

B Brewing System

B.1 Adjustments

WHAT:	HOW:
Min. + max. Water volume (depending on the flow and the corresponding valve adjustments (l/min.)	Dispenser adjustments min. (60/80 ml) programming max. (240 ml)
----- Scraper position	----- front or rear, adjustable via programming

B.2 Disassemblies

B.2.1 Dismounting Parts of the Brewer / Components of the Brewer

Legend for fig. 1:

- 1 Safety switch switches as soon as the brewer moves beyond the closing position. E.g. sealing of the filter plate, filter plate, or brewer cylinder not installed.
- 2 Actuator motor drives the actuator, controls the brewing process.
- 3 Dosing motor drives the dosing unit, controls the product quantity.
- 4 Brewer Closed Switch switches as soon as the brewer cylinder and the filter plate form a chamber.
- 5 Actuator controls the functions of the filter plate, the plunger and the scraper during the brewing process.
- 6 Brewer At End Switch switches on both end positions of the brewer, e. g. scraper in end position or lower plunger position.

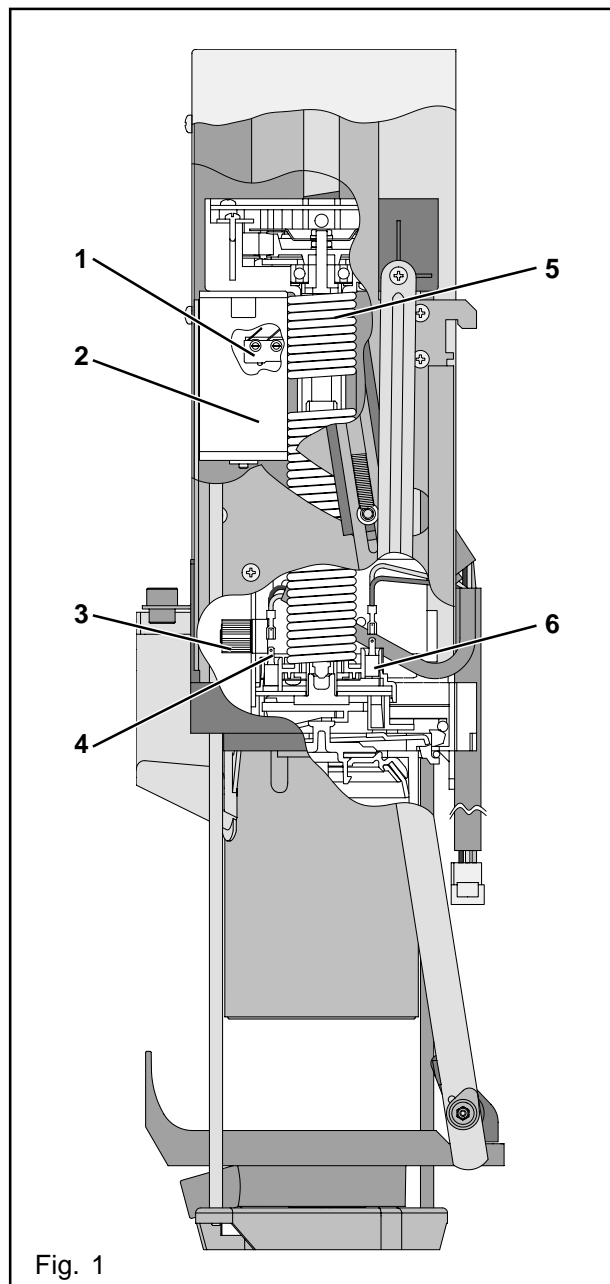


Fig. 1

B.2.2 Safety Instructions

CAUTION: Installation and repair works on the dispenser may only be carried out by trained service technicians.

General Mounting Instructions

Mounting the scraper guide

- When mounting, the guiding lugs (1) have to point towards the brewer's fastening holes and the cable harness (2). (Fig. 1)

Mounting the support

- When replacing, the screw (3) has to be fastened by means of Loctite. (Fig. 2)

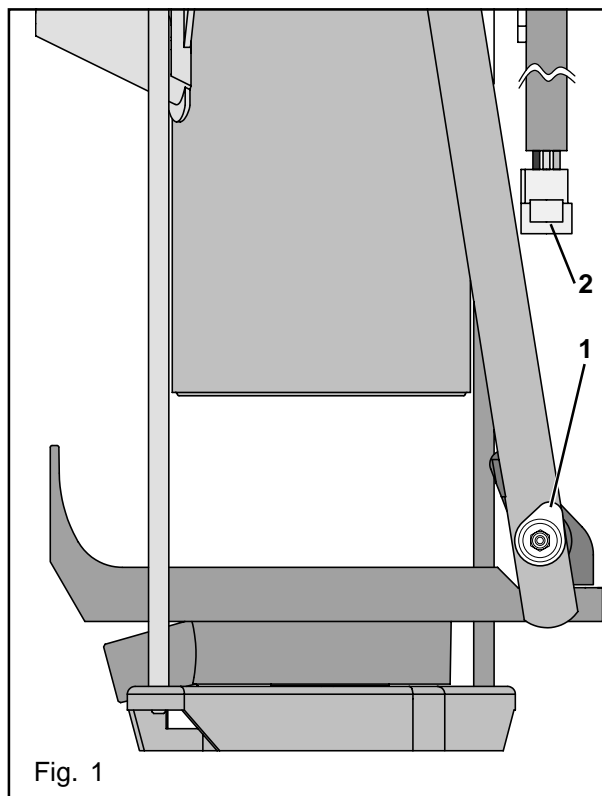


Fig. 1

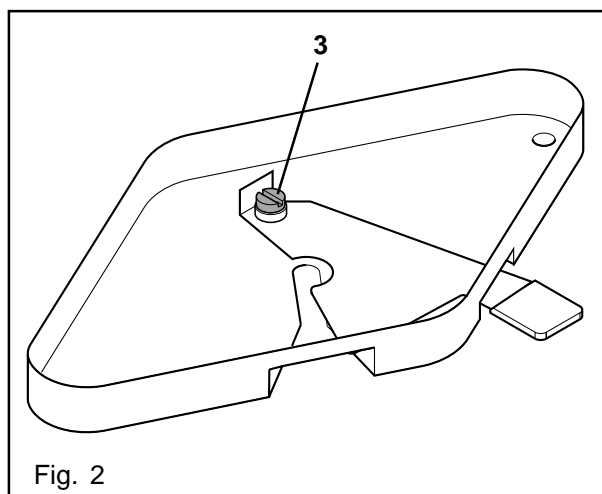


Fig. 2

B.2.3 Dismounting the Brewer Unit

CAUTION: When working on the brewer unit be aware of sharp edges. There is a risk of being injured.

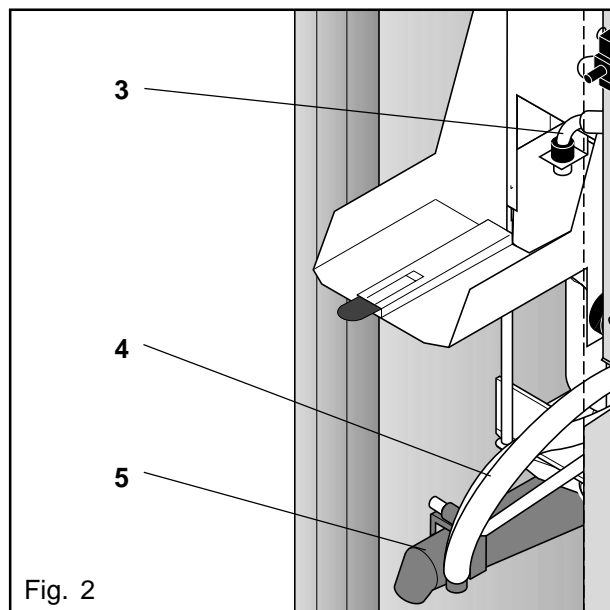
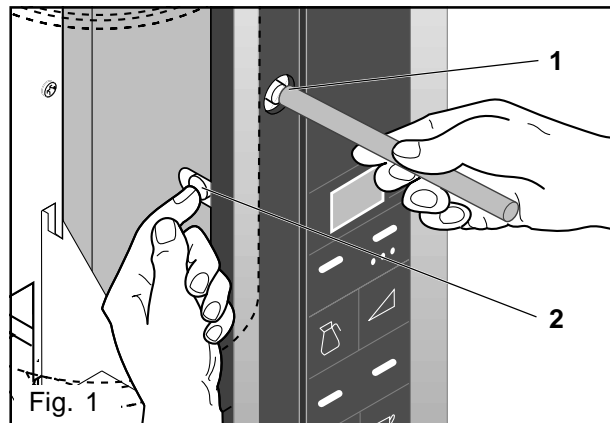
- Open the left door.
- Remove the product container.

CAUTION: The safety cut-off device of the brewer is put out of function when pressing the safety switch. Keep your clothing and your hands clear of the dispenser. There is a risk of being injured.

- Press the safety switch (1) by means of the special tool, and simultaneously press the rinsing button (2) through the opening in the right door, and keep them pressed until the brewer cylinder has closed completely (fig. 1).

The brewer is now in transport position.

- Unlock the outlet (5) and tilt it upwards (fig. 2). When re-installing, make sure that the outlet is locked into place.
- Remove the coffee grounds container and the drip tray.
- Switch off the mains switch, disconnect the power supply, and close the water cock.
- Pull off the hot water hose (4). (Fig. 2)
- Remove the angle of the water inlet for the brewer (3) from the brewer, and push it to the side. (Fig. 2)



- If necessary, remove the filter plate, the scraper, and the brewer cylinder.
- Remove the two screws (6). (Fig. 3)
- Disconnect the 15-pole plug.
- If necessary, mount the filter plate, the scraper, and the brewer cylinder.

WARNING: If it was not possible to move the brewer into transport position, only touch the brewer on its outside. Do not reach underneath the brewer cylinder, as there is a risk of injuries if the actuator is defective.

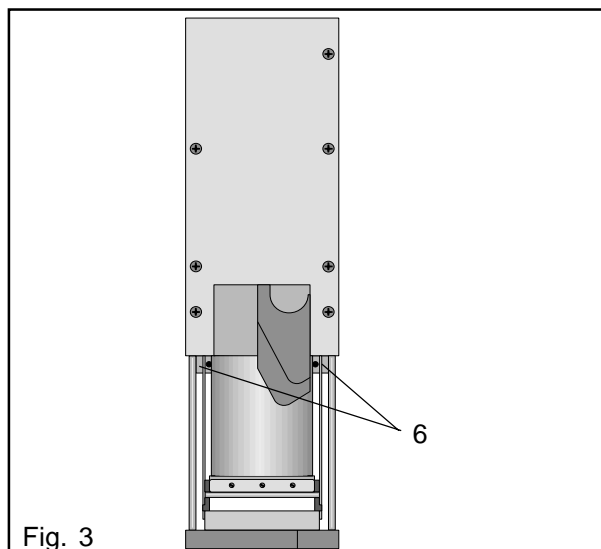


Fig. 3

- Take the product console, lift the brewer and pull it out of the support towards the front.
- If necessary, disconnect the ground cable from the brewer housing.

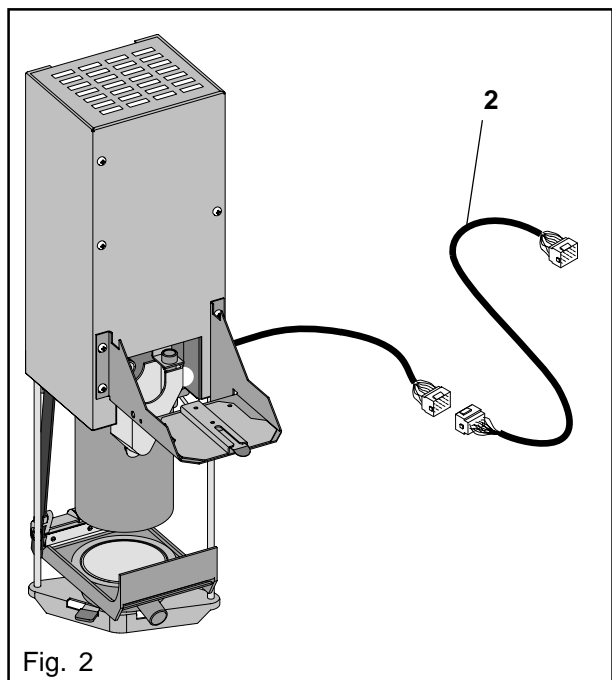
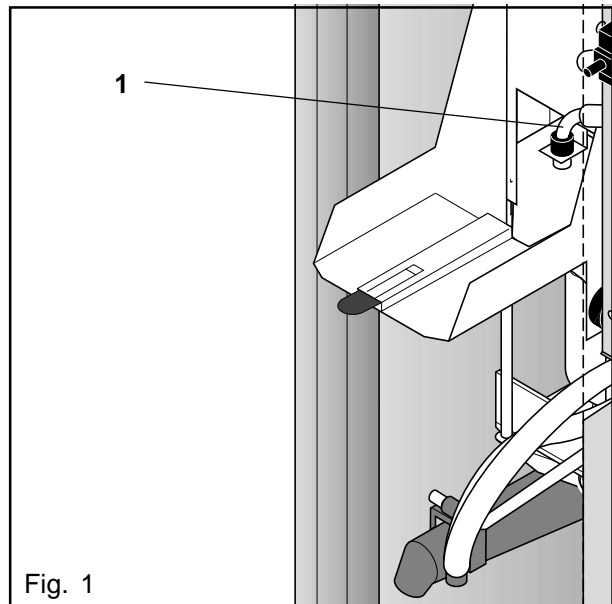
B.2.4 Testing the Brewer Unit

Testing the brewer unit next to the dispenser

CAUTION: Connect the hose to the water inlet elbow (1), and put the elbow into a container, so that the water does not run into the dispenser. (Fig. 1)

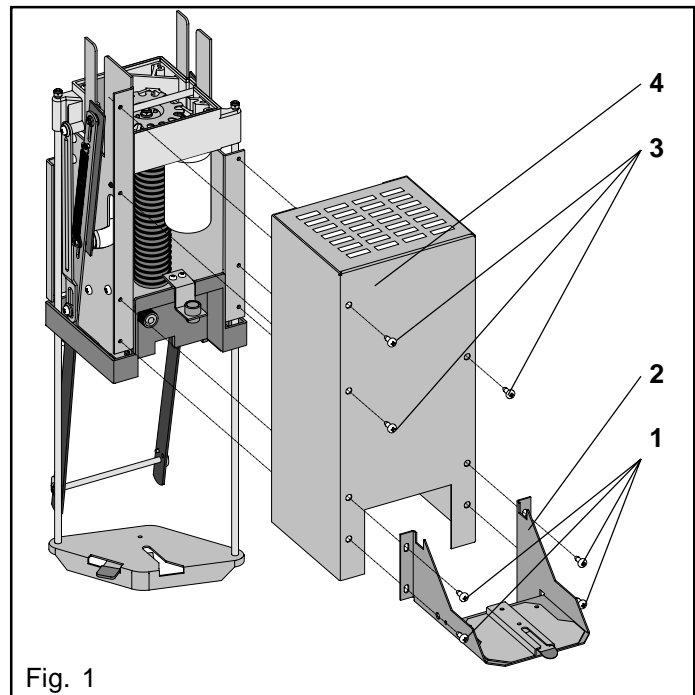
- Plug the adapter cable harness (2) (for service parts refer to the spare parts list) between the 15-pole plug of the brewer unit and the connection socket of the brewer unit in the dispenser. (Fig. 2)
- Actuate the safety switch.

DANGER: There is an increased risk of injuries. Keep parts of your body and loose clothing away from the brewer.



B.2.5 Removing the Brewer Housing

- Dismount the brewer.
- Remove the brewer cylinder, the filter plate support, and the scraper.
- Remove the four screws (1). (Fig. 1)
- Remove the product container console (2). (Fig. 1)
- Remove the three screws (3). (Fig. 1)
- Remove the brewer housing (4). (Fig. 1)



B.2.6 Dismounting the Dosing Motor

CAUTION: When dismantling the dosing motor, the scraper has to be in the rear position.

- Remove the brewer housing.
- Disconnect the plug connection.
- Remove the two screws (1). (Fig. 1)
- Pull the dosing motor (2) backwards. (Fig. 1)
- Remove the dosing motor.



Brewers are supplied with **grey** or **black** base consoles (3). For brewers with **black** base consoles (3) the following has to be observed: When the dosing motor sticks, check whether the fastening of the base console to the brewer base is defective. In this case, press the actuator against the brewer base. There is a possibility that the fastening domes were broken so that the actuator slid from the brewer base towards the top.

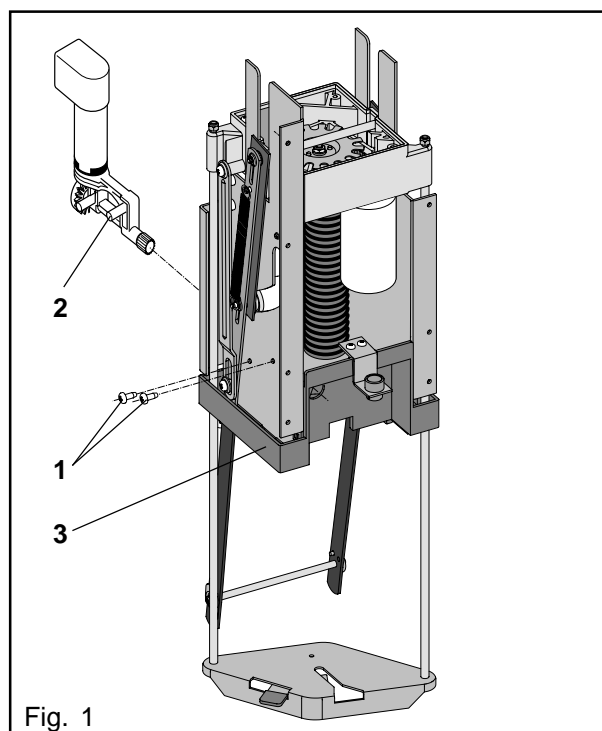


Fig. 1

B.2.7 Dismounting the Actuator

DANGER: The spring of the actuator is under tension.
In case of a malfunction of the actuator there is an increased risk of injuries due to a sudden expansion of the actuator spring.

If the brewer cylinder cannot be opened (brewer cylinder/filter plate), it is possible that the actuator does not accept the spring tension, which may be the case if:

- Date of manufacture before week 20/96 (see label or printing on the actuator)

These actuators include:

1. Plunge holder not screwed (screws visible from the bottom)
2. Plastic nut (guiding nut)

Reasons for actuator malfunction:

- broken plunge holder (plastic)
- actuator does not retract
- spindle sticks on the bearing housing
- the axle (9) cannot be removed and turned manually (fig. 5)

CAUTION: If in case of a malfunction the described mounting order cannot be performed, please proceed on your own discretion.

Attention: Observe the safety instructions in order to prevent injuries.

Dismounting the actuator

- Dismount the brewer unit according to section "Dismounting the brewer unit".
- Remove the brewer housing. (Fig. 1)
- Dismount the dosing motor (1). (Fig. 2)

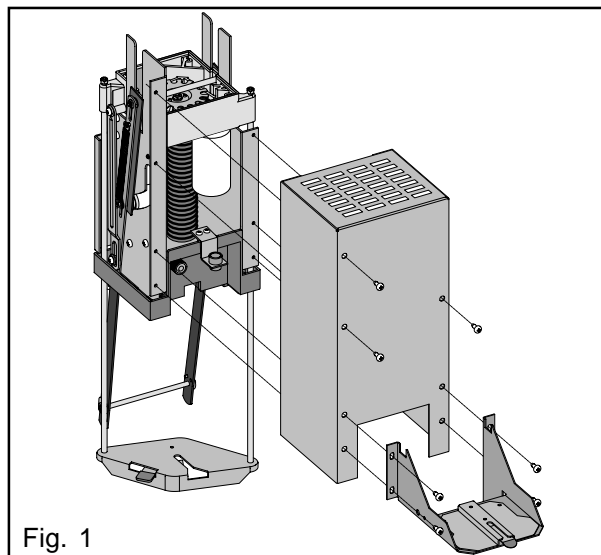


Fig. 1

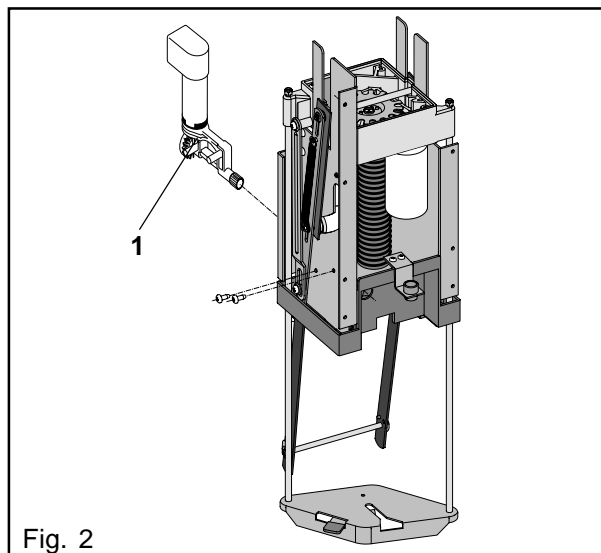


Fig. 2

- Disconnect the plug connection (2) of the actuator motor on the connection console. (Fig. 3)
- Unhinge the spring (3) for the scraper arm (4). (Fig. 4).
- Remove the retaining rings (5) and the washers in front of the outer scraper arm (4). (Fig. 4).
- Remove the fastening screws (6) and the collared bushes (7) of the lever arms (8) on the bearing housing. (Fig. 4)

Carry out the works on both sides.

- Pull the outer scraper arm (4) from the axle (9), remove the retaining ring (above the inner scraper arm) on one side of the axle, then pull the axle (9) out of the other side of the bearing housing (10). (Fig. 4, 5)

DANGER: The defective actuator could expand suddenly.
There is an increased risk of injuries!

- Loosen the tie rod (11) (2 self-locking nuts with washers). (Fig. 5)

CAUTION: When the spring has expanded, the top parts of the actuator as well as the spring can be removed.

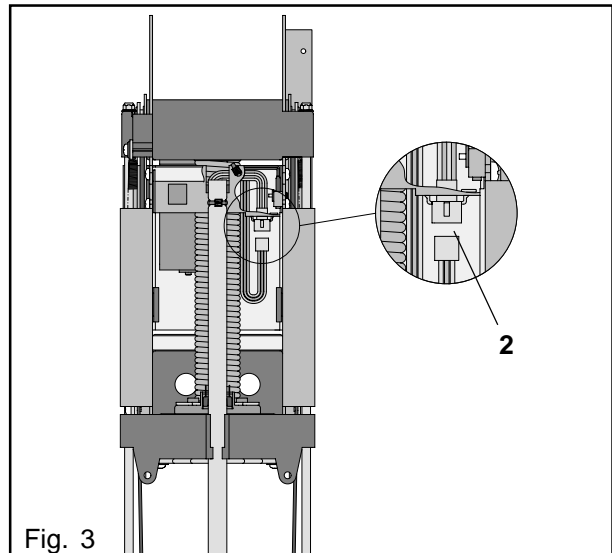


Fig. 3

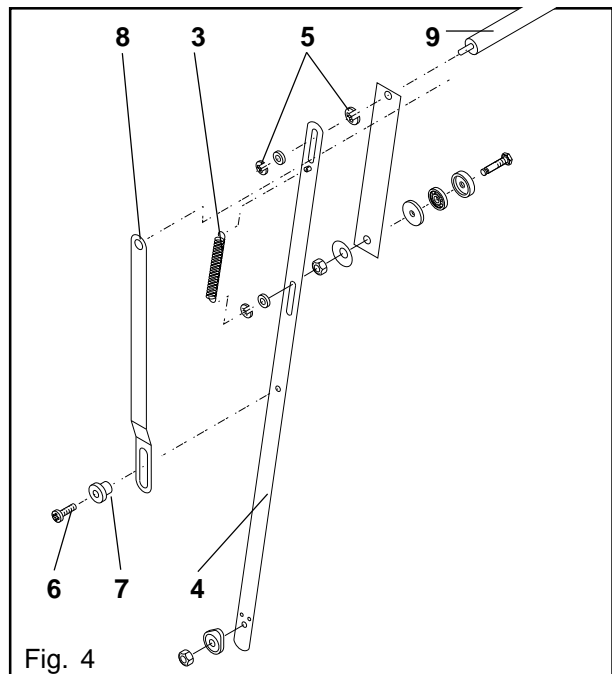


Fig. 4

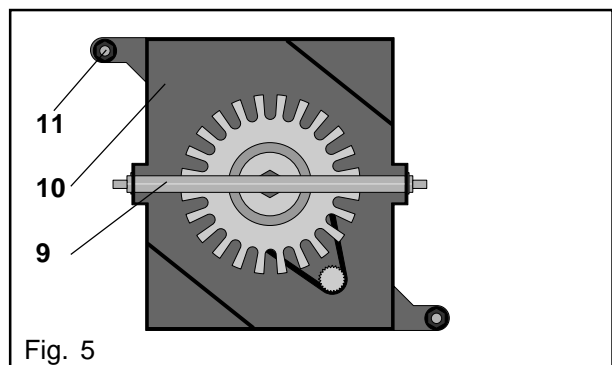


Fig. 5

- Pull out the tie rod together with the filter plate support as well as the filter plate.
- Remove the screws (12) from the base of the brewer. (Fig. 6)
- Carefully pull out the actuator, and simultaneously unplug the cable of the microswitches.
- Remove the locking ring and the washer of the inner scraper arm.
- Remove the inner scraper arm through the lower bore (13) in the side plate. (Fig. 7)

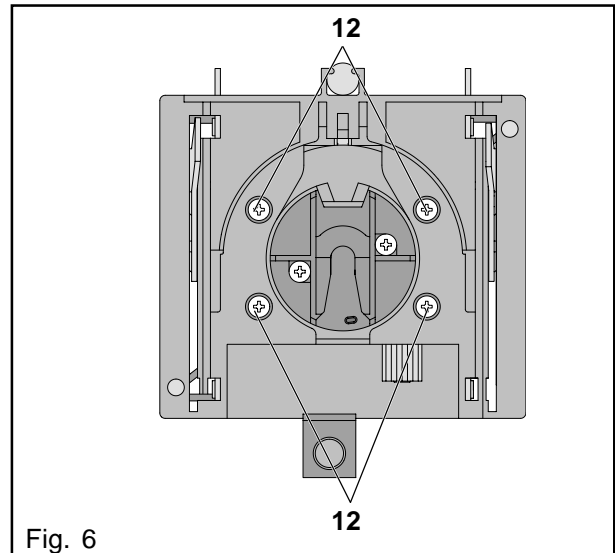


Fig. 6

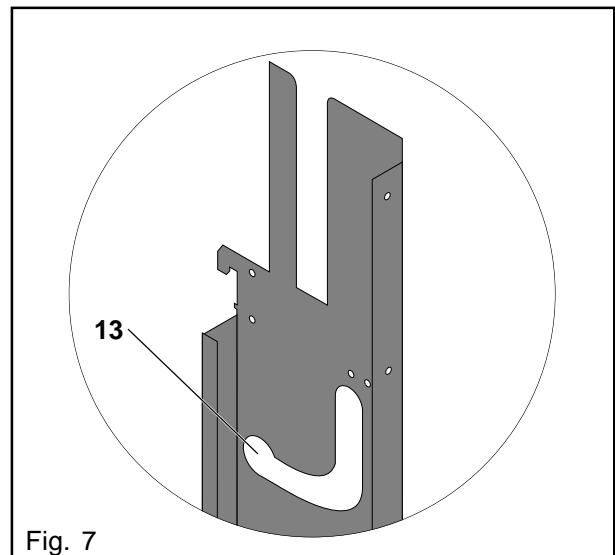


Fig. 7

B.2.8 Dismounting the Tachoboard

- Remove the brewer housing.
- Remove the two screws (1). (Fig. 1)
- Disconnect the 6-pole plug connection console/tachoboard.
- Pull off the two cable plug connections from the actuator motor.



When remounting:
Observe the correct polarity.
With several dispensers, multiple-digit numbers or roman numbers are printed onto the stranded wire connections. The higher number represents the negative pole. (Fig. 2)

- Remove the tachoboard (2) together with the cable harness.



When using a new tachoboard, make sure that rubber sleeves are applied to the plug connections for the actuator motor.

CAUTION: If the tothing of the tachodisc is bent, there is a danger of a short circuit on the tachoboard. Observe the correct installation position of the tachoboard (2). Cables and sound indicator have to point towards the magnet, i.e. towards the inside.

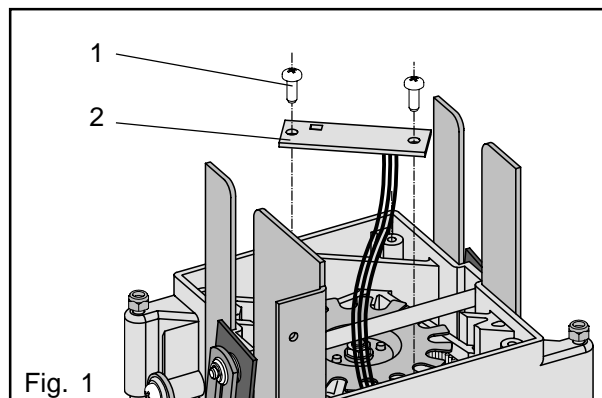


Fig. 1

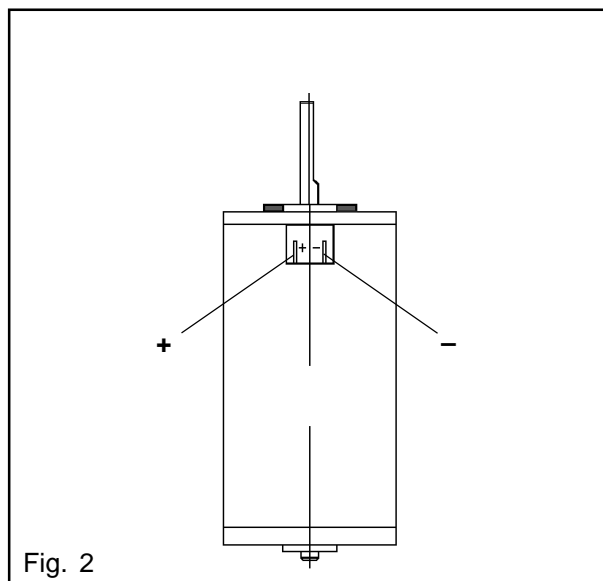


Fig. 2

B.2.9 Dismounting the Driving Parts for the Actuator

- Remove the brewer housing.
- Remove the retaining rings (1) and the washers (2) on both sides. (Fig. 1)
- Carefully remove the axle (3), first from the scraper arms and then from the housing. (Fig. 1)



When remounting, make sure that the scraper arms are positioned correctly.

- Remove the hexagonal nut and the washer (4). (Fig. 1)
- Remove the tachoboard disc (5). (Fig. 1)
- Remove the toothed belt (6). (Fig. 1)
- Remove the gear wheel (7) from the actuator motor. (Fig. 1)



In order to replace both gears and toothed belts in one step, the actuator has to be dismounted and expanded.

WARNING: Risk of injuries.
If the large gear is removed with spring-loaded actuator, the spindle can slide out of the bearing support, causing the actuator to suddenly expand.

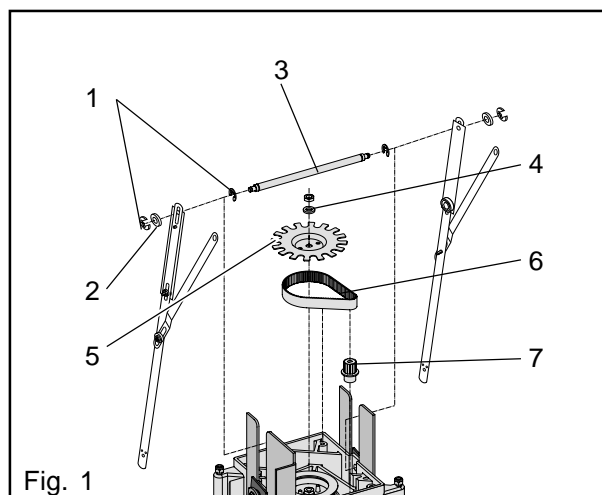


Fig. 1

Dismounting the actuator motor

- Disconnect the electrical connection (2 plug connectors).



When mounting:

Ensure correct polarity.

With several dispensers, multiple-digit numbers or roman numbers are printed onto the stranded wire connections.

The higher number represents the negative pole. (Fig. 2)

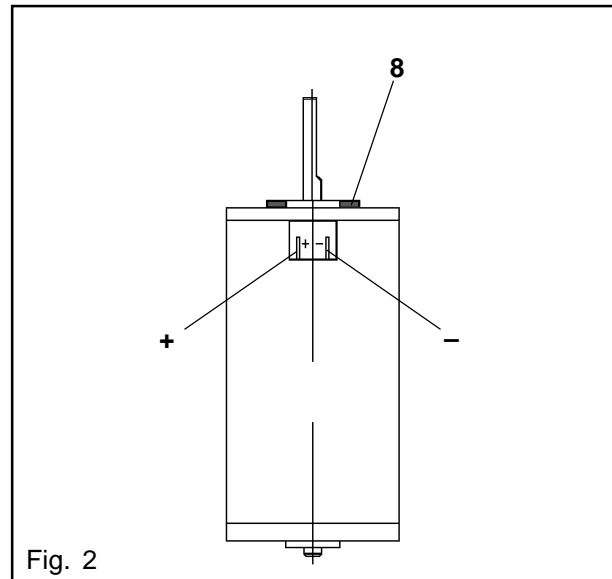


When using a new tachoboard, make sure that rubber sleeves are applied to the plug connections for the actuator motor.

- Carefully remove the four screws of the actuator motor (do not damage the tachoboard disc).

CAUTION: Make sure not to lose the spacer ring (8). (Fig. 2)

- Remove the actuator motor towards the base, and simultaneously pull off the gear. The gear remains inside the bearing housing.



B.2.10 Dismounting the Actuator

CAUTION: When dismantling the actuator, the driving parts (tacho disc) must not be dismantled first.

- Release the actuator spring (1) by turning the fastening nut of the tacho disc (2) anti-clockwise. The nut must rotate together with the tacho disc and must not loosen. (Fig. 1)
- Remove the bearing housing (3) and the spring (4). (Fig. 2)
- In order to remove the tacho disc, it must be fixed. (Fig. 3)
- Now unscrew the nut (5). (Fig. 3)
- Hold the large gear wheel (6) tightly and remove the nut. (Fig. 3)

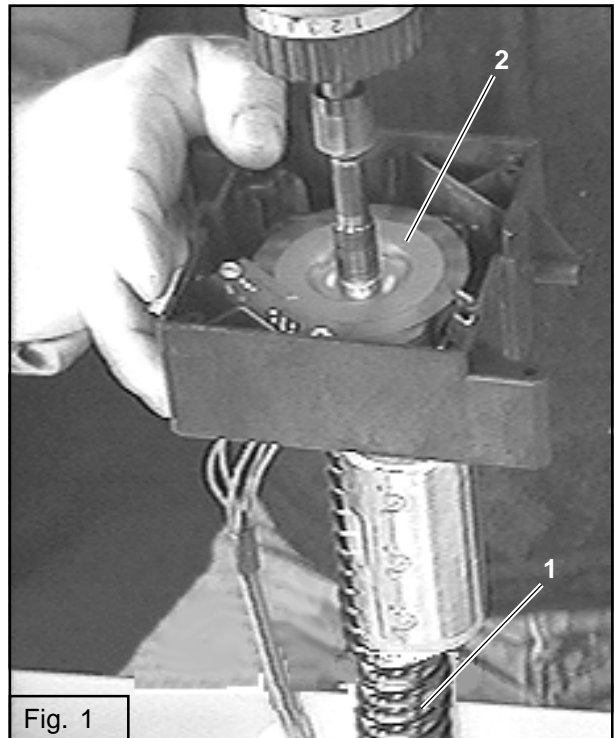


Fig. 1

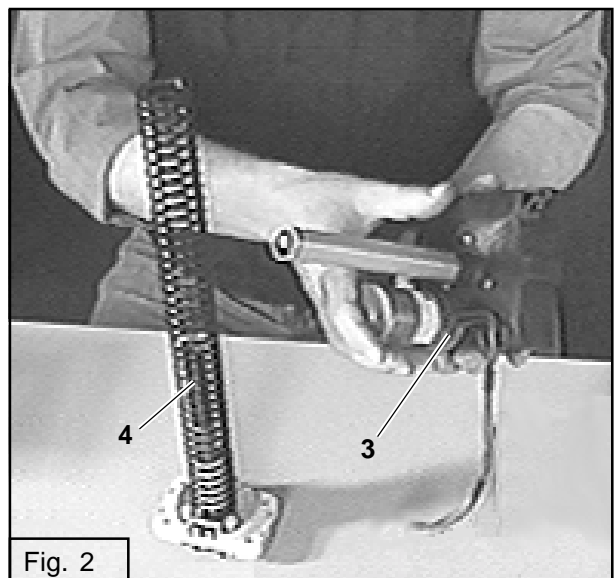


Fig. 2

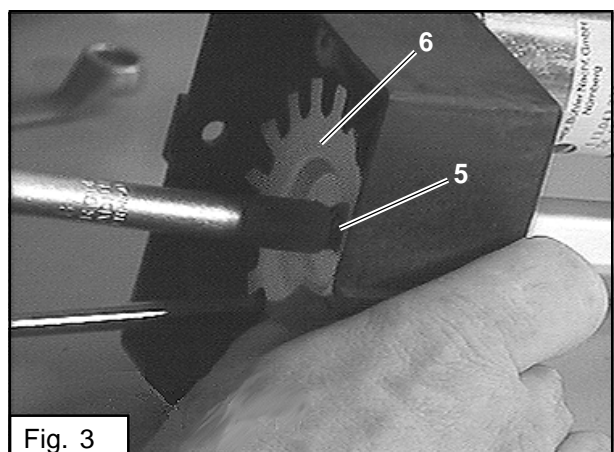
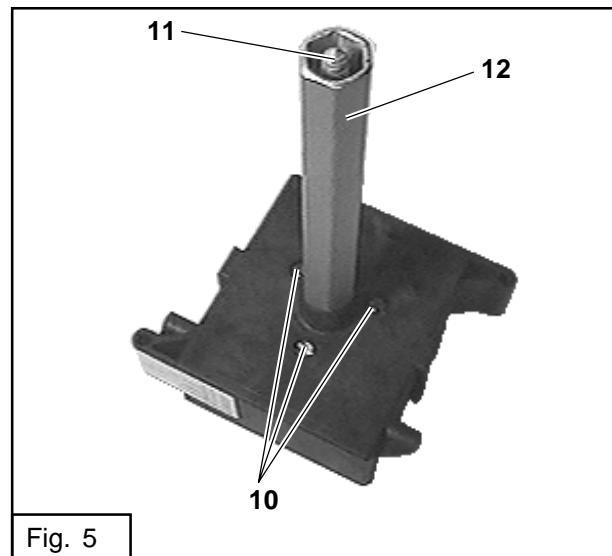
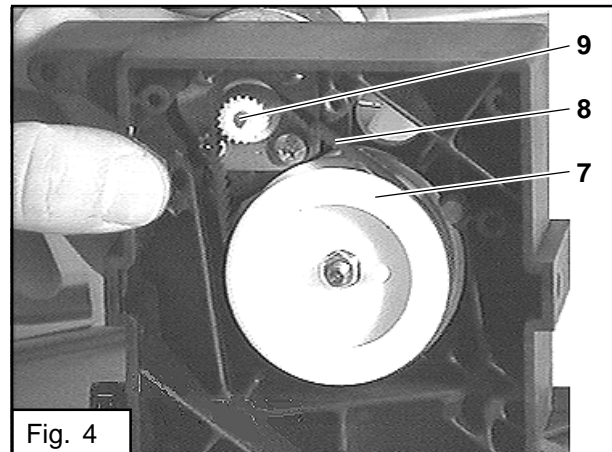


Fig. 3

- Now, the large gear wheel (7) with toothed belt (8) and the small gear wheel (9) can be removed consecutively. (Fig. 4)
- The actuator motor can be removed by loosening the 4 fastening screws.

Dismounting the spindle

- Loosen the 3 fastening screws (10) at the bearing housing. (Fig. 5)
- Press the spindle (11) slightly. Withdraw the spindle together with bearing and washers. (Fig. 5)
- Unscrew the outer tube (12). (Fig. 5)



- For dismantling the bottom console, unscrew the plunge holder (1). (Fig. 6)
- Remove the plate (2) from the bottom console. (Fig. 7)
- Loosen the sealing (3) and press the inner plate outside through the slots (4). A table edge facilitates this process. (Fig. 8, 9)
- Loosen the two accessible screws and withdraw the unit completely from the bottom console.

CAUTION: When mounting the actuator it is imperative to observe that

- the plunge holder opening,
- the flat side of the bottom console and
- the actuator motor are in range.

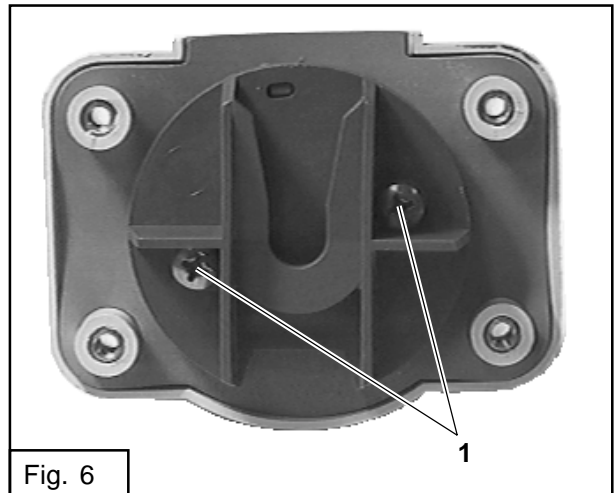


Fig. 6

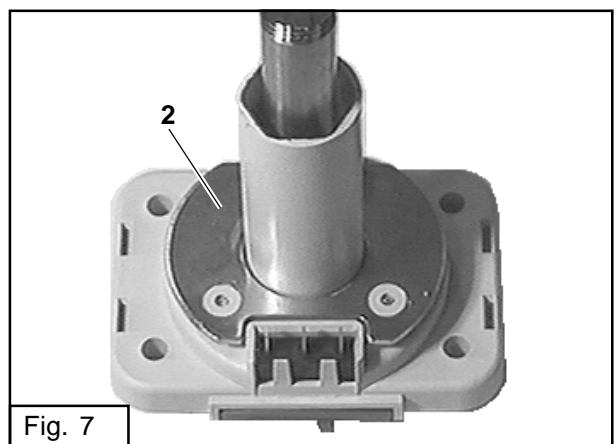


Fig. 7

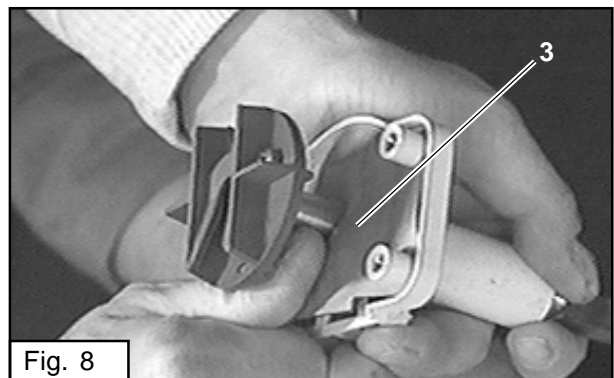


Fig. 8

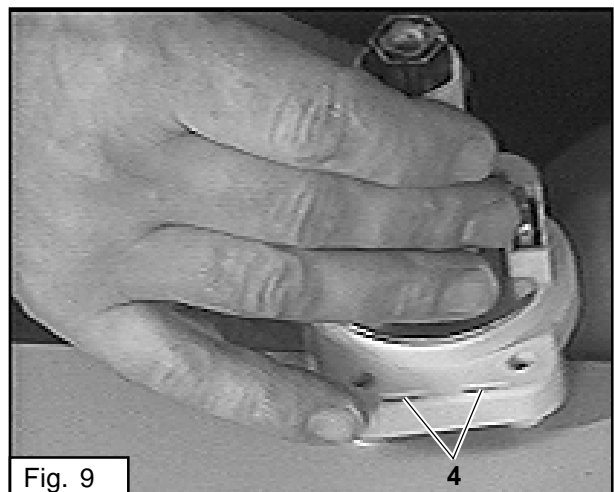


Fig. 9

B.2.11 Mounting the Actuator

- Slide the actuator into the chassis of the brewer unit, so that the actuator motor shows to the front.
- Prior to the final positioning, push the cables to the according outer contacts of the microswitches.
- The cables:
 - may not come into contact with the gear of the dosing motor. Furthermore, they have to be guided on the opposite side of the dosing motor.
- Fasten the actuator to the brewer base by means of 4 screws (1). (Fig. 1)
- Insert the inner scraper arm (2). (Fig. 2)
- Push the axle (3) through the bore of the inner scraper arm, and then through the bores of the bearing housing. (Fig. 2, 3)
- Slide the second inner scraper arm (2) onto the axle, and apply the retaining rings (4). (Fig. 2)
- Mount the outer scraper arm (5) onto the axle and fasten it by means of the washers and retaining rings (6). (Fig. 2)
- Fasten the lever arm (7) with the collared bushes (8) and fastening screws (9). (Fig. 2)
- Hinge the spring (10) for the scraper arm. (Fig. 2)

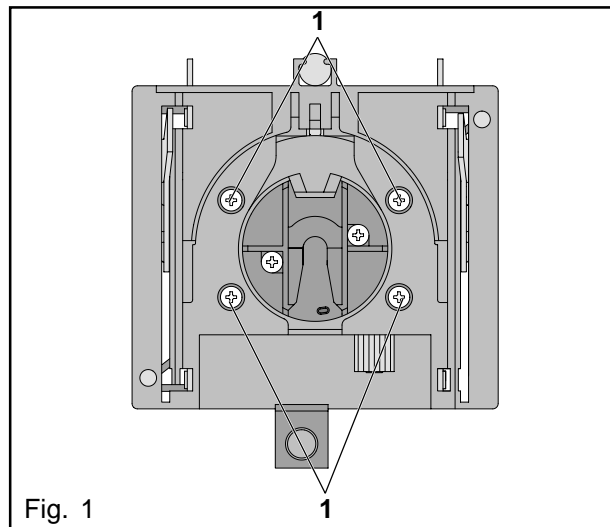


Fig. 1

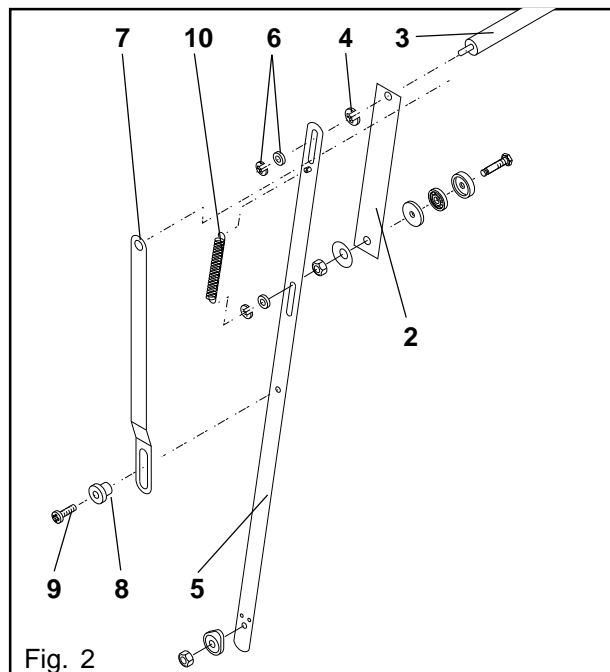


Fig. 2

Carry out the works on both sides.



Insert the tie rod together with the support in such a manner that

- the locking mechanism for the filter plate shows to the left side,
- the filter plate can be inserted from the front.

- Push the tie rod (11) through the bores of the bearing housing (12), and fasten it by means of washers and two new self-locking nuts. (Fig. 3)



Do not fasten the nuts too tightly, as the plastic parts could tear off.

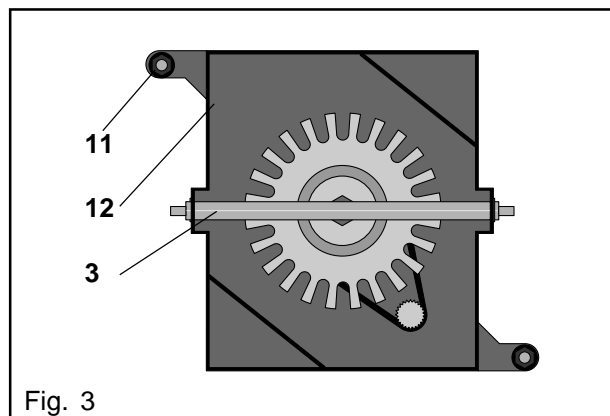
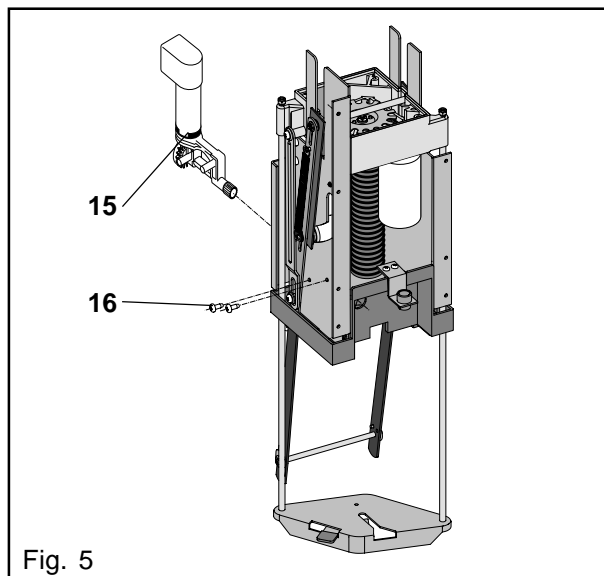
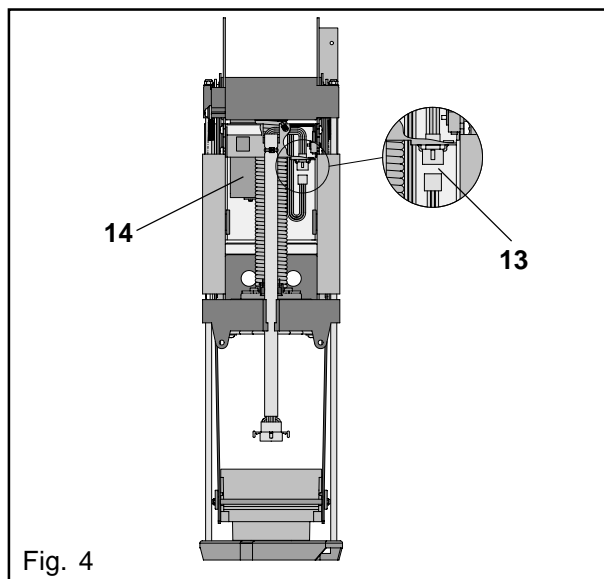


Fig. 3

- Connect the plug (13) of the actuator motor (14) to the socket. The cable harness must be accessible. (Fig. 4)
- Fasten the dosing motor (15) with 2 screws (16) and carry out the electrical connection. (Fig. 5)



B.2.12 Dismounting/Mounting the Microswitch BSSW

- In case of replacement, dismount the brewer unit according to section "Dismounting the Brewer Unit".
- Remove the fastening screws (1) and the threaded plate of the microswitch (2) and replace the switch. (Fig. 1).
- Unplug the cable lugs of the defective microswitch, and connect them to the new microswitch. Make sure that the insulation hose is positioned correctly. (Fig. 1).
- Fasten the new microswitch (2) by means of the screws (1), washers, and nuts to the brewer housing. (Fig. 1).
Observe that the screws are not fastened too tight.



Horizontally place the microswitch into the 3 mm holes in the highest possible position.

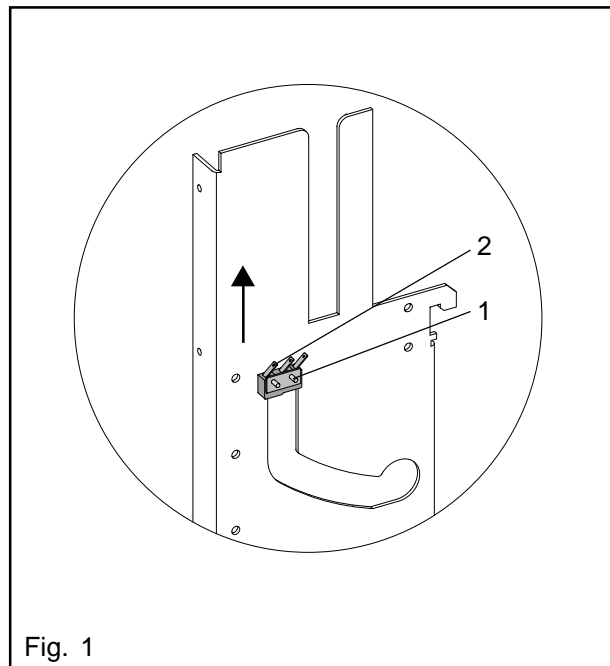


Fig. 1

B.2.13 Dismounting the Bearings of the inner Scraper Arm

- Unscrew the nut (1). (Fig. 1)
- Remove the spring washer (2). (Fig. 1)
- Unscrew the bearing neck (3) from the inner scraper arm by means of a 10 mm socket wrench. (Fig. 1)
- Remove the guiding washers (4) and the ball bearing (5) from the bearing neck. (Fig. 1)

Mounting instructions:

- The grained surfaces of the guiding washers have to point towards the ball bearing
- Fasten the bearing neck (10 mm socket wrench) in such a manner that the outer bearing ring can be turned. Check by means of a screw driver
- Mount the locking ring.

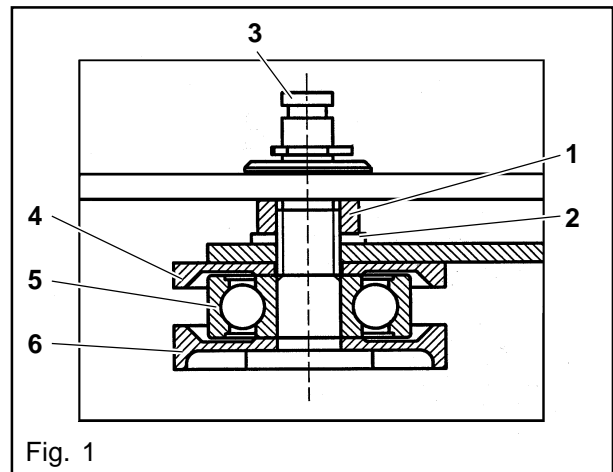


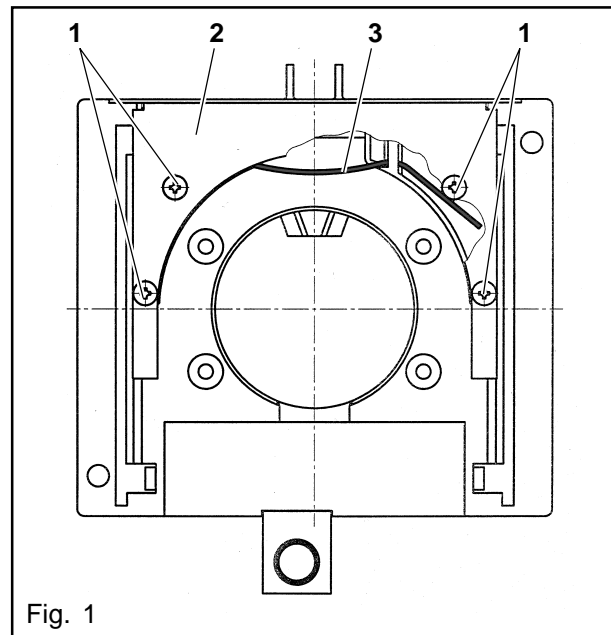
Fig. 1

B.2.14 Dismounting the Ejector Spring

- Remove the four screws (1) of the brewer cylinder support (2). (Fig. 1)
- Press the spring (3) towards the back by means of a screw driver, and remove it to the side. (Fig. 1)

Mounting instruction:

The spring has to be placed between the fastening domes and the spring guide (see fig. 1).



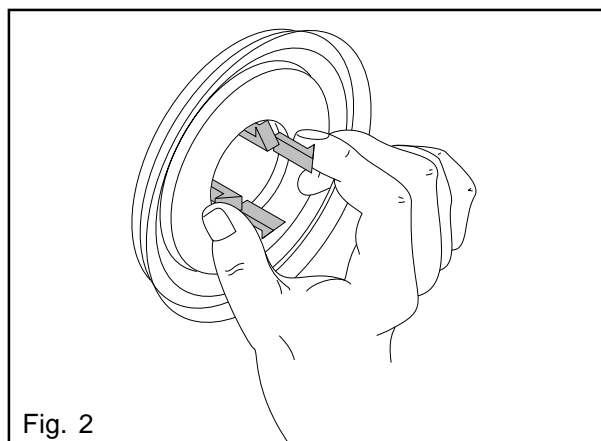
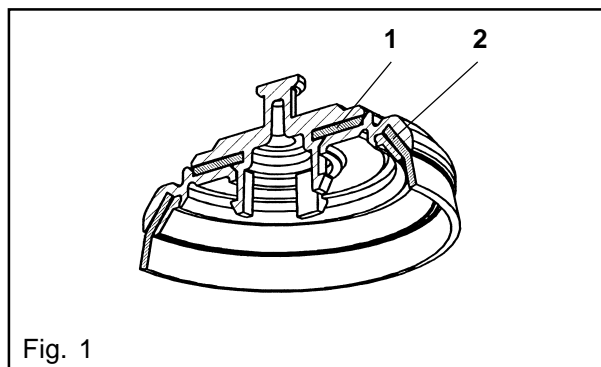
B.2.15 Replacing the Gaskets of the Brewer Cylinder

CAUTION: Observe the safety instructions (see section "Dismounting the Brewer Unit").

- Remove the brewer cylinder.
- Remove the plunger from the brewer cylinder.
- The valve with the gasket (1) is located in the centre of the plunger. (Fig. 1)
Press the four supports of the valve together, and pull the valve downwards. (Fig. 2).
- Remove the outer gasket (2) by pulling the sealing lip. (Fig. 1)

CAUTION: When replacing the gaskets, it is absolutely necessary to replace older versions of the plunger or brewer cylinder by the up-to-date versions.

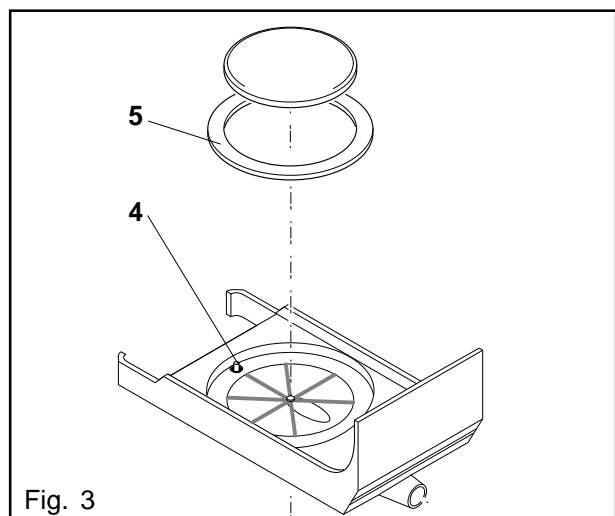
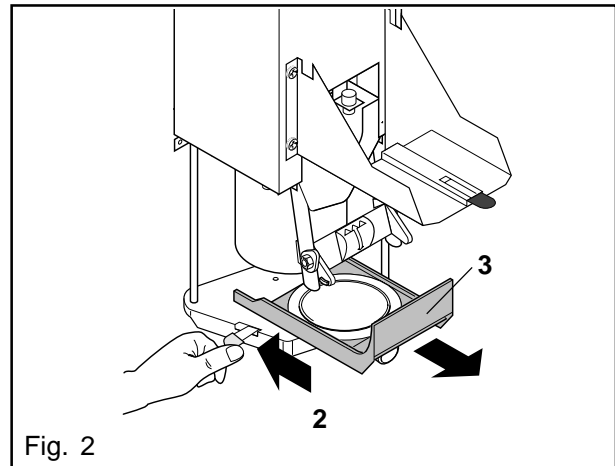
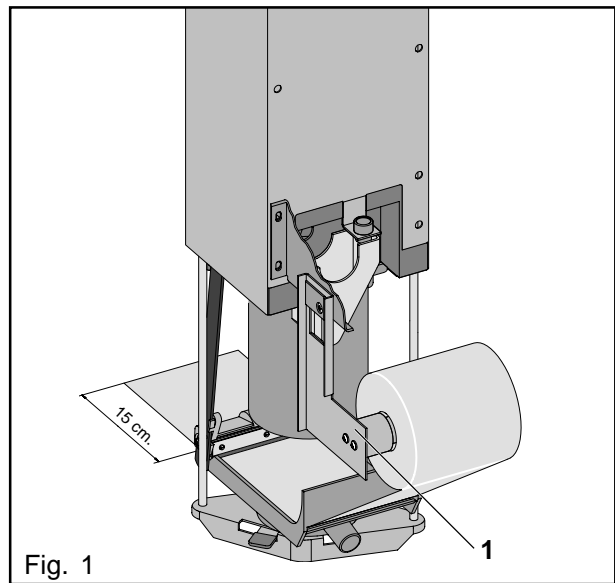
- Replace the gaskets.
- The mounting is done in reverse order.



B.2.16 Decalcifying and Replacing the Filter Plate

The filter plate has to be decalcified on a regular basis after approx. 1000 deliveries (depending on the hardness of the water).

1. Remove the filter paper roll holder (1) (accessories), and press the bolt on the filter plate holder backwards (2). Pull out the filter plate holder (3). (Fig. 1, 2)
2. Press down the ejector pin (4) until the sealing ring (5) comes free. (Fig. 3)



3. Remove the jack latch (6) from the filter plate. Decalcify all metal parts of the filter plate. (Fig. 4)
4. Clean the rubber sealing (7), the sealing ring (5), and the filter plate holder in hot water. (Fig. 3, 4)
5. Install the filter plate in reverse order. Make sure that the locking bolt engages, and that the filter plate is guided by the scraper arms. Make sure that the disc (8) is positioned correctly. (The smooth side must face the sealing). (Fig. 4, 5)



Avoid damage of the fine-pore filter.

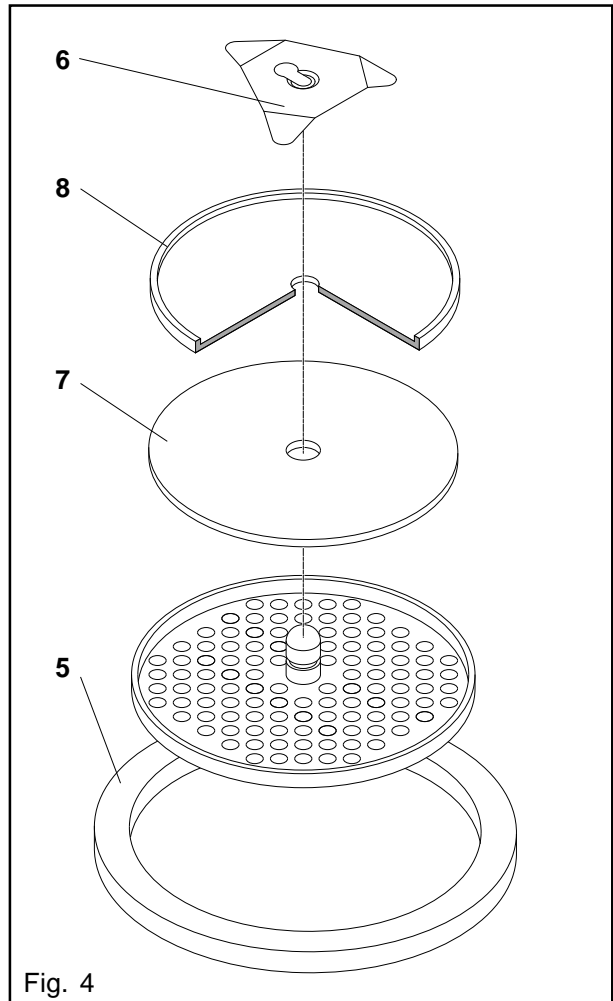


Fig. 4

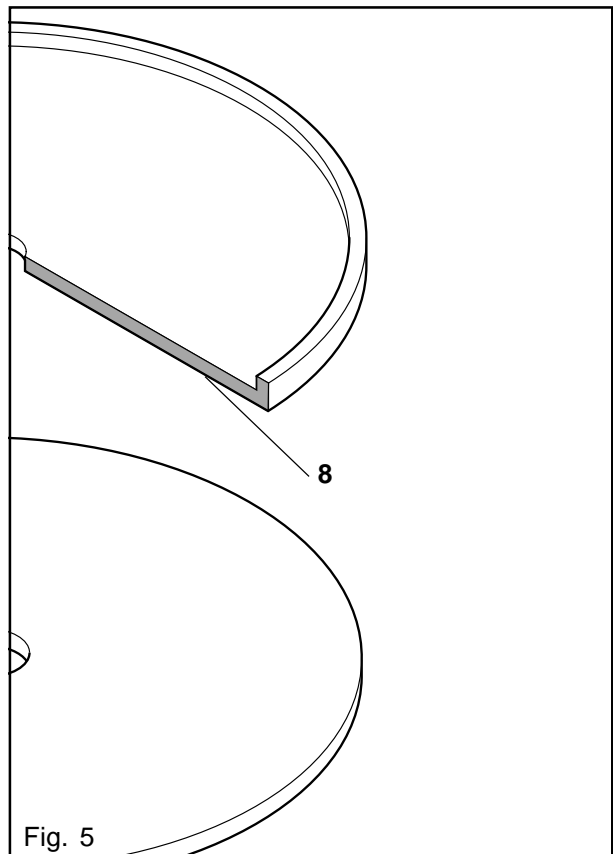


Fig. 5

B.2.17 General Notes

- Starting with week 42/98 all actuators/ brewers as well as recycled actuators/ brewers are equipped with an additional **Label for Brewer (part-no. 35207300)**. (Fig.1)

Actuator numbers:

- for new actuators (part-no. 35207300) **starting with actuator number 41987389**
- for recycled actuators (part-no. 35207300 R) **from week 42 on**

The label has to be completed as follows:

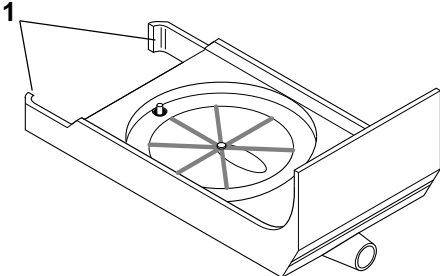
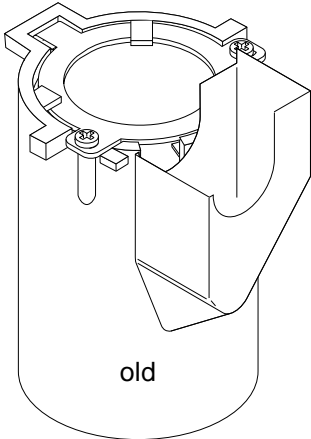
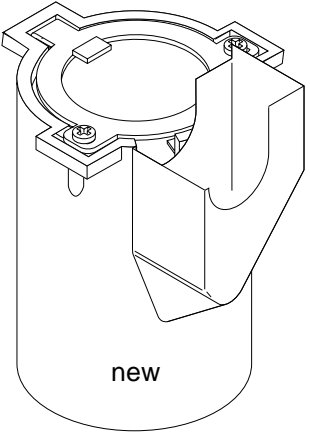
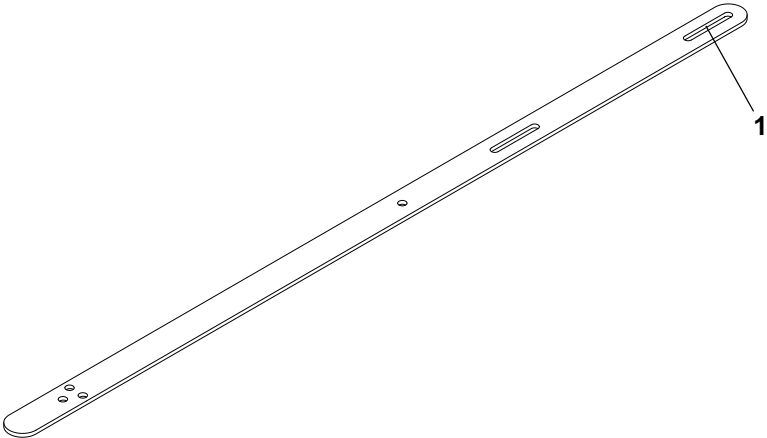
- For brewers which have been installed by the manufacturer the data for the fields MACH. TYPE (1), INSTALL.DATE (2), and COUNTER (3) are already filled in.
- In case of **replacing** brewers/actuators, the data for fields (1), (2) und (3) have to be filled in by the service technician.
- In case of **removing** brewers/actuators for replacement, the data for fields REMOVE DATE (4) and COUNTER (5) have to be filled in by the service technician.

The diagram shows a rectangular label divided into two columns. The left column is titled 'MACH. TYPE' and contains five rows: 'FB50...', 'FB55...', '5500...', '5100...', and '.....'. Each row has a small square box to its right. The right column contains four rows: 'INSTAL. DATE.....', 'COUNTER.....', 'REMOVE DATE.....', and 'COUNTER.....'. Numbered callouts are as follows: 1 points to the 'MACH. TYPE' header; 2 points to the 'INSTAL. DATE.....' field; 3 points to the first 'COUNTER.....' field; 4 points to the 'REMOVE DATE.....' field; and 5 points to the second 'COUNTER.....' field.

Fig.1

B.2.18 Checkliste

Check list of parts that have to be replaced during repair:

<p>Part:</p>	<p>Up-to-date parts can be recognized by the below stated remarks, all other versions have to be replaced by the following parts:</p>	
<p>Holder for filter plate</p>	<p>Rear guide (1)</p>	
<p>Brewer cylinder and plunger</p>	<p>(old + old)</p>  <p>old</p>	<p>(new + new)</p>  <p>new</p>
<p>Dosing motors</p>	<p>to be recognized by the marking K 4</p> <p style="margin-left: 150px;"> Year Month (1,2,3,4,5,6,7,8,9,0,N,D) </p>	
<p>Plunge holder</p>	<p>grey parts</p>	
<p>Scraper arms</p>	<p>new version with 22 mm slotted holes (1)</p> 	

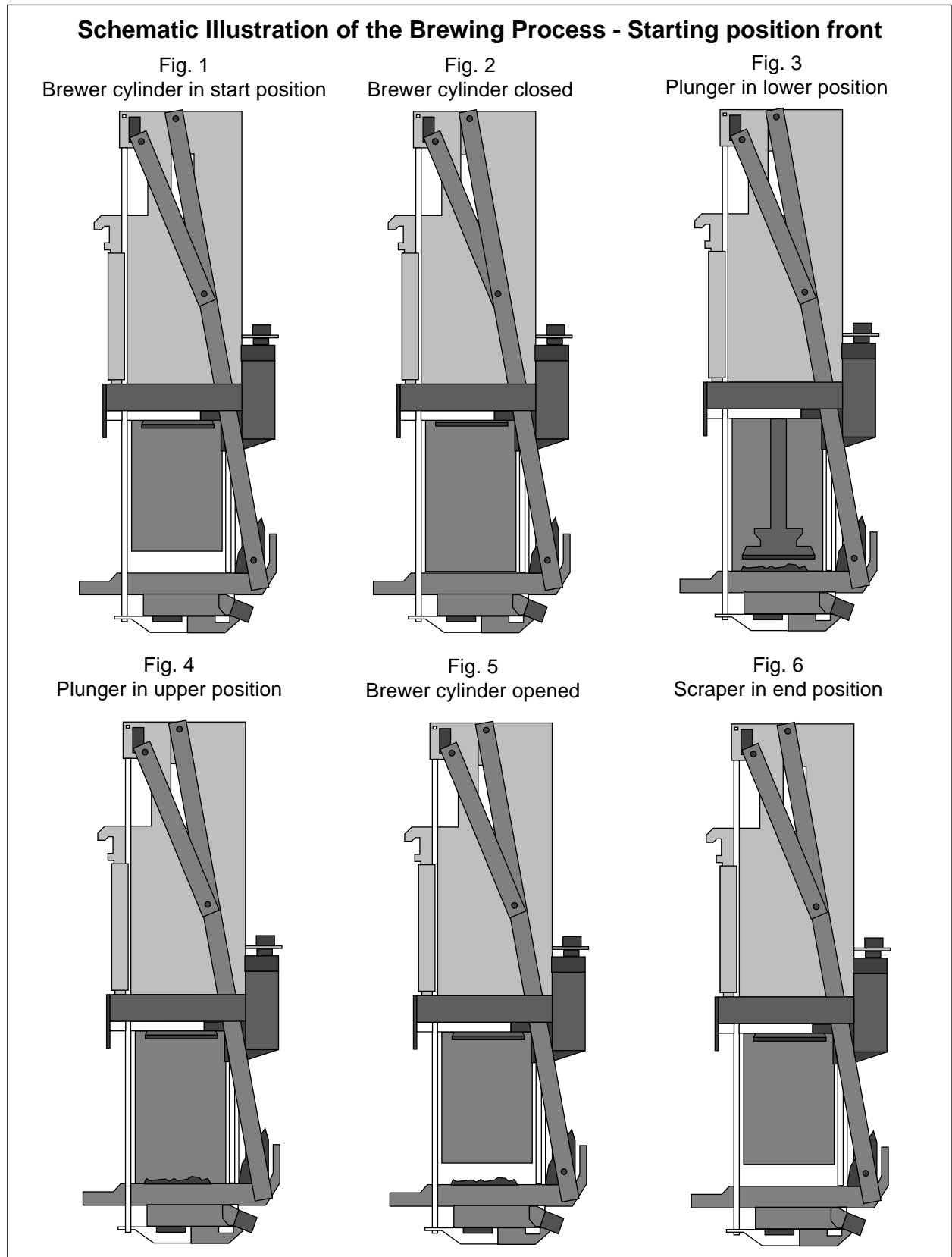
Part:	Up-to-date parts can be recognized by the below stated remarks, all other versions have to be replaced by the following parts:
Spindle	with ball bearing
-----	-----
Premounted assemblies:	
Base console	grey parts with microswitches (microswitches cannot be dismantled because of a one-way snap function)
Inner tube and plunge holder, plastic nut	for part-no. see spare parts list
Spindle with ballbearing,assy.	for part-no. see spare parts list

**General note:**

When replacing the dosing motor, the side parts have to be cleaned. Silicone remnants have to be removed by means of alcohol.

B.3 Functional Descriptions

B.3.1 Schematic Illustration of the Brewing Process



Schematic Illustration of the Brewing Process - Starting position rear

Fig. 1
Brewer cylinder in start position

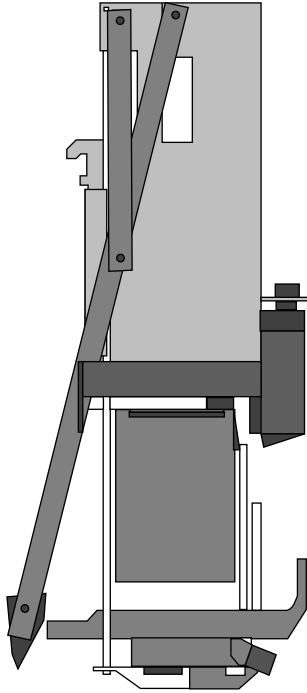


Fig. 2
Brewer cylinder closed

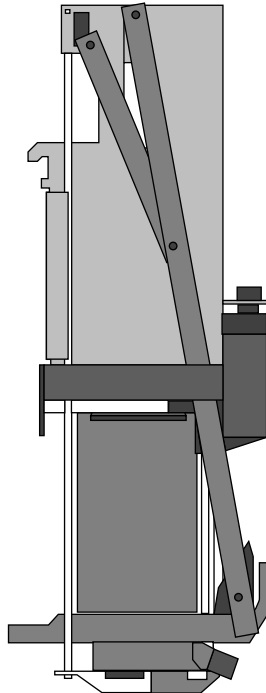


Fig. 3
Plunger in lower position

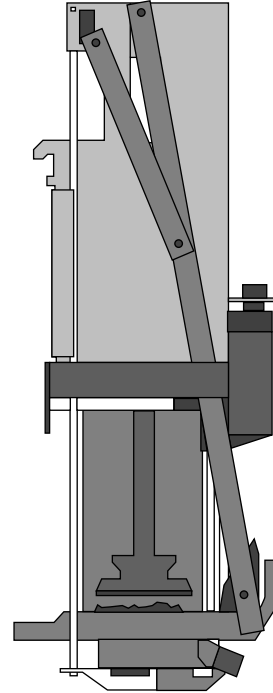


Fig. 4
Plunger in upper position

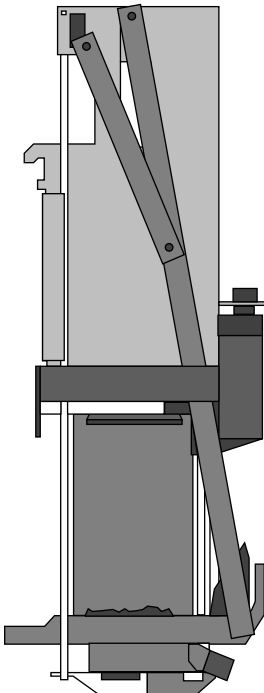


Fig. 5
Brewer cylinder opened

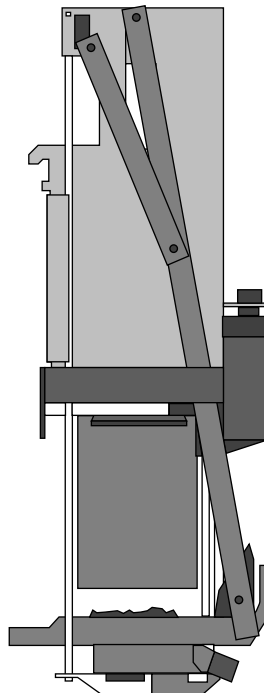
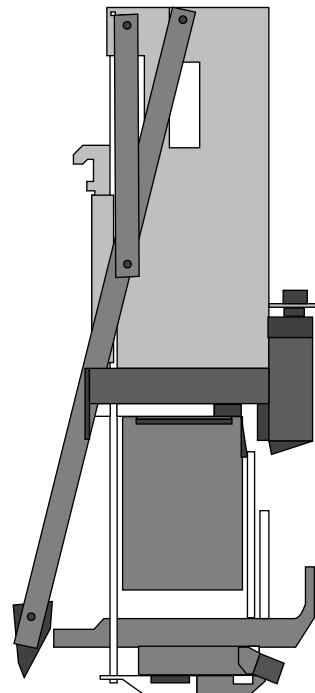


Fig. 6
Scraper in end position



B.3.2 Functioning of the Brewer

- The brewing process takes place by means of the following steps:
 - The actuator is switched on for direct action by the control
 - The actuator winds up
 - After a few rotations of the spindle the switch BAE (Brewer at end) is opened
 - The actuator continues winding up
 - Simultaneously, the scraper moves forward, and the filter plate closes the brewer cylinder
 - The counterpressure of the brewer cylinder prevents a further ascent of the filter plate and the actuator
 - Via the spindle, the forward movement of the motor presses down the plunger
 - When the pin on the plunger holder does not operate the microswitch BC (Brewer closed) any longer, the control stops the actuator motor
 - The dosing volume is controlled by means of the tachopulses of the dosing motor
 - According to the set product quantity, the control determines the number of rotations of the dosing motor
 - The dosing motor is driven
 - The water flushes the coffee powder into the brewer cylinder
Simultaneously to the coffee dosing hot water flows from the boiler into the mixing funnel
 - After expiration of the set extraction time of the brewer, the actuator motor descends the plunger in the brewer cylinder via the spindle
 - The beverage is filtered through the filter plate and delivered via the delivery spout
- With correct settings, the brewer is never filled completely
- The remaining air between the brewer and the plunger serves to dry the coffee grounds
- As soon as the guiding nut closes the microswitch BAE, the actuator motor stops
- The plunger is in the lower end position
- The control switches the actuator motor to reverse motion
- The plunger ascends
- When the plunger holder reaches its upper position, the pin on the plunger holder operates the microswitch BC (opener)
- The actuator motor continues the reverse motion
- The brewer cylinder opens, and the scraper is guided in such a way that the dried coffee grounds as well as the filter paper** are pushed into the coffee grounds container
- Simultaneously, the filter paper** is rolled off the paper roll and aligned into position
- When the scraper is in its rear position, the microswitch BAE is actuated
- The control stops the actuator motor (according to dispenser type the start positions can be different)
- The brewing process is completed

BAE = Brewer at end
BC = Brewer closed

**Optional for coffee filling