

Service-Handbuch
Service-Booklet

Hako

Hakomatic B 1100

(7580.02)

Schulung/Training
Fehlersuche/Trouble Shooting
Einstelldaten/Adjustments



Hako-Werke GmbH · Technisches Produktmanagement · D-23840 Bad Oldesloe · Stand 04/2006
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Contents

- 1 Notes** **4**
- 2 General** **5**
 - 2.1 Settings 6
 - 2.2 Brief description 9
 - 2.2.1 Vacuuming OFF / soiled water tank full 12
 - 2.2.2 Initial position machine, enabling / disabling functions 13
- 3 Check and set machine type, LDS and options, view and delete last error** **16**
 - 3.1 Check and set machine type 20
 - 3.2 Check and set options 21
 - 3.3 Check and set LDS 22
 - 3.4 View and delete last error in display 23
- 4 Program various cleaning cycles as a function of drive rheostat setting** **24**
 - (check and set)
- 5 Program functions** **26**

Contents

6	Particular settings according to the customer's requirements (last error display and water stage selection, cleaning agent dosing, SWR, side brush, filter)	31
6.1	Display of last error	34
6.2	Water stage when start cleaning	35
6.3	Cleaning agent when turning water ON	36
6.4	Switchover to SWR when water ON	37
6.5	Side brush when turning "scrubbing" ON	38
6.6	Shake filter	39
6.7	Filter vacuuming when turning sweeping ON	40
6.8	Automatic filter shaking when sweeping is terminated	41
7	Module Settings	42
7.1	Module 1	43
7.2	Module 3	44
8	Control panel settings	45
9	Water pump	46
10	Diagnosis LED for travel drive module	47
10.1	Signal measuring at the drive control	50
11	Error reference chart with information on service display	54

1. Note

Caution:

- De-energize the machine when working on it (disconnect battery plug) except for current or voltage measuring.
- Only loosen the screws when replacing the strip circuit breaker. Do not remove them entirely to avoid the risk of short-circuit.
Insert the new strip circuit breaker entirely and evenly under the screws.
- Measure the start-up and the operating voltage after repair in order to detect eventual faults.
- The generally applicable legal provisions for safety and for prevention of accidents have to be respected when working on the machines.

2.1 Settings

The following settings on the control electronics/control panel must be defined and checked on each machine.

- machine type
- LDS (low discharge signal sender)
- options
- delete last error display after elimination
- program variants with a given drive rheostat setting

2.1 Settings

Settings via control panel which may be defined according to the customer's requirements:

- display of the last (eliminated) error when turning the machine ON
- water stage selection when start cleaning
- cleaning agent when turning water ON
- switchover to SWR when water ON
- side brushes when turning „scrubbing“ ON
- shake filter
- filter vacuuming when turning sweeping ON
- automatic filter shaking when sweeping is terminated

2.1 Settings

Settings on module 1:

- DIP switch for electronic circuit breakers

Settings on module 3:

- DIP switch for electronic circuit breakers and module codes

Settings on additional control panels:

- DIP switch for control panel codes

2.2 Brief description

The following electronic modules control the machine:

- control unit
- module 1
- module 3 (for pre-sweep and side brush options)
- control panel
- control panel for cleaning agent dosing / soiled water recycling (SWR) (optional)
- cleaning agent block (optional)
- additional voltage module (voltage transformer 36V/24V)

The electronics modules are supplied via the additional voltage module, a voltage transformer 36V to 24V. The electronics modules being the same as implemented in the B750R and B910, are 24V components which require thus transformation.

Motors, pumps etc. are 36V components.

2.2 Brief description

The control unit ensures all control and monitoring functions in the machine except for the drive control.

The drive control works completely independent, only the „enable“ signal and the „reduce speed“ signal being transferred via the control electronic to the drive control. Vice versa the drive control transfers the „forward“ or „reverse drive“ signals to the control unit.

When an error occurs on the drive control the error code is not displayed since the drive control is equipped with its own diagnosis display (see chapter 10).

The keys for scrubbing, vacuuming, scrubbing and vacuuming as well as the green Hakomatik key for combined cleaning can be used independently only the selected function being active. The pre-sweep function may be turned ON and OFF irrespective of the selected cleaning mode.

The other function keys (water, brush pressure) allow to additionally turn ON and OFF the corresponding function without modification of the active cleaning function.

2.2 Brief description

The machine has to be equipped with a seat switch which must be actuated when turning ON the key switch, otherwise the sweeping and scrubbing function (even combined) are locked. When the seat switch is not actuated, only the vacuuming function for the manual suction hose option may be activated.

The seat switch has to be actuated any time, i.e. in case of leaving the machine with the key switch turned ON the functions are locked.

Release the parking brake to enable the cleaning functions and the drive control.

2.2.1 Vacuuming OFF/ soiled water tank full



The vacuuming function is turned OFF either by operator's key action or automatically when the signal „soiled water tank full“ applies.

Operator turns vacuuming OFF:

- squeegee is lifted
- suction motor turned OFF with a delay of 15 seconds

Turned OFF when tank full:

- The „soiled water tank“ switch opens as soon as the tank is filled
- If the switch opens 3 seconds or longer (spill protection) the squeegee is lifted and the suction motor turned OFF with a delay of 15 seconds.

2.2.2 Initial position machine, enabling/disabling functions *Hako*

After turning ON the machine all components are brought into „initial position“ if the seat switch is actuated.

This means that the control unit activates all components (lifting elements and motors).

The lifting elements will lift if they have not been turned OFF in top final position by the micro switch integrated in the lifting element. The motors turn OFF and the LEDs on the control panel extinguish. The drive control receives the enabling signal.

If the seat switch is not actuated the motors are turned OFF as well but the lifting elements do not lift for security reasons and the drive control is not enabled.

Exception: water vacuuming with manual hose.

2.2.2 Initial position machine, enabling/disabling functions *Hako*

The operation of the pre-sweeper is possible if the hood is closed and the dirt hopper correctly mounted. Hood and dirt hopper are monitored by switches (NC-contacts) which are connected in series. As soon as the contact opens, the LED “hood open” in the standard control panel alights and the pre-sweep function is disabled. Since both switches are connected in series this LED equally alights if the contact “dirt hopper not installed” opens. In case of malfunction check the switches, the wiring and plugs.

A second protective interrogation is performed via the thermal switch of the broom motor. If this contact opens the pre-sweep function is disabled in the same way and the corresponding error code is displayed.

The cleaning functions are disabled with the parking brake activated and the red LED “brake activated” alights. This switch is an NC-contact as well thus check the switch, the wiring and the plugs in case of malfunctions.

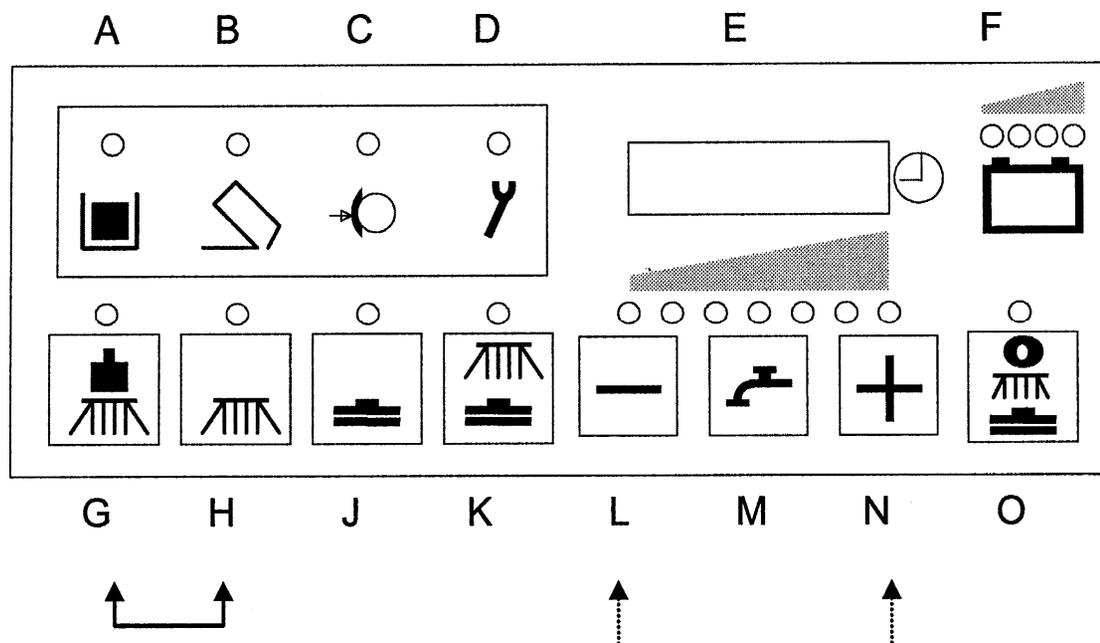
2.2.2 Initial position machine, enabling/disabling functions *Hako*

When switching on the “brush” function, the brush head is lowered to the so-called medium position. When cleaning with a higher brush pressure the lifting element lowers to the final position. The lifting element brush head is thus equipped with three micro switches for top, medium and bottom position. The side scrub unit may only be shifted if the brush head is lowered. If for instance the micro switch for medium position does not respond the signal “brushes lowered” is missing and the side brush does not shift. The signal only depends on the “medium position” micro switch which means that the side brush can shift as well when cleaning with increased pressure for the “medium position” micro switch has been activated in this case on the faultless way down to the bottom final position

3. Check and set machine type



The settings described in this paragraph must by all means be checked and if necessary modified. Particularly in the case of replaced electronic module.



3. Check and set machine type

Entry in the programming step

1. Turn OFF machine with key switch.
2. Depress "G" and "H" key the same time and hold, turn key switch ON
3. Hold both keys until a number (software version) will appear in the display, thereafter release both keys

The set machine type is displayed automatically. Use the „N“ key for display of option and LDS settings or thereafter for display of the last (eliminated) error.

Use the „L“ key to step back in display.

Quit the session by turning the key switch OFF.

3. Check and set machine type

3018 „N“

Software version, next display appears automatically

4

Machine type setting: 4 means B1100

Option settings

5

LDS setting

0.0.0.0.

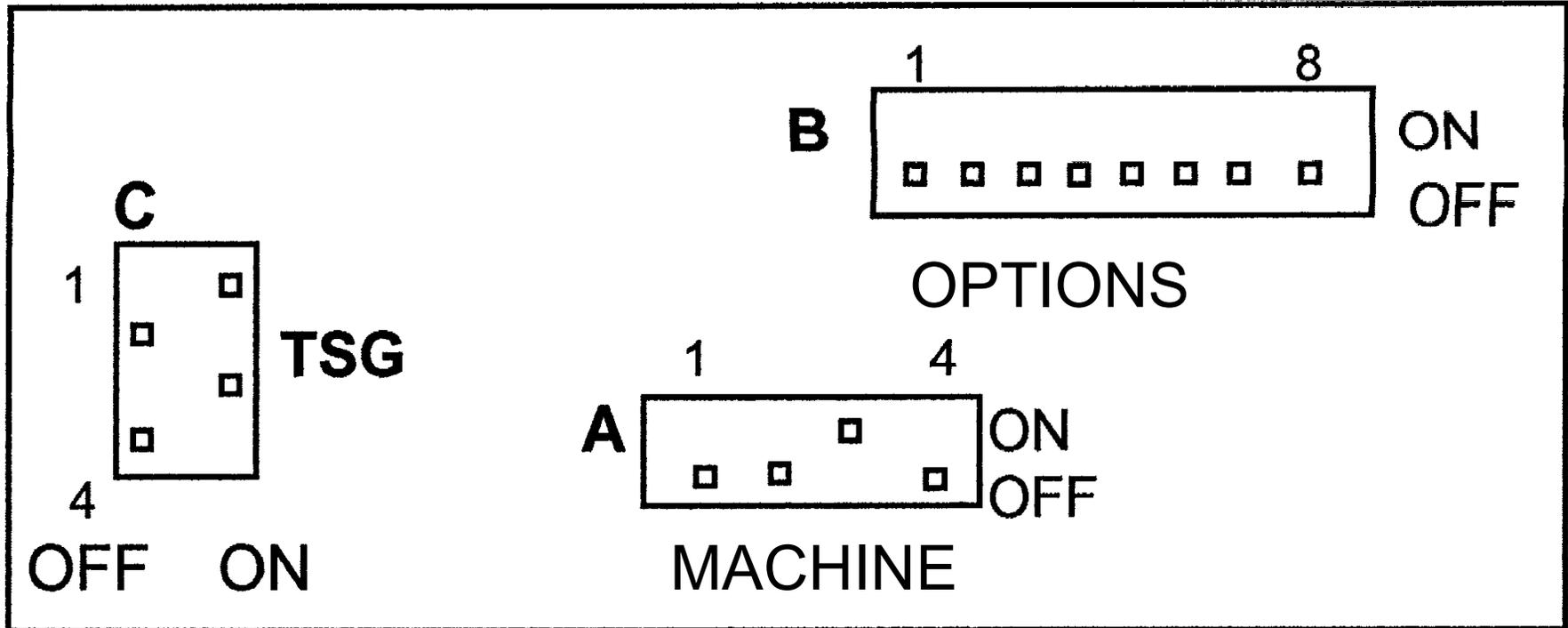
Display last error and reset

„L“

3. Check and set machine type



Control electronic module





3.1 Check and set machine type

1. The correct machine type setting is absolutely necessary. To do so use the DIP switch A on the control electronic module (see Folie 19).
2. For the B1100 type bars no. 1, 2 and 4 have to be positioned in the bottom line, bar no. 3 in the top line. This setting results in the displayed number 4.
3. If the display does not correspond with the data, modify the DIP switch combination.

B 1100 1: OFF
 2: OFF
 3: ON
 4: OFF

3.2 Check and set options

1. The correct setting of all options on the DIP switch B of the control electronic module is absolutely necessary (see Folie 19).

2. The DIP switches are assigned as follows:

- | | | |
|--------|------------------------|--------------|
| 1: | cleaning agent dosing | (set = „ON“) |
| 2: | SWR | (set = „ON“) |
| 3: | side brush | (set = „ON“) |
| 4: | tool | (set to OFF) |
| 5: | pre-sweep | (set = „ON“) |
| 6 - 8: | unassigned, i.e. „OFF“ | |

3. The option is set if the DIP switch is ON.

3.3 Check and set LDS

1. The LDS must by all means be set to the correct battery type.
2. If different batteries are installed, modify the LDS setting as described below.
Use DIP switch C on the control electronic module (see Folie 19).
3. Dip switch 4 has to be set to 36 V.

The LDS is set following this chart. (No. 5 being the standard setting)

„1“ means ON; „0“ means OFF / „Foreign“ means all batteries **not** delivered by **Hako**.

Displayed number →	2	3	4	5	6	7
Dip-switch	GIS foreign	GIS	PzS foreign	PzS	Gel (Sonnen-schein)	Gel (Deta)
1	0	1	0	1	0	1
2	1	1	0	0	1	1
3	0	0	1	1	1	1
4	OFF = 36 V					

3.4 View and delete last error in display



View

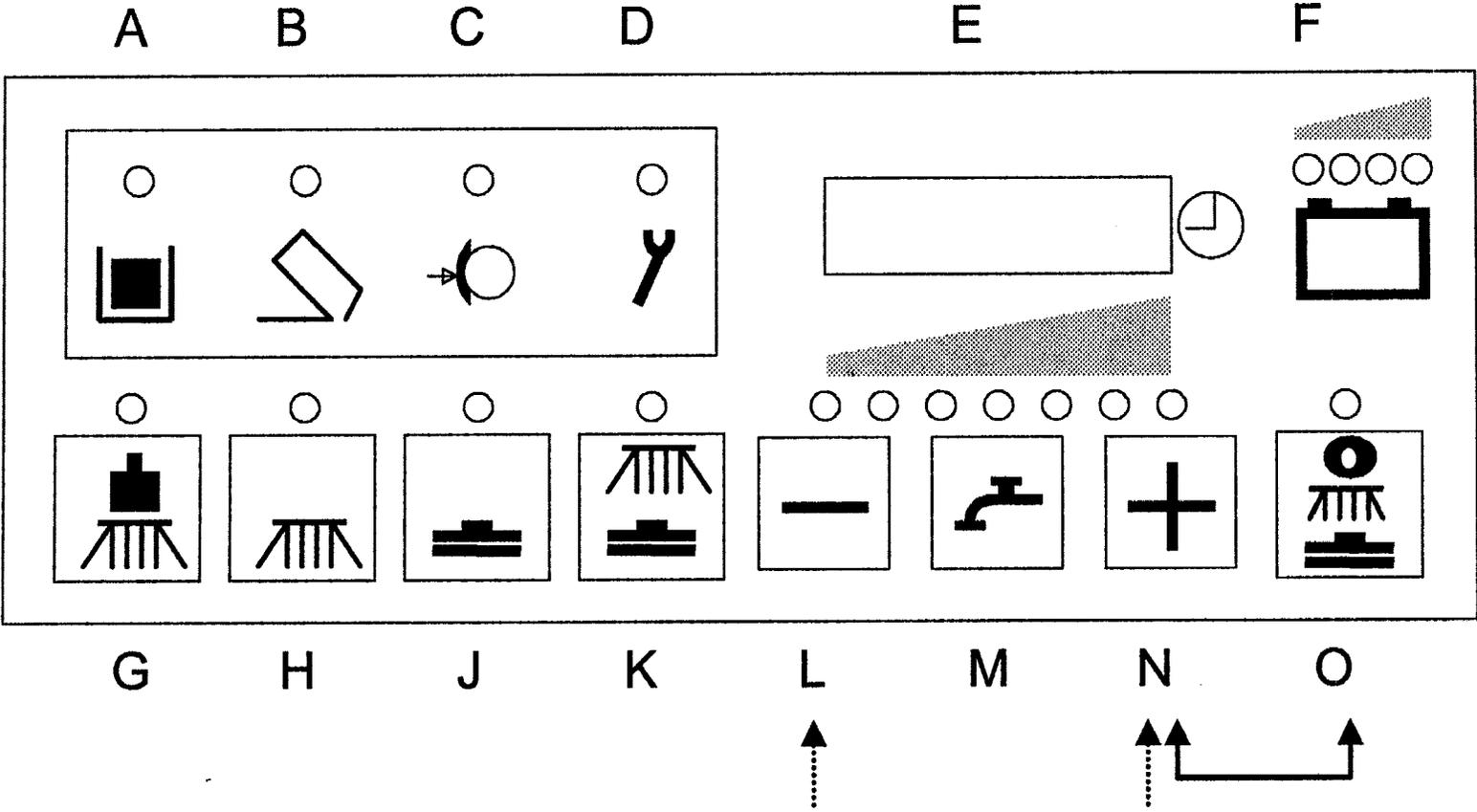
1. Depress „N“ key three times, the 4-digit error code with flashing dots will appear (last eliminated error).
2. Quit the session by turning the key switch OFF (must not be executed when passing to „delete“).

Delete

1. Depress „O“ key and hold until 0.0.0.0. is displayed.
2. Release key, turn key switch OFF and ON.
3. The software version will shortly appear followed by the hourmeter display.
4. You may view the last error in the menu as described under „View“, since such data cannot be deleted in the menu.
5. Quit the session by turning the key switch OFF:

4. Program

Program various cleaning cycles as a function of drive rheostat setting
(check and set)



4. Program

Check

1. Turn machine OFF with key switch.
2. Depress "N" and "O" key the same time and hold, turn key switch ON.
3. Hold both keys until a number (software version) appears in the display, thereafter release both keys.
4. The programs may also be viewed by depressing the „L“ key (down) or the „N“ key (up).
5. The active program always will be marked by a dash before the number.
6. Quit the session by turning the key switch OFF (must not be executed when passing to „Setting“).

Setting

1. Select the required program with the „L“ or „N“ key.
2. Depress „O“ key and hold until the dash appears before the number. The program is now saved and active.
3. Quit the session by turning the key switch OFF.

5. Program functions

The description of program functions requires the „brushing“ and/or „vacuuming“ function being turned ON. All programs allow normal cleaning or vacuuming in the ‘forward’ drive rheostat setting. The following chart shows the differences for ‘neutral’ and ‘reverse’ drive rheostat setting.

Program code	Drive rheostat setting/ direction selector	Function with a given drive rheostat setting/direction selector		
		Brush head + water	Squeegee	Broom
1	Neutral	Brushes and water ON	Vacuuming remains ON	Broom remains ON
	Reverse	Brushes and water ON	Squeegee lifts	Broom remains ON

5. Program functions

Program code	Drive rheostat setting/ direction selector	Function with a given drive rheostat setting/direction selector		
		Brush head + water	Squeegee	Broom
2	Neutral	Brushes and water ON	Squeegee lifts	Broom remains ON
	Reverse	Brushes and water ON	Squeegee lifts	Broom remains ON
3	Neutral	Brushes and water OFF	Vacuumping remains ON	Broom remains ON
	Reverse	Brushes and water ON	Squeegee lifts	Broom remains ON

5. Program functions

Program code	Drive rheostat setting/ direction selector	Function with a given drive rheostat setting/direction selector		
		Brush head + water	Squeegee	Broom
4	Neutral	Brushes and water OFF, brush head lifts	Squeegee lifts	Broom OFF and lifted
	Reverse	Brushes and water OFF, brush head lifts	Squeegee lifts	Broom OFF and lifted
5	Neutral	Brushes and water OFF	Squeegee lifts	Broom remains ON
	Reverse	Brushes and water ON	Squeegee lifts	Broom remains ON

5. Program functions

Program code	Drive rheostat setting/ direction selector	Function with a given drive rheostat setting/direction selector		
		Brush head + water	Squeegee	Broom
6	Neutral	Brushes and water OFF, (1 second delay for brushes to prevent brushes from being turned OFF when switching from forward to reverse drive)	Squeegee lifts	Broom OFF and lifted
	Reverse	Brushes and water ON	Squeegee lifts	Broom OFF and lifted

5. Program functions

The water, brush or vacuuming function LED or the Hakomatik key (green key) is flashing if the selected function is turned OFF by the drive rheostat setting.

„ON“ always means ‘turned ON’ and ‘lowered’.

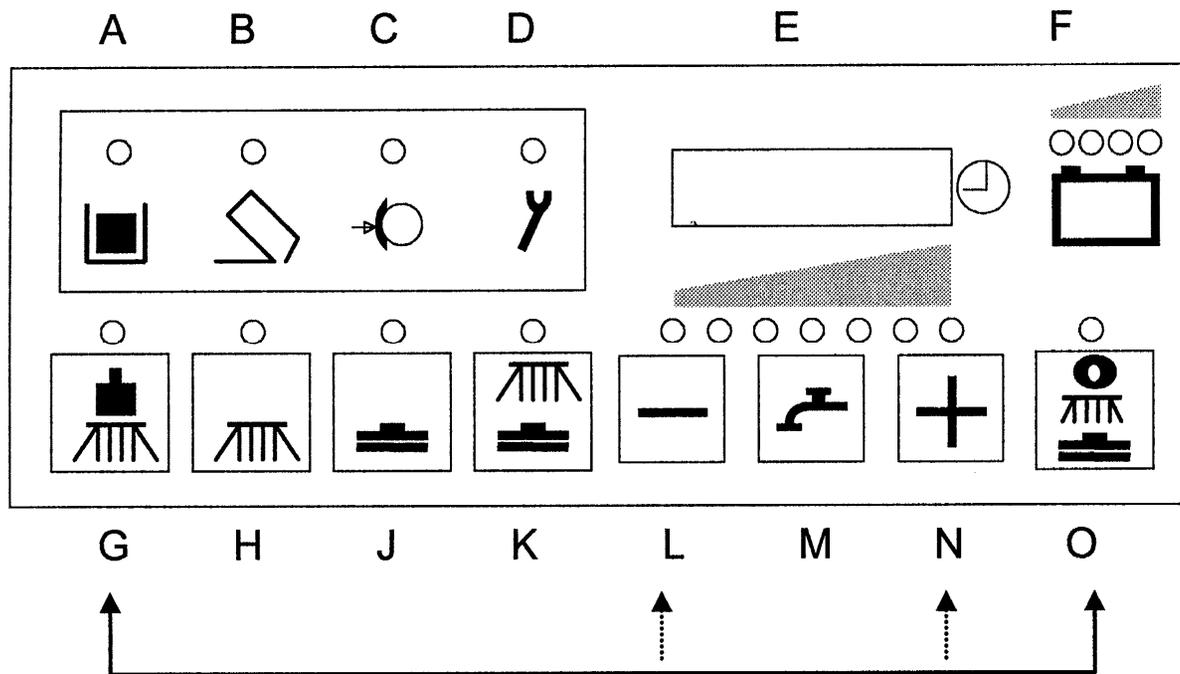
„OFF“ only means ‘turned OFF’, the ‘lifting’ action being mentioned in addition.

6. Particular settings according to the customer's requirements



(last error display and water stage selection, cleaning agent dosing, SWR, side brush, filter)

The settings described in this paragraph may be modified following the customer's requirements. The settings made in the factory must not be respected.



6. Particular settings according to the customer's requirements



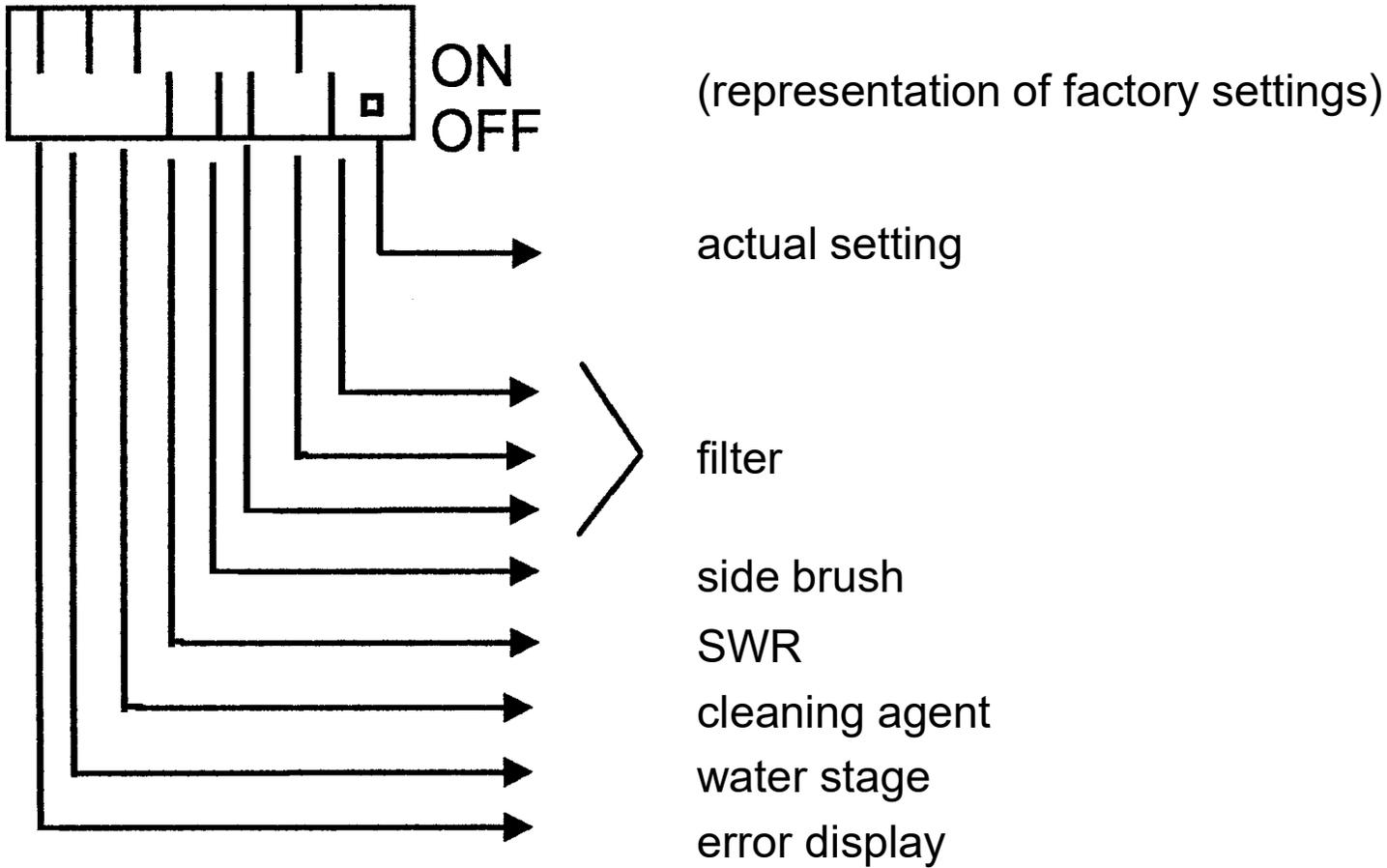
Entry in the programming step

1. Turn machine OFF with key switch
2. Depress „G“ and „O“ key the same time and hold, turn key switch ON.
3. Hold both keys until a number (software version) appears in the display, thereafter release both keys.

The following programmed settings will appear automatically in the display:

- last (eliminated) error display when turned ON: yes/no
- water stage when start cleaning: last selected stage / always middle stage
- cleaning agent ON when water ON: yes/no
- switchover to SWR when water ON: clean water / SWR
- side brush ON when „scrubbing“ ON: yes/no
- shake filter: intervals / as long as keys is depressed
- filter vacuuming ON when sweeping ON: yes/no
- automatic filter shaking when sweeping terminated: yes/no

6. Particular settings according to the customer's requirements



6.1 Display of last error

1. Select required setting with „L“ and „N“ keys.
2. The bar of the setting to be modified is flashing.
3. Move the bar up or down with „M“ key
Up = ON = error code (of last eliminated error) will appear for approx. 3 seconds in the display after turning ON
Down = OFF = error code (of last eliminated error) is not displayed.
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.2 Water stage when start cleaning



1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing
3. Move the bar up or down with „M“ key.
Up = ON = last selected stage is set
Down = OFF = middle stage is always set
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.3 Cleaning agent when turning water ON

1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing.
3. Move the bar up or down with „M“ key.
Up = ON = cleaning agent turned ON
Down = OFF = cleaning agent is not turned ON
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.4 Switchover to SWR when water ON



1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing.
3. Move the bar up or down with „M“ key.
Up = ON = switchover to soiled water recycling (SWR)
Down = OFF = switchover to clean water
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.5 Side brush when turning „scrubbing“ ON



1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing.
3. Move the bar up or down with „M“ key.
Up = ON = side brush turned ON
Down = OFF = side brush is not turned ON
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.6 Shake filter

1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing.
3. Move the bar up or down with „M“ key.
Up = ON = filter shaking as long as key is depressed
Down = OFF = filter shaking after turning ON with key three times in intervals
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.7 Filter vacuuming when turning sweeping ON



1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing.
3. Move the bar up or down with „M“ key.
Up = ON = filter vacuuming turned ON
Down = OFF = filter vacuuming is not turned ON
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

6.8 Automatic filter shaking when sweeping is terminated *Hako*

1. Select required setting with „L“ and „N“ key.
2. The bar of settings to be modified is flashing.
3. Move the bar up or down with „M“ key.
Up = ON = after at least 2 minutes sweeping the „shaking“ function is turned ON automatically when sweeping is terminated
Down = OFF = shaking is not turned ON automatically when sweeping is terminated
4. The setting is saved when the green key („O“ key) is pressed until the dot appears at the right bottom in the display.

7. Module Settings

The settings on the modules affects the electronic circuit protection value and the module coding.

7.1 Module 1 / Power electronic (A5)



The DIP switch settings on module 1 must be correct since they modify the electronic circuit breaker values for the lifting elements (brush head and squeegee).

DIP switch settings:

- 1: OFF
- 2: OFF

Circuit breaker values:

Brush head:	5.7 A
Squeegee:	5.7 A

7.2 Module 3 / Power electronic (A4 or A9)



The DIP switch settings on module 3 must be correct since they modify the module coding and the electronic circuit breaker values for the lifting elements (pre-sweep / side brush).

Module 3 Code A (for pre-sweep; A4):

1: OFF

2: OFF

3: OFF

4: OFF

electr. circuit breaker: 5.7 A

Module 3 Code D (for side brush; A9):

1: ON

2: ON

3: OFF

4: ON

electr. circuit breaker: 1.9 A

8. Control panel settings

The DIP switch settings for control panels code A and B (pre-sweep / side brush and cleaning agent / SWR) must be correctly coded.

Code A (pre-sweep / side brush; A2):

1: OFF
2: OFF

Code B (cleaning agent / SWR; A10):

1: ON
2: OFF

9. Water pump

For check purpose of the water pump function the voltage of the different stages can be measured on the control electronic module (A5:X2:6+7).
In case of measurement with the measuring device Fluke 87, water in tank but suction turbine turned OFF and without side brush, the result is:

stage 1: xxx V	(cannot be evaluated because of value variation caused by the pulses)	approx. 1.3 l/min
stage 2: 5.7 V		
stage 3: 7.4 V		
stage 4: 8.9 V		approx. 3.5 l/min
stage 5: 12.0 V		
stage 6: 14.7 V		
stage 7: 20.0 V		approx. 7.5 l/min

When not using the indicated measuring device the result may vary since the voltage is pulsed. The value depends on the battery voltage as well. In the present case the measuring was executed with loaded battery and three green LEDs alight.

10. Diagnosis LED for travel drive module



The LED is located on the travel drive module.

LED shows	Malfunction	Remarks
OFF	Travel drive module is inoperable	No power supply Check circuit breakers and wiring
ON	Travel drive module is serviceable	Travel drive module is ok
2 signals	Wrong start sequence	Check travel drive control and forward-reverse selector as well as wiring
3 signals	Output transistors do not trigger or contact with travel drive motor missing motor	Check drive motor and drive wiring and carbon brushes; if ok but still signals displayed replace travel drive electronic

10. Diagnosis LED for travel drive module



LED shows	Malfunction	Remarks
4 signals	Output transistors do not trigger or contact with travel drive motor missing	Check drive motor and drive motor wiring; check forward-reverse selector and direction contactors on travel drive control; if ok but still signals displayed replace travel drive electronic
5 signals	Output transistor defective	160 A fuse blown, check enabling signal of control electronic; check direction selector and direction contactors on travel drive control; if ok but still signals displayed replace travel drive electronic

10. Diagnosis LED for travel drive module



LED shows	Malfunction	Remarks
6 signals	Travel drive rheostat or wire broken	Check rheostat and wiring, loose contact (plug connectors) possible; check direction selector and travel drive rheostat
7 signals	Battery low less than 13 Volts	Measure voltage, check wiring
8 signals	Travel drive electronic overheated (70 °C or over)	Does travel drive respond smoothly? Parking brake setting ok? Did you perform an extended uphill ride? Operating current approx. 45 A

10.1 Signal measuring at the drive control



Check the following items with the drive control test. If the respective signal are not applied, the drive control does not work sufficiently.

In the circuit diagram the drive control is designed with A6 and supplied with 36V even if some signals are 24V signals.

The drive control is an impulse control using the pulsed voltage to activate the motor. In case of full speed in forward mode the battery voltage is applied to the motor.

1. Is fuse F51-160A okay?
2. Is battery voltage applied to drive control?
3. Is negative battery voltage applied to drive control?
4. Is battery voltage applied to A6-X51:2 after activation of key switch?

10.1 Signal measuring at the drive control



5. Is wiring between drive rheostat and drive control okay?

Voltage measuring

green at A6-X51:8 (approx. 8.6V)

red to A6-X51:9 (0-5V depends on rheostat position)

yellow to A6-X51:3 (approx. 0V)

Measured at negative battery pole.

Measurement of resistor (machine is switched off; rheostat is separated):

between green and red:	approx. 5.7 k Ω	decreasing to approx. 1.8 k Ω
between yellow and red:	approx. 1.8 k Ω	increasing to approx. 5.7 k Ω
between green and yellow:	approx. 4.0 k Ω	unchanged

Caution: the potentiometer has a nominal value of 4 k Ω \pm 20%. This means because of the tolerance of 20% Ohms-values from 3.2 k Ω to 4.8 k Ω can be reached. All other values will vary up to \pm 0.8 k Ω .

10.1 Signal measuring at the drive control



6. Is connection of A6:X51:3 and A1:X4:3&4 okay? Negative battery pole equally linked to A1:X4:3&4?
7. Is the negative battery pole linked to A1:X3:1?
Equally to S54:1? Is link between A1:X3:1 and S54:1 okay?
The closing direction contactors can switch the drive rheostat and the direction switch S53 only in case of connection of drive rheostat S54 and negative battery pole.
8. Is the connection between direction switch and drive control okay?
S53:B2 to A6-X51:4 for forward mode
S53:B4 to A6-X51:5 for reverse mode
9. Is connection between switch and control unit A1 okay?
S53:A2 to A1:X8:4
S53:A4 to A1:X8:2
10. Is 24V applied to A1:X8:4 if “reverse” mode has been selected?
11. Is 24V applied to A1:X8:2 if “forward” mode has been selected?

10.1 Signal measuring at the drive control



12. Is jumper wire in A1:X8 between pin 1 and 3 and 5 okay?
13. Do S53 (direction switch) and S54 (drive rheostat) switch correctly?
14. Is the negative battery pole applied to A6-X51:4 (drive rheostat switch must close) in “forward” mode?
15. Is the negative battery pole applied to A6-X51:5 (drive rheostat switch must close) in “reverse” mode?
16. Is the negative battery pole no longer applied to A6-X51:11 (signal for reducing speed) in “reverse” mode?
17. Is wiring between drive control and drive motor okay? Check each single wire and contact. If two wires contact via the crimp terminations → short-circuit.
18. Do the direction contactors switch? Apply voltage if necessary.
19. Test with diagnosis device.

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
1.2.5.2.	Thermal protector brush	Wire broken (break contact circuit)? Measure operating current (approx. 12 A max. for a motor operating without increased pressure and on Fama Famin floor) Motor overload caused by unfavourable floor-brushes combination and/or extended ride with increased brush pressure?
1.2.6.1.	Blocking protection brush motor	Check 35 A fuse Measure operating current (approx. 12 A max. for a motor operating without increased pressure and on Fama Famin floor) Motor overload caused by unfavourable floor-brushes combination and/or extended ride with increased brush pressure?

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
1.2.6.3.	Electronic circuit breaker lifting element brush	Jammed? Does lifting element moves up to dead stop before being switched off by micro switch? Check module coding module 1 Measure operating current (approx. 3.5 A when lifting)
1.3.5.1.	Thermal protector side brush	Jammed? Did you perform an extended ride along edge? Wire broken (break contact circuit)? Check 35 A fuse Measure operating current (approx. 8 A)
1.3.6.1.	Blocking protection side brush	Jammed? Did you perform an extended ride along edge? Wire broken (break contact circuit)? Check 35 A fuse Measure operating current (approx. 8 A)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
1.3.6.2.	Blocking protection lifting element side brush	Jammed? Does lifting element moves up to dead stop before being switched off by micro switch? Check module coding module 3 code D (A9) Measure operating current (approx. 1.2 A when lifting)
1.4.6.1.	Electronic circuit breaker lifting element squeegee	Jammed? Does lifting element moves up to dead stop before being switched off by micro switch? Check module coding module 1. Measure operating current (approx. 3.2 A when lifting)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
2.2.5.1.	Thermal switch of broom (and thermal switch of side broom motor if new version fitted)	Thermal switch of broom or of side broom motor open or incorrect wiring? Jammed? Measure operating voltage (approx. 9.5A max. on Fama-Famin ground for broom motor) Wrong sweeping track width? Broom not adapted to floor condition? For machines with new side broom version (Kit 105-736): Correct side broom adjustment? Jammed? Measure operating voltage (2.5A max. after approx. 10 min run) and approx. 100-110 rev./min

11. Error reference chart with information on service display **Hako**

Error code in display	Malfunction	Remarks
2.2.6.1.	Blocking protection broom	Jammed? Check 35 A circuit breaker Measure operating current (approx. 9.5 A on Fama Famin floor) Wrong brush mirror position)? Unfavourable floor-broom combination?
2.2.6.2.	Blocking protection lifting element broom	Jammed? Does lifting element moves up to dead stop before being switched off by micro switch? Check module coding module 3 Code A (A4) Measure operating current (approx. 9.5A when lifting)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
2.3.6.1.	Blocking protection side broom left	Correct side broom adjustment? Jammed? Measure operating voltage (2.5A max. after approx. 10 min run) and approx. 100-110 rev./min
2.3.6.2.	Blocking protection side broom right	Correct side broom adjustment? Jammed? Measure operating voltage (2.5A max. after approx. 10 min run) and approx. 100-110 rev./min

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
3.1.6.1.	Fuse module 1 (A5)	Check 10 A / 80 V fuse Check code for blocking protection lifting element for brushes or squeegee if indicated; Check water pump; When SWR check K2 and water pump (SWR); Check 35 A fuse Measure operating current of suction turbine (approx. 19.5 A for one motor)
3.1.6.2.	Fuse module 3 code A (A4; for pre-sweep)	Check all fuses (F4 - F7 (20 A / 80V) and F1 (10 A / 80 V); Check motors for filter vacuuming (F6) and shaking filter (F7), side brush right (F4) and left (F5)

11. Error reference chart with information on service display **Hako**

Error code in display	Malfunction	Remarks
3.1.6.6.	Fuse module 3 code D (A9; for side brush)	Check all fuses (F4 - F7 (5 A / 80V) and F1 (10 A / 80 V) Check water valve side brush
3.1.6.7.	Fuse control electronic	Check fuse 7.5 A / 32 V; Check connection cleaning agent block (A7:X2:2); to module 1 (A5:X1) to modules 3 (A4:X1 and A9:X1) and to the control panel cleaning agent / SWR (A10:X1:1) (broken wire, short-circuited etc.)

11. Error reference chart with information on service display **Hako**

Error code in display	Malfunction	Remarks
3.2.1.1.	LDS defective	Measure battery voltage on control electronic A1.X2:1 and 4 (even when machine turned OFF), if not okay, check wiring up to battery plug, check battery selector setting at Dip switch on control electronics module, if ok but still 3.2.1.1 displayed replace control electronics module
3.4.1.1.	Error travel drive control	Check drive rheostat and direction selector as well as wiring
3.4.5.1.	Thermal protector drive motor	Does travel drive respond smoothly? Parking brake setting ok? Did you perform an extended uphill ride? Wire broken (break contact circuit)? Measure operating current (approx. 40 A when cleaning)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
4.1.2.1.	Module 1 not recognised	Check fuse F1 (2 A / 32 V) check water valve brushes and SWR; check contacts and plugs; check power supply module 1 (voltage transformer)
4.1.3.1.	Module 1 no response (timeout)	Check fuse F1 (2 A/32 V); check CAN bus; check contacts and plugs; check resistance (120 Ω) (60 Ω by parallel circuit) check power supply module 1 (voltage transformer)
4.3.2.1.	Module 3 code A not recognised (A4; for pre-sweeper)	CAN bus connected? Check fuse F3 (2 A / 32 V) check contacts and plugs; Module code ok? (see Folie 44) check power supply module 3 (voltage transformer)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
4.3.2.4.	Module 3 code D not recognised (A9; for side brush)	CAN bus connected? Check fuse F3 (2 A / 32 V) check contacts and plugs; Module code ok? (see Folie 44) check power supply module 3 (voltage transformer)
4.3.3.1.	Module 3 code A no response; timeout (A4; for pre-sweeper)	CAN bus connected? Check fuse F3 (2 A / 32 V) Check contacts and plugs Module code ok? (see Folie 44) check power supply module 3 (voltage transformer)
4.3.3.4.	Module 3 code D no response; timeout (A9; for side brush)	CAN bus connected? Check fuse F3 (2 A / 32 V) Check contacts and plugs Module code ok? (see Folie 44) check power supply module 3 (voltage transformer)

11. Error reference chart with information on service display **Hako**

Error code in display	Malfunction	Remarks
4.5.2.1.	CAN control panel code A not recognised (for pre-sweep / side brush)	Check CAN bus to control panel pre-sweep/side brush; check contacts and plugs; check resistance (120 Ω); (60 Ω by parallel circuit) check module coding (see Folie 45)
4.5.2.2.	CAN control panel code B not recognised (for cleaning agent / SWR)	Check CAN bus to control panel cleaning agent/SWR; check contacts and plugs Check resistance (120 Ω); (60 Ω by parallel circuit) Check module coding (see Folie 45)
4.5.3.1.	CAN control panel code A no response; timeout (for pre-sweep / side brush)	Check CAN bus to control panel pre-sweep/side brush; check contacts and plugs; Check resistance (120 Ω); (60 Ω by parallel circuit) Check power supply of control panel (voltage transformer)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
4.5.3.2.	CAN control panel code B no response; timeout (for cleaning agent / SWR)	Check CAN bus to control panel cleaning agent / SWR; check contacts and plugs; Check resistance (120 Ω); (60 Ω by parallel circuit); Check power supply of control panel (voltage transformer)
4.6.1.1.	Internal CCU error (A1)	Check contacts of all connectors on control electronics module (particularly for corrosion); Check power supply (voltage transformer); Replace control electronics module

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
4.6.2.1.	CAN bus error (no response - timeout)	Check wiring CAN bus between control unit and modules check contacts and plugs Check resistance (120 Ω) (60 Ω by parallel circuit)
4.6.3.1.	CAN bus error (bus error)	Check wiring CAN bus between control unit and modules check contacts and plugs Check resistance (120 Ω) (60 Ω by parallel circuit)
4.6.3.2.	CAN bus error (overrun)	Check wiring CAN bus between control unit and modules check contacts and plugs Check resistance (120 Ω) (60 Ω by parallel circuit)

11. Error reference chart with information on service display *Hako*

Error code in display	Malfunction	Remarks
4.6.5.1.	Machine type setting incorrect	Check the machine type setting on Dip switch A on control unit A1 (see Folie 20)
4.6.5.2.	Set option impossible	Too many options set on DIP switch B (see Folie 21)? All modules linked via CAN bus?
4.6.5.3.	Too many modules in the machine	All options set on DIP switch B (see Folie 21)?

The values for the cleaning units always depend on the brush and broom characteristics as well as on the condition of the floor and its quality.
The values for the cleaning units always depend on the brush and broom characteristics as well as on the condition of the floor and its quality.