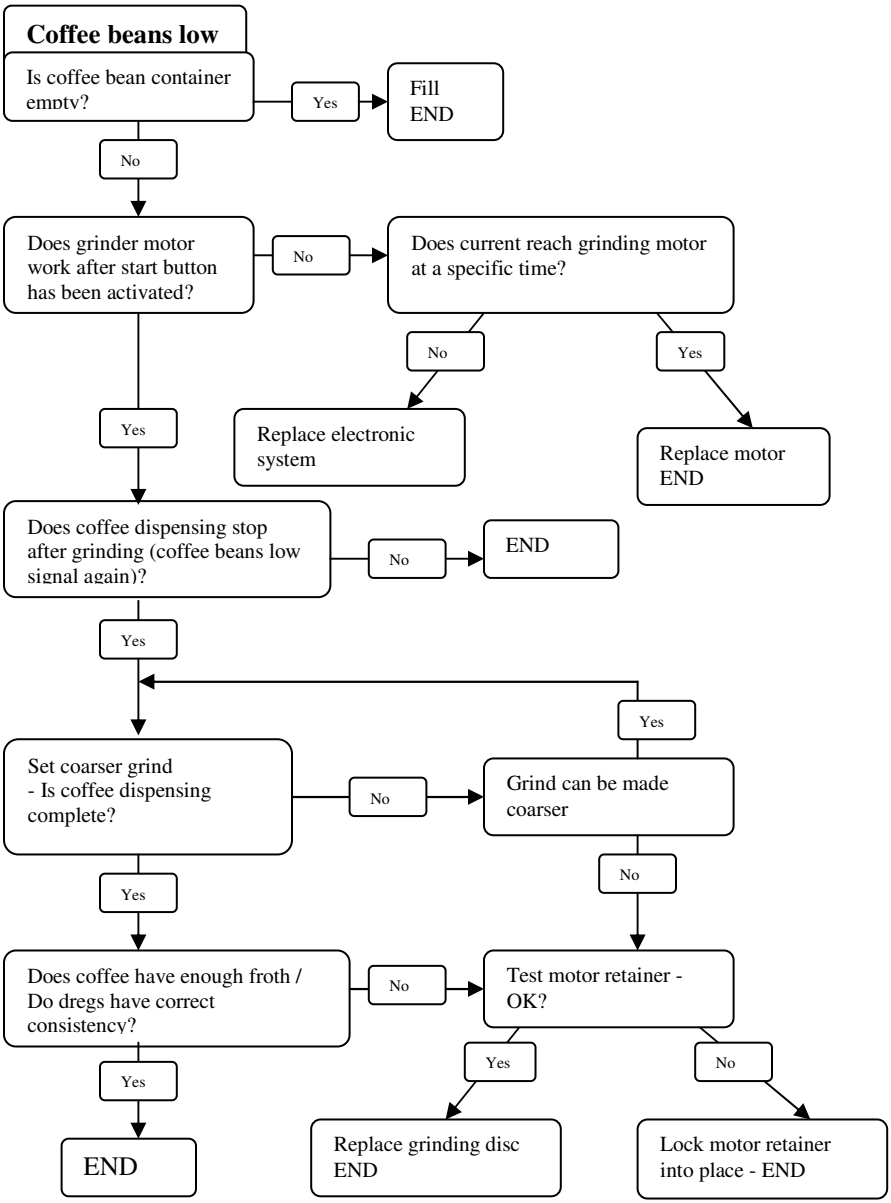
2.3. Water low


Water low
Water in tank?
(over reserve)
No
Fill water
END
Yes
Has float sunk or is
jammed?
Yes
Replace /
Remove
END
No
Is magnet old?
Yes
Replace float
END
No
Is reed sensor
defective?
Yes
Replace reed sensor
END
No
Electronic system
defective?
Yes
Replace - END

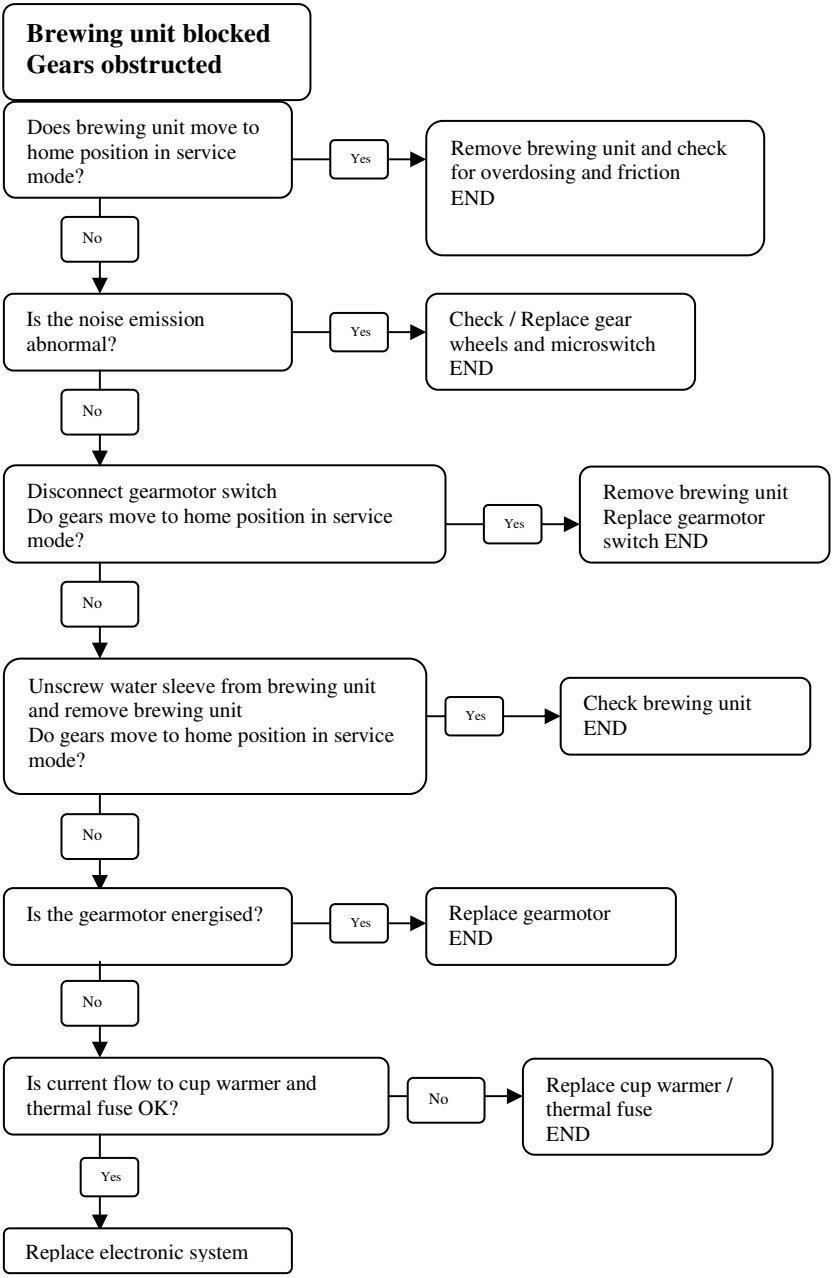
2.4. De-aerate


De-aerate
Can pump activity be detected at a specific time?
No
Is the pump energised?
Yes
Check polarity / Replace pump END
No
Is pump thermal fuse OK?
Yes
Replace electronic system END
Yes
Is water tank empty?
Yes
Fill water tank END
Tank valve faulty (foreign objects)?
Yes
Remove foreign objects END
No
Is water filter calcified / dirty?
Yes
Descale / Replace END
No
Flow meter pulses for hot water supply OK?
No
Flow meter calcified/ Other dirt
Yes
Replace END
Yes
Check valve plugs Calcified / Damaged Check brewing unit END
No
Instantaneous water heater calcified / Piping calcified - Descale / Replace

2.5 Coffee Beans Low indicator



2.6. Brewing unit blocked / Gears blocked



CHAPTER 8
REPAIRS / SERVICE SCHEDULE

1. Repairs schedule:

The repairs schedule, together with the service schedule, lists all relevant activities to be performed in an efficient sequence.

	Activities
1	Visual check (transport damage)
2	Record of machine data
3	Functional check / Error analysis
4	Opening of machine
5	Visual check (leakages)
6	Mechanical systems check (functional test)
7	Defect detection
8	Modifications check
9	Service operations according to service schedule
10	Internal cleaning
11	Functional test (with open machine / leakage test)
12	Assembly
13	Final test according to test schedule
14	Steam off (winter)
15	External cleaning
16	Lubrication of brewing unit
17	Insulation test
18	Documentation

2. Service schedule:

Service activities

R = Replace C = Clean VC = Visual check
AT = Acoustic test D = Descale A = Adjustment

Component	**Activity**	**Equipment**
Water filter	R	
Lip seal / Water tank	R	
Coffee return flow valve	R	
Valve spring	R	
Valve plug O-ring	R	
Valve plug O-ring	R	
Filter (brewing unit)	C / VC	Fat solvent
Hose connections	VC	
Pump	VC / AT	
Gearmotor	AT / VC	
Grinder	C / A	Vacuum cleaner / brush
Doser	C	Vacuum cleaner / brush
Water circuit	D	Descaler (Saeco)
HWS valve	VC / R	
Water outlet (valve plug)	C	Fat solvent / brush
O-ring (boiler connection / instantaneous water heater)	R	

3. Final test:

Test	Procedure	Equipment	Instruction	Tolerance
Cup fill volume	2-3 cups on expresso setting	Measuring beaker	Equal quantity	15%
Cup fill volume	2-3 cups on coffee setting	Measuring beaker	Equal quantity	15%
Noise emission			Empirical value Standard noise	
Froth quantity	Carefully froth coffee in cup until froth separates		Froth cover must subsequently close fully again	
Froth colour			Textured light brown	
Temperature	Measurement of dispensed coffee stream	Temperature - measuring device	84 °C	± 4 °C
Grinding level	Check grain size of coffee grinds		See Training	
Hot water	Dispense hot water			
Steam function	Dispense steam			
Water Low indicator	Remove tank		Fill water tank indicator	
Grinds Container Absent indicator	Remove grinds container		Grinds Container Absent indicator	
Coffee Beans Low indicator	Start coffee programme - coffee bean container empty		Coffee Beans Low indicator	
Insulation test			HG 701	

CHAPTER 9
DISASSEMBLY

1. Disassembly of the housing

a) Remove: Driptray, dreg drawer, water tank and brew unit.
b) Unscrew the bean container by removing the two screws (1). New models may have a additional housing screw below the bean container to be unscrewed.
c) Remove the two screws (2) below the water tank (Torx/T10).

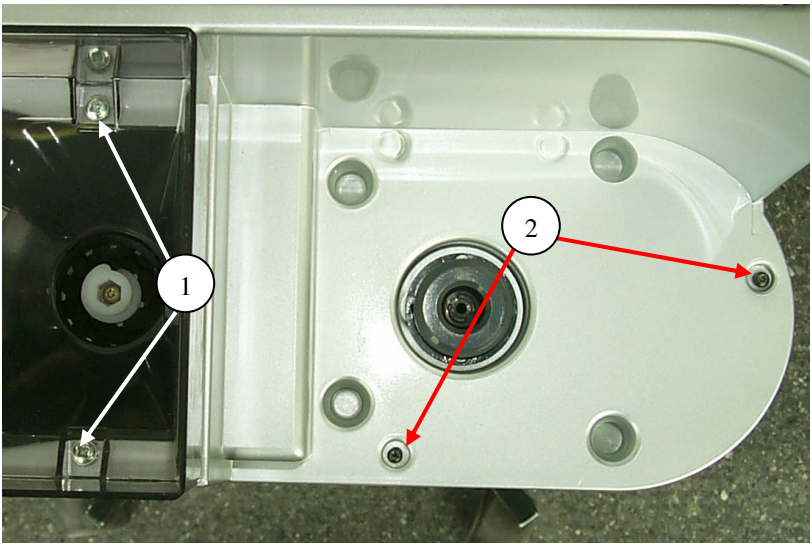


Fig. 1

d) Remove the two bottom housing screws (1).

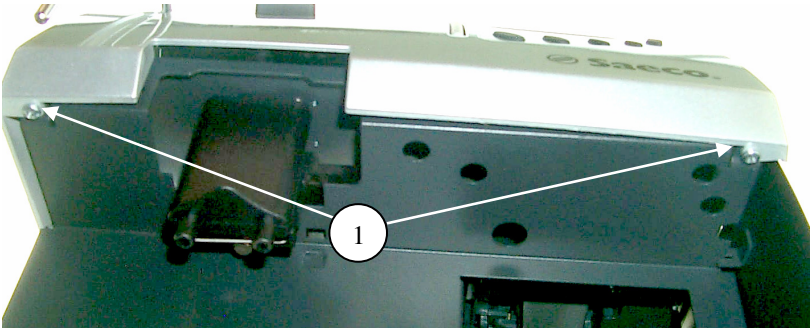


Fig. 2

e) Release the two hooks by using a screw driver (1).Remove the grinder setting lever (2) carefully in order not to break the fixing hooks.

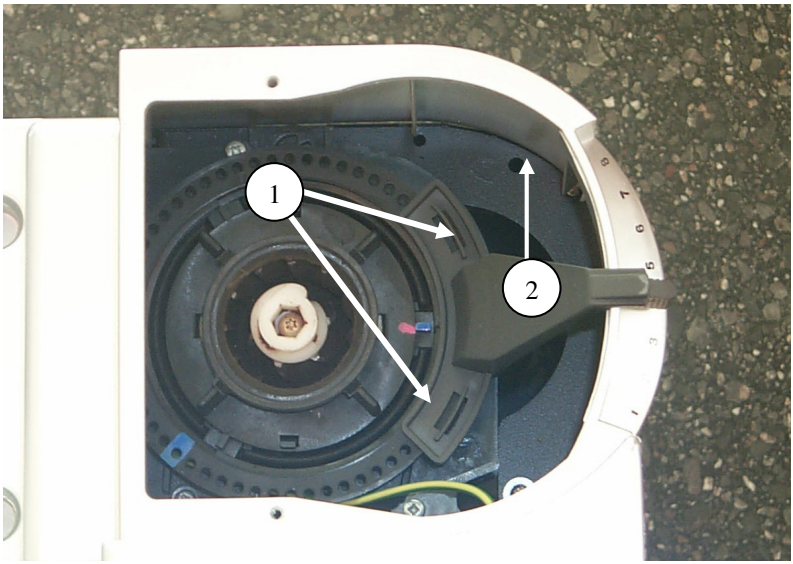


Fig. 3

f) Lift the housing at the rear side and pull water hose off. Than remove the housing. **When reassembling make sure, that the water hose is connected correctly!**

2. Disassembling the electronic system

a) Number the connections on the control board and remove.

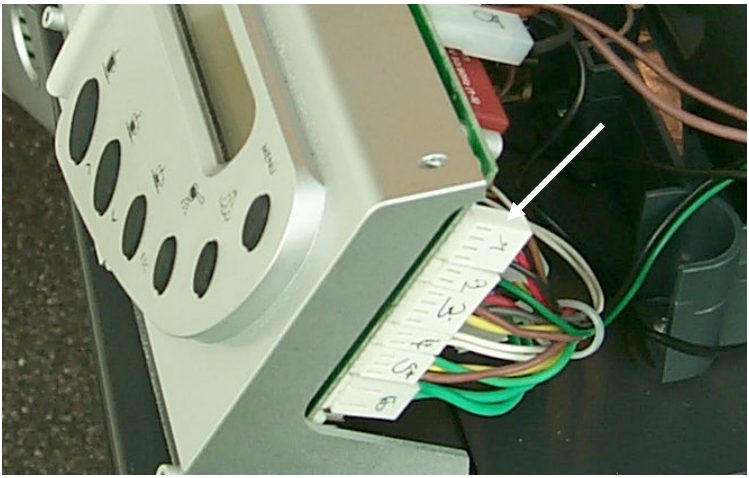


Fig. 4

b) Unscrew the electronic system by removing the two fixing screws (1) and remove.

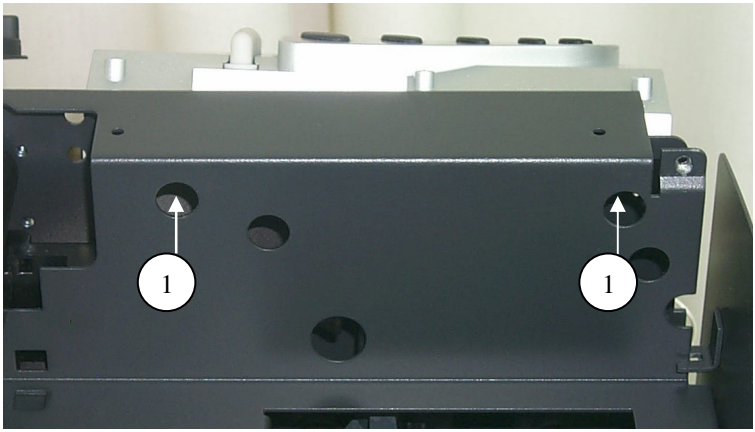


Fig. 5

3. Disassembling the doser

a) Unscrew the doser cover by removing the screw (1).

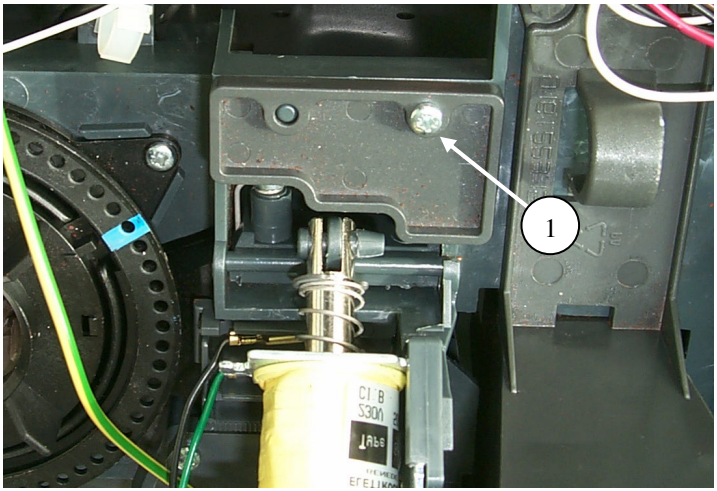


Fig. 6

b) Using a screwdriver, release the fastening tab (1) and push dosing magnet out of its fitting.

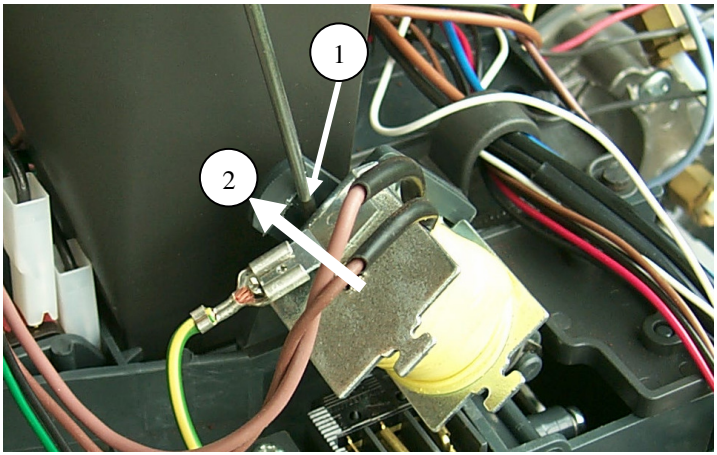


Fig. 7

c) Using a screwdriver, first push the doser flap out of the open end (1). Than slide it out of the closed bearing (2) and remove.

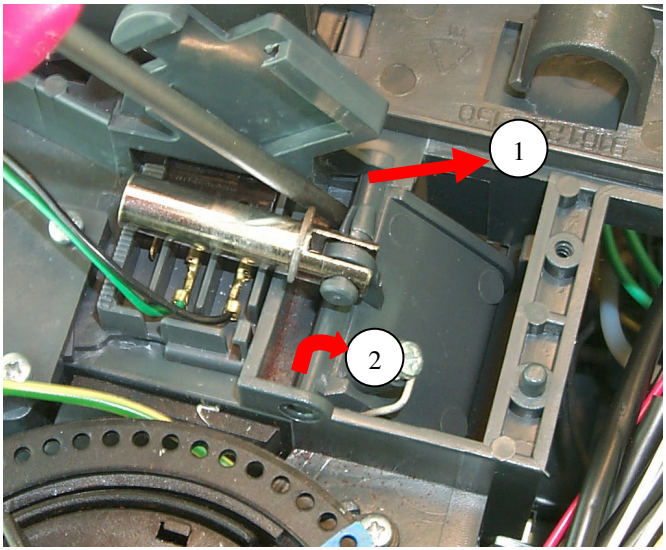


Fig. 8

4. Disassembling doser switch

a) Push the powder coffee compartment in direction of the arrow (1) and lift it (2). Carefully pull out the two rubber holders (3).

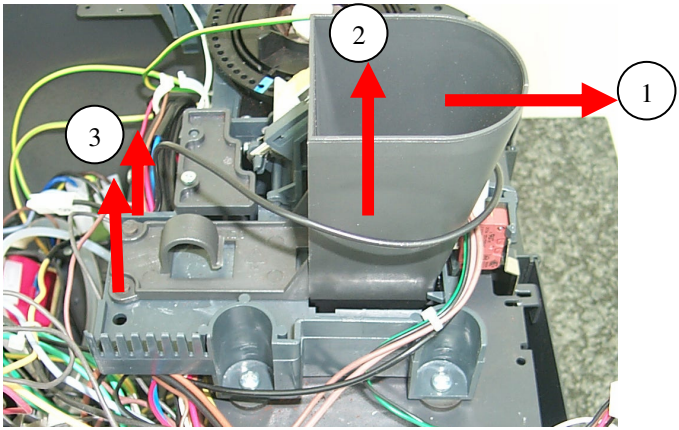


Fig. 9

b) Disconnect the switch. Lift the doser switch using a screwdriver (1) and push it out of ist fitting (2).

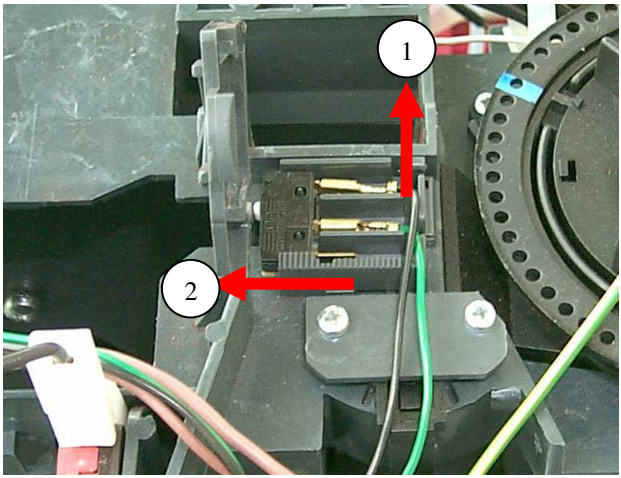


Fig. 10

5. Disassembling the grinder

a) Turn the grinding adjustment ring (1) counter clockwise until the three lugs of the grinding disc fitting (2) are clearly visible and remove the upper grinding disc from the grinder. Using a vacuum cleaner remove the ground coffee.

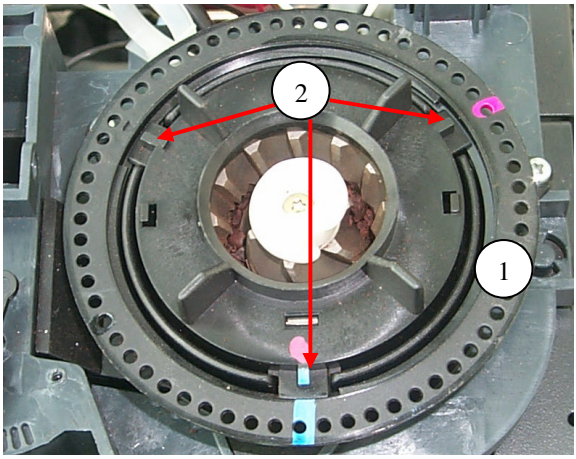


Fig. 11

b) Remove the fixing screw (1) of the grinding cone (note: left thread).
c) Carefully remove the grinding cone (2) (take care of balls and springs of friction clutch).

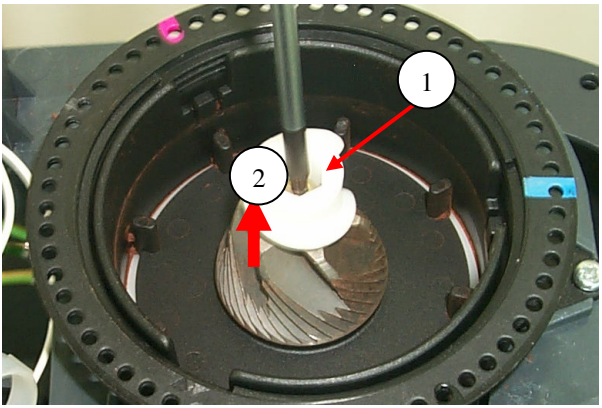


Fig. 12

d) Carefully remove the clutch disc.

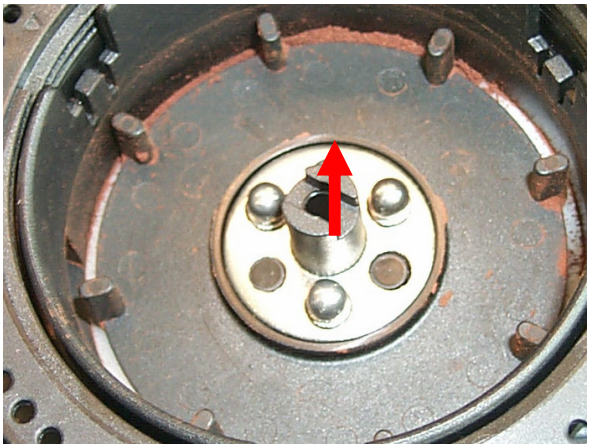


Fig. 13

e) Remove: Balls, springs and rubber drivers. The sealing felt (1) can then be cleaned or exchanged. (Same steps have to be performed when exchanging the Grinder motor)

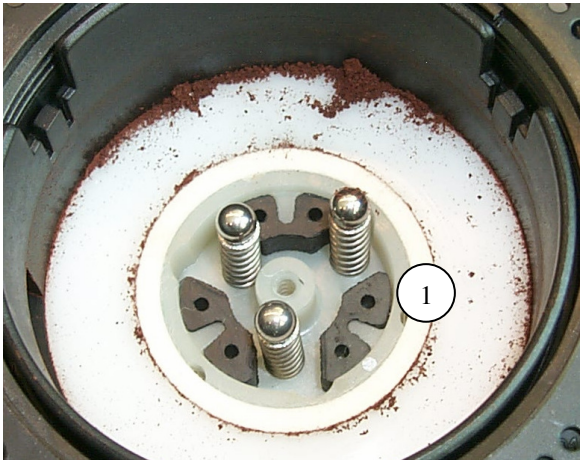


Fig. 14

6. Adjusting the grinder

a) Install the grinding ring onto its fitting so that the marking (1) on the grinding adjustment ring and the ring fitting (2) are adjacent to one another.

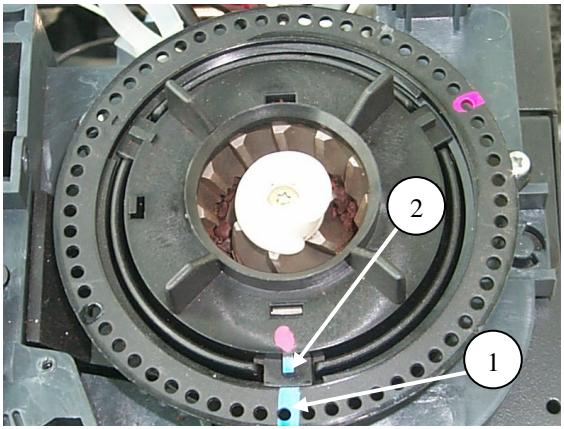


Fig. 15

b) Turn the grinding adjustment ring (1) clockwise until a certain friction can be felt.

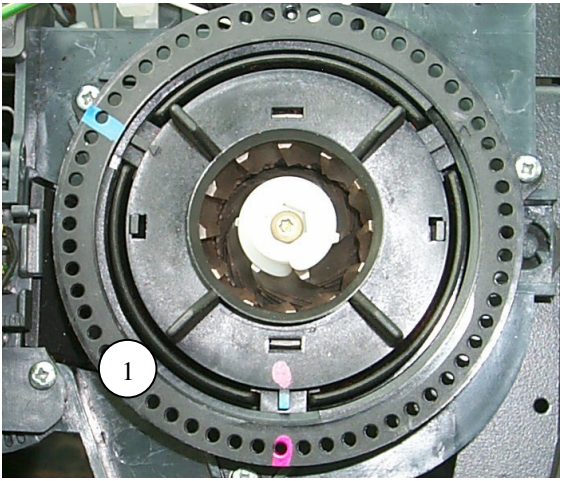


Fig. 16

c) Turn about 12-14 notches in an anti-clockwise direction and check the grind level by making a test coffee (Crema / dregs grain size). Adjust the grind level as required (max. 3-5 notches). Attach the housing and mount the lever in position 5.

7. Disassembling the grinder motor

a) If the motor has to be exchanged perform according to description 6. Disassembling the grinder first. Remove the three fixing screws (1), and set the doser switch to max position.

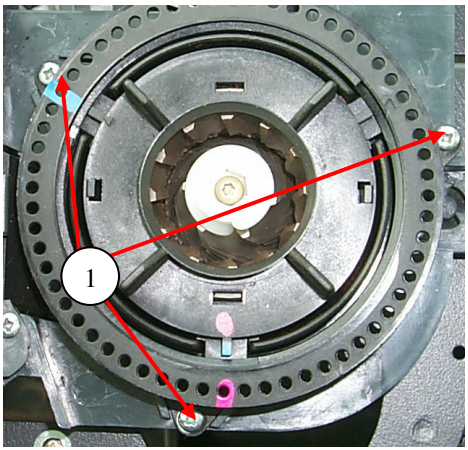


Fig. 17

b) Lift the motor and disconnect the connectors (1).

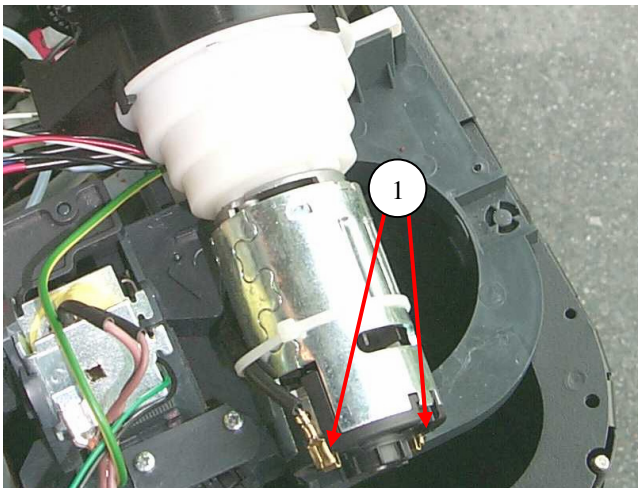


Fig. 18

c) Remove the securing ring if there is one (not in all machines), unhook the three tabs and seperate the upper part from the motor/gear assy (the motor is alwasy delivered with the gear).

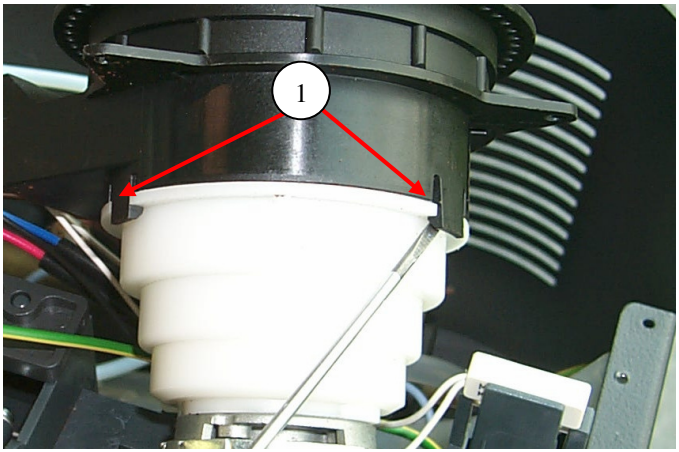


Fig. 19

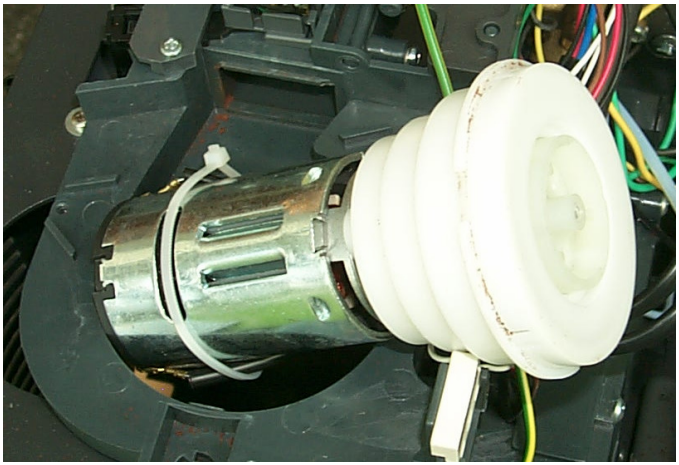


Fig. 20

8. Disassembling the instantaneous water heater

a) Remove the hose clip of the HWS-valve (1) and the instantaneous water heater (2) and remove the Water hose.

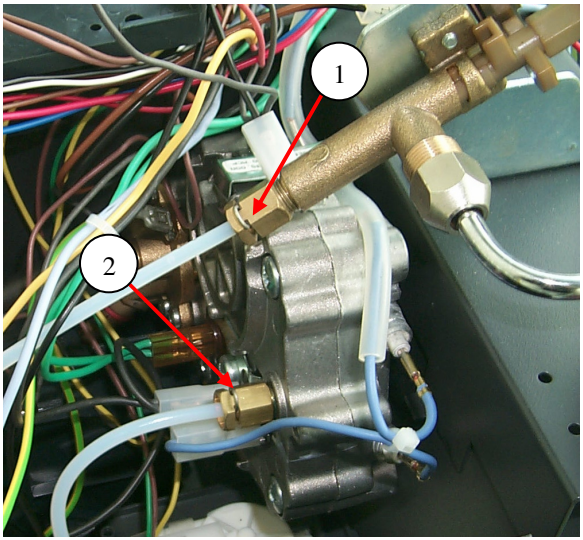


Fig. 21

b) Remove the two fixing screws (1) of the instantaneous water heater (new version / boiler J is fixed with 3 screws).

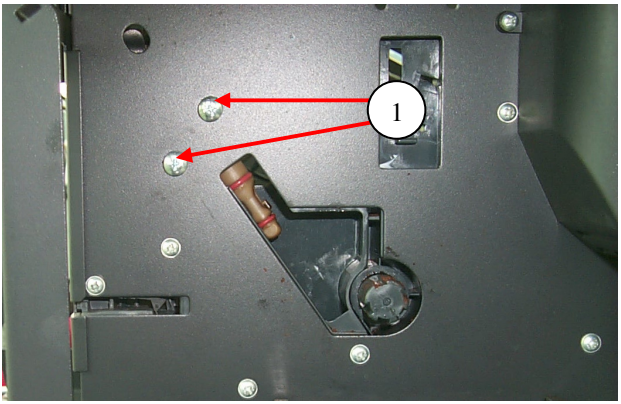


Fig. 22

c) Lift the heater out of the machine and exchange parts as necessary. In order to exchange the thermostat or the sensor, remove screw (1) and the fixing clamb.

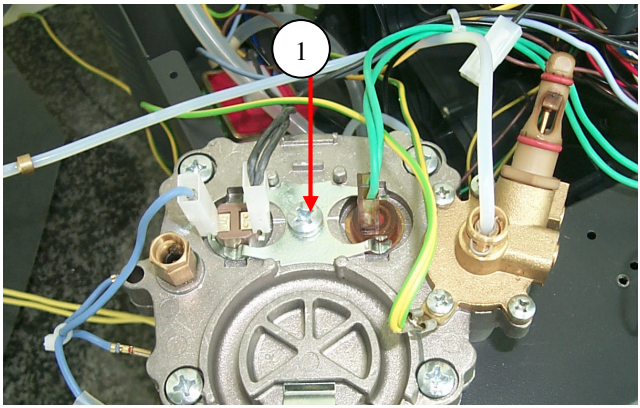


Fig. 23

d) Attention: The metal cylinder (Fig. 24/1) of the thermal sensor (KTY) must be transferred from the old sensor to the new sensor when the sensor is replaced!.

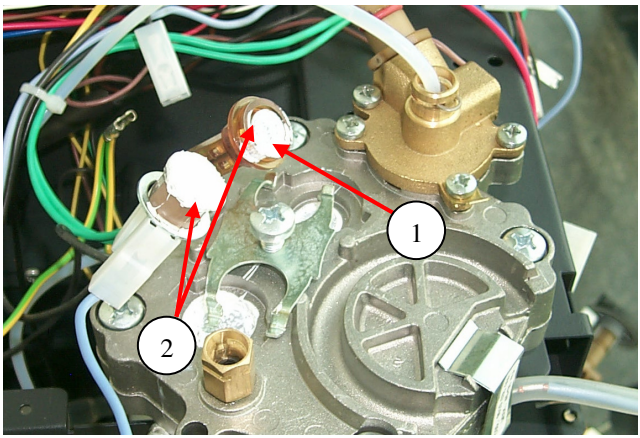


Fig. 24

e) When re-assembling ensure that sufficient heat conductive paste is used (Fig. 24/2).

9. Disassembling of the gear

a) Remove the housing
b) Remove loosen the instantaneous water heater
c) Remove the gear fixing screws (1).

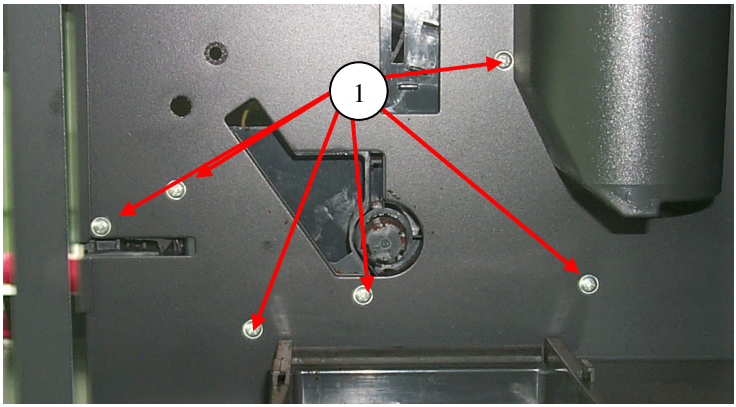


Fig. 25

d) Remove the gear by lifting it a bit – pulling out the bottom side of the gear first, and thereafter the upper side. Unscrew the screws of the gear cover and remove the cover.

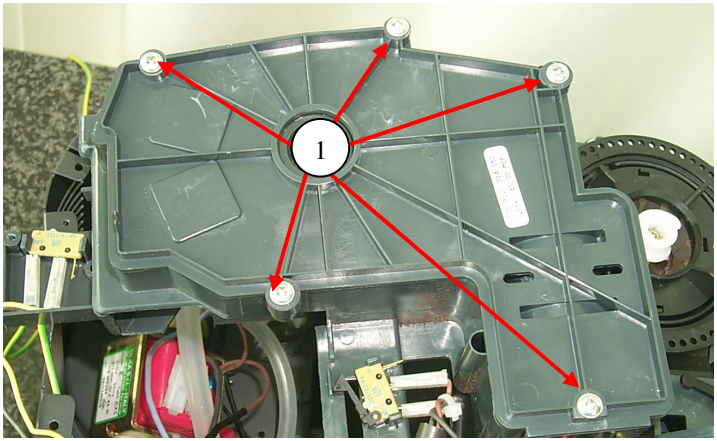


Fig. 26

e) Replace parts as necessary.
f) When replacing the gear wheel ensure that the arrow on the large gear wheel points towards the achsle of the small gear wheel. The brewing unit cannot be installed in this position. (Install all components, switch on machine - gears go to home position - install brewing unit.) The small gear wheel can be assembled as required

a) Micro switch brew position
b) Micro switch home position
c) Micro switch dreg drawer
d) Micro switch brew unit

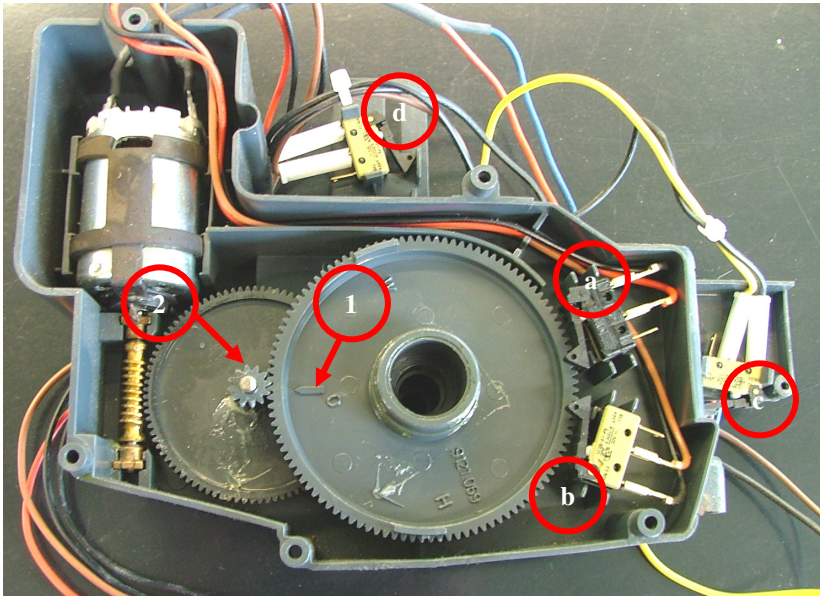


Abb. 27

10. Assembly/adjustment of instantaneous water heater

a) Screw on the instantanous water heater, but do not fasten the screws completely. Insert the brew unit and drive it into brew position using the test mode. Fasten the lower fixing screw (1).

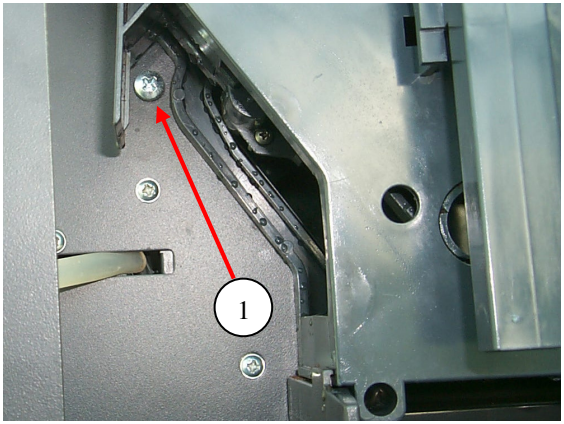


Abb. 28

b) Drive the brew unit into home position, remove the brew unit and fasten the upper screw (1). (Attention: Boiler J is fixed with three screws)

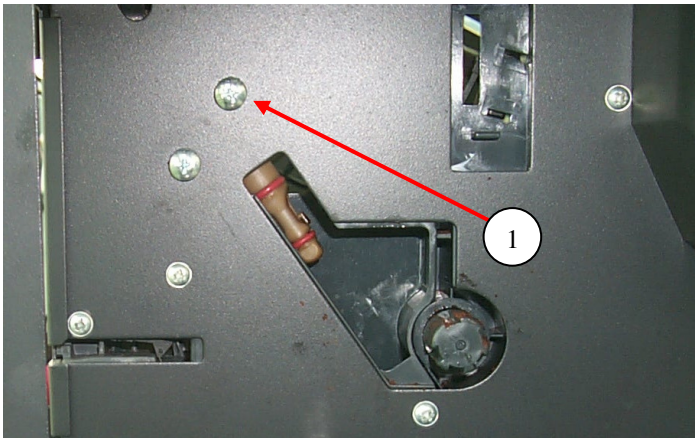


Abb. 29

11. Disassembling the pump

a) Pull off the adapter angle (1) and pump holder (2).

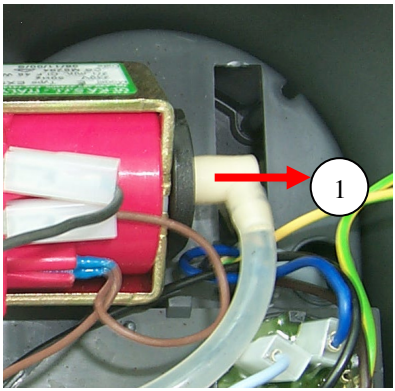


Abb. 30

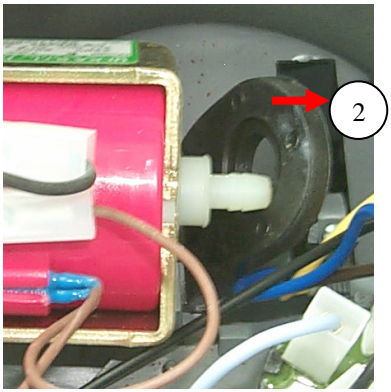


Abb. 31

b) Remove the locking spring (1).
c) Push down the fixing tab (2) and remove pump and holder (3).

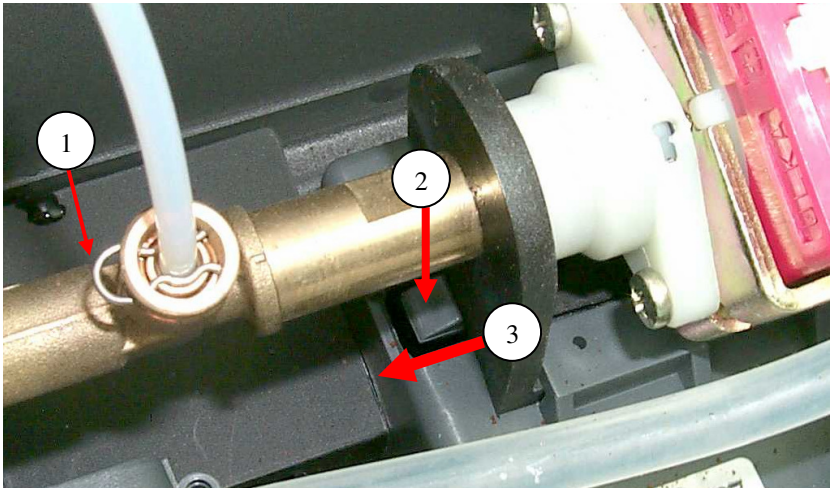


Abb. 32

CHAPTER 10
CIRCUIT DIAGRAMS