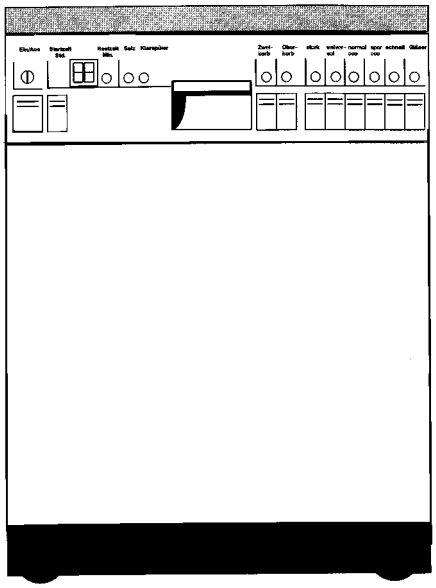
KÜPPERSBUSCH
After-Sales Service



Technical Information
Dishwasher Series 630

Models: IGVS 649.1
IGV 659.1
IG 669.1
IG 644.1
IG 659.1

GB

VKS-H	Technical Information Dishwasher Series 630	H7-410-03-01

Responsible: Rutz	Tel.: (0209) 401-733	Fax: (0209) 401-743	Date: 30.09.1998

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1. GENERAL PRODUCT INFORMATION

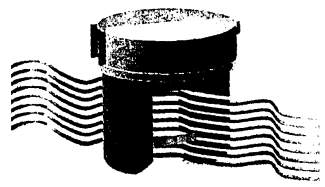
1.1 Intelligent washing technology

In the dishwasher series 630 all top and middle class dishwasher models are equipped with an electronic control. Advantage for use: the appliances provide a number of functions during which the dishwasher "decides" itself. Thus the appliances are enabled to optimally fulfill their main task, i. e. to wash and dry dishes that are more or less heavily dirtied while consuming the lowest possible amount of water, current and chemicals. This performance is supported by the following features:

- Aqua Sensor
- Regeneration electronic
- Optimally differentiated wash programs
- Warm water detection

The Aqua Sensor

The essential component of the "Intelligent washing technology" is the Aqua Sensor: an optical measuring system to measure the turbidity of the wash water. The Aqua Sensor consists of an infrared light barrier located in the wash water circuit between recirculation pump and spray arms. This light barrier serves to detect the contamination of the water by substances that have come off like grease, oil, protein.



The Aqua Sensor is activated in all programs that contain a prewash cycle. If the wash water is still "clean" at the end of the prewash cycle, i. e. the turbidity does not exceed a determined limit value, the wash water will be used for the subsequent wash cycle. If the water is more heavily contaminated, it will be drained and replaced by fresh water from the water supply. In this way the water consumption in case of standard dirtying of the dishes is reduced by 4.5 ltrs. Saving is always realised, if the water has not been heavily dirtied during the prewash cyle, i. e. "has not yet fulfilled its task". This applies to moderately dirtied dishes and to dishes to which the dirt sticks such heavily that it could not be removed during prewash. Also in this case clean water is not unnecessarily drained. A comparable system for optical checking of the water contamination has so far not been used by any competitor in Europe. In general, the Aqua Sensor is included in the standard equipment of appliances with 5 programs and more (see appliance range and features).

Regeneration electronic

By means of the regeneration electronic the new dishwashers may regulate the consumption of water and salt as required.

In contrast to mechanical dishwashers where a regeneration process is generally performed in any wash program (regeneration of the softening system by means of a salt solution), the electronic controls this regeneration process in accordance with the actual requirement. By means of the water hardness preset at the dishwasher (see p. 13 - Softening system) the electronic counts the number of wash baths that can be performed until the softening system is "exhausted". The number of the actually performed wash baths is considered accordingly. When the highest-possible number is reached, the regeneration process will be started.

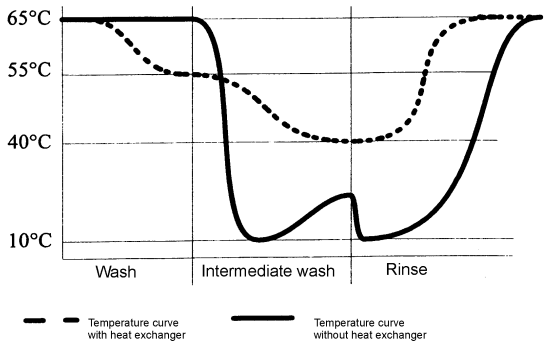
Depending on the water hardness and the selected wash program regeneration may be performed after every (31-50 dH) or only after the 30th wash program (0-3 dH). The regeneration electronic is factory-set to level 5, i. e. 17-21 dH. With this presetting, regeneration is performed after 12 wash baths, i. e. 3 standard programs (see p. 13 - Softening system). The advantage of this feature is that only the amount of water and salt actually required for the respective water hardness will be used for regeneration. The average salt consumption for each wash program is reduced by approx. 30% from 25 g to 18 g.

The regeneration electronic is included in the standard equipment of dishwasher models with electronic control.

Warm water detection

The electronic control reacts to the connection conditions of the appliance and thus enables the unlimited use of all dishwasher models, with or without heat exchanger, in case of warm water connection.

If the control recognises that the appliance has been connected to warm water supply (if the measured temperature of the inlet water during the rinse cycle exceeds 45 °C), the heat exchanger will not be filled for the drying cycle. In order to ensure the temperature difference required for condensation, the temperature will be increased to 70 °C during the rinse cycle and thus the inherent heat of the dishes increased.



Smooth temperature transmissions due to heat exchanger

1.2 Operation and handling

The design of the new dishwasher series 630 is especially characterised by easy operation and activation of the most frequently used operating elements. Daily handling of the new dishwashers is convenient and user-friendly thanks to easily comprehensible operating sequences requiring only little force. The most important elements are:

- Selection of all functions via short-stroke buttons
- Remaining cycle time display
- Detergent metering chamber
- Filter system
- Door brake

Depending on the equipment, delayed program start can be selected on some dishwasher models. This start time preselection is possible up to 24 hours in Top electronic models and up to 9 hours in Comfort electronic models.

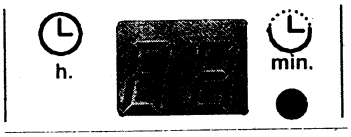
Also after the program sequence has been started changing to another program or operating mode is still possible by pressing the respective button twice. This safety feature prevents unintentional changing during a running program. In case of an intentional program change, the running program is interrupted and the sequence continued at the respective point in the newly selected program. As soon as "0" is displayed in the figure panel, the dishwasher has returned to the initial position and can be newly started.

Remaining cyle time display

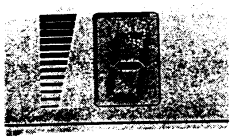
In case of dishwashers equipped with Top electronic the user is informed on the stage of the running wash program: the remaining cycle time until program end (in minutes) is displayed on the operating panel.

The remaining cycle time display is newly calculated and thus updated several times during the program sequence. It mainly depends on the following factors: quantity and type of the dishes, temperature of the inlet water as well as degree of dirtying of the dishes. For the initial calculation after switching on of the dishwasher, always the values of the preceeding pogram are used. The less the above-mentioned factors deviate, the less corrections are made as compared to the time displayed first. The required correction amounts to approx. 10 minutes in the least favourable case. The display is quartz-controlled and thus also reliable in case of deviations of the mains frequency.

In case of dishwashers equipped with Comfort electronic the program sequence display is performed by means of an LED "bar", which indicates the individual phases of the wash program (basically comparable to the program "indicator" of the previous series).



Remaining cyle time display



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Sequence display

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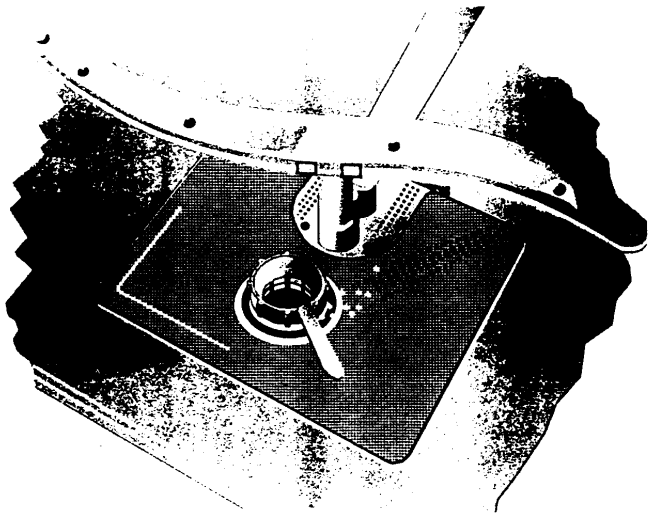
Filter system

The filter system consists of 3 parts: coarse, fine and micro-filter. The coarse and micro filter may be taken out by means of of a joint handle, the fine filter is separately located in the container bottom.

Due to the surface increased by 30 % and the permanent cleaning during the wash cycle by means of a special nozzle at the underside of the bottom spray arm, the fine filter has to be checked for clogging only twice per year.

Furthermore, the newly designed coarse filter serves for improved self-cleaning. It is open towards the drain pump and allows all foreign matters to pass through that may be borne by the drain pump. In this way it is ensured that the filter system will not be clogged by left-overs of food. All larger matters of dirt that cannot be transported by the drain pump are collected in the collection groove of the coarse filter from where they can be easily removed.



Filter system

Door brake

In contrast to the dishwasher models of the previous series the door does not automatically fall down but remains in any desired position. This feature allows to open the door only half the way, e. g., when charging the upper basket or during filling of the detergent chamber and thus enables the user to close the door without bending down.

1.3 Improved installation and connection

Erection, installation and connection have been considerably facilitated for the dishwasher models of the new series thus enabling the kitchen fitter and plumber to intergrate our dishwashers more quickly and more easily into the kitchen. The following items are to be especially noted:

- Aqua Stop
- Installation reserve in the appliance height
- Adjustments from the front
- Infinite panel adaptation

Aqua Stop

Above all, the installation and handling of the Aqua Stop system has been facilitated by a number of improvements. Inlet and outlet hose are separated from each other in any dishwasher model in order to be more flexible in case of unfavourably located water connections. The Aqua Stop housing is smaller althouhg its operativeness remains unchanged. In this way, installation thorugh the bottom cupboards of the kitchen is facilitated .

A significant advantage of the new Aqua Stop is that it can be installed in any desired position, also at an angle, horizonally or, in extreme cases, overhead. Besides that, the minimum height for the inlet connection (0.3 m above the installation surface of the appliance) needs no longer to be observed.

To this end, the valve system has been changed: the pneumatic valve in the Aqua Stop housing has been replaced by a second magnetic valve. As the valves are directly located on the water tap and are closed in de-energized condition, safety can be continually ensured independent of the mains. The Aqua Stop guarantee is of course also fully granted for the new dishwasher models.

Furthermore, the discharge hose can be installed at any location on the dishwashers of the new series, as the vertical installation that has been required so far is no longer necessary due to the "hose bend". This has been realised by a vertical installation and ventilation of the water outlet already in the dishwasher itself. With respect to the appliance, it is thus ensured that no malfunctions like emptying of the appliance or penetration of dirty water from clogged drain pipes may occur.

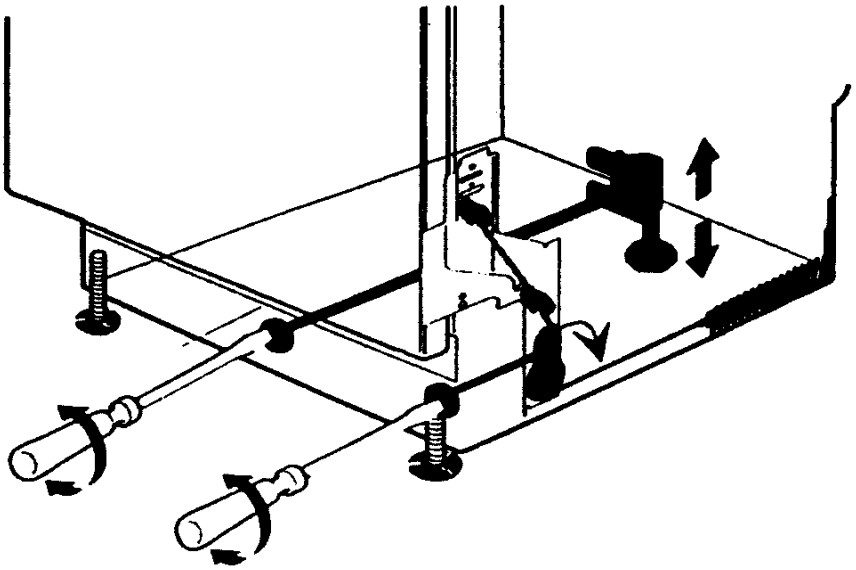
In order to extend the inlet hose, acc. part no. 485 may be installed at the new dishwasher models. The discharge hose can be extended by means of a commercial plastic hose to max. 4 m, if required.

Installation reserve in the appliance height

To faciliate the installation the body height of all appliances of the new series, including stand-alone and built-under models suitable for decoration, is reduced by 10 mm (see p. 18 - Installation dimensions). This ensures, especially in case of replacement, easy installation also with narrow niche conditions, e. g. unlevel ground, carpet, subsequently layed flooring materials. Furthermore, the appliances can thus also be installed in kitchens with special niche dimensions (heights between 810 and 820 mm).

Adjustments from the front

The height of the rear foot as well as the prestress of the door springs (weight compensation of furniture fronts) can be adjusted from the front at all intergrated and fully integrated dishwasher models of the new series.



Adjustment of door springs and rear foot

Thus the appliance needs not to be repeatedly inserted and pulled out for alignment and adjustment. All adjustments may be performed by means of the screws located in the base after the appliance has been inserted into the niche.

At the same time, the design of the door springs has been changed in such a way that they are suitable for furniture fronts of max. 10.5 kg in case of built-in appliances.

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Infinite panel adaptation

In order to adapt the panel height to the drawer dimensions of the kitchen furniture a set of cover strips with infinitely adjustable height is used for integrated appliances. This set consists of 4 strips with a height of 8 mm each, which may be each telescoped into each other up to 3 mm. By means of the complete set, a height difference of up to 32 mm may thus be compensated. The strips may be assembled and disassembled without tool.

An exception are all appliances equipped with stainless steel operation panel. For these models 3 stainless strips are supplied, which may be used alternatively.

Spare part no.	42 67 44	up to	17.5 mm
	42 66 11	up to	27.5 mm
	42 66 10	up to	37.5 mm

Two further stainless steel strips may be supplied as accessory:

Spare part no.	42 67 45	up to	47.5 mm
	42 67 46	up to	57.5 mm

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Appliance heights of 82 and 87 cm

In the kitchens, increased worktop heights tend to gain more and more acceptance for ergonomical reasons. Today 55% of the new kitchens in Germany are already equipped with worktop heights of 91 cm and more. In Scandinavia, Great Britain and the Netherlands the proporotions of these height dimensions are significantly higher.

Especially for those "high" kitchens, a further innovation is provided: dishwashers with a height increased by 5 cm which ensure optimal utilisation of the available space. In contrast to dishwashers with "normal" height these "extra-large" dishwashers offer an increased internal height of 5 cm. These dishwashers are suitable for all kitchens with a niche height of at least 86 cm and a body size (niche height minus base height) between 70 and 72 cm. In comparison with that: The "normal" appliances are suitable for body sizes of 65 to 72 cm, with the minimum niche dimension amounting to 81 cm.

In order to select the ideal appliance for a certain kitchen it is thus important to know the base height in addition to the existing niche height, as the application of the dishwasher is determined by the difference between them.

Niche height in mm

	810	820	830	840	850	860	870	880	890	900	910	920
90	②					❼						
100	②	②				❼	❼					
110	②	②	②			❼	❼	❼				
120	②	②	②	②		❼	❼	❼	❼			
130	②	②	②	②	②	❼	❼	❼	❼	❼		
140	②	②	②	②	②	②❼	❼	❼	❼	❼	❼	
150	②	②	②	②	②	②❼	②❼	❼	❼	❼	❼	❼
160	②	②	②	②	②	②❼	②❼	❼	❼	❼	❼	❼
170		②	②	②	②	②	②❼	❼	❼	❼	❼	❼
180			②	②	②	②	②	❼	❼	❼	❼	❼
190				②	②	②	②		❼	❼	❼	❼
200					②	②	②			❼	❼	❼
210						②	②				❼	❼
220							②					❼

② dishwasher 82 cm ❼ dishwasher 87 cm

Possible installations in case of a niche height of 87 cm

1.4 Further technical innovations

In the following chapters further innovations of the dishwasher series 630 are summarized and explained. These modifications have also resulted in improved operation, performance, quality and optical aspects of the appliance.

1.4.1 Wash system

The wash system of the dishwashers has been further developed with the aim to achieve an optimal cleaning result with the lowest possible consumption of water and energy. The following appliance components contribute to reach this aim:

Heat exchanger

The heat exchanger, which is still an exclusive feature of Küppersbusch appliances, is also offered in the new series. The heat exchanger offers a multitude of operating advantages like economical, hygienic drying, gentle temperature guidance, no penetration of steam when the door is opened after the program end. The heat exchanger is, above all, installed in top class dishwashers, partially also in middle class appliances. Due to the warm water detection of the electronic system a good drying performance is also achieved in case of warm water connection.

Spray arms

An obvious characteristic feature of the new series is represented by the curved "wave-type spray arms" that are exclusively installed in Küppersbusch dishwashers. The advantage of this design is an improved spraying of the entire dishwasher interior, i. e. no more "dead angles" that are not reached by the spray arms. All pieces of the dishes are thus reached by the spraying jets and cleaned accordingly.

Both spray arms of the new dishwasher series - also the lower arm - are made of plastic. This enables a more precise design and more exact alignment of the spraying nozzles as well as a lower weight which results in a faster rotation of the spray arms and thus an improved distribution of the water.

Water guidance

The entire water guidance from the pump casing to the spray arms and the top spray has been newly designed and is now located in the inside of the rinse container. This leads to a reduction of the inactive water quantity and thus to an improved washing result.

The water guidance to the upper spray arm is also new. The spray arm is connected to the supply by means of a movable coupling and directly mounted at the upper basket. For this reason, no more space-consuming funnel is required for any appliance. Thanks to this new coupling, height adjustment and even removal of the upper basket with spray arm is now also possible without funnel. In the latter case, the entire internal space of the appliance (51 or 56 cm, respectively) is then available, for example for washing baking trays.

Flow heater

All appliances of whatever class belonging to the dishwasher series 630 are equipped with an integrated flow heater to heat the water. Thus the new generation does not include appliances with visible tubular heating any more. The complete range of advantages provided by the flow heater (increased internal height, no damaging of plastic dishes, no carbonisation of remaining food) is only provided in Küppersbusch appliances.

1.4.2 Dish baskets

In the new series two different types of dish baskets are used: standard baskets and universal baskets.

The standard baskets are identical with those of the series 624 (dishwashers with heat exchanger). The upper basket is suitable for up to 4 rows of glasses or cups and one row of small plates. The lower basket is equipped with two rows of plates designed as fixed or removable inserts, depending on the model (see "Appliance range and equipment"). In case of the appliances with removable inserts the special accessory "Special glass basket" may be used.

The universal baskets are already known from the series 624 (upper basket dishwashers). They offer variable charging of the upper and lower basket and allow location of 6 standard dishes including all parts like pots, bowls and pans only in the upper basket. The universal baskets are included in the standard equipment of all upper basket dishwashers.

Furthermore, the new dishwasher models allow adjustment of the basket height for the upper basket appliances which means a further improvement of the flexible charging. The heights are factory-set to 26 cm at the top and 25 cm at the bottom. If required, this setting can be changed to 21 cm at the top and 30 cm at the bottom. Thus, these appliances are also suitable for pieces of dishes up to a height of 30 cm (if arranged at an angle even up to 33 cm). Adjustment of the upper basket has been facilitated: the basket is simply lifted of the guide rails and inserted in the second height position.

The standard baskets are generally supplied with 21 cm top height and 30 cm bottom height. No adjustment is possible here. The heights of the "high" appliance types amount to 26 cm at the top and 30 cm at the bottom, no adjustment possible.

The heights of all appliance types are summarised in the following table:

	Height 82 cm		Height 87 cm	
	Standard baskets	Universal baskets	Standard baskets	Universal baskets
Height upper basket	21	26	26	26
- arranged at an angle		29	29	29
Height lower basket	30	25	30	30
- arranged at an angle	33	28	33	33
Adjustable to:				
Height upper basket		21		
- arranged at an angle				
Height lower basket		30		
- arranged at an angle		33		

1.4.3 Softening system

The filling capacity of the salt container of the new dishwasher models amounts to 1.5 kg and is sufficient for approx. 70 standard wash cycles with a water hardness of 5. After lighting up of the salt refill indicator approx. 5 wash cycles can still be peformed before the salt container is completely empty. The operation of the softening system depends on the respective control.

1.4.4 Noise

The appliances of the new series are equipped with 2 noise insulating stages: 48 dB and 45 dB. These values always apply to the sound power dB (re 1 pW) for a built-under appliance.

Apart from some exceptions, all electronic appliances will be equipped with 48 dB. This value is so low that it is not audible compared to the normal noise level in the room. This equipment enables us to offer a large variety of low-noise dishwashers.

1.4.5 Turbo drying

The electronic appliances of the new dishwasher series enable the operator, if desired, to select a more intensive drying function which, of course, results in an increased energy consumption.

In order to program this turbo drying, switch the dishwasher on while keeping the button "Heavy-load 65°" depressed. The preset value "0" (= turbo drying off) will then be indicated in the 7-segment display. The function is actually activated by pressing the button "Heavy-load 65°" once again. The value "1" (= turbo drying on) will be displayed. After switching off the appliance, the new value is stored.

1.4.6 Connection value

All dishwashers of the new series have a heating capacity of 2150 W and thus a connection value of 2300 W; therefore a fuse protection of at least 10 A is required. Due to this feature, all dishwashers may also be used at locations where no 16 A protection is available in the future. Special low-protection variants, as are partially existing today, are no longer required.

1.4.7 Rinse aid metering chamber

The location, filling, metering adjustment and refill indicator of the rinse aid chamber have been taken over from the acutal dishwasher models. Only the lid has been modified; it is now fixed to the cabinet. Thus loss or misplacement of the lid is avoided.

The filling capacity of the rinse aid chamber amounts to 110 ml; in position 3, 3 ml are added per wash program. Thus approx. 25 rinse cycles may be performed until the refill indicator lights up.

1.4.8 Ventilation

The inner container of the new dishwashers has no openings in the top, lateral and rear wall. The only outlet for the produced steam is located in the inner door, integrated in the refill assembly for detergent and rinse aid. The steam condenses in a separate channel in the inner door and is recirculated below the door to the container bottom. In this way, the penetration of the steam towards the top which results in the risk of a damaging of the worktops in this area is avoided.

1.4.9 Operating safety

All appliances (except fully integrated appliances) are equipped with a safety device in case of opening during the program sequence, i. e. a direct circuit-breaker which is operated when the door opener is activated. When the appliance is opened, it will be immediately switched off via the mains switch. After closing the door and switching on again, the program will be continued at the same point. Besides that, all upper basket dishwashers are equipped with a child-proof lock located in the door handle to protect the appliance from being switched on unintentionally. When the child-proof lock has been activated, the appliance can only be opened by pressing an additional pin in the handle recess. If not required, the child-proof lock can be deactivated by means of a ballpen or equivalent.

1.4.10 Salt refilling

The refilling of regeneration salt in the container bottom has been facilitated by shifting the filling opening towards the front. Furthermore, a salt funnel is supplied with all appliances.

1.4.11 Feet and skids

The feet are made of plastic with extended foot plates in order to avoid damaging of flooring materials. Stand-alone appliances and appliance suitable for decoration are equipped with four, built-in appliances with three feet (two at the front, one at the rear in the middle) that ensure stable standing on any ground.

The skids for easier sliding of the appliance into the furniture niche are integrated in the bottom tub. In this way the installation of the appliances is even more faciliated.

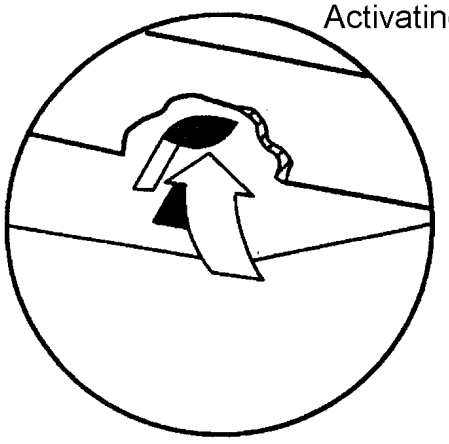
1.4.12 Mounting at the kitchen furniture

For mounting the built-under appliances (suitable for decoration, integrated and fully integrated) at the kitchen furniture two metal brackets to be inserted into the force sensors at the top of the appliance are supplied. Each of the metal brackets has two fastening locations. In case mounting at the worktop is not possible (e. g. stone or granite worktops), these brackets may also be used for lateral mounting at the furniture body.

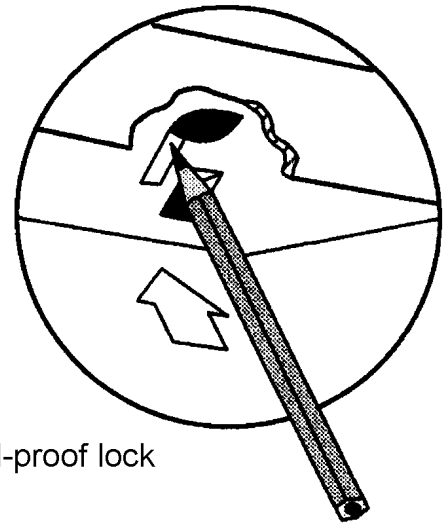
In order to protect kitchen worktops against being damaged by emerging steam, for example when opening the door during the program sequence, all built-under appliances are supplied with a steam protection foil to be mounted at the underside of the worktop.

1.4.13 Child-proof lock

Activating the child-proof lock



Opening the door with activated child-proof lock



Deactivating the child-proof lock

1.5 Technical Data

1.5.1 Consumption values

Electronic with heat exchanger

Programs	2 x 6 Prog.	5 Prog.	2 x 4 Prog.	Water (ltr.)	Current (kWh)	Time (min.)
Pots 70 °C	x			18 / 23*	1,7 / 1,8*	99
upper basket				14 / 18*	1,2 / 1,3*	90
Heavy-load 65 °C	x	x	x	18 / 23*	1,4	95
upper basket	x		x	14 / 18*	1,1	85
Normal 55 °C	x	x	x	14 / 18*	1,2	90
upper basket	x		x	11 / 14*	0,9	82
Eco 55 °C	x	x	x	16	1,2	90
upper basket	x		x	13	0,9	81
Glasses 40 °C	x			14	0,9	58
upper basket	x			11	0,7	52
Quick	x	x	x	12	1,0	30
upper basket	x		x	10	0,8	25

* thanks to Aqua Sensor low value in case of standard dirtying

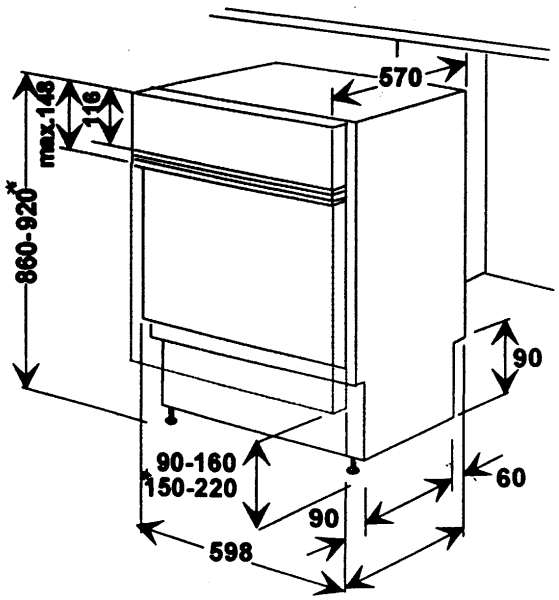
Electronic without heat exchanger

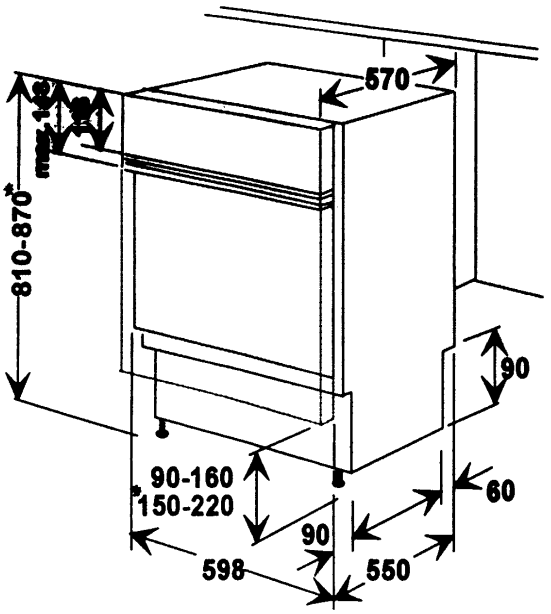
Program	5 Prog.	4 Prog.	Water (ltr.)	Current (kWh)	Time (min.)
Heavy-load 65 °C	x	x	23	1,6	95
Normal 55 °C	x	x	18	1,4	90
Eco 55 °C	x	x	16	1,4	90
Glasses 40 °C	x		14	1,1	58
Quick	x	x	12	1,0	30

Mechanic

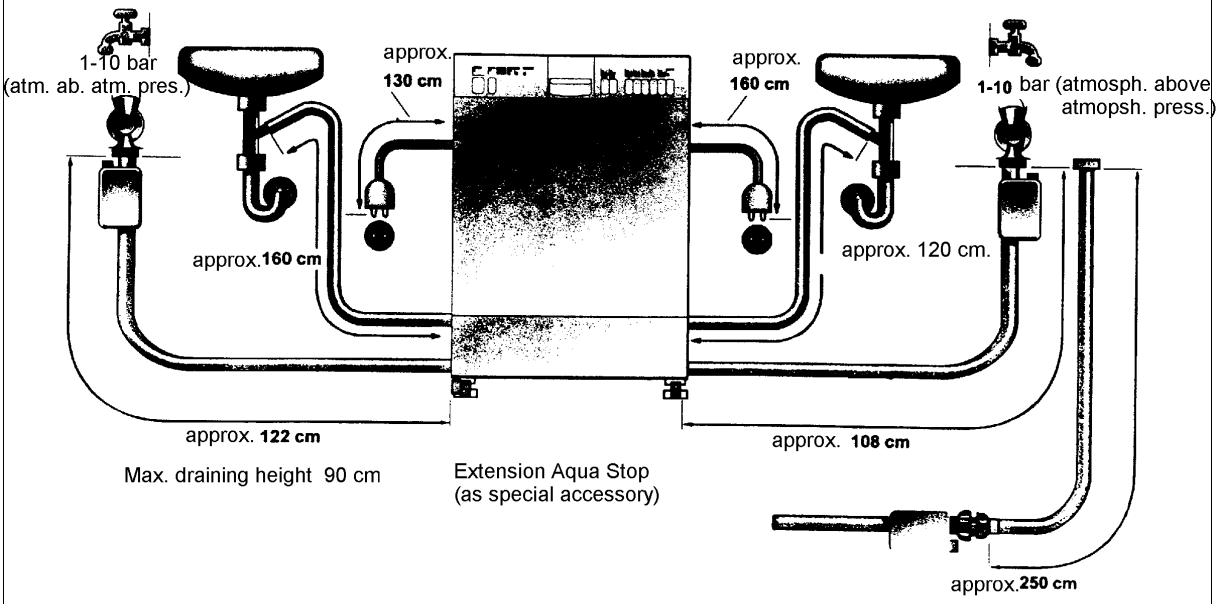
Program	5 Prog.	4 Prog.	Water (ltr.)	Current (kWh)	Time (min.)
Heavy-load 65 °C	x	x	25	1,6	95
Normal 65 °C		x	20	1,5	95
Normal 55 °C	x		20	1,4	92
Eco 55°C	x		16	1,4	88
Energy saving		x	17	1,3	75
Quick	x		12	1,0	45

1.5.2 Installation dimensions





1.5.3 Connection dimensions



2. GENERAL TECHNICAL DESCRIPTION

2.1 Structure

2.2 Housing parts

The lower edges of the side walls are inserted into the tub. Attachment is via 2 screws each at the front and rear of the appliance. The outer door, which is screwed to the inner door, is attached below the access panel with brackets in the support. For stand-alone models, the table top is attached at the four supports. Built-under models have a divided, height-adjustable outer door for different bases.

2.3 Rinse container

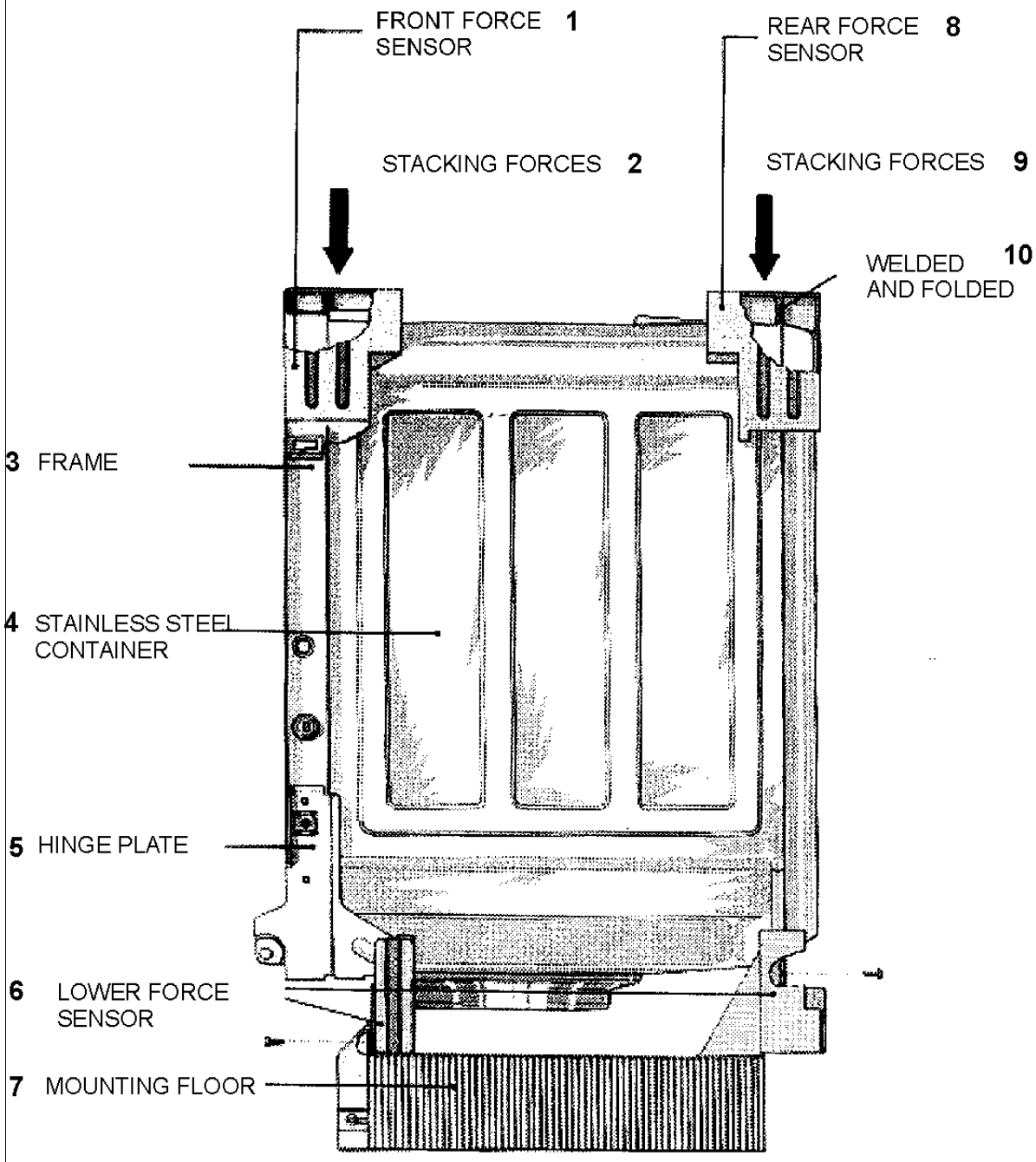
The bitumen coated stainless steel inner container has a U-channel around the door area which is welded to the container. The welded rear wall is also double stacked on all four sides with the container. These doubled and lock-seamed connections provide rigid and safe container edges. The specially formed supports at the upper container corners, to which the housing parts are also attached, absorb the load and clamping forces. The softening system is screwed down to the container bottom. The heat exchanger with integrated water inlet is attached at the left container wall with two rails. The connection between heat exchanger, softening system and level sensor system is made via hoseless plug connections.

2.4 Inner door

The dispenser assembly is locked into the stainless steel inner door, which is also bitumen coated. The surge water seal is screwed to the inner door using the seal rail and snapped onto the container edge. The edges of the inner door are doubled and lock-seamed for no sharp edges. The container is vented through the housing of the dispenser assembly. A steam condensation tube fitted into the housing between the inner and outer doors passes condensates during the heating cycles or expansion peaks back into the container. The control, mains switch, displays and door latch are attached to the support which is screwed to the inner door.

The access panel is fixed on the support.

RINSE CONTAINER



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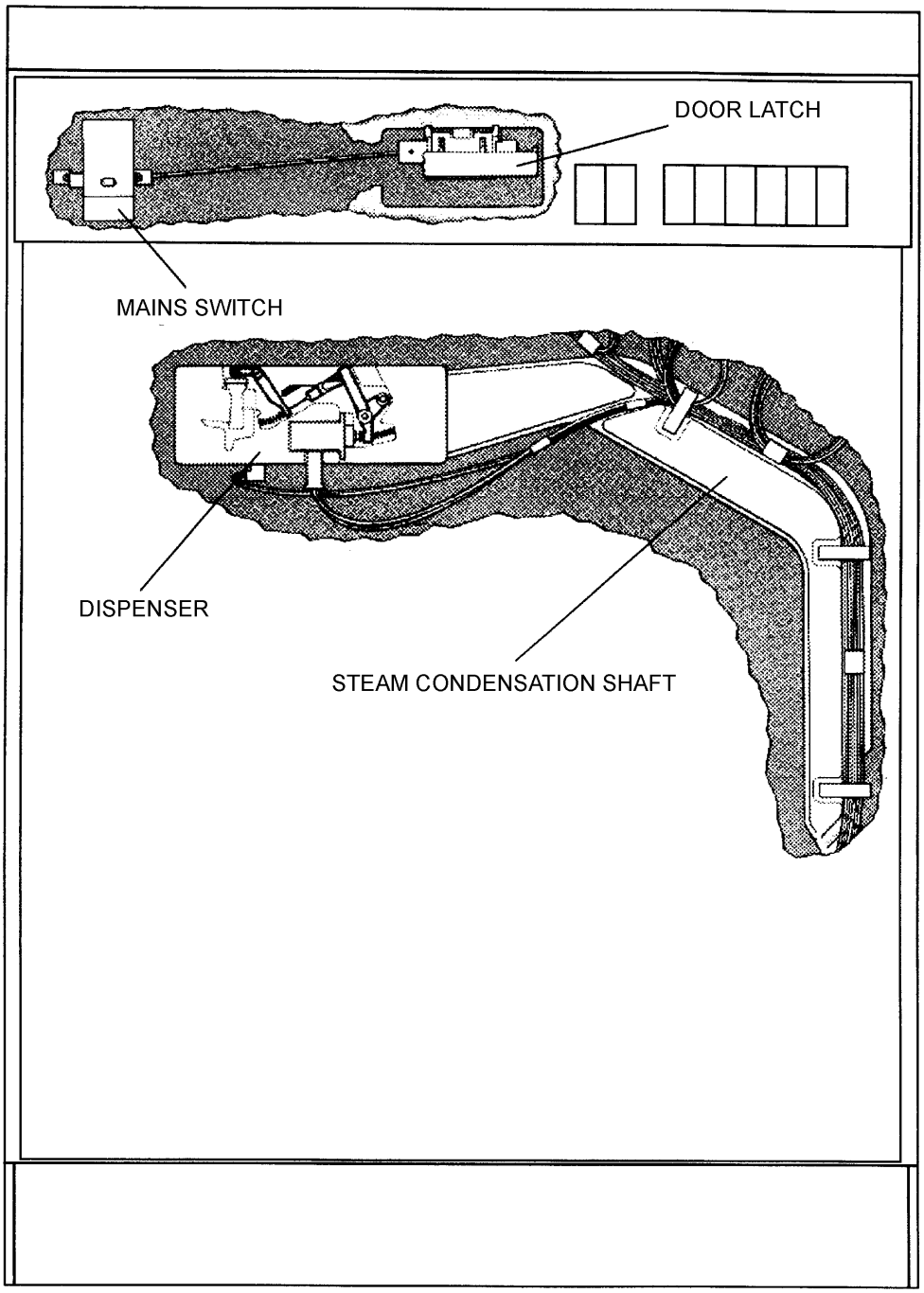
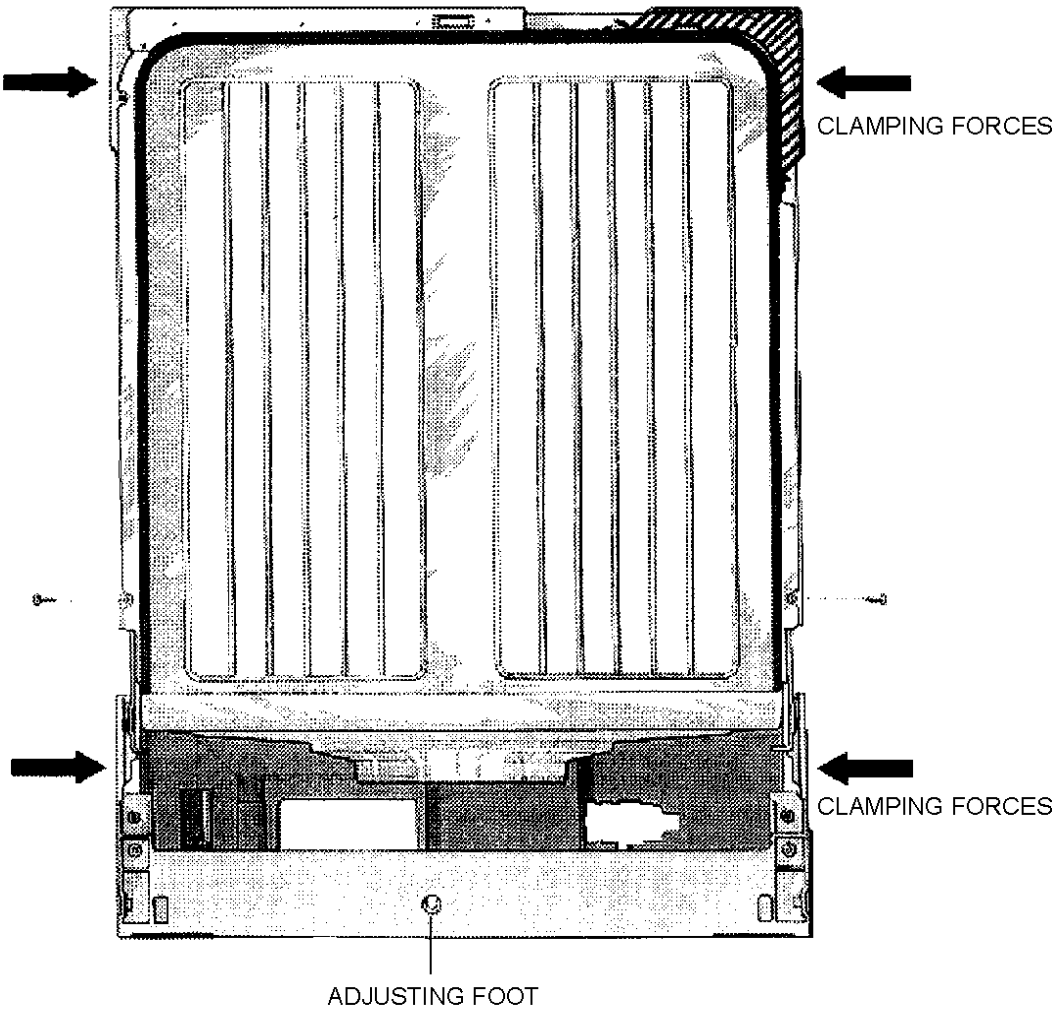


2.5 Tub

The plastic tub contains the pump system with flow heater, pump casing, drain and recirculation pump, the level and safety system, as well as the float for shutting off when water is in the tub. The drain and Aqua Stop hoses are brought in separately at the rear left of the tub. The electrical connection with main filter is at the right rear.

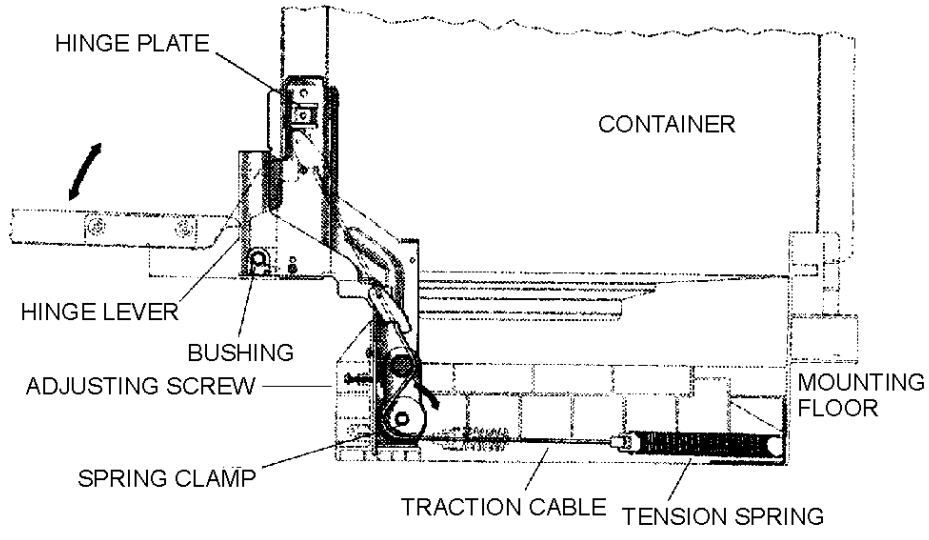
The rear wall of the tub is formed such that it serves both as a support and attachment member for the rinse container. The front support and attachment is made using the extended hinge plates of the door hinges in the tub, which are screwed to the U-frame of the container.



2.6 Door spring adjuster

The adjusting assembly consists of the tension spring, the cable, spring adjuster and adjusting screw. The tension springs are attached below the tub at the rear wall using brackets. The tension cable is fed to the hinge plate over the spring adjuster, angled and hung into the hinge lever of the door.

DOOR HINGE WITH TENSION SPRING



2.7 Height adjustment

The integrable and built-under models have two adjusting feet in front and a rear foot which is adjustable for height from the front. The stand-alone models have four identical adjusting feet, the front ones in the base.

2.8 Spray system

The rotary spray system consists of three spray levels , the lower and upper spray arm and a top spray .

The water supply to the upper spray arm and the top spray is brought through the inlet pipe attached to the inside of the container rear wall. This pipe is connected by a direct connection with the flow heater under the pump casing at one of its two outlets.

The upper spray arm is directly fastened with its inlet pipe to the upper basket. The connection to the inlet pipe is through a variable coupling. In models with height adjustable upper basket, the water entry is adapted to the spray arm using this variable coupling.

The connection to the inlet pipe is through a variable coupling. In models with height adjustable upper basket, the water entry is adapted to the spray arm using this variable coupling.

The lower spray arm with its bearing is connected directly through the pump casing at the second outlet of the flow heater.

The valve for the upper basket wash cycle is located in this outlet.

2.9 Wash and pump system

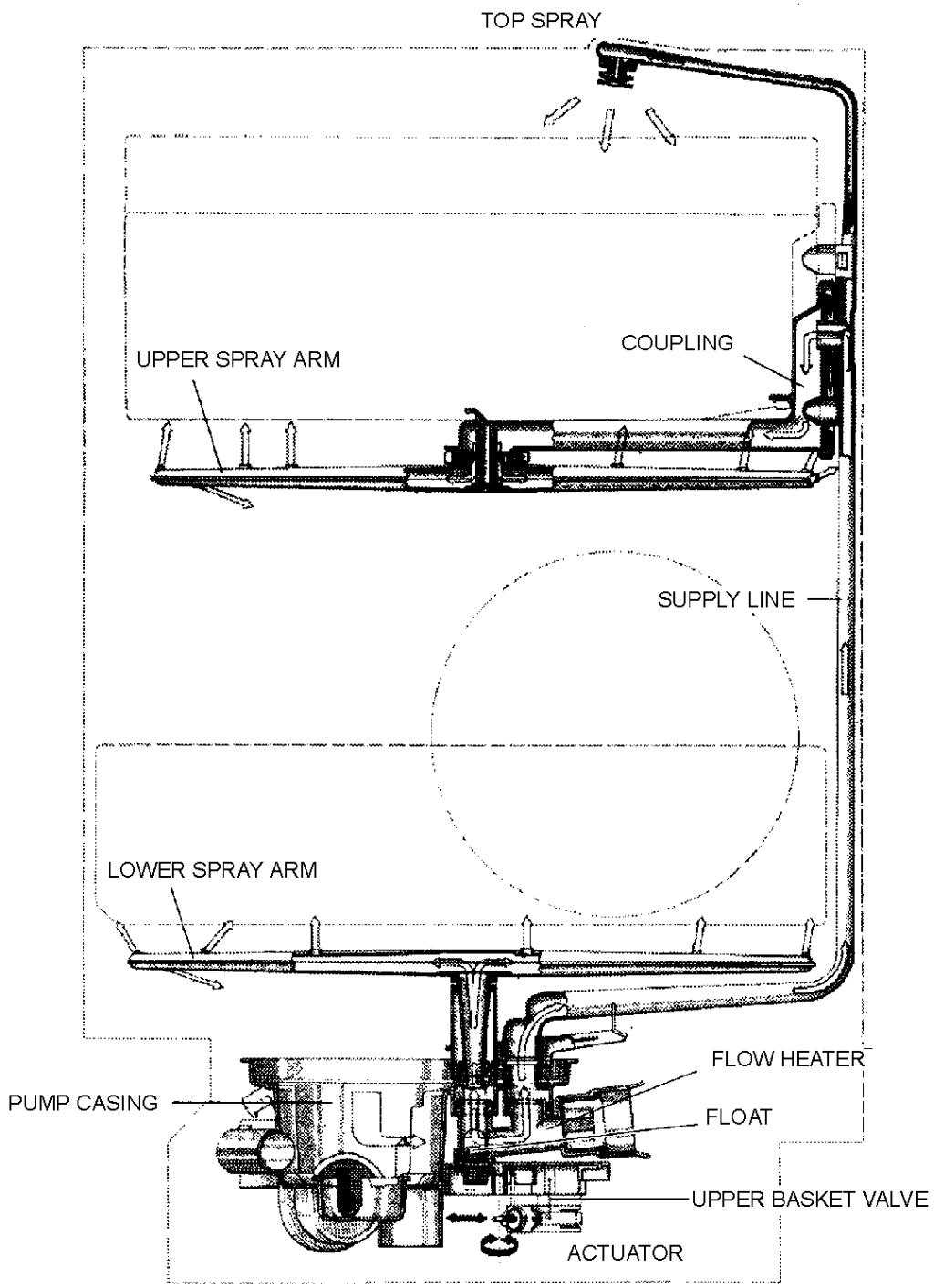
The switching mechanism with the permanent magnet and actuator is attached beneath the flow heater. The recirculation and drain pump as well as the flow heater are attached to the pump casing using plug connections. The flow heater is additionally screwed to the pump casing for pressure resistance.

The pump casing is covered by the area fine filter. With the combined coarse and micro-filter, the fine filter is attached to the floor of the pump casing using a bayonette mount. The washing liquid accumulating in the pump casing is drawn by the recirculation pump and pressed into the flow heater. At the appropriate pressure a flange membrane actuates the pressure switch for the heater A series connected temperature controller with a turn-off temperature of 85 °C prevents overheating.

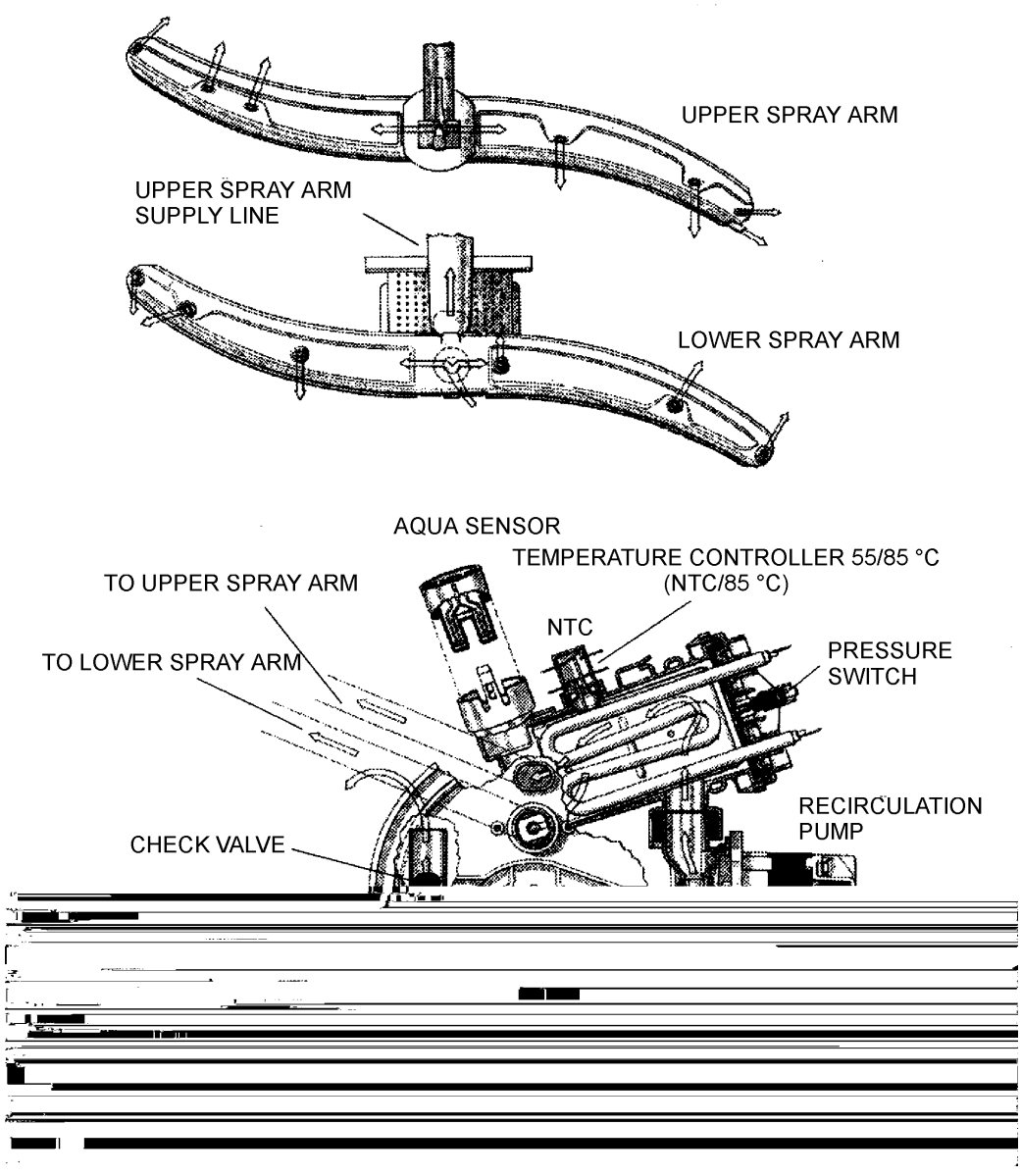
This temperature switch is combined with an NTC resistor (**N**egative **T**emperature **C**oefficient) (otherwise 55/88 °C) into a single component, and is only used in models with electronic control.

The NTC surface has direct contact with the wash liquid. At the outlet of the flow heater is the Aqua sensor with its sensor in the flow current of the wash liquid for detecting turbidity of the water. With the drain pump directly attached to the pump casing, the impeller and the check valve are accessible after removing the cover in the rinse container.

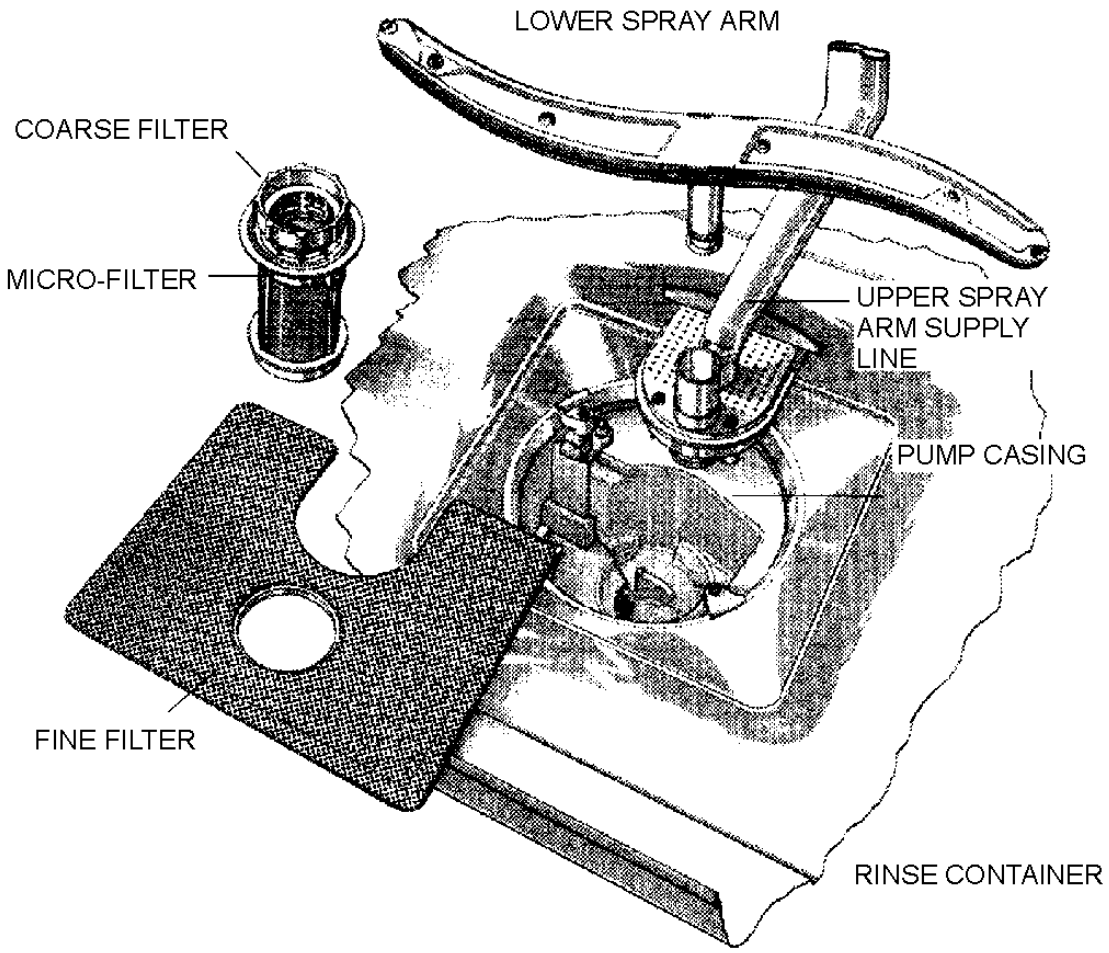
SPRAY SYSTEM



WASH AND PUMP SYSTEM



FILTER SYSTEM



3. FUNCTION DESCRIPTION

3.1 Water inlet for models with heat exchanger and electronic control

3.2 Aqua Stop system

The system consists of two series connected electrical solenoids, the fill solenoid and the safety solenoid. The solenoid combination is enclosed in a housing and attached at the water inlet junction. From the solenoid, the supply line is led to the integrated water inlet by the heat exchanger, and the electrical control line for the solenoids is led into the tub through a leak water tube attached to the solenoid housing.

3.3 Safety function

All leaks inside the appliance are collected in the tub, including leaks in the fill and safety solenoid and the water supply line, which are led to the tub through the leak water tube. At a preset level in the tub, the float actuates a switch lever for the safety switch on the level sensor, which electrically shuts off the fill and safety solenoid. Simultaneously the drain pump is turned on, the wash liquid is removed from the rinse container, and the pump runs continuously.

Note: In models with electronic controls, the electronic system is turned off by a safety switch.

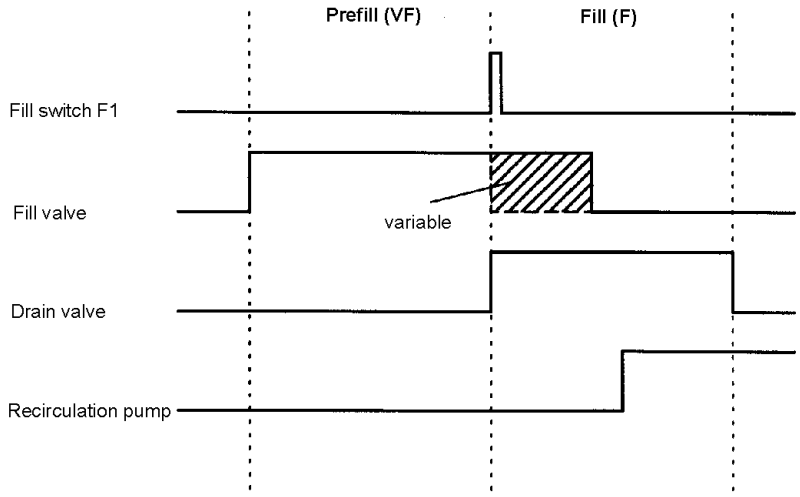
3.4 Water inlet with heat exchanger prefill (VF1) (models with electronic control only)

After the fill solenoid is opened, the water flows to the integrated inlet over the free flow line into the softener and then as softened water into the heat exchanger. After the regeneration chamber is filled the water flows through the overflow channel into the thredtle cup of the level sensor. The pressure buildup in the pressure socket causes the level switch to open the heat exchanger drain valve.

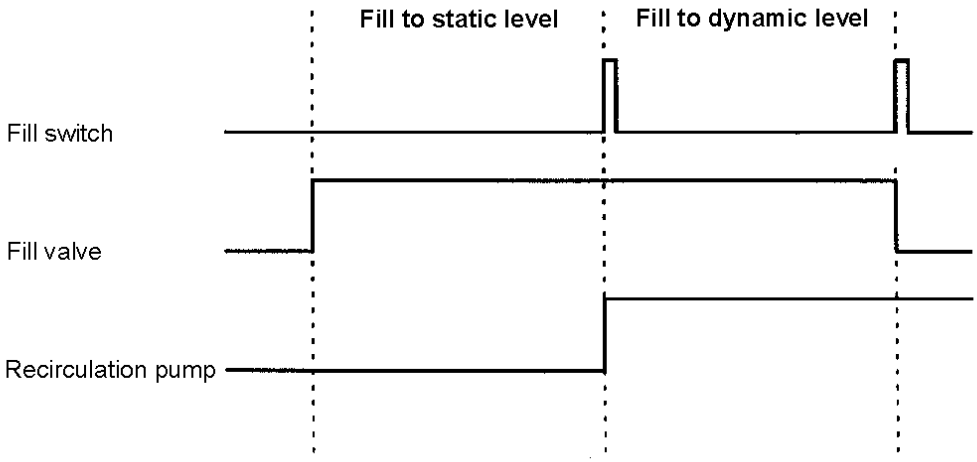
The electronic determines the time between the open command of the fill solenoid and the closing of the level switch (f1). From this time the additional fill time of the fill solenoid is calculated. At each first filling of a wash cycle, 200 ml more water than the normal amount is filled. With this water amount, for the first fill of the wash cycle the water loss is compensated which is caused by the wetting of the dry dishes. Redation of the recirculation pump is ensured and in the following fill operations water is saved. The recirculation pump is turned on time-delayed, the drain valve stays open until the heat exchanger is fully emptied.

3.5 Explanation of wash commands

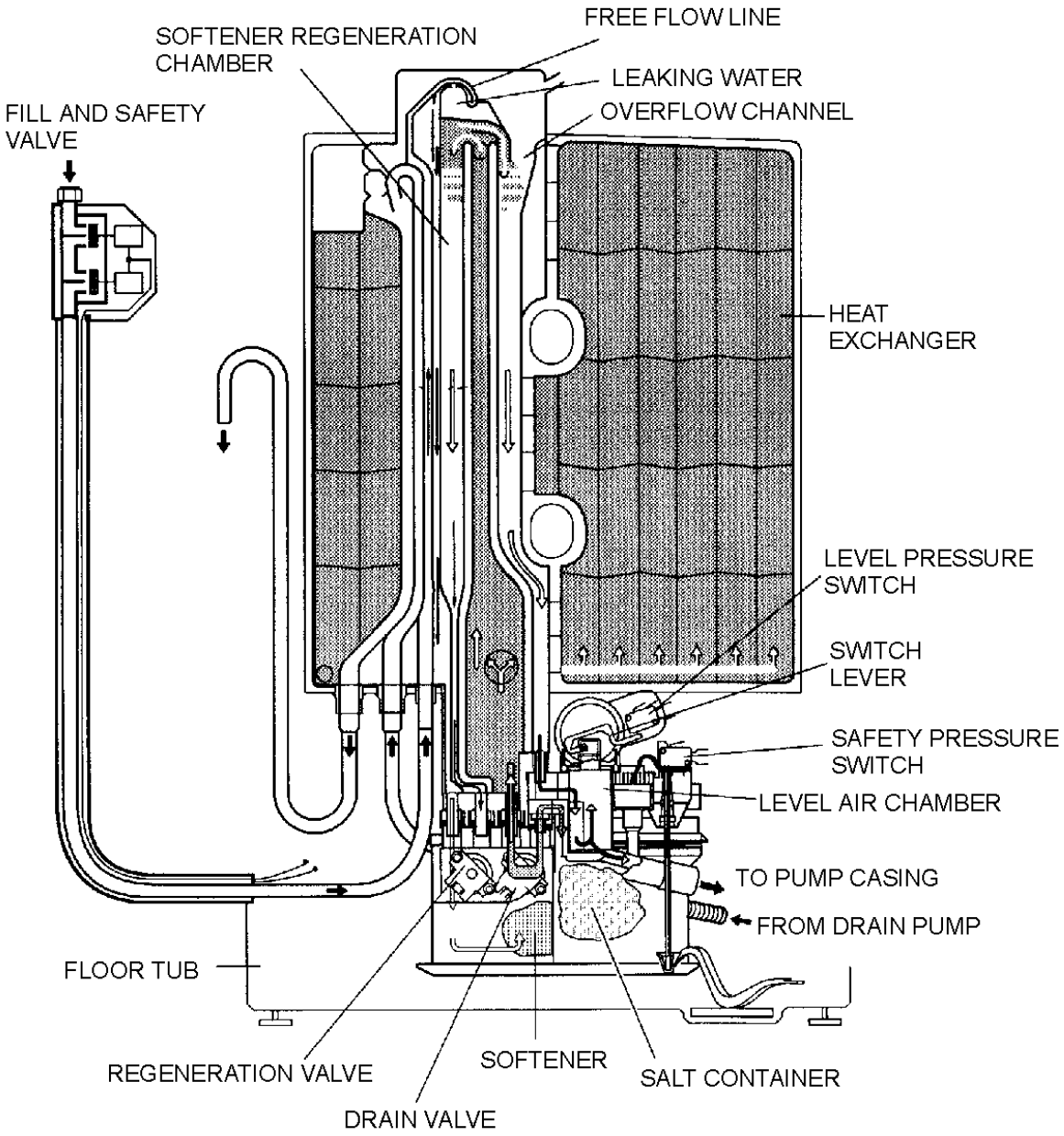
3.5.1 Filling process for models with heat exchanger (HE)



3.5.2 Filling process for models without heat exchanger (HE)



FILL SYSTEM WITH HEAT EXCHANGER AND WATER SOFTENER
WATER INLET SOFTENING



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3.6 Water inlet without heat exchanger

After the fill solenoid opens, water flows to the integrated inlet across the free flow line into the regeneration chamber. After the regeneration chamber is filled, the water flows over the overflow channel through the softener, then as soft water into the level sensor and pump casing. After the static level is reached, the output signal from the level pressure sensor is picked up the by the electronics and the recirculation pump is turned on. When the rerecirculation pump starts, the level pressure switch is reset. Dynamic filling continues until the level switch is activated again, which means the wash level has been reached.

3.7 Regenerating with heat exchanger

The water quantities of the wash cycles which have already run are registered by the electronic and determine the timing for regenerating of the softener. Before each regeneration step the electronic system checks whether the capacity of the softener is still sufficient for a complete normal program sequence. If not, another regeneration is done. During regeneration the regenerating valve on the softener is opened. The reservoired quantity of water flows across the valve into the salt container, is enriched with salt, and flows as brine through the softener into the pump casing. To increase the effect, another 360 ml are cycled. To this end the fill solenoid is actuated for a short time with open drain valve. To clear the dissolved hardening agents, the softener is rinsed through in two phases during the drying cycle.

3.8 Regenerating without heat exchanger

The water quantities of the wash cycles which have already run are registered by the electronics and determine the timing for regenerating of the softener. Before each regeneration step the electronics checks whether the capacity of the softener is still sufficient for a complete normal cycle. If not, another regeneration is done. In regenerating the regenerating valve on the softener is opened. The reservoired quantity of water flows across the valve into the salt reservoir container, is enriched with salt, and flows as brine through the softener into the pump casing. To increase the effect, another 360 ml are added. To this end the fill solenoid is actuated for a short time with open drain valve. To clear the dissolved hardening agents, the softener is rinsed through in two phases at the beginning of the next cycle.

3.9 Level sensor system for fill level

After the heat exchanger and regeneration chamber are filled, the water flows over the drain channel into the level sensor housing to the level pressure chamber. The throttle cup under the pressure chamber ensures that the level pressure chamber is filled first, until the corresponding pressure for actuating the level switch is reached. The overflow water flows directly into the pump casing.

3.10 Safety level

If the fill solenoid does not shut off, filling continues until the level in the safety level chamber is reached and the float actuates the safety switch. The safety level chamber is wired ahead of the level chamber and is located between the level chamber and the drain to the pump casing.

The safety switch is used to turn the fill and safety solenoid off and the drain pump on.

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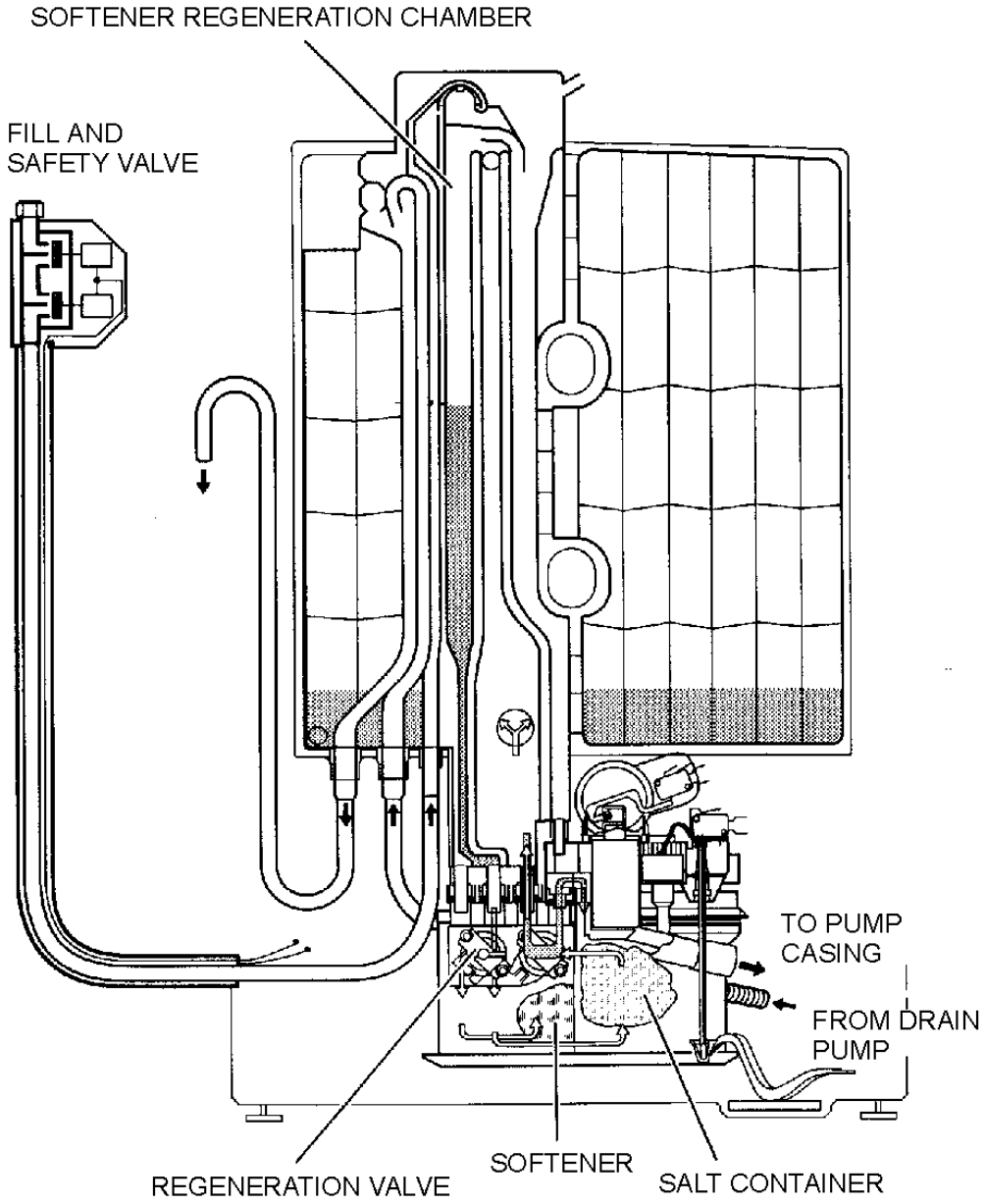
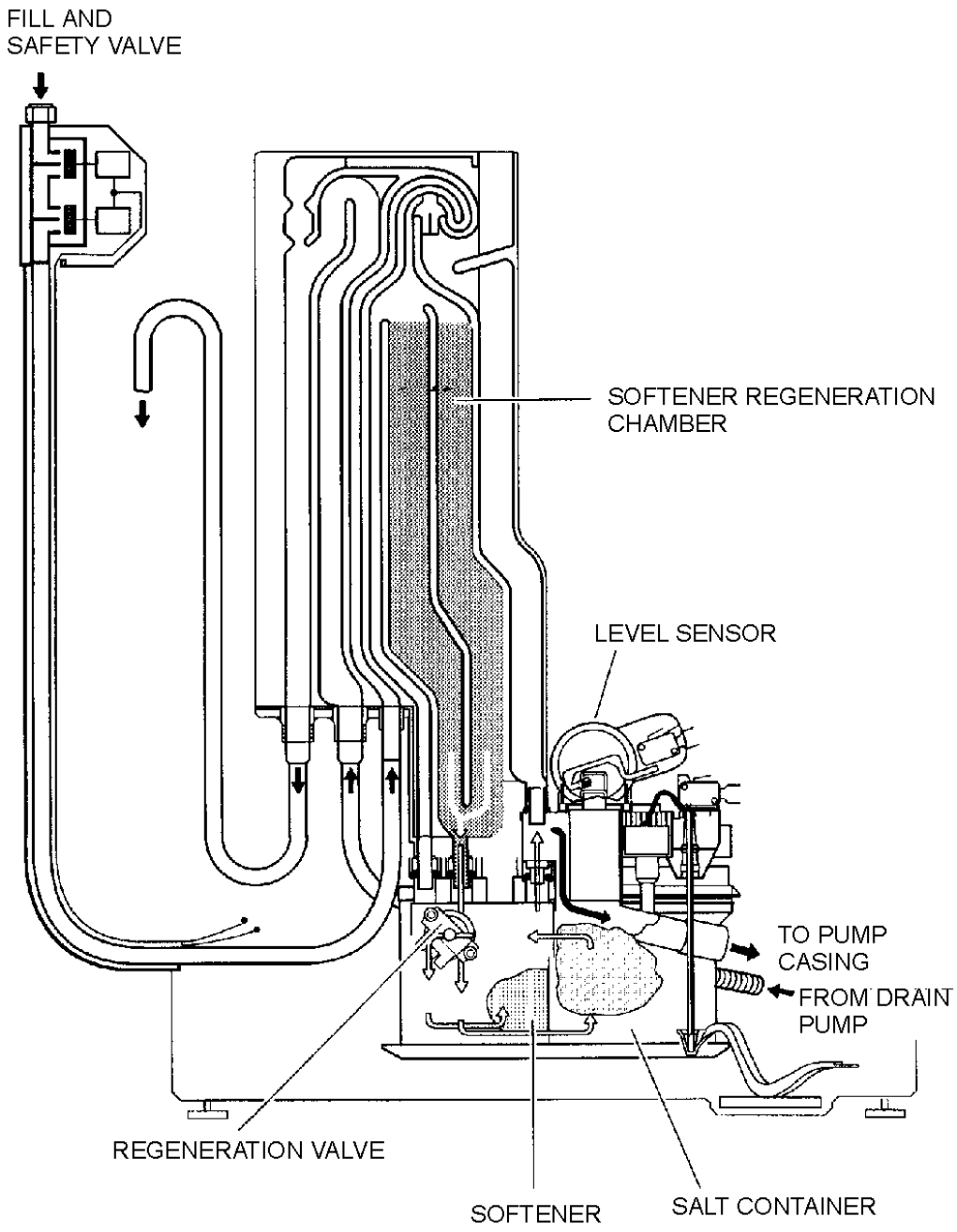
FILL SYSTEM WITH HEAT EXCHANGER AND WATER SOFTENER REGENERATING



FILL SYSTEM WITHOUT HEAT EXCHANGER WITH WATER SOFTENER WATER INLET REGENERATING



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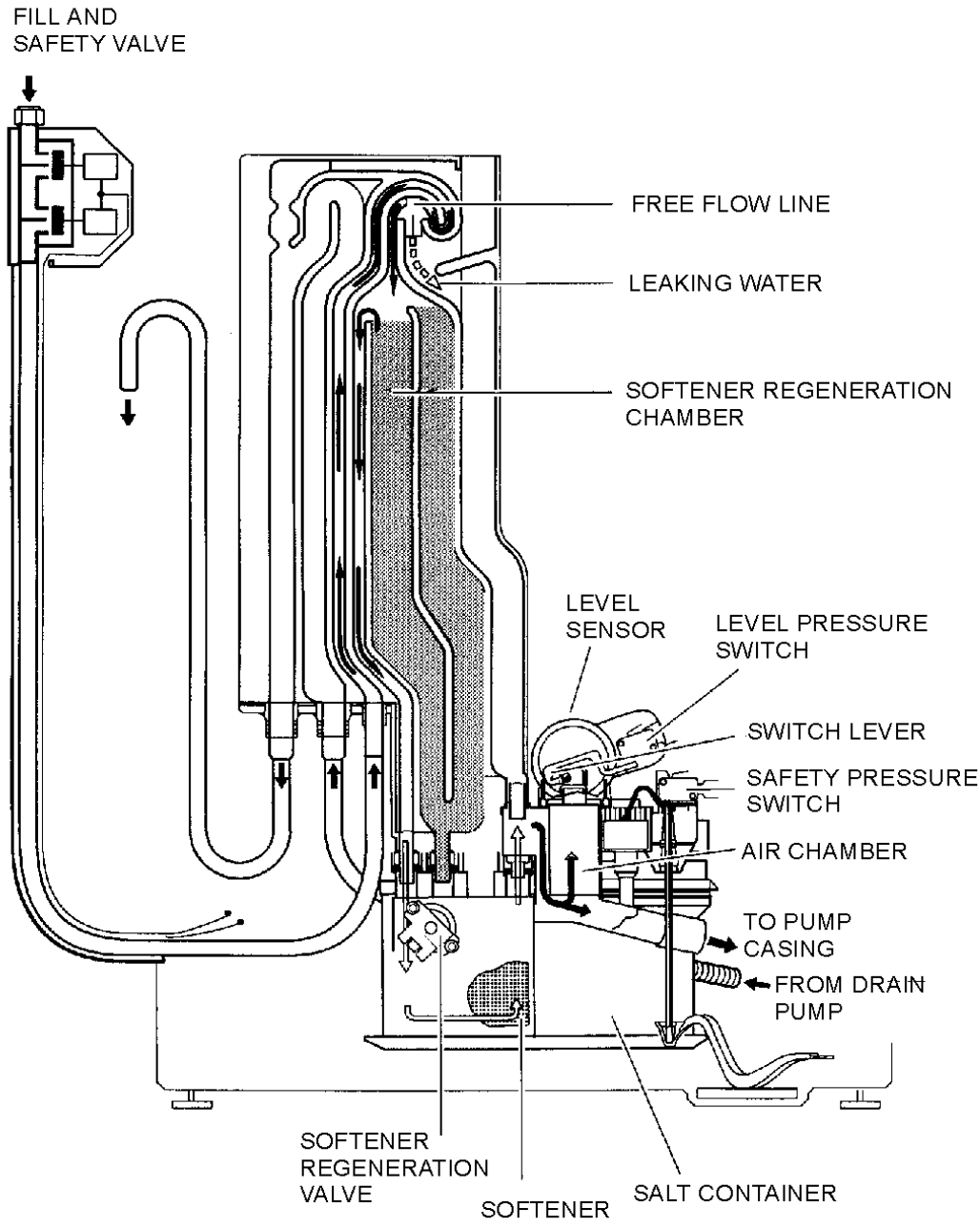
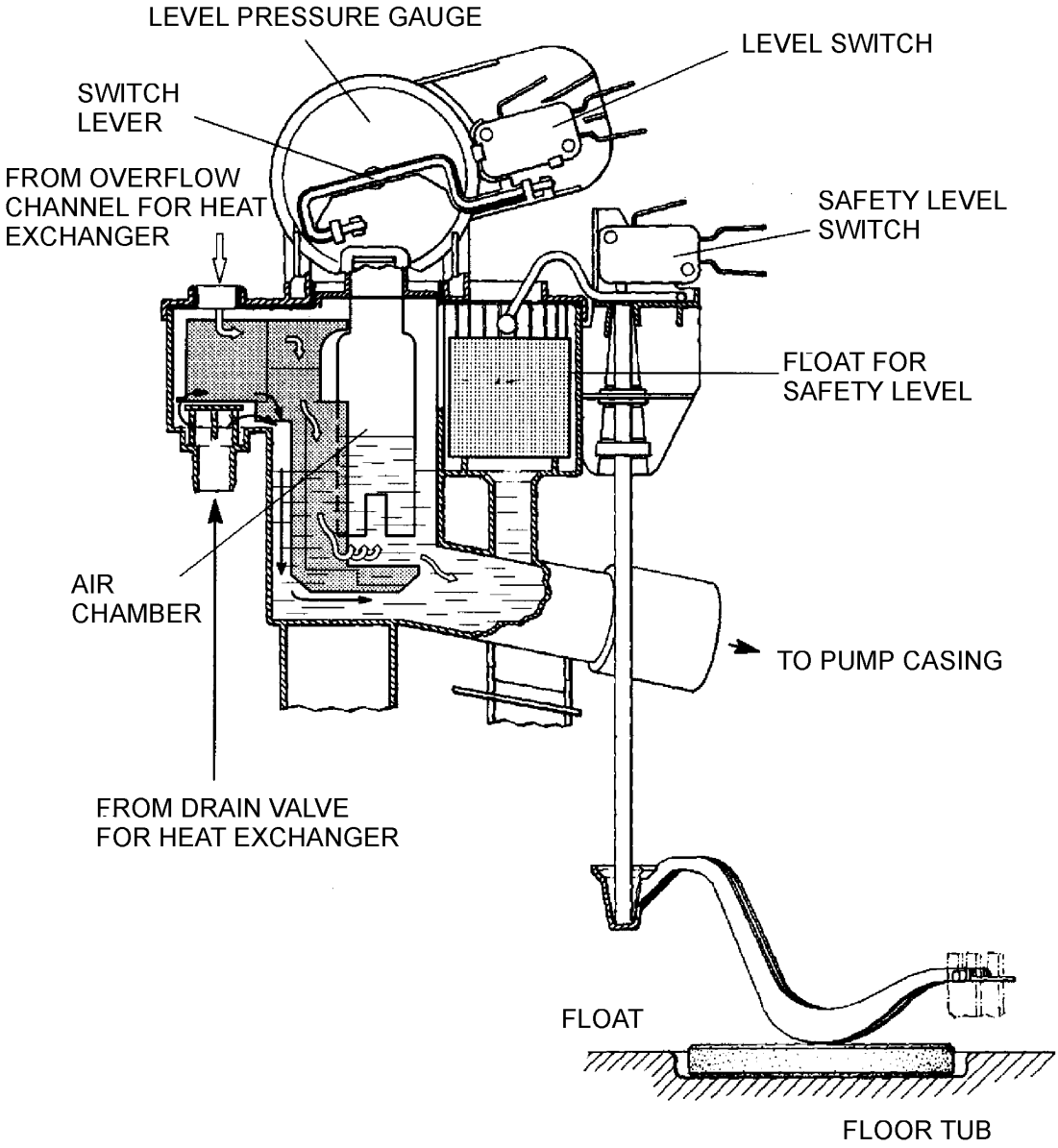
FILL SYSTEM WITHOUT HEAT EXCHANGER WITH WATER SOFTENER WATER INLET SOFTENING



NORMAL LEVEL



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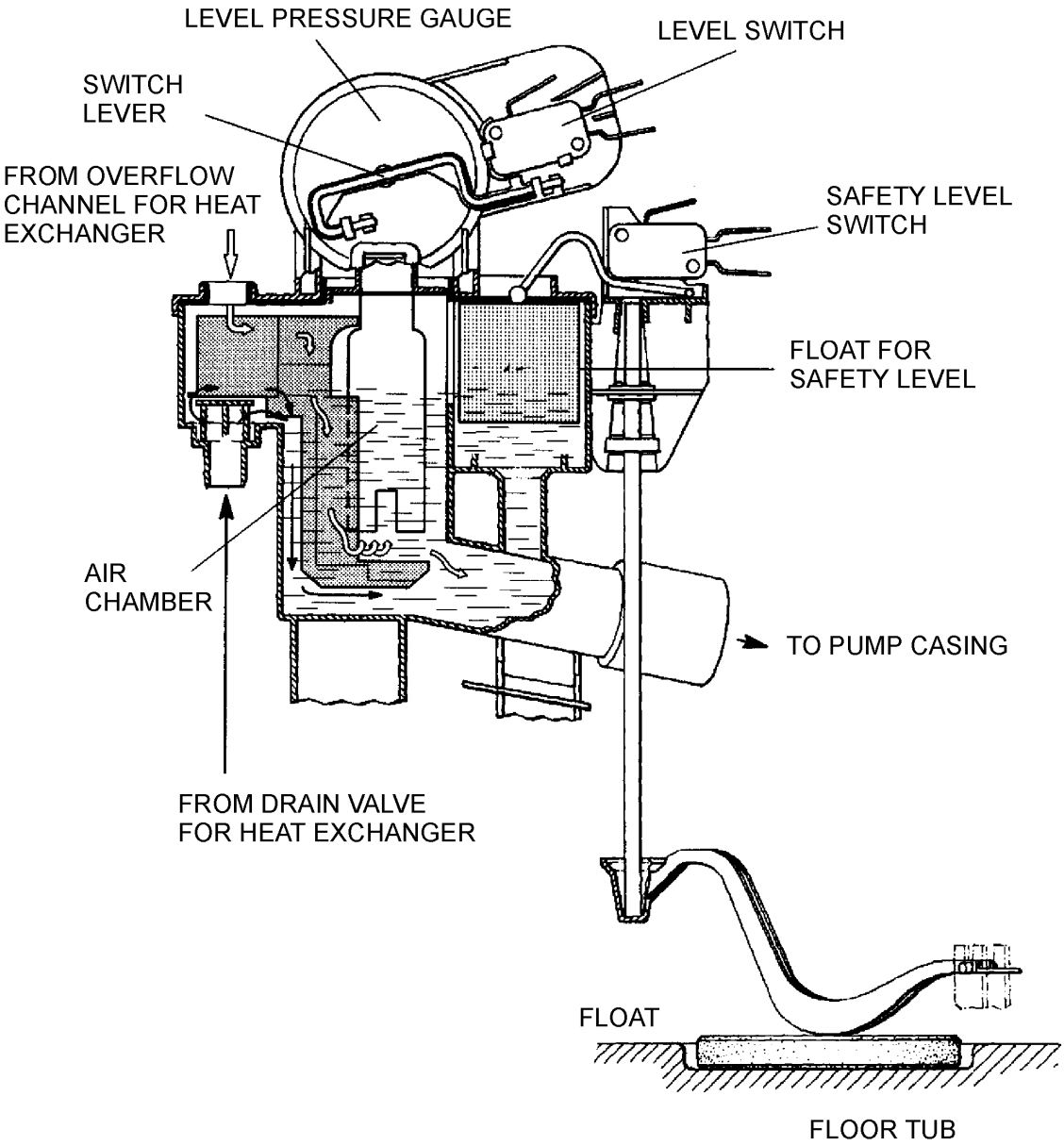
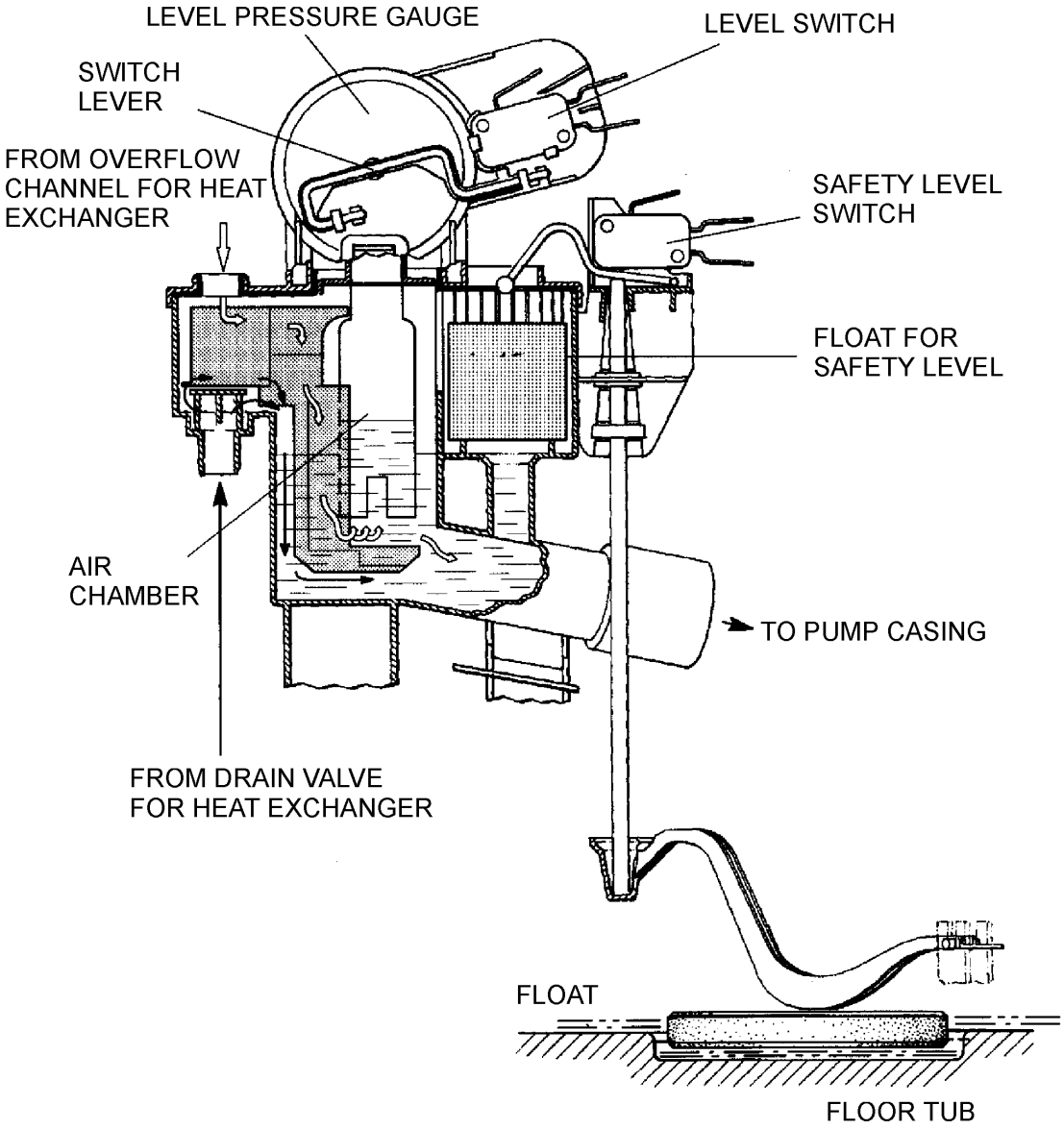
SAFETY LEVEL: OVERFILLING



SAFETY LEVEL: TUB

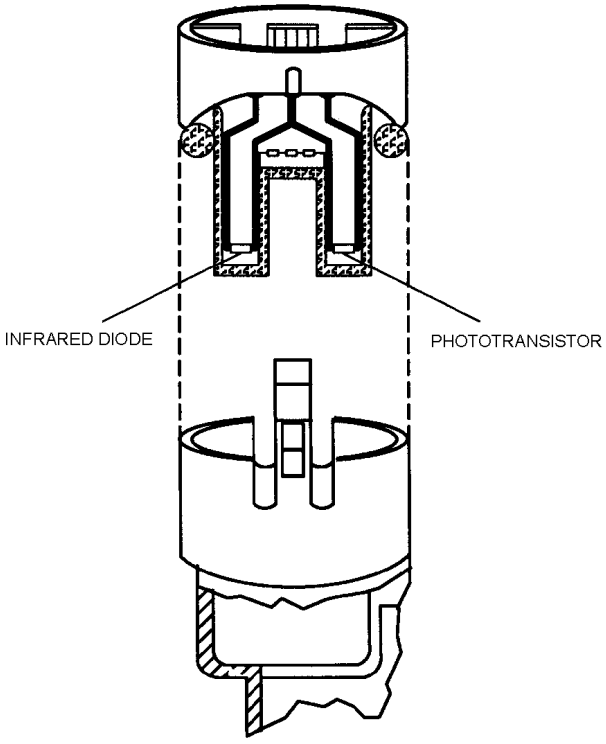


3.11 Aqua Sensor

The infrared LED and the phototransistor are located in a U-shaped, light-passing housing opposite each other on a circuit board. The infrared diode sends its infrared light through the water which passes between it and the phototransistor, whereby light which reaches the phototransistor switches it on.

If the water is excessively cloudy, the light intensity is not sufficient to switch the phototransistor. The absence of a voltage signal is detected by the microcomputer, and the required water change is carried out for cycles which include a prewash.

If the water remains clear enough, it is kept in the rinse container for use in the wash cycle.

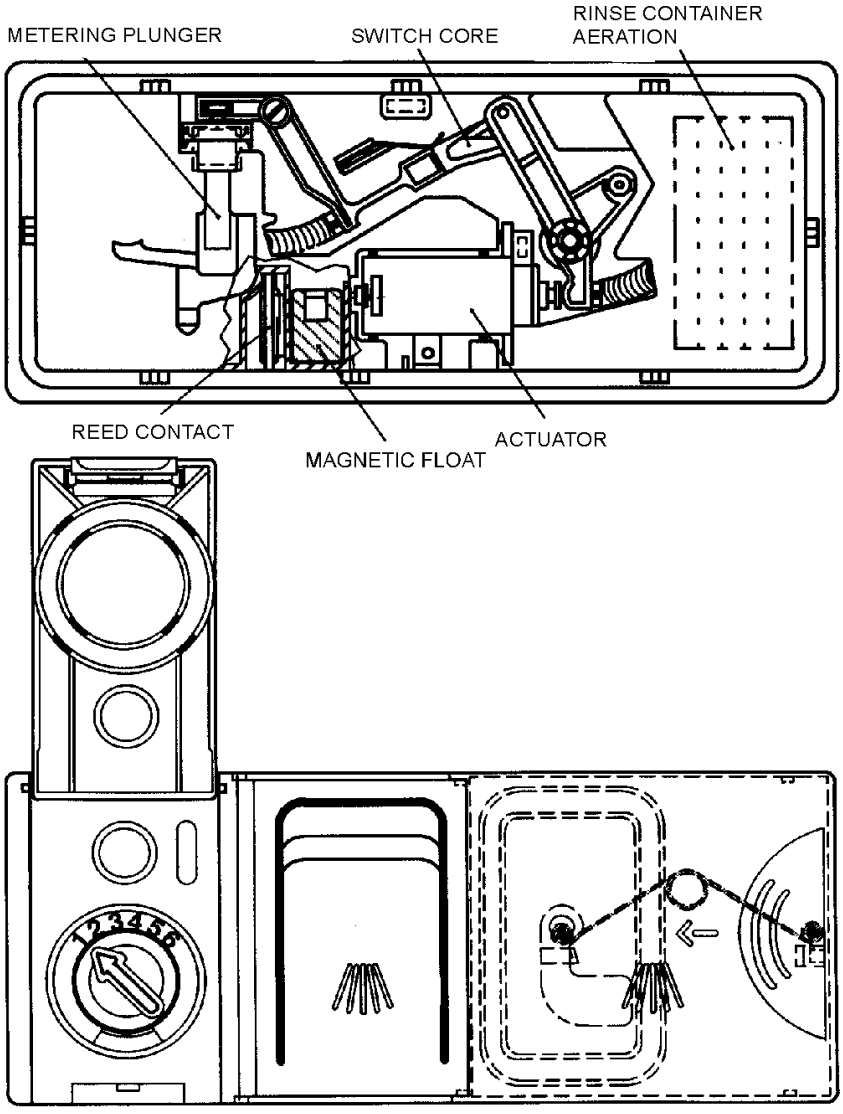


3.12 Dispenser detergent/rinse aid

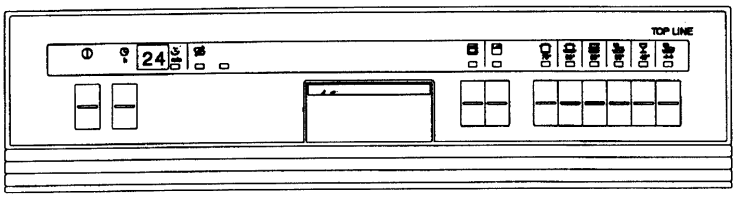
The release mechanism is controlled by a thermoactuator.

The first actuation causes the cover of the detergent dispenser to open, and at the same time the release tab ratchets into the switch detent of the rinse aid lever, so that the next operation of the actuator causes the metering plunger of the rinse aid to lift.

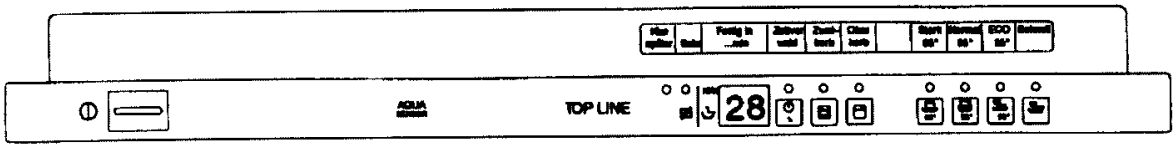
When repairs or inspections of the appliance are done, the release mechanism must be reset to the initial position by closing and opening the cover.



3.13 Operating panels



Built-under appliance/integrable



Fully-integrated appliance

4. PROGRAMS/BUTTON FUNCTIONS E1 CONTROL

2-baskets	Upper basket	Intensive 70	Heavy-load 65	Normal ECO	Energy saving 55	Fine 40	Quick 30
		S1	S2	S3	S4	S5	S6

Program interrupt — Press S2 + S4 for approx. 3 seconds

5. FEATURES

Control	E26	E24	E15	F15	F14	M4	R
Models	S/D/I	S/I/V	S/D/I/V	S	S/I/V	S/D/I	S/D/I
No. of programs	2 x 6	2 x 4	5	5	4	4	3
Upper basket	X	X	—	—	—	—	—
Basket inserts	—	—	2	2	—	—	—
Drying cycle (heat exchanger / specific heat)	W	W	W	E	E	E	E
Aqua Sensor / autom. water saving device	X/X	X/X	X/X	—/X	—/X	—/—	—/—
Remaining cycle time display, two-digit 7 segment display	X	X	X	—	—	—	—
Program sequence, one-digit 7 segment display	—	—	—	X	X	—	—
Program sequence printed	—	—	—	—	—	X	X
Time preselection via 7-segment display	X	—*	X**	—	—	—	—
Water hardness range setting							
electronic 0 - 7	X	X	X	X	X	—	—
mechanical as usual 0 - 3	—	—	—	—	—	X	X
Buttons / knobs	10 / 0	7 / 0	7 / 0	6 / 0	5 / 0	5 / 1	1 / 1
Operating panel wording	text	symbols	symbols	symbols	symbols	symbols	symbols
LED - for the selected program	6	4	5	5	4	—	—
LED - salt indication	X	X	X	X	X	X	—
LED - rinse aid indication	X	X	X	X	—	—	—
Consumption values water / current							
Noise of built-under appliance in dB (re 1 pW)	48	48	48	48	48	51	54

* fully integrated with time preselection

** integrated without time preselection

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6. CONSUMPTION VALUES

6.1 Electronic with heat exchanger

	Water* calculated quantity		Indication	Current** calculated quantity		Indication	Time calculated quantity		Indication
	ltr.			kWh			min.		
Pots 70 °C	23,5	25,0	23	1,83	1,9	1,8	95	99	99
Heavy-load 65 °C	23,5	23,3	23	1,62	1,7	1,4	92	95	95
Normal 55 °C	19,0	20,8	18	1,42	1,5	1,2	94	95	95
Normal 55 °C A-S	14,5	14,8	14						
Normal 55 °C (Upper basket)			14	1,08		0,9			
Normal 55 °C (Upper basket, A-S)			11						
ECO 55 °C	16,5	17,0	16	1,38	1,5	1,2	90	90	95
ECO 55 °C (Upper basket)	12,2		12	1,04		0,9			
Glasses 40 °C	14,5	15,0	14	0,91	1,0	0,9	58		58
Quick	11,35	12,0	12	0,96		1	45	44	30
A-S = Aqua Sensor	* = Indications refer to 17° dH			** Indications correspoding to good drying cycle (70 °C Rinse)					

6.2 Electronic without heat exchanger

	Water* calculated quantity	Indication	Current** calculated quantity	Indication	Time calculated quantity	Indication
	ltr.		kWh		min.	
Pots 70 °C	26	23	1,9	2		99
Heavy-load 65 °C		23	1,7	1,6		95
Normal 55 °C		18		1,4		95
Normal 55 °C, A-S		14				
Normal 55 °C (Upper basket)		14		1,1		
Normal 55 °C (Upper basket, A-S)		11				
ECO 55 °C	18,5	16	1,5	1,4		95
ECO 55 °C (Upper basket)		12		1,1		
Glasses 40 °C		14		0,9		58
Quick	12	12		1		30
A-S = Aqua Sensor	* Indications refer to 17°dH		** Indications corresponding to good drying cycle (70° RInse)			

7. SPECIAL PROGRAMS E1 CONTROL

Special cycle	Call up	Display
Hardness range	S3 + HS Setting: "0" to "7" with button S3 To save: HV off	L3 blinks Display: current setting
Function check	S2 + S3 + HV Start: S2 + S3	L2 + L3 blink Display shows: 20,21 Overrun detected / code variant as long as both buttons are pressed Display fault no. see below
Customer service	S2 + S4 + HV Start: S2 + S4	L2 + L4 blink Display shows: 20,21 Overrun detected / code variant as long as both buttons are pressed Display fault no. see below
Special - Dry	S2 + HV Setting: "0" or "1" with button S2 To store: HV off	L2 blinks Display: current setting
Test (continuous running)	S2 + S3 + S4 + HV Start: Cycle Select within 4 seconds	LEDs of the last run program blink For manufacturing only Program is restarted after a 20 min. break
Electrical safety test (high-voltage)	S3 + S4 + HV	L3 + L4 blink
Buzzer (VI only)	S4 + HV Setting: "0" or "1" with button S4 To save: HV off	L4 blinks Display: current setting

Display information for special program "function check" and "customer service":
1 Turbidity sensor defective
2 Heating fault
4 Filling fault
8 NTC fault For multiple faults, the values are correspondingly added.

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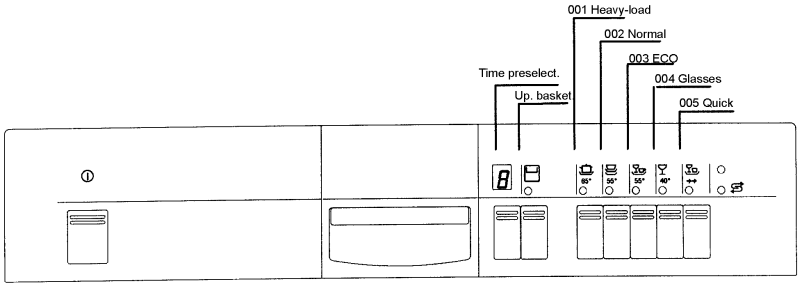
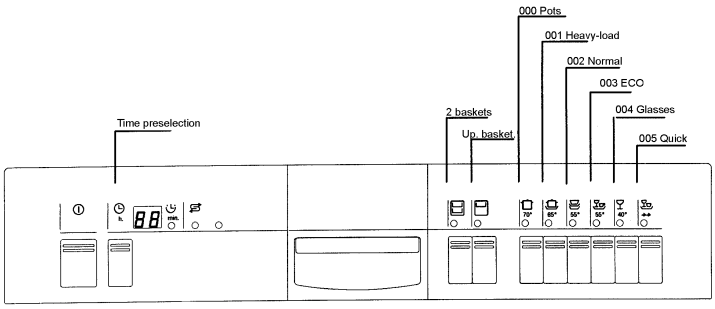
7.1 Button functions
F-control with one 7-segment display

Program buttons						Function			
S1	S2	S3	S4	S5	S6	Time preselection	2-basket washing	Up. basket washing	Encoder plug
---	001 Heavy-load	002 Normal	003 ECO	004 Glasses	005 Quick	no	no	no	without
---	001 Heavy-load	002 Normal	003 ECO	005 Quick		no	no	no	red
---	001 Heavy-load	002 Normal	003 ECO	004 Glasses	---	no	no	no	without
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	yes	no	no	red
---	001 Heavy-load	002 Normal	003 ECO	006 Prewash	---	no	no	no	blue
---	001 Heavy-load	002 Normal	003 ECO	006 Prewash	---	yes	no	no	blue
---	001 Heavy-load	002 Normal	003 ECO	004 Glasses	005 Quick	yes	no	no	without
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	006 Prewash	yes	no	no	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	004 Glasses	005 Quick	no	no	no	without
---	001 Heavy-load	002 Normal	003 ECO	004 Glasses	---	yes	no	no	without
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick	005 Quick	yes	no	no	without
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	006 Prewash	no	no	no	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick	006 Prewash	yes	no	no	red
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	no	no	yes	red
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	yes	no	yes	red
000 Pots	002 Normal	003 ECO	005 Quick	---	---	no	no	no	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	004 Glasses	005 Quick	yes	no	yes	without
---	001 Heavy-load	002 Normal	003 ECO	---	---	no	no	yes	without

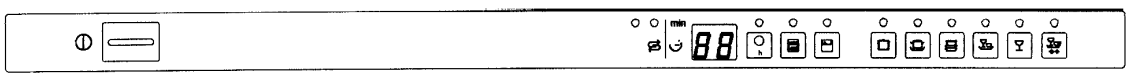


7.2 Button functions E-control and V-control with two 7-segment displays

Program buttons						Function			
S1	**S2**	**S3**	**S4**	**S5**	**S6**	**Time preselection**	2-basket washing	**Up. basket washing**	**Encoder plug**
000 Pots	001 Heavy-load	002 Normal	003 ECO	004 Glasses	005 Quick	yes	yes	yes	without
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick		yes	yes	yes	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	yes	no	no	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	no	no	no	red
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	yes	yes	yes	red
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	no	yes	yes	red
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	---	no	no	no	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	006 Prewash	---	yes	no	no	blue
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick	006 Prewash	yes	no	no	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	005 Quick	006 Prewash	yes	yes	yes	red
000 Pots	001 Heavy-load	002 Normal	003 ECO	004 Glasses	005 Quick	yes	no	no	without
---	001 Heavy-load	002 Normal	003 ECO	005 Quick	006 Prewash	yes	no	no	red



Built-under appliance - integrable



Fully-integrated appliance

7.3 Special program "Function check", with heat exchanger

Abbreviation	Index	Type of action	Function	Temperature	Time (sec.)	Sensor
P = Pump	0	6	P+OK		5	
VF = Prefill	1	23	TR1+TR2+OK			
F = Fill	2	5	VF+Z+OK			F1
U = Recirculate	3	0	F+OK			
H = Heat	4	3	U+VF			F1
Z = Dispense	5	9	U+P		30	
R = Regenerate	6	6	P		30	
D = Rinse	7	0	F			
A = Drain	8	13	U+H+Z		90	
TR1+TR2 = Calibrating turbidity sensor	9	14	U+H+R		60	
	10	25	H		5	
	11	12	U+H	55 °C		
	12	12	U+H		90	
	13	9	U+P		15	
	14	7	P+H		45	

If buttons S2 and S3 are pressed while the appliance is turned on at the mains switch, the special program "function check" will start.

The following is displayed on the panel:

- LED L2 and L3 blink.
- As long as both buttons, S2 and S3, are kept pressed after starting - provided that the overrun check is successful - a designator for the variant code is displayed, e. g. 20 = Variant 0, 21 = Variant 1, etc.
- Pressing one of the program buttons causes the associated LED to come on.
- Pressing S3 causes in addition the display and the refill LEDs to come on.
- Pressing the time preselection button causes the minutes LED to come on.
- Pressing buttons S2 and S3 causes the function check program to start. Time preselection is not possible here.

The following fault numbers may be displayed:

Fault no.	One 7-segment display	Two 7-segment displays
0	There is no fault	There is no fault
1	Aqua Sensor system fault Note: Fault display also if there is no sensor	Aqua Sensor system fault
2	Heating fault	Heating fault
3	Combined fault: fault 1 + fault 2	Combined fault: fault 1 + fault 2
4	Filling fault	Filling fault
5	Combined fault: fault 1 + fault 4	Combined fault: fault 1 + fault 4
8	NTC fault	NTC fault
9	Combined fault: fault 1 + fault 8	Combined fault: fault 1 + fault 8
12	---	Combined fault: fault 4 + fault 8
13	---	Combined fault: fault 1 + fault 4 + fault 8
c	Combined fault: fault 4 + fault 8	---
d	Combined fault: fault 1 + fault 4 + fault 8	---
F	Filling fault (from FD 7610 on) (is only displayed in the normal program sequence)	Filling fault (from FD 7710 on) is only displayed in the normal program sequence

The upper basket function is selected for the complete program sequence.

Pressing S3 allows you to skip to the next program step (*exception:* during the filling process, only pressing the fill button F1 is effective).

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7.4 Customer Service check program - electronic dishwashers

The new dishwasher series corresponds to the state-of-the-art. It is not only characterised by the completely new design structure but also by the great number of technical details with respect to function and control. Special importance has been attached above all to even higher quality standards.
The customer service is requested to participate in maintaining this quality standard in case of failures by quick reaction and expertise. Any special matters are to be communicated to the department VKS-H by written information and return of the relevant components.

IMPORTANT!
Reset the electronic after any customer service call.

- Switch on the mains switch.
- Press buttons S2 and S4 approx. 3 seconds (display: 0).
- Wait until the drain pump switches off (approx. 1 min.).
- Switch off the mains switch.

7.4.1 Button designations, e. g.

	70 °C = S1,	55 °C = S4
Heavy-load	65 °C = S2,	40 °C = S5
Normal	55 °C = S3,	30 °C = S6

Note: Independent of the number of control buttons (acc. to model), the check program is always started by simultaneously pressing button 65 °C and the next but one button.

7.4.2 Starting the check program

- Keep button S2 and S4 depressed.
- Switch on the mains switch.

Note: If the buttons are depressed, the model no. of the electronic will be indicated in the display (e. g. 20, 21..., important as reference in case of queries).

- LEDs of buttons S2 and S4 flash.

7.4.3 LED check

- Press the associated button - LED lights up.
- If button S3 is pressed, the display and the LEDs of the refill indicators will light up.

7.5 Check program with heat exchanger

Abbreviation	Index	Type of action	Function	Temperature	Time (sec.)	Sensor
P = Pump	0	6	P		30	
VF = Prefill	1	23	TR1+TR2			
F = Fill	2	2	VF			F1
U = Recirculate	3	0	F			
H = Heat	4	13	U+H+Z		120	
Z = Dispense	5	12	U+H	65 °C		
R = Regenerate	6	14	U+H+R		120	
D = Rinse	7	6	P		60	
A = Drain	8	22	D+A		60	
TR1+TR2 = Calibrating turbidity sensor	9	7	P+A		30	

If buttons S2 and S4 are pressed while the appliance is turned on at the mains switch, the special program function check will start.

The following is displayed on the panel:

- LEDs L2 and L4 blink.
- As long as both buttons, S2 and S4, are kept pressed after starting - provided that the overrun check is successful - a designator for the variant code is displayed, for example 20 = Variant 0, 21 = Variant 1, etc.
- Pressing one of the buttons causes the associated LED to come on.
- Pressing S3 causes in addition the display and the fault LEDs to come on.
- Pressing the time preselection button causes the minutes LED to come on.

Pressing buttons S2 and S4 causes the function check program to start. Time preselection is not possible here.
The function check program is terminated by switching off the appliance via the mains switch.

The following fault numbers may be displayed:

Fault no.	One 7-segment display	Two 7-segment displays
0	There is no fault	There is no fault
1	Aqua Sensor system fault Note: Fault display also when there is no sensor	Aqua Sensor system fault
2	Heating fault	Heating fault
3	Combined fault: Fault 1 + Fault 2	Combined fault: Fault 1 + Fault 2
4	Filling fault	Filling fault
5	Combined fault: Fault 1 + Fault 4	Combined fault: Fault 1 + Fault 4
8	NTC fault	NTC fault
9	Combined fault: Fault 1 + Fault 8	Combined fault: Fault 1 + Fault 8
12	---	Combined fault: Fault 4 + Fault 8
13	---	Combined fault: Fault 1 + Fault 4 + Fault 8
c	Combined fault: Fault 4 + Fault 8	---
d	Combined fault: Fault 1 + Fault 4 + Fault 8	---
F	Filling fault (from FD 7610 on) (is only displayed in the normal program sequence)	Filling fault (from FD 7710 on) (is only displayed in the normal filling sequence

The upper basket function is selected for the entire program sequence. Pressing S3 allows you to skip to the next program step (*exception*: during the filling process, only pressing the fill button F1 is effective).

7.6 Starting the Customer Service program

- Start by simultaneously pressing the buttons S2 and S4 once again.

CAUTION! A figure between 0 and 15 is indidated in the display (0 = no fault).

The electronic system checks 4 functions and indicates faults that have occurred with the respective fault numbers in the display. The fault numbers are displayed as follows:

1 Aqua Sensor defective
2 Heating fault
4 Filling fault (time fault or hardware fault)
8 NTC fault

For multiple faults, the values are added on!

The fault display is only extinguished after a repair, if a complete function check has been performed afterwards, e. g. in case of a heating fault after the temperature has been reached.

The figure 1 which is indicated in the display shortly after the start (approx. 5 sec) is no fault no. but rather caused by the calibration process of the Aqua Sensor.

The individual check positions are automatically switched.

Note: Keeping the button S3 depressed enables steps to be skipped, e. g. the step out of the heating position. The skipped functions are displayed as fault number.

7.7 Fault numbers

Fault no. 1: Aqua Sensor

Failure during the calibration process at the Aqua Sensor, or no Aqua Sensor available
- electrical defect
- sensor contaminated / calcified
- contact fault

Fault no. 2: Heating fault

The max. heating time of 60 min. has been exceeded.
- heating defective
- pressure switch has no function
- 85° C thermo has no passage (electr. defect, temperature is exceeded)
- heating without voltage
- contact fault

The wash time in case of a defective heating amounts to 75 to 300 min. depending on the program.

Fault no. 4: Filling fault

The max. filling time of 10 min. has been exceeded.
- no water supply
- poor water pressure
- Aqua Stop valve defective

CAUTION! This step cannot be skipped by means of button 3. In case of intermittent filling and draining (electronic can be switched off during draining depending on the model) check the level switch.

Fault no. 8: NTC fault

The NTC resistance is beyond the tolerance range.

- resistance with water temperature 25° +/- 8° ~ 48 KOhm
- resistance with water temperature 60° +/- 6° ~ 11 KOhm
- contact fault
- line interruption
- etc.

CAUTION! The NTC resistance value for the indication of the fault no. is checked in cold condition. The NTC controlled heating steps stored in the program are skipped and the selected temperature will not be reached.

7.8 Storage of fault numbers

The electronic AKO 546 304 (art. no. 1 738 300 130) stores the fault numbers only at the end of a terminated wash program. If the appliance is switched off by the customer beforehand (mains switch, door switch, power failure) no fault will be stored.

7.9 Remaining cycle time display

The remaining cycle time display is self-learning and calculates the expected washing time remaining up to the program end. The remaining cycle time is calculated during the program sequence after each heating phase. A new time calculation is also performed in case of a change of the wash program and in case of a program interruption (mains switch, door switch, power failure). If the washing time is longer than calculated due to failures or defects, "1" is persistently indicated in the display. After the last draining cycle at the program end the display changes over to "0".

7.10 Operation - wash program

In order to change the wash program the newly selected program button has to be pressed twice depending on the appliance type. This also applies for changing over between one-basket and two-basket operation and vice versa.
The changed selection is immediately confirmed by lighting up of the respective LED. Re-programming within the electronic is only performed after changing of a program section, e. g. after switchover from the prewash to the wash program.

Depending on the model the filling fault is indicated in the display by an "F" (e. g. if the water tap is closed).

The fault display is extinguished when the fili switch F1 is activated.

7.11 Program sequence

Legend

TR 1 + TR 2	Calibrating turbidity sensor
TR 1	Measure turbidity. If the value lies above the threshold, the next drain step and following fill step are not carried out. If the turbidity is below nominal, the cycle continues without interruption.
KW = Cold water connection	Do not carry out for cold water connection.
P = Pump	Drain pump on.
WW = Warm water connection	Do not carry out for warm water connection.
R = Regenerating	Regenerating valve on.
PA = Break	Break step, all consumers are switched off.
D = Rinse	Filling valve on for the programmed time.
H = Heat	Heater on. If a heating step lasts longer than 60 min., it is then cancelled and the program advances to the next cycle.
VF = Prefill	Filling valve on.
F = Fill	Filling valve on.
U = Recirculation	Recirculation pump on.
Z = Dispense	Actuator on.
A = Drain	

ONR = Overrun in case of non-regeneration
OTS = Overrun Turbidity Sensor

7.11.1 Intensive program / Pots 70 °C, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prewash 1.0	0	6	P		15			
	1	23	TR1+TR2					
	2	2	VF			F1		
	3	0	F					
	4	12	U+H	40 °C				
	5	12	U+H		60			
	6	10	U		180			
	7	10	U		120			
	8	16	U+TR		30			
	9	3	VF+U			F1		X
	10	9	U+P		30			X
	11	6	P		30			X
Wash 1.0	0	2	VF			F1		X
	1	0	F					X
	2	13	U+H+Z	max. 55 °C	120			
	3	12	U+H	65 °C				
	4	12	U+H		60			
	5	10	U		120			
	6	10	U		120			
	7	3	U+VF			F1		
	8	10	U		120			
	9	9	U+P		30			
	10	6	P		30			
Intermediate wash 1.0	0	2	VF			F1		
	1	0	F					
	2	10	U		60			
	3	3	U+VF			F1		
	4	10	U		180			
	5	9	P+U		30			
	6	6	P		30			
	7	2	VF			F1		
	8	0	F					
	9	10	U		60			
	10	3	U+VF			F1		
	11	10	U		180			
	12	9	P+U		30			
	13	6	P		30			
Rinse 1.0	0	2	VF			F1		
	1	0	F					
	2	14	U+H+R	max. 55 °C	120		X	
	3	12	U+H	max. 55 °C	120			
	4	24	U+H+D	max. 55 °C	5		X	
	D = add 200 ml water							
	5	12	U+H	55 °C				
	6	13	U+H+Z	max. 60 °C	120			
	7	12	U+H	65 °C				
	8	12	U+H		60			
	9	10	U		0			
	10	10	U		30			
	11	12	U+H		30			
	12	15	U+H+KW		120			
Drying 1.0	0	18	PA		600			
	1	18	PA		120			
	2	7	P+A		30		X	
	D = 1.5l water rinse							
	3	26	P+A+D		43		X	
	4	27	A		30		X	
	D = 2l water rinse							
	5	22	A+D		55		X	
	6	7	P+A		45			
	7	4	VF+WW			F1		
	8	6	P		15			

7.11.2 Heavy-load program 65 °C, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prewash 2.0	0	6	P		15			
	1	23	TR1+TR2					
	2	2	VF			F1		
	3	0	F					
	4	10	U		360			
	5	10	U		120			
	6	16	U+TR1		30			
	7	3	VF+U			F1		X
	8	9	U+P		30			X
	9	6	P		30			X
Wash 1.1	0	2	VF			F1		X
	1	0	F					X
	2	13	U+H+Z	max. 55 °C	120			
	3	12	U+H	65 °C				
	4	12	U+H		0			
	5	10	U		120			
	6	10	U		120			
	7	3	U+VF			F1		
	8	10	U		120			
	9	9	U+P		30			
	10	6	P		30			
Intermediate wash 1.0	0	2	VF			F1		
	1	0	F					
	2	10	U		60			
	3	3	U+VF			F1		
	4	10	U		180			
	5	9	P+U		30			
	6	6	P		30			
	7	2	VF			F1		
	8	0	F					
	9	10	U		60			
	10	3	U+VF			F1		
	11	10	U		180			
	12	9	P+U		30			
	13	6	P		30			
Rinse 1.1	0	2	VF			F1		
	1	0	F					
	2	14	U+H+R	max. 55 °C	120		X	
	3	12	U+H	max. 55 °C	120			
	4	24	U+H+D	max. 55 °C	5		X	
	D = add 200 ml water							
	5	12	U+H	55 °C				
	6	13	U+H+Z	max. 60 °C	120			
	7	12	U+H	65 °C				
	8	12	U+H		60			
	9	10	U		0			
	10	10	U		30			
	11	12	U+H		30			
	12	15	U+H+KW		120			
Drying 1.0	0	18	PA		600			
	1	18	PA		120			
	2	7	P+A		30		X	
	D = 1.5 l water rinse							
	3	26	P+A+D		43		X	
	4	27	A		30		X	
	5	22	A+D		55		X	
	D = 2 l water rinse							
	6	7	P+A		45			
	7	4	VF+WW			F1		
	8	6	P		15			

7.11.3 Normal program ECO, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prewash 2.1	0	6	P		15			
	1	23	TR1+TR2					
	2	2	VF			F1		
	3	0	F					
	4	10	U		360			
	5	10	U		240			
	6	16	U+TR1		30			
	7	3	VF+U			F1		X
	8	9	U+P		30			X
	9	6	P		30			X
Wash 2.0	0	2	VF			F1		X
	1	0	F					X
	2	13	U+H+Z	max. 55 °C	120			
	3	12	U+H	55 °C				
	4	12	U+H		0			
	5	10	U		720			
	6	10	U		120			
	7	3	U+VF			F1		
	8	10	U		180			
	9	9	U+P		30			
	10	6	P		30			
Intermed. wash 2.0	0	2	VF			F1		
	1	0	F					
	2	10	U		120			
	3	3	U+VF			F1		
	4	10	U		240			
	5	9	P+U		30			
	6	6	P		30			
Rinse 1.1	0	2	VF			F1		
	1	0	F					
	2	14	U+H+R	max. 55 °C	120		X	
	3	12	U+H	max. 55 °C	120			
	4	24	U+H+D	max. 55 °C	5		X	
	D = add 200 ml water							
	5	12	U+H	55 °C				
	6	13	U+H+Z	max. 60 °C	120			
	7	12	U+H	65 °C				
	8	12	U+H		60			
	9	10	U		0			
	10	10	U		30			
	11	12	U+H		30			
	12	15	U+H+KW		120			
Drying 1.0	0	18	PA		600			
	1	18	PA		120			
	2	7	P+A		30		X	
	3	26	P+A+D		43		X	
	D = 1.5 l water rinse							
	4	27	A		30		X	
	5	22	A+D		55		X	
	D = 2 l water rinse							
	6	7	P+A		45			
	7	4	VF+WW			F1		
	8	6	P		15			

7.11.4 Energy saving program 55 °C, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prew. 3.0	0	6	P		15			
Wash 3.0	0	2	VF			F1		
	1	0	F					X
	2	10	U		480			
	3	13	U+H+Z	max. 55°C	120			
	4	12	U+H	55°C				
	5	12	U+H		0			
	6	10	U		600			
	7	10	U		120			
	8	3	U+VF			F1		
	9	10	U		180			
	10	9	U+P		30			
	11	6	P		30			
Intermediate wash 3.0	0	28	A+U+D		15			
	1	6	P		30			
	2	2	VF			F1		
	3	0	F					
	4	10	U		60			
	5	3	U*VF			F1		
	6	10	U		120			
	7	10	U		0			
	8	10	U		240			
	9	9	U+P		30			
	10	6	P		30			
	11	28	A+U+D		15			
	12	6	P		45			
Rinse 1.1	0	2	VF			F1		
	1	0	F					
	2	14	U+H+R	max. 55 °C	120		X	
	3	12	U+H	max. 55 °C	120			
	4	24	U+H+D	max. 55 °C	5		X	
	D = add 200 ml water							
	5	12	U+H	55 °C				
	6	13	U+H+Z	max. 60 °C	120			
	7	12	U+H	65 °C				
	8	12	U+H		60			
	9	10	U		0			
	10	10	U		30			
	11	12	U+H		30			
	12	15	U+H+KW		120			
Drying 1.0	0	18	PA		600			
	1	18	PA		120			
	2	7	P+A		30		X	
	3	26	P+A+D		43		X	
	D = 1.5 l water rinse							
	4	27	A		30		X	
	5	22	A+D		55		X	
	D = 2 l water rinse							
	6	7	P+A		45			
	7	4	VF+WW			F1		
	8	6	P		15			

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7.11.5 Fine program 40 °C, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prew. 3.0	0	6	P		15			
Wash 4.0	0	2	VF			F1		
	1	0	F					X
	2	13	U+H+Z	max. 40 °C	120			
	3	12	U+H	40 °C				
	4	12	U+H		0			
	5	10	U		180			
	6	10	U		120			
	7	3	U+VF			F1		
	8	10	U		180			
	9	9	U+P		30			
	10	6	P		30			
Intermed. wash 2.1	0	2	VF			F1		
	1	0	F					
	2	10	U		120			
	3	3	U+VF			F1		
	4	10	U		120			
	5	9	P+U		30			
	6	6	P		30			
Rinse 2.0	0	2	VF			F1		
	1	0	F					
	2	14	U+H+R	max. 55 °C	120		X	
	3	12	U+H	max. 55 °C	120			
	4	24	U+H+D	max. 55 °C	5		X	
	D = add 200 ml water							
	5	12	U+H	55 °C				
	6	13	U+H+Z	max. 55 °C	120			
	7	12	U+H		0			
	8	10	U		0			
	9	10	U		30			
	10	12	U+H		30			
	11	15	U+H+KW		120			
Drying 1.0	0	18	PA		600			
	1	18	PA		120			
	2	7	P+A		30		X	
	3	26	P+A+D		43		X	
	D = 1.5 l water rinse							
	4	27	A		30		X	
	5	22	A+D		55		X	
	D = 2 l water rinse							
	6	7	P+A		45			
	7	4	VF+WW			F1		
	8	6	P		15			

7.11.6 Quick program 30 °C, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prew. 3.0	0	6	P		15			
Wash 5.0	0	2	VF			F1		
	1	0	F					X
	2	13	U+H+Z	max. 30 °C	120			
	3	12	U+H	30 °C				
	4	12	U+H		0			
	5	10	U		180			
	6	10	U		120			
	7	3	U+VF			F1		
	8	10	U		180			
	9	9	U+P		30			
	10	6	P		30			
Intermed. wash 4.0	0	2	VF			F1		
	1	22	d+a		25			
	2	10	U		120			
	3	3	U+VF			F1		
	4	10	U		0			
	5	9	P+U		30			
	6	6	P		30			
Rinse 1.1	0	2	VF			F1		
	1	0	F					
	2	14	U+H+R	max. 55 °C	120		X	
	3	12	U+H	max. 55 °C	120			
	4	24	U+H+D	max. 55 °C	5		X	
	Add 200 ml water							
	5	12	U+H	55 °C				
	6	13	U+H+Z	max. 60 °C	120			
	7	12	U+H	65 °C				
	8	12	U+H		60			
	9	10	U		0			
	10	10	U		30			
	11	12	U+H		30			
	12	15	U+H+KW		120			
Drying 2.0	0	18	PA		0			
	1	7	PA		30		X	
	2	26	P+A+D		43		X	
	D = 1.5 l water rinse							
	3	27	A		30		X	
	4	22	A+D		55		X	
	D = 2 l water rinse							
	5	7	P+A		45			
	6	4	VF+WW			F1		
	7	6	P		15			

7.11.7 Prewash program, with heat exchanger

	Index	Type of action	Function	Temperature	Time (Sec.)	Sensor	ONR	OTS
Prewash 4.0	0	6	P		15			
	1	2	VF			F1		
	2	0	F					
	3	10	U		360			
	4	10	U		240			
	5	3	VF+U			F1		
	6	9	U+P		30			
	7	6	P		30			

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7.12 Adjustment of regeneration steps

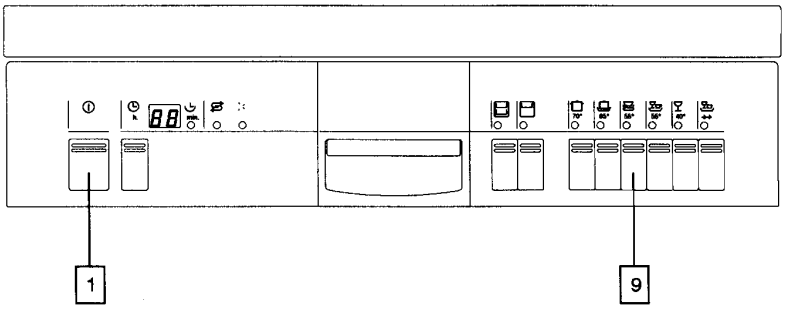
	RWH range	Number of wash cycles between regenerations	Softener capacity	Settings	
	[°d]		[l]		
	0 ... 3	30	540	0	
	4 .. 6	15	270	1	
	7 .. 9	8	144	2	
	10 .. 12	6	108	3	
	13 .. 16	4	72	4	
	17 .. 21	3	54	5	= factory setting
	22 .. 30	2	36	6	
	31 .. 50	1	18	7	

Hold "Normal" [9] button down and turn on mains switch [1] , then release button.

The LED of the "Normal" button and the factory-set value "5" flash in the digit display.

Each time the button is pressed, the set value increases by one; once "7" is reached, the display returns to "0".

Turn off mains switch [1]. The set value is stored in the appliance.



In all models with electronic control, regeneration of the water softener is activated electronically as needed (see "Intelligent washing technology").

This results in different consumption values of water and salt depending on the actual water hardness. All water consumption values indicated in our catalogues, PI tables, etc. are based on a water hardness of 14°dH.

The salt consumption values are summarised in the following table:

Water hardness (°dH)	Water hardness (mmol/l)	Setting Degree	Salt used per cycle (g)
0 - 3	0 - 0,6	0	0
4 - 6	0,7 - 1,1	1	4
7 - 9	1,2 - 1,6	2	7
10 - 12	1,7 - 2,1	3	9
13 - 16	2,2 - 2,5	4	14
17 - 21	2,6 - 3,7	5	18
22 - 30	3,8 - 5,4	6	27
31 - 50	5,5 - 8,9	7	54

To set the water hardness range (0 - 7), turn the appliance on while pressing the "Normal 55°C" button. A preset value of "5" will then appear in the display.

To change this preset value, press the "Normal 55 °C" button repeatedly. After the appliance is turned off, this new value will be retained.

In mechanically controlled models, regeneration of the water softener is carried out during each wash program. Water hardness is set in steps between 0 - 3, using the switch located in the salt refill opening in the container bottom.

8. POSSIBLE FAULT DISPLAYS AND EXPLANATION OF THE NTC CHARACTERISTIC CURVE

8.1 Wiring diagrams

IG 634.1	SO-60/0331 SO-60/0372 SO-60/0333	
IG 644.1	SO-60/0353 SO-60/0352 SO-60/0391 SO-60/0343	up to FD 7704 up to FD 7705
IG 659.1	SO-60/0358 SO-60/0347 SO-60/0387 SO-60/0343	up to FD 7704 up to FD 7705
IG 669.1	SO-60/0358 SO-60/0351 SO-60/0384 SO-60/0343	up to FD 7703 up to FD 7704
IGV 659.1	SO-60/0356 SO-60/0361 SO-60/0388 SO-60/0343	up to FD 7704 up to FD 7705

8.2 Indications in the display and of the LEDs for electronic controls with one 7-segment display

WASH PROGRAM

In the normal program sequence, i. e. dishwasher switched on by means of the mains switch without pressing an additional button.

The upper basket LED lights up, if the upper basket function has been selected.

The refill LEDs light up if refilling is required. Caution! With hardness set to 0, the salt refill LED will not light at all.

A program LED lights.

When pressing the time preselection button figures 0-9 may be displayed in the 7-segment display. "0" is extinguished after 4 seconds.

During the program sequence one single bar of the 7-segment display is lit. *The upper one is lit during prewash and wash, the medium one during intermediate wash and rinse, the lower one during drying.* At the program end ""0" will be displayed.

If a filling fault occurs during the filling process (see fault 4) "F" is displayed in the 7-segment display. If the filling level is reached during this process but not detected, the appliance switches from filling to pumping and vice versa. If no filling is performed, the appliance is out of operation until the level is reached. As long as "F" is displayed, the filling valve must be activated. (Buzzing).

CHECK PROGRAM

In the special program "Customer Service check program", i. e. the buttons HEAVY-LOAD 65 °C and ECO are pressed upon switching on the mains switch.

As long as the buttons HEAVY-LOAD 65 °C and ECO are kept depressed, the encoding is indicated in the 7-segment display. Display 0-7, depending on the encoder plug. 0 means without encoding plug. Up to now appliances encoded 0, 1 and 2 have been manufactured.

The LEDs of the programs HEAVY-LOAD 65 °C and ECO blink to indicate the special program "Customer Service check program".

If the buttons are released, the mode "button mirrowing" is active, i. e. the LED of the assigned button will light, if the respective button is pressed. This does not apply for the button of the normal program. If this button is pressed in "button mirrowing", not only the program LED Normal will light, but also the refill LEDs and all segments of the 7-segment display, i. e. "8".

If the buttons HEAVY-LOAD 65 °C and ECO are again simultaneously pressed, the program cycle of the special program "Customer Service check program" is started. The following characters are indicated in the 7-segment display as listed:
0,1,2,3,4,5,6,7,8,9,A,b,c,d,E,F

The end of the "Customer Service check program" is not indicated.
Note: See "Customer Service check program".
The Customer Service check program is only performed with the upper basket washing function, i. e. in case of appliances with heat exchanger and without shut-off valve for the lower spray arm washing is performed with the water amount for upper basket washing (3.6 l) during 2-basket operation.

8.3 Calling the Customer Service or function program

Electronic with one 7-segment display

0 = There is no fault
1 = Fault 1, Turbidity sensor fault
2 = Fault 2, Heating fault
3 = Combined fault:, Fault 1+2=3
4 = Fault 4, Filling fault
5 = Combined fault:, Fault 1+4=5
6 = Combined fault:, Fault 2+4=6**
7 = Combined fault:, Fault 1+2+4=7**
8 = Fault 8, NTC fault
9 = Combined fault:, Fault 1+8 = 9
A = Combined fault:, Fault 2+8 =A**
b = Combined fault:, Fault 1+2+8 =b**
c = Combined fault:, Fault 4+8 = c
d = Combined fault:, Fault 1+4+8 =d
E = Combined fault:, Fault 2+4+8 =E**
F = Combined fault:, Fault 1+2+4+8 =E**

The combined faults marked ** exclude each other.

Electronic with two 7-segment displays

0 = There is no fault
1 = Fault 1, Turbidity sensor fault
2 = Fault 2, Heating fault
3 = Combined fault:, Fault 1+2=3
4 = Fault 4, Filling fault
5 = Combined fault:, Fault 1+4=5
6 = Combined fault:, Fault 2+4=6**
7 = Combined fault:, Fault 1+2+4=7**
8 = Fault 8, NTC fault
9 = Combined fault:, Fault 1+8 = 9
A = Combined fault:, Fault 2+8 =A**
b = Combined fault:, Fault 1+2+8 =b**
c = Combined fault:, Fault 4+8 = c
d = Combined fault:, Fault 1+4+8 =d
E = Combined fault:, Fault 2+4+8 =E**
F = Combined fault:, Fault 1+2+4+8 =E**

The combined faults marked ** exclude each other.

Fault 1, Turbidity sensor system defective
The turbidity sensor is checked after the first pump step, i.e. it is decided after the first pump step whether fault 1 is displayed or not.
Possible causes:
- no turbidity sensor available
- turbidity sensor not calibrated (turbidity sensor defective)
- connection or plug fault
- electronic component for turbidity sensor evaluation defective
  electronic defective

Fault 2, Heating fault
If the final temperature is not reached after 60 min. fault no. 2 will be displayed.
Possible causes:
- heating defective
- pressure switch defective
- thermal switch 85° defective (always open)
- no water in appliance
- heating relay or electronic control defective
- connection or plug fault
- recirculation pump partially inoperative, motor circuit-breaker triggers

Note:
In case of a defective heating the washing time amounts to 75 to 300 minutes depending on the program.

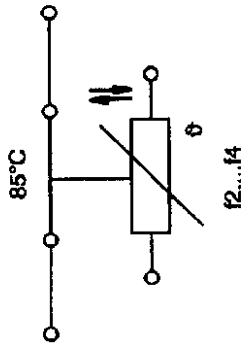
Fault 4, Filling fault
If the filling level is not reached after 6 minutes, fault no. 4 will be displayed.
Possible causes:
- water tap closed
- filling valve defective
- connection or plug fault
- electronic component of filling switch detection defective
- filling valve control on electronic defective
- poor water pressure

Fault 8, NTC fault
If the resistance value of the NTC temperature detector located in the safety thermostat exceeds or falls below certain limit values (e. g. in case of shortcircuit of the NTC or interruption of the connection lines) fault no. 8 is displayed 8.
Possible causes:
- water in thermostat switch with NTC
- connection or plug fault
- thermostat switch with NTC defective (see check values)
- electronic component for temperature evalution defective

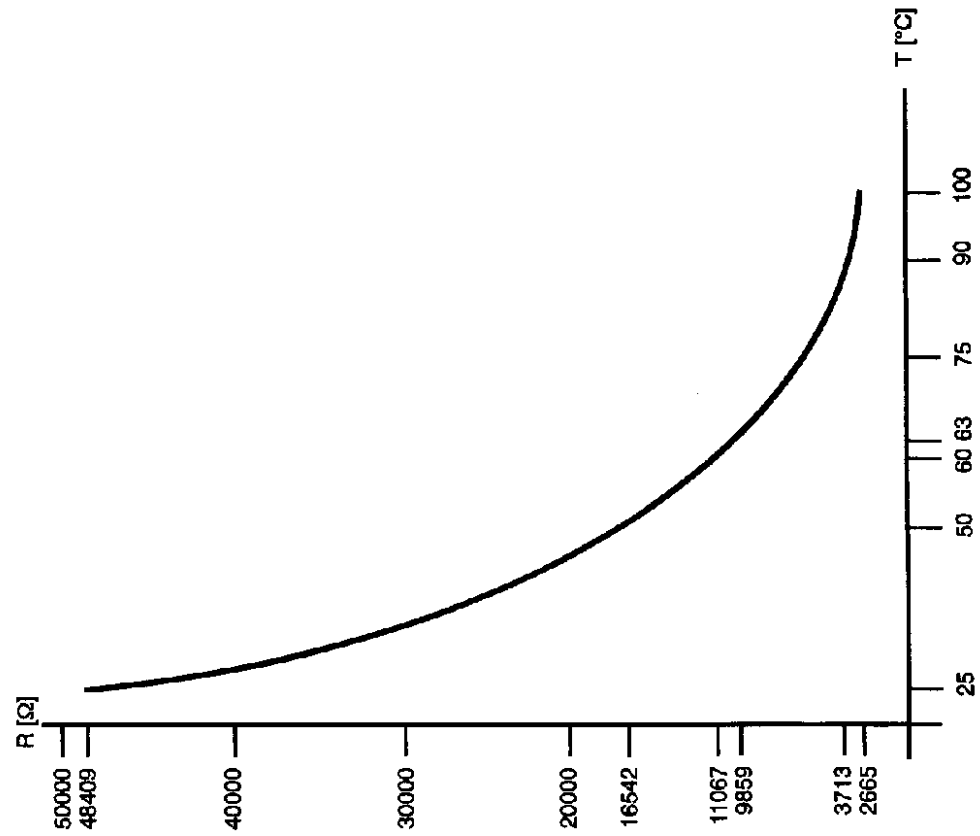
NTC check values:

10°C approx. 97.9 KW	25°C approx. 48.4 KΩ
30°C approx. 38.5 KΩ	40°C approx. 25.0 KΩ
50°C approx. 16.5 KΩ	60°C approx. 11.0 KΩ
65°C approx. 9.1 KΩ	70°C approx. 7.1 KΩ

8.4 NTC characteristic curve

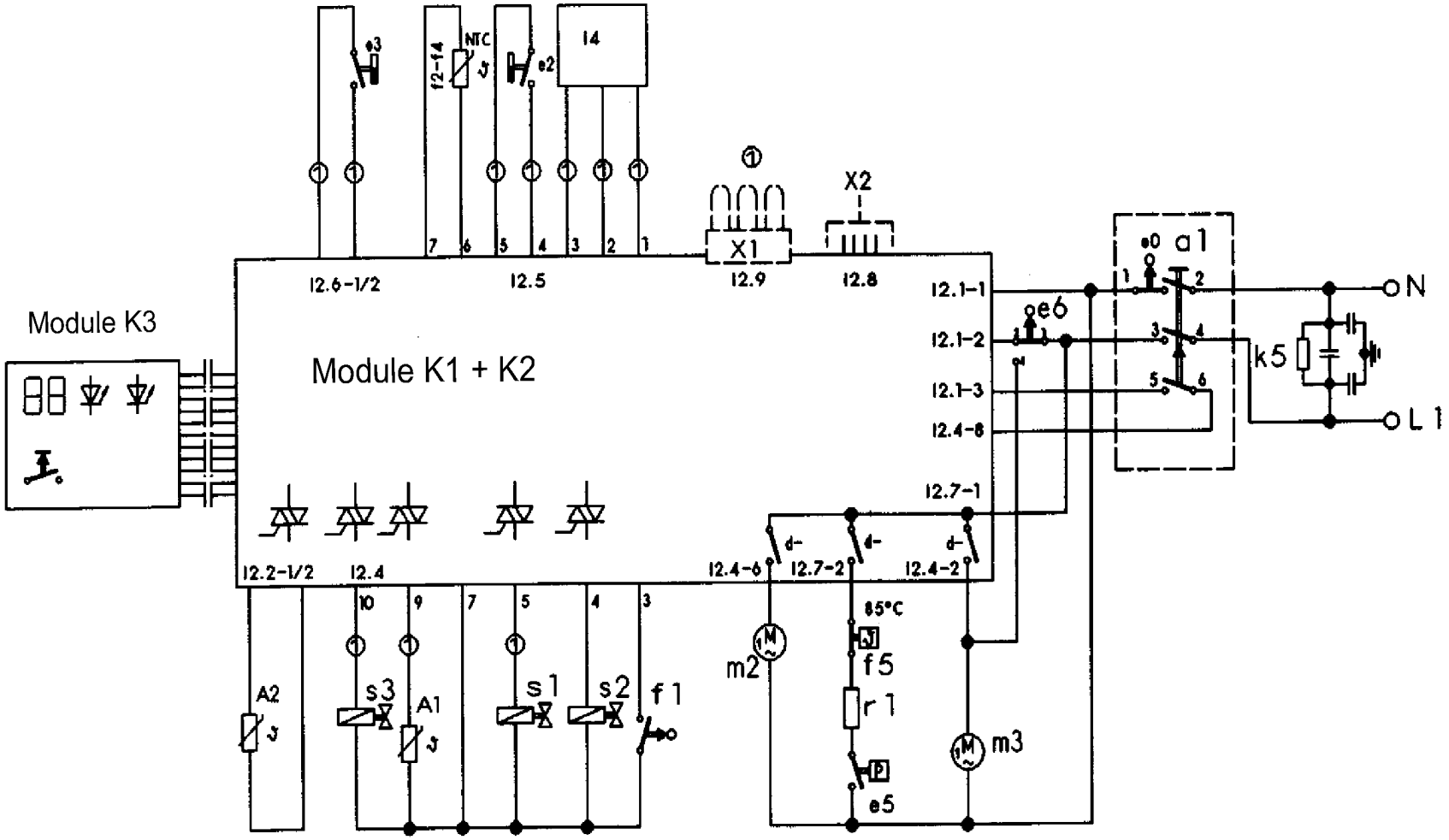


Temperature	25	50	60	63	90	100
Resistor	48409	16542	11067	9859	3713	2665



9. WIRING DIAGRAMS

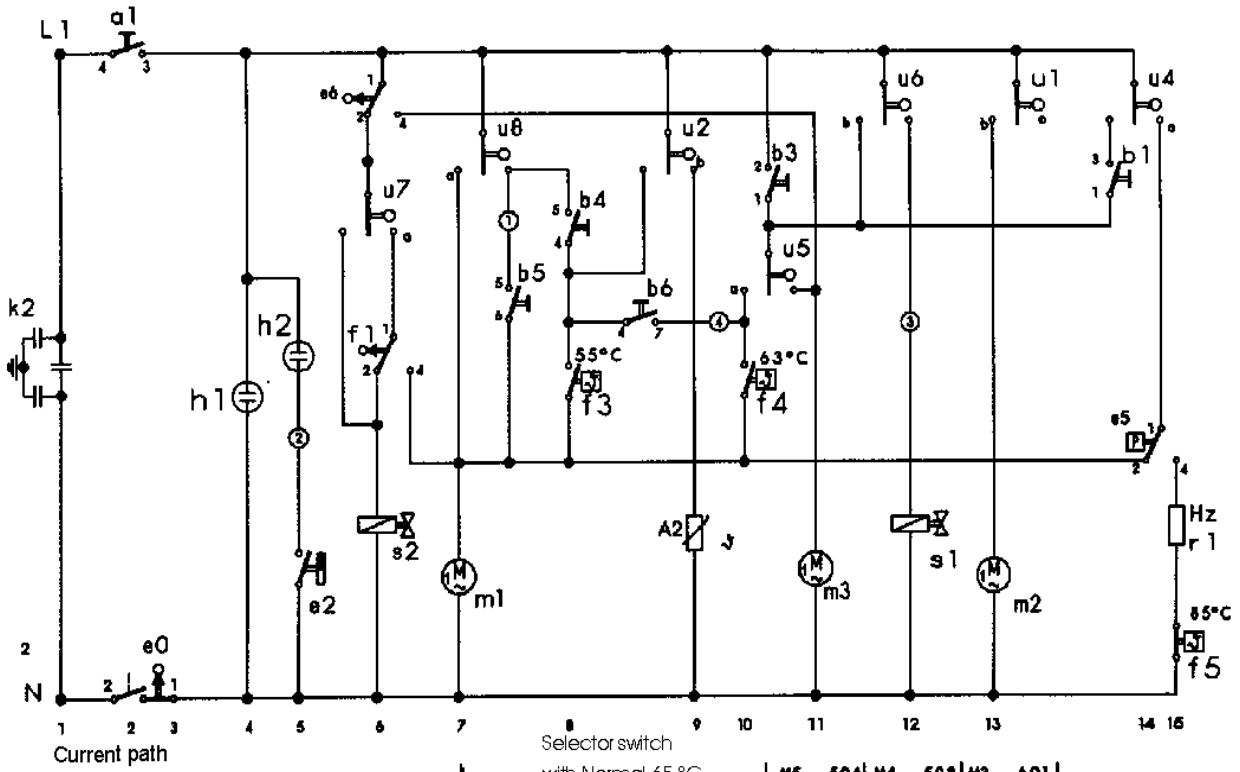
see the following pages



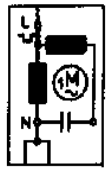
a1 = Mains switch	m2 = Recirculating pump
e0 = Integrated door switch	m3 = Draining of pump
e2/3 = Reed switch	r1 = Heater
e6 = Float switch	e5 = Pressure switch
f1 = Water level regulator	s1 = Regeneration valve
NTC = Temperature sensor	s2 = Fill valve
f5 = Temperature regulator	s3 = Outlet valve
K5 = Interference suppression	A1 = Upper-basket actuator
K1 = Display + operating module	A2 = Dispense actuator
K2 = Control module	I4 = Aqua Sensor
K3 = Time preset	X1 = Encoder plug
	X2 = Service connection

① depending on the equipment

1 739 911 132	
Ed.: 06.96	SO-60/0342



Capacitor motor



Selector switch

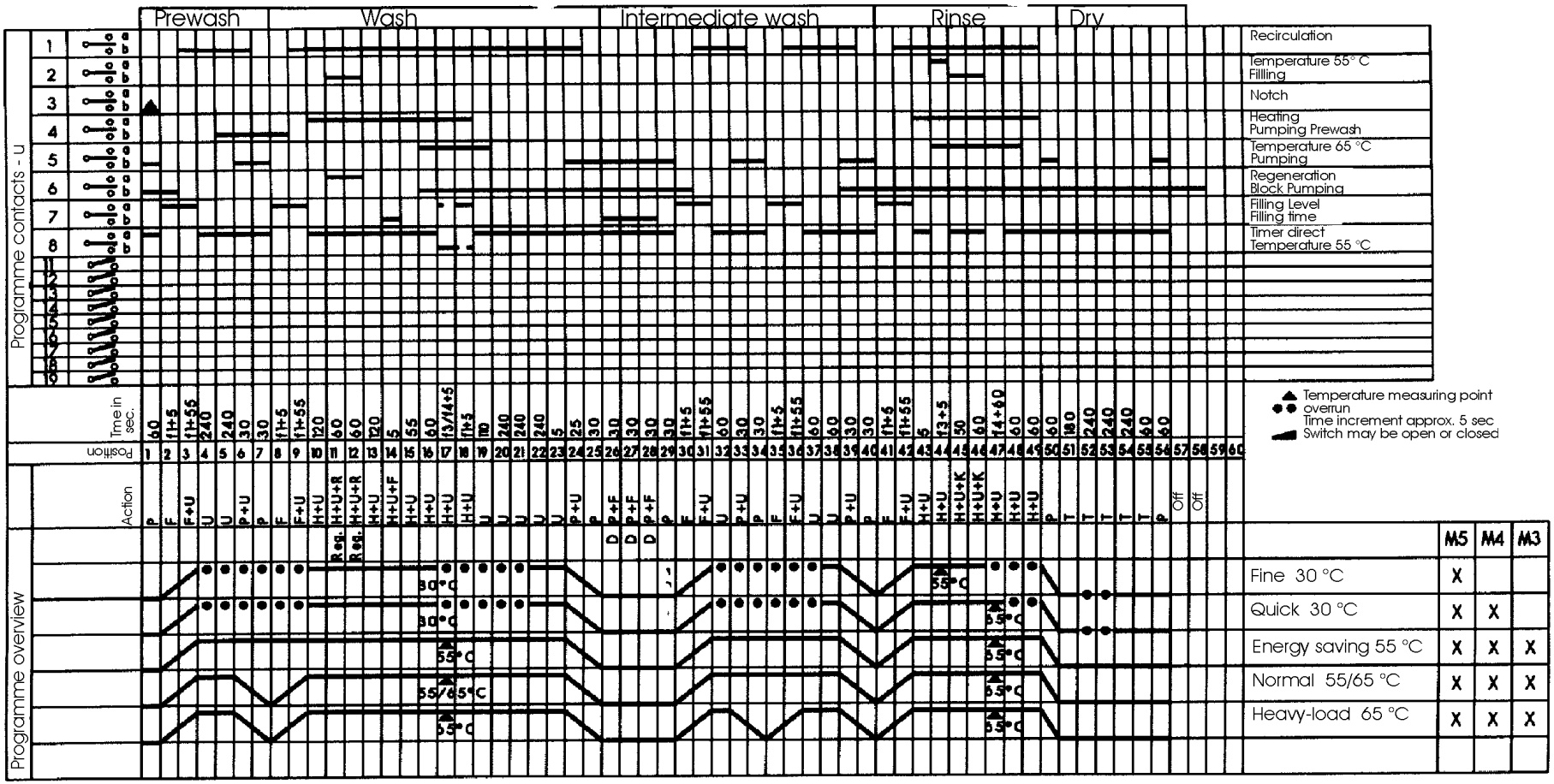
	with Normal 65 °C	M5 ...596	M4 ...598	M3 ...601
b3	Heavy -load 65 °C	X	X	X
b1 + b4	Normal 55 °C	X	X	X
b4	Normal Eco 55 °C	X	X	X
b5	Quick 55 °C	X	X	
b5 + b6	Fine 30 °C	X		

① additionally with M4, M5
② only with salt refill indicator
③ only with water softening
④ additionally with M5

a1	=	Mains switch	2
A2	=	Dispense actuator	9
e0	=	Integrated door switch	3
e2	=	Reed switch	5
e5	=	Safety switch	14
e6	=	Float switch	6
f1	=	Water level regulator	6
f3	=	Temperature regulator	8
f4	=	Temperature regulator	10
f5	=	Temperature regulator	15
h1	=	Control lamp	4
h2	=	Refill indicator	5
k2	=	Interference suppression	1
m1	=	Control motor	7
m2	=	Recirculating pump	13
m3	=	Draining of pump	11
r1	=	Heating element	15
s1	=	Regeneration valve	12
s2	=	Fill valve	6
			Current path

Timer
1 737 203 854

1 739 911 139	
03/97	S0-60/0331



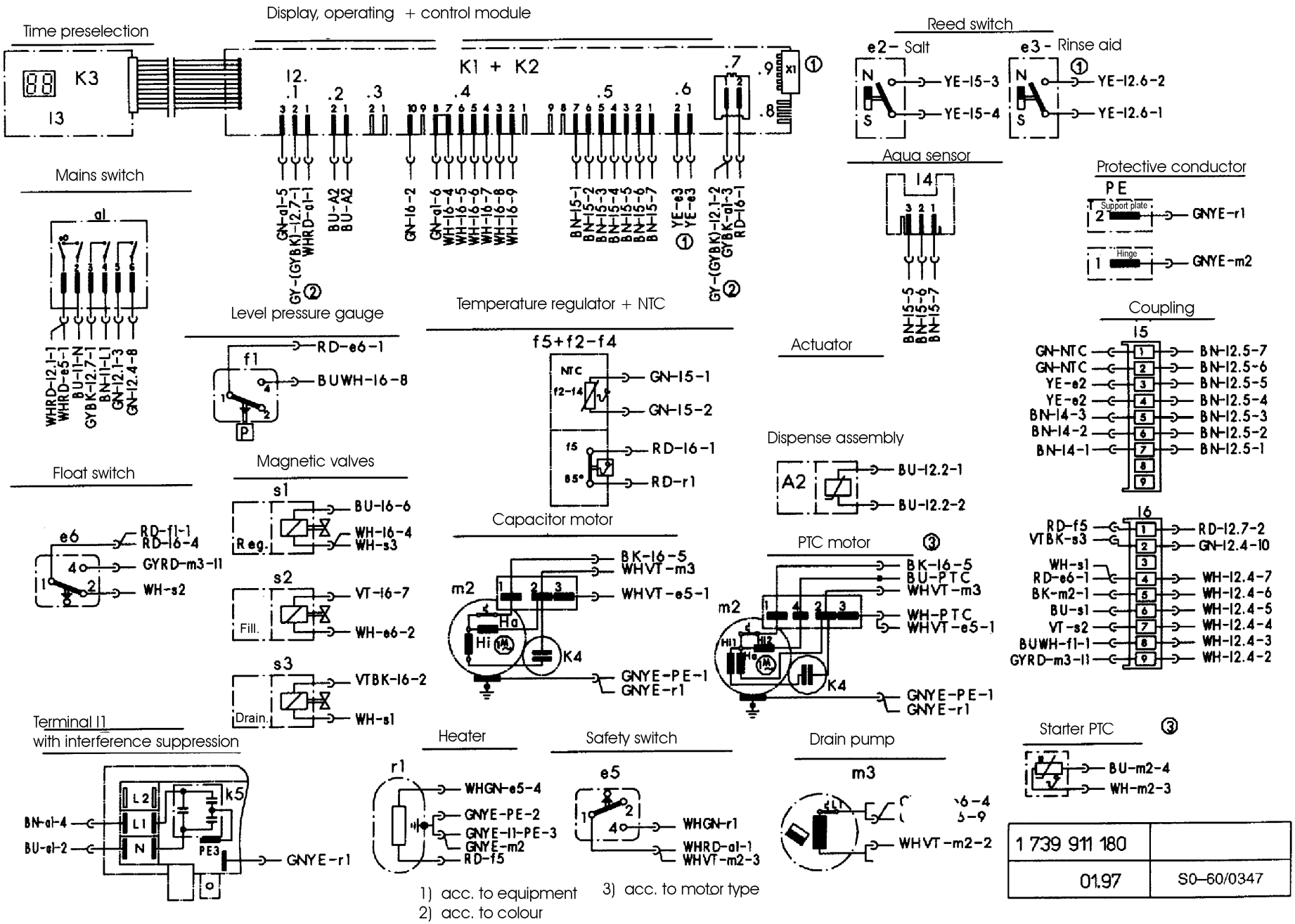
	M5	M4	M3
Fine 30 °C	X		
Quick 30 °C	X	X	
Energy saving 55 °C	X	X	X
Normal 55/65 °C	X	X	X
Heavy-load 65 °C	X	X	X

① depending on the selector switch

Timer
1 737 203 854

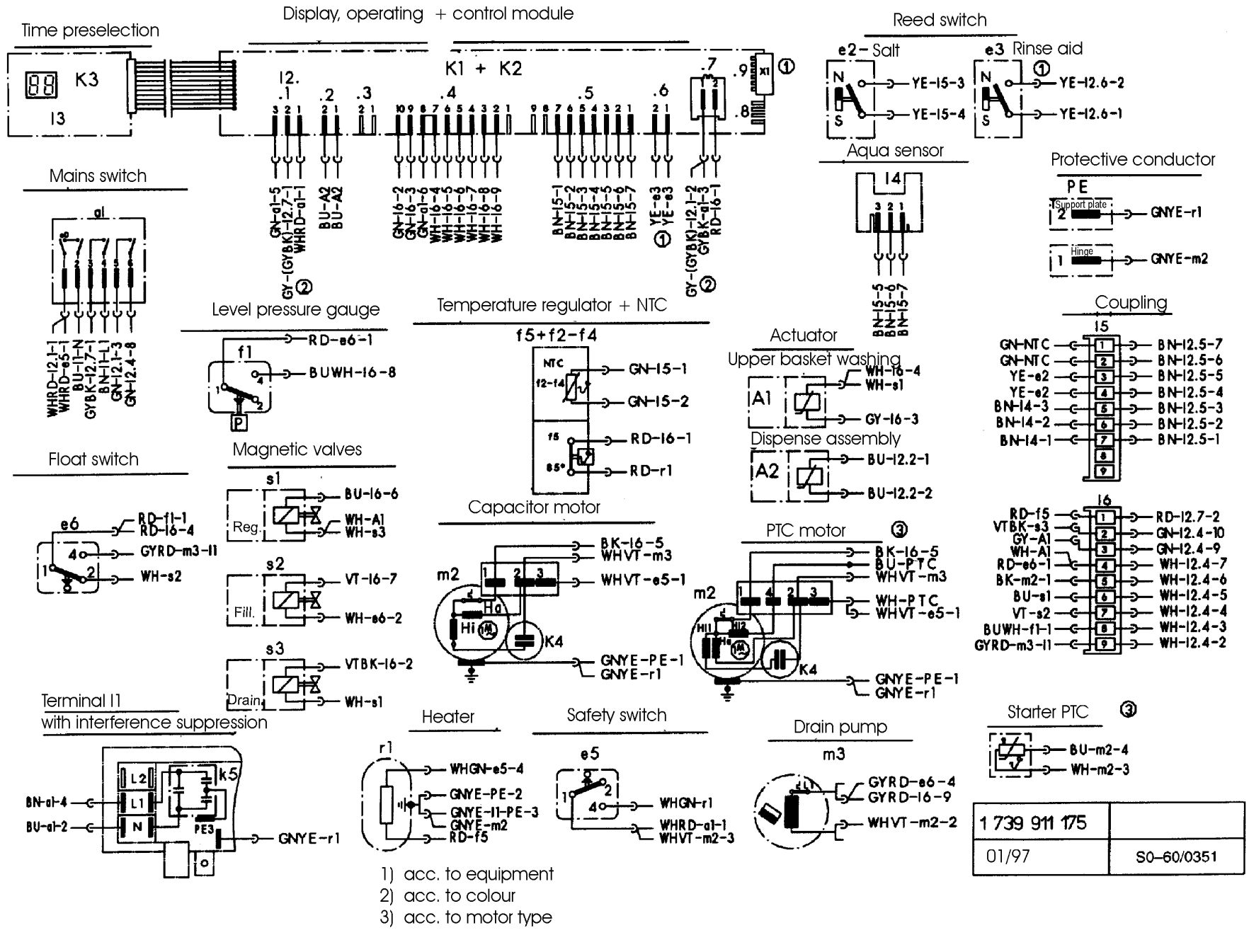
F = Fill
H = Heat
K = Add rinse aid
P = Pump
D = Rinse
T = Dry
R = Add detergent
U = Recirculate
Reg = Regenerate

1 739 911 140	
03/97	S0–60/0333

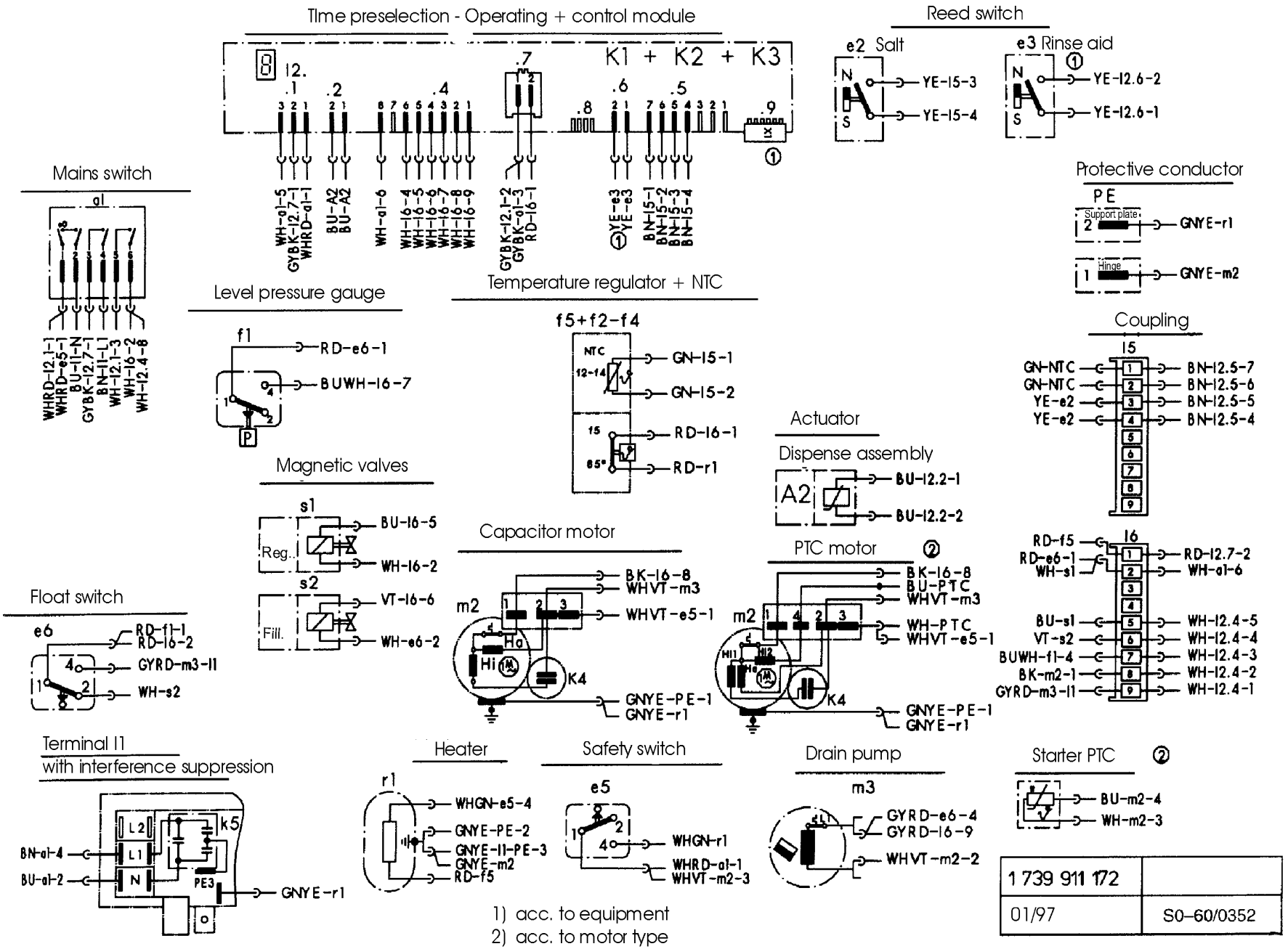


1) acc. to equipment
2) acc. to colour
3) acc. to motor type

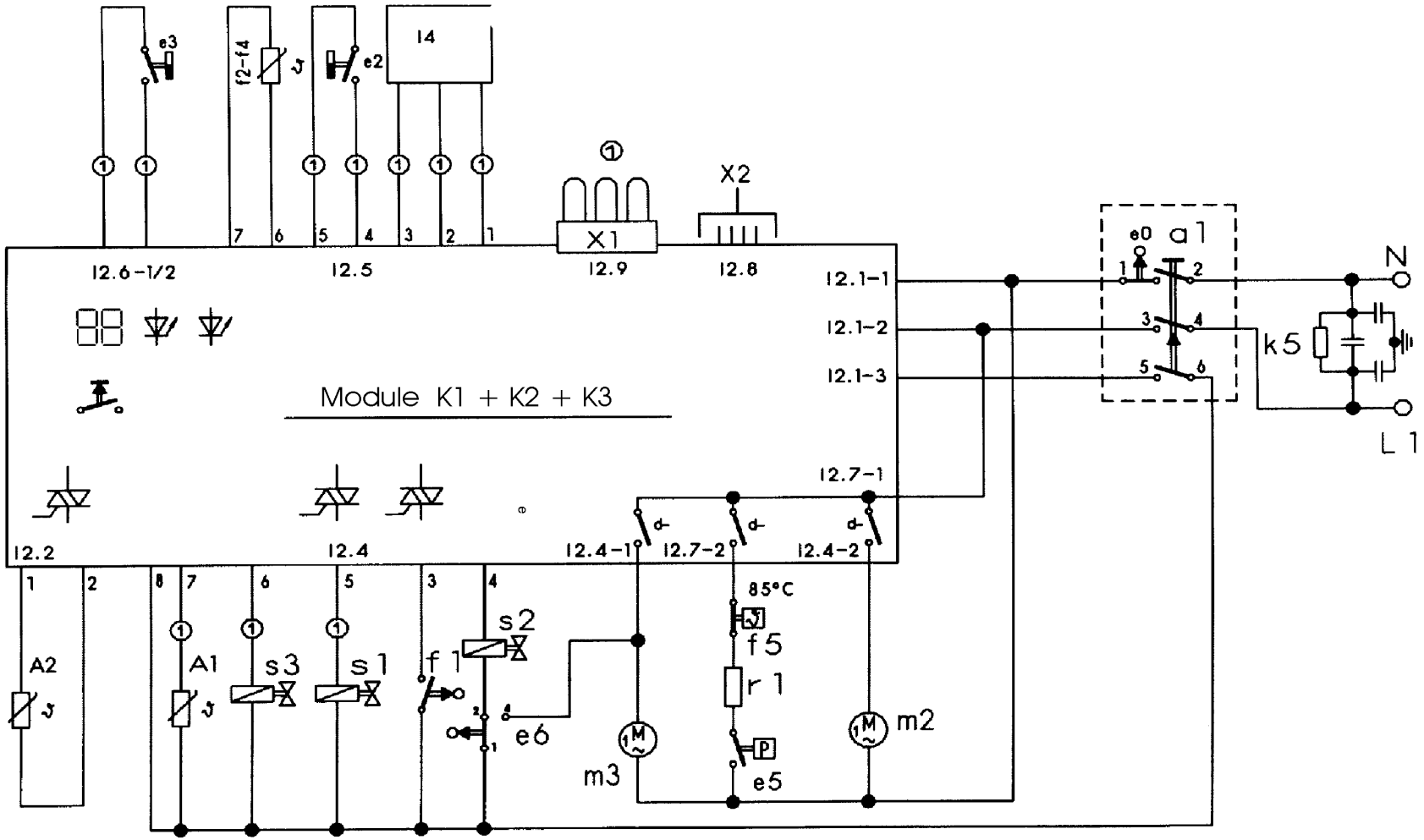
1 739 911 180	
01.97	S0–60/0347



1 739 911 175	
01/97	S0-60/0351



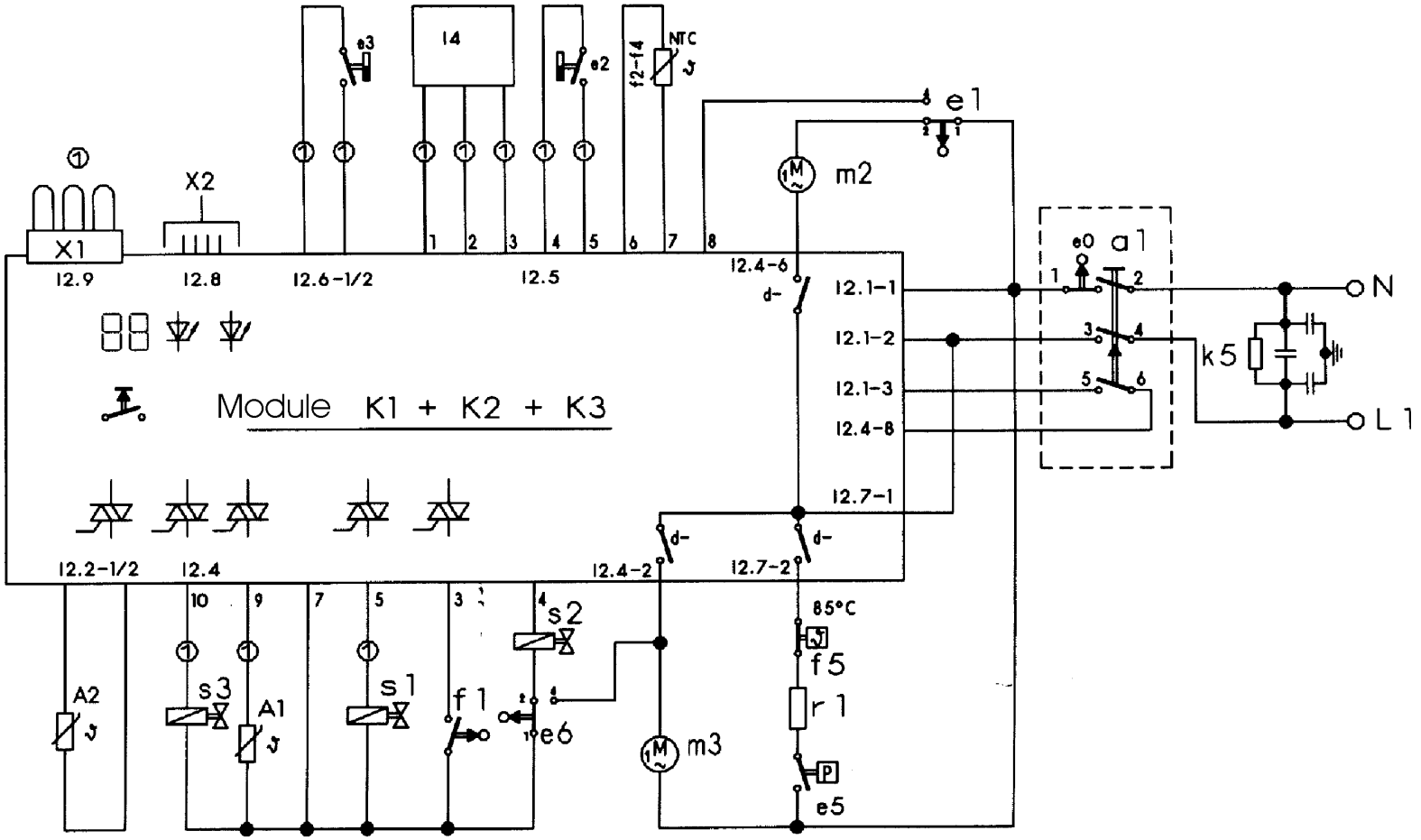
1 739 911 172	
01/97	S0-60/0352



a1	=	Mains switch	m2	=	Recirculation pump
e0	=	Integrated door switch	m3	=	Draining of pump
e2/3	=	Reed switch	r1	=	Heater
e6	=	Float switch	e5	=	Pressure switch
f1	=	Water level regulator	s1	=	Regeneration valve
NTC	=	Temperature detector	s2	=	Fill valve
f5	=	Temperature regulator	s3	=	Outlet valve
k5	=	Interference suppression	A1	=	Upper basket actuator
K1		Display and operating module	A2	=	Dispense actuator
K2	=	Control module	I4	=	Aqua sensor
K3	=	Time preselectio n	x1	=	Encoder plug
			x2	=	Service connection

1) acc. to equipment

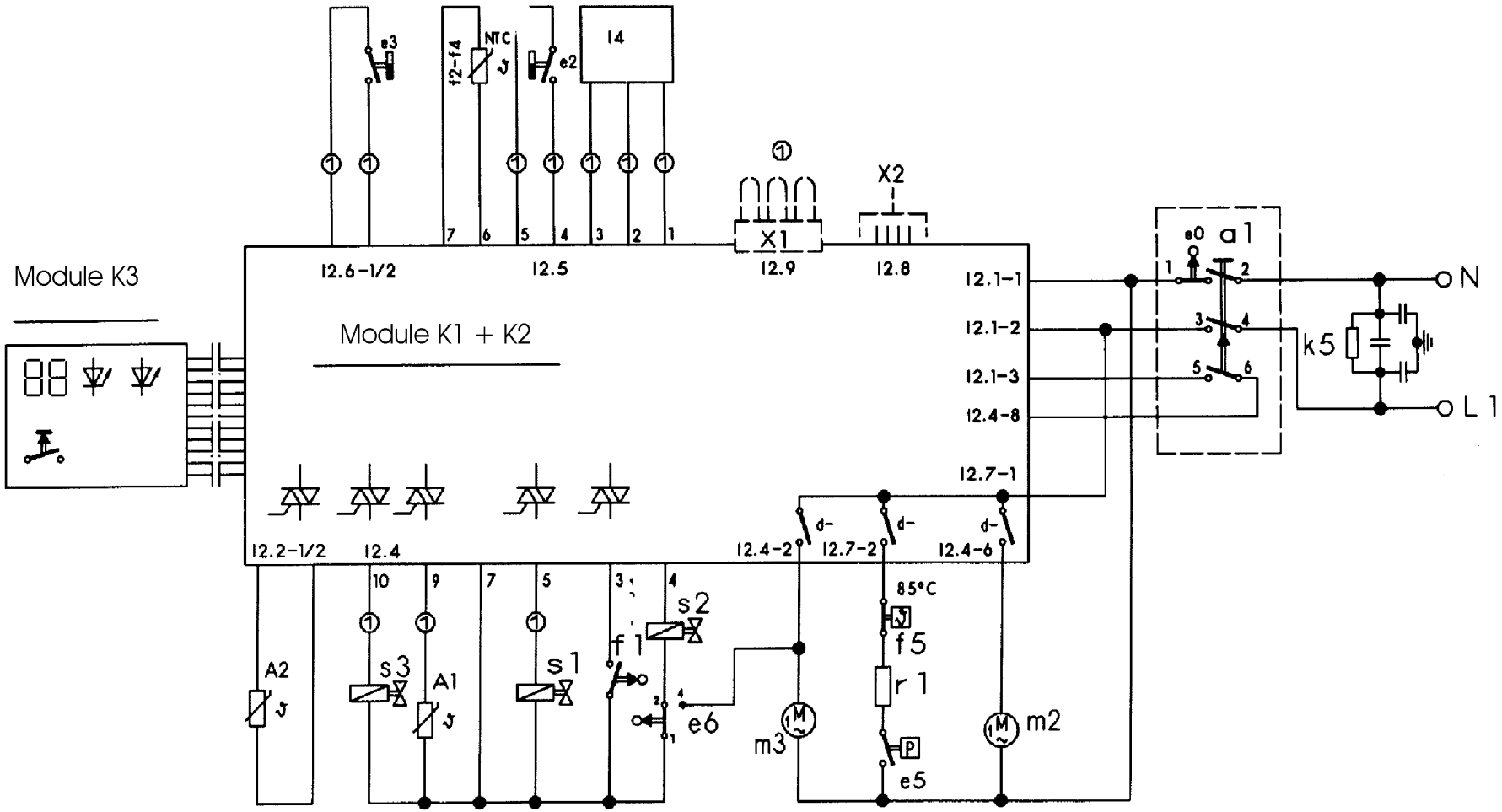
1 739 911 170	
07/96	S0–60/0353



a1	=	Mains switch	m2	=	Recirculation pump
e0	=	Integrated door switch	m3	=	Draining of pump
e1	=	Door switch	r1	=	Heater
e2/3	=	Reed switch	e5	=	Pressure switch
e6	=	Float switch	s1	=	Regeneration valve
f1	=	Water level regulator	s2	=	Fill valve
NTC	=	Temperature detector	s3	=	Outlet valve
f5	=	Temperature regulator	A1	=	Upper basket actuator
k5	=	Interference suppression	A2	=	Dispense actuator
K1	=	Display and operating module	l4	=	Aqua sensor
K2	=	Control module	x1	=	Encoder plug
K3	=	Time preselection	x2	=	Service connection

1) acc. to equipment

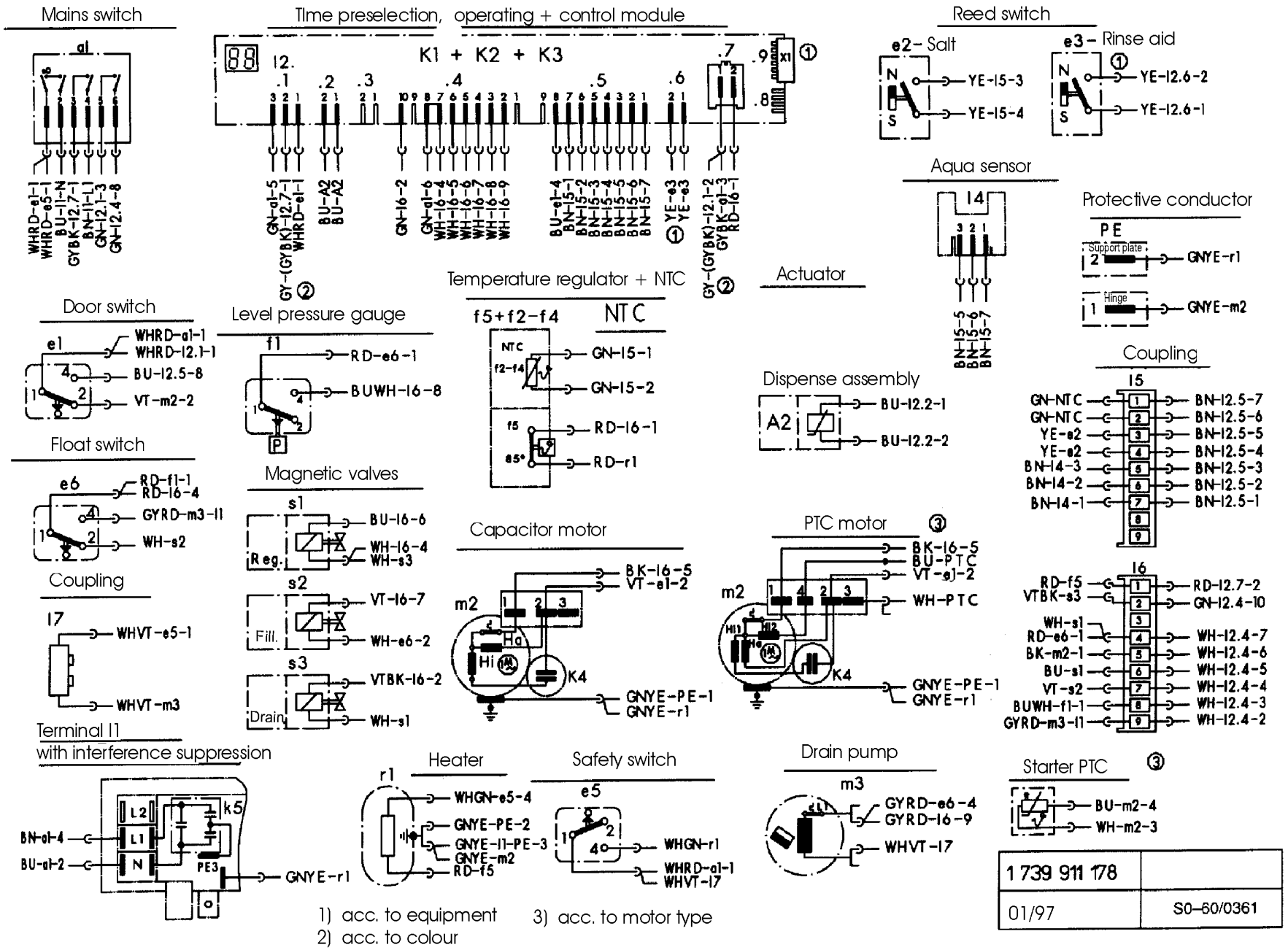
1 739 911 176	
08.96	S0-60/0356



a1	=	Mains switch	m2	=	Recirculation pump
e0	=	Integrated door switch	m3	=	Draining of pump
e2/3	=	Reed switch	r1	=	Heater
e6	=	Float switch	e5	=	Pressure switch
f1	=	Water level regulator	s1	=	Regeneration valve
NTC	=	Temperature detector	s2	=	Fill valve
f5	=	Temperature regulator	s3	=	Drain valve
k5	=	Interference suppression	A1	=	Upper basket actuator
K1	=	Display and operating module	A2	=	Dispense actuator
K2	=	Control module	14	=	Aqua sensor
K3	=	Time preselection	X1	=	Encoder plug
			X2	=	Service connection

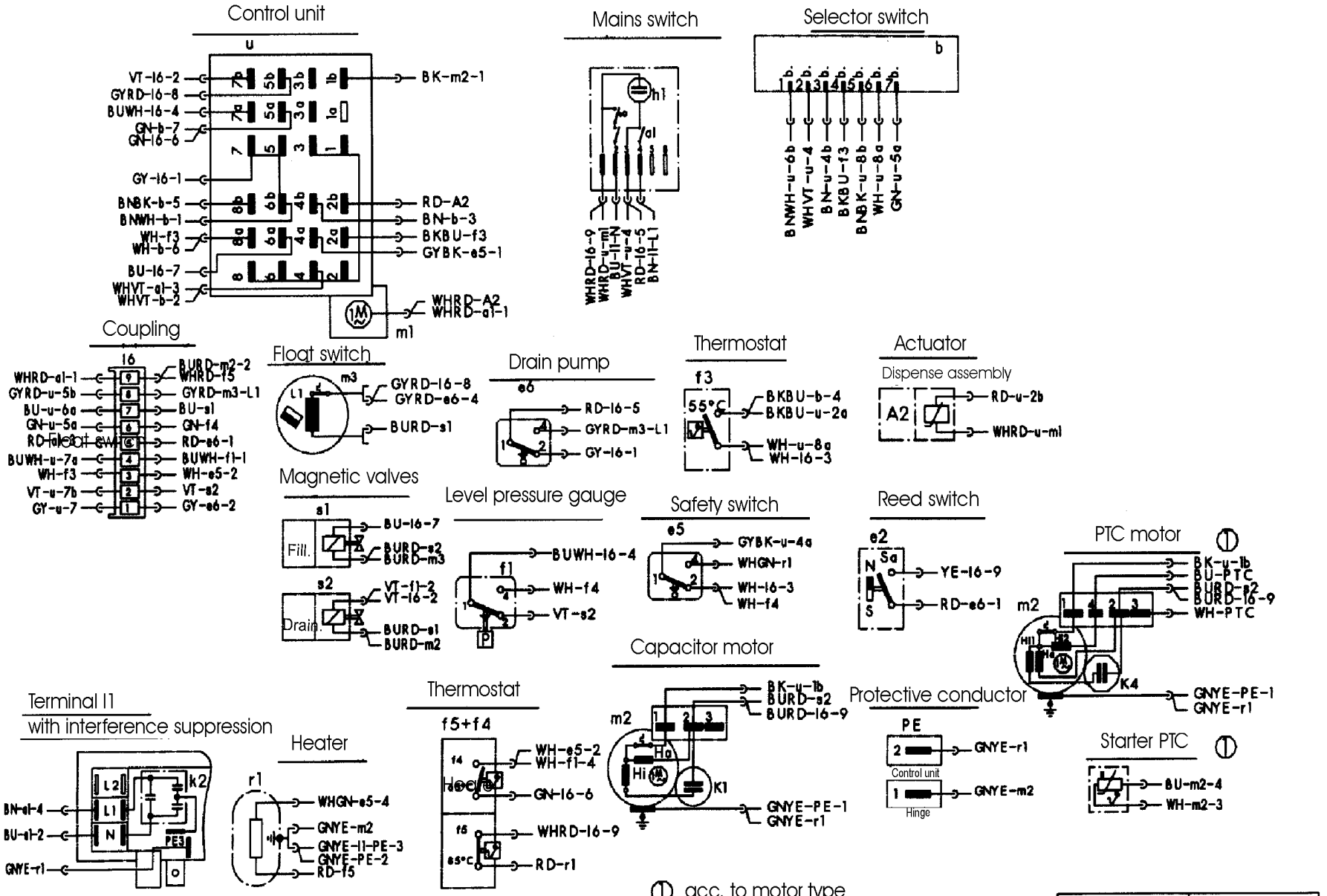
1) acc. to equipment

1 739 911 174	
07/96	S0-60/0358

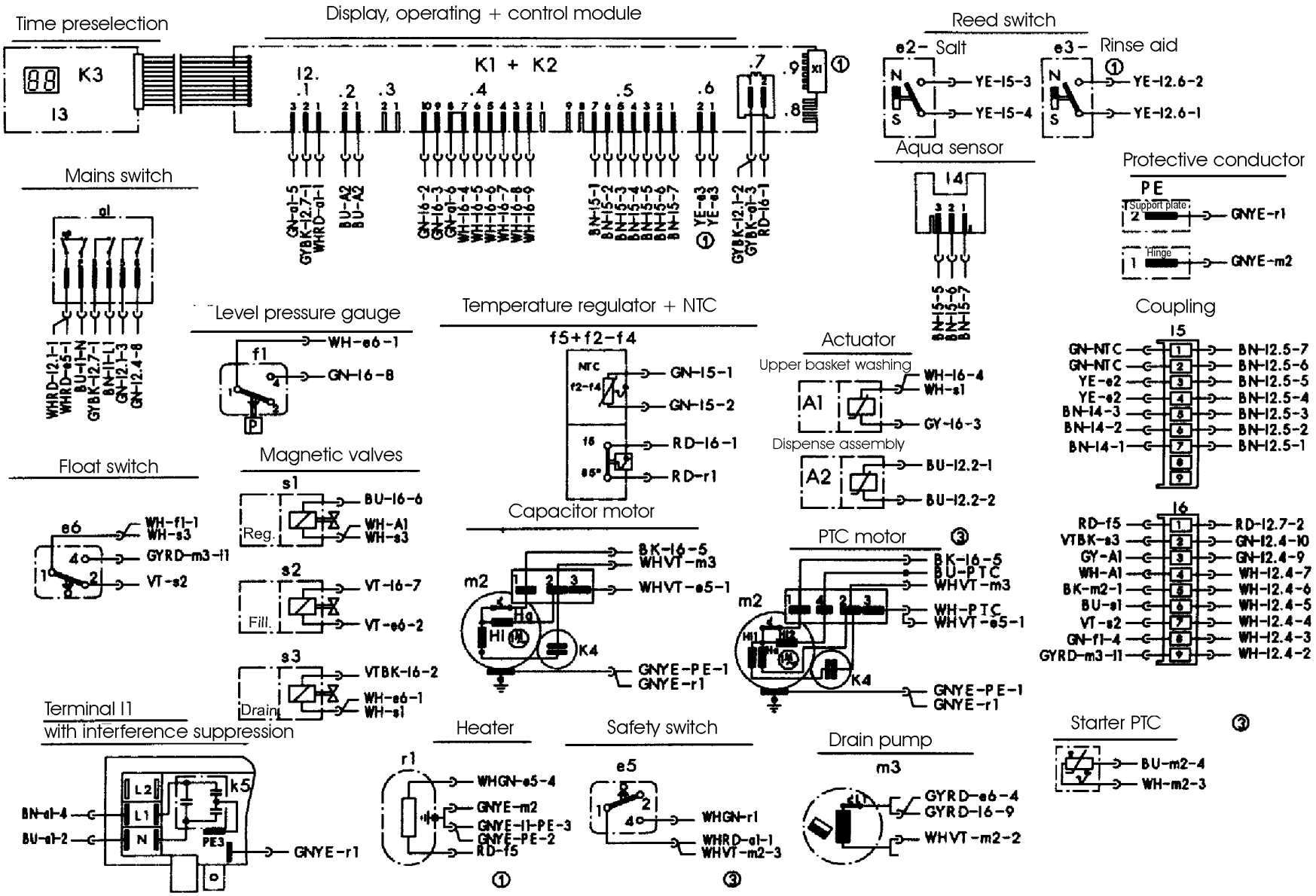


1) acc. to equipment
2) acc. to colour
3) acc. to motor type

1 739 911 178	
01/97	S0-60/0361

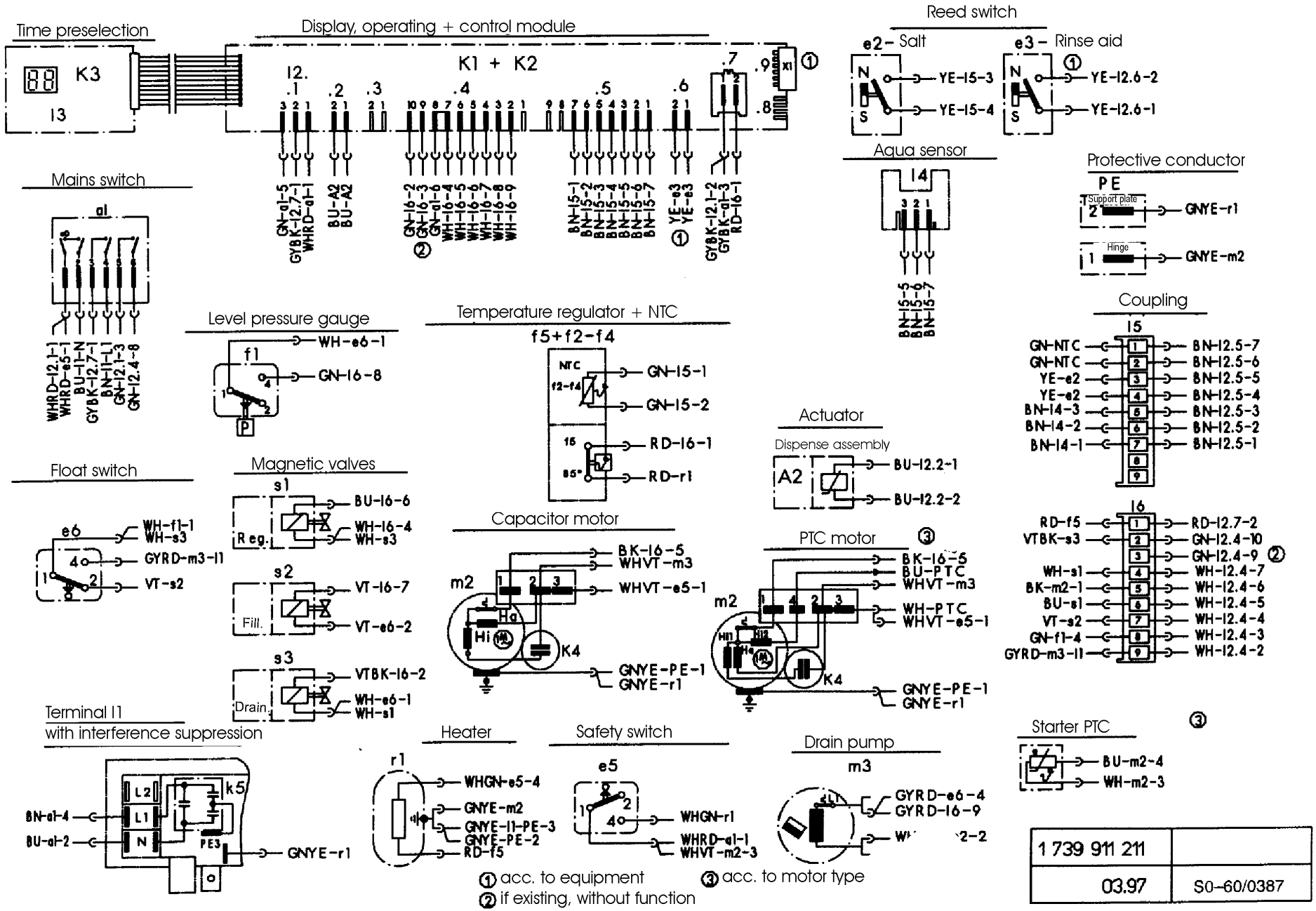


1 739 911 197	
03/97	S0-60/0372

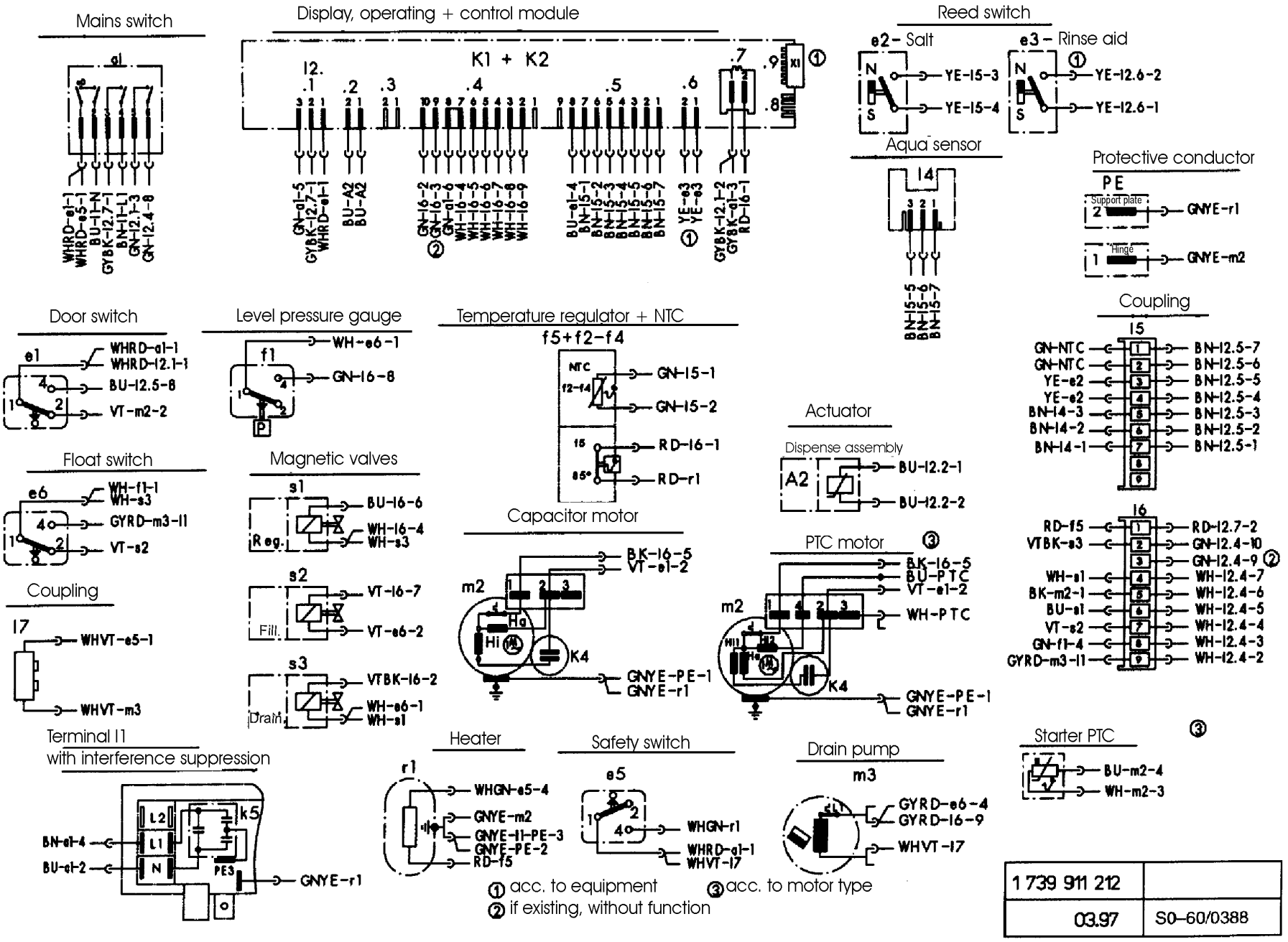


1) acc. to equipment
3) acc. to motor type

1 739 911 208	
03.97	S0-60/0384

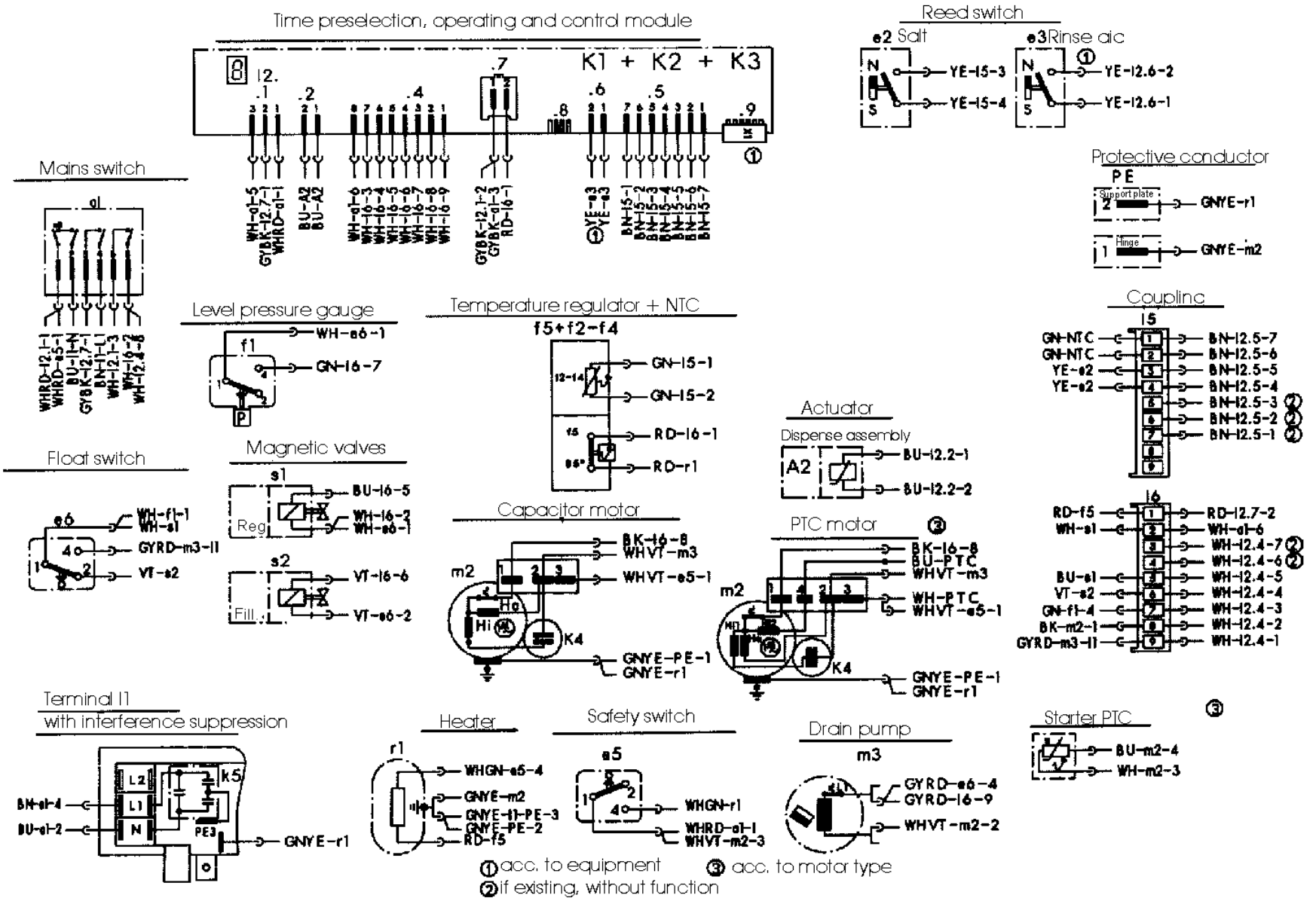


1 739 911 211	
03.97	S0-60/0387



① acc. to equipment ③ acc. to motor type
② if existing, without function

1 739 911 212	
03.97	S0-60/0388



1 739 911 215	
03/97	S0--60/0391