PowerBoss®
The Power of Clean

ADMIRAL 36

Service Manual

Training
Trouble Shooting
Adjustments

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Contents

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Contents

1. Note

Caution:

- Before working at the machine make sure to disconnect it (disconnect battery plug); except for cases of current and voltage measurement.
- When replacing the stripe fuses only loosen the screws. Do not remove them completely to avoid short-circuit hazard.
  Place the new stripe fuses completely i.e. evenly under the screws.
- Measure starting and operating voltage after any repair action to detect any eventual defect.
- The applicable safety and accident prevention regulations as imposed by law have to be respected when working at the machine.

2. General

The Hakomatic B910 uses a service display integrated in the hourmeter display. When turning the key switch ON, a 4-digit display will appear for about 3 seconds, describing the software version (e.g. 3012), another 4-digit display appears which repeats the last error, followed by the hourmeter display.

In case of malfunction during operation, a red error LED alights and a buzzer sounds. The actual error code (4-digit number with flashing dots) will appear in the service display. Only if these criteria are fulfilled the error is actual.
For detailed information on the error codes please refer to the error reference chart.

2.1 Settings

The following settings on the control unit/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 position

Settings via control panel which may be defined by the customer:

- display of the last (eliminated) error when turning the machine ON
- water stage selection when start cleaning

Settings on module 1:

- DIP-switch for electronic circuit breakers

2.2 Brief description

The following electronic modules control the machine:

- control unit
- module 1
- control panel
- sweeping block (option)

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 “reduce speed” signal in reverse drive and the “RED permanent light” LDS display 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 electronic.

2.2 Brief description

Apart from that no particular error code is transmitted to the drive control when an error occurs, since the drive control is equipped with an independent diagnosis display.

The keys for scrubbing, vacuuming, tool function and the green Hakomatic key for combined cleaning can be used autonomously, only the selected function being active. Irrespective of the selected cleaning mode the pre-sweeper may be turned ON or OFF if the tool function is not active. The “Tool” function is prior to all other cleaning functions.

2.2.1 Vacuuming OFF/soiled water tank full/tool operation

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 full" 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.

In tool operation the function is immediately turned OFF without delay.

2.2.2 Initial position of machine

After turning ON the machine and activation of the seat contact switch, all components are brought into “initial position”.
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 are turned OFF and the LEDs on the control panel extinguish.

The seat contact switch is connected to the electronic control module A1 at A1:X7:7+8.
The control module’s reaction to activation (opening) of the seat contact switch is delayed by 2 seconds i.e. if, during operation, the contact is opened for more than 2 seconds, the motors and brush head stop and the squeegee is lifted.
If the switch is closed again within this delay, operation is not interrupted.
If the machine is switched ON without the seat switch being closed or if the switch is opened for more than 2 seconds, the hourmeter of the control panel starts flashing. All functions (driving and cleaning) are now inhibited.
How to test the seat contact switch, its wiring and the module’s input by means of the diagnosis device: Under the code no. 3151 the switch status is displayed (open or closed) as detected by the module.

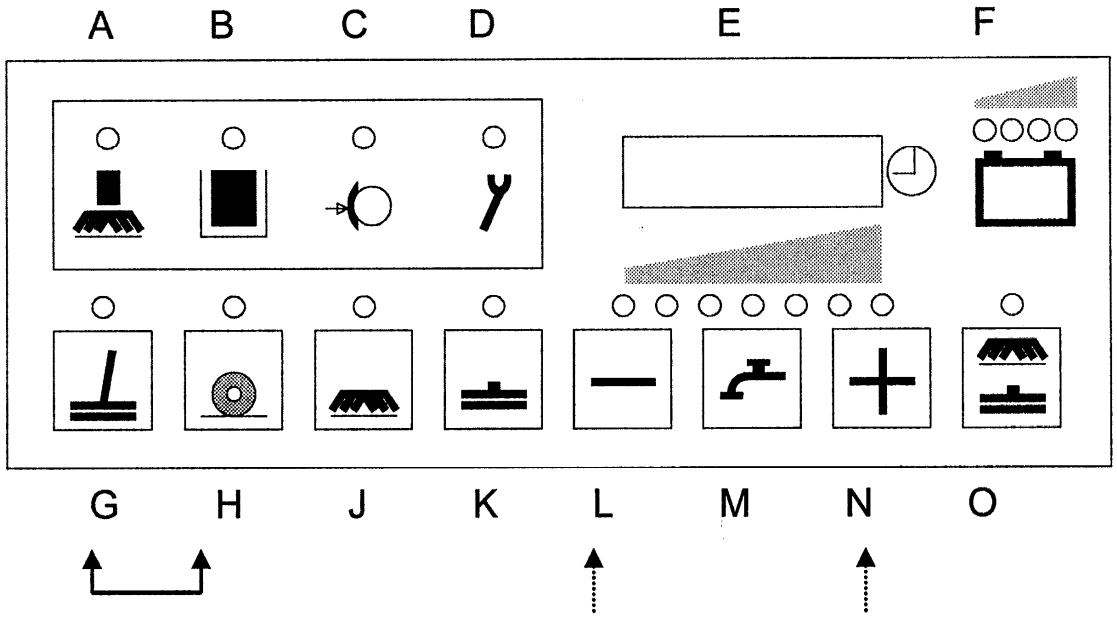
2.2.2 Initial position of machine

The drive control module is equipped with an individual diagnosis and self test function.
Operation of the drive control is thus inhibited if the machine is switched ON but the potentiometer is not in NEUTRAL position or its NEUTRAL position is not detected.
If the potentiometer attains its neutral position within 5 seconds after switching ON the machine, the drive control function is released.
If the potentiometer is not brought into its neutral position within this 5 second delay after switching ON, the machine has to be turned OFF and ON again before the drive control function is released.
The same procedure applies after the seat contact switch has been opened and closed again. The neutral position of the potentiometer is required as well when actuating the seat contact switch i.e. the drive control has to detect a neutral position of the potentiometer.
If the potentiometer position detected by the drive control is not neutral, the LED flashes. Refer to the chapter on drive control test.

3. Check and set machine type

Check and set machine type, LDS and options,view and delete last error

The settings described in this paragraph must by all means be checked and modified if necessary.



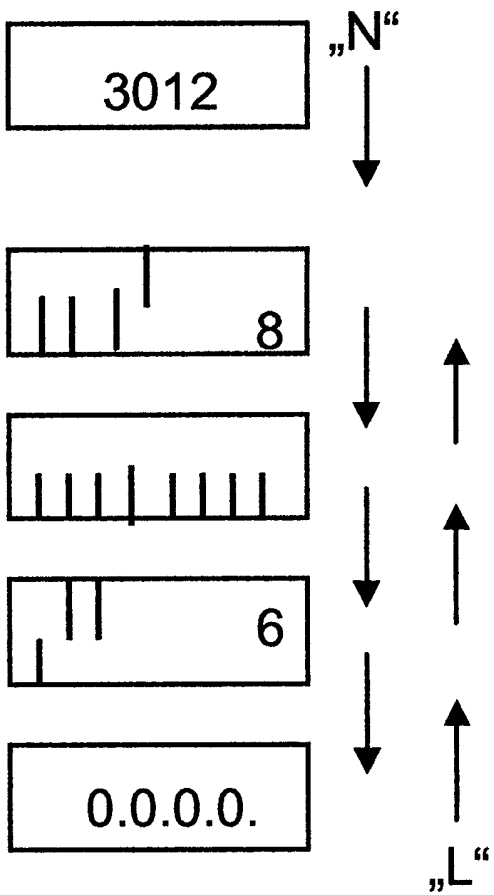
3. Check and set machine type

Entry in the programming step

1. Turn OFF machine with the key switch.
2. Depress "G" and "H" keys the same time and hold, turn ON with the key switch.
3. Hold both keys until a number (software version) will appear in the display, then 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 for display of previous codes.
Quit the session by turning key switch OFF.

3. Check and set machine type



Software version, next display appears automatically

Machine type setting: 8 stands for B 910

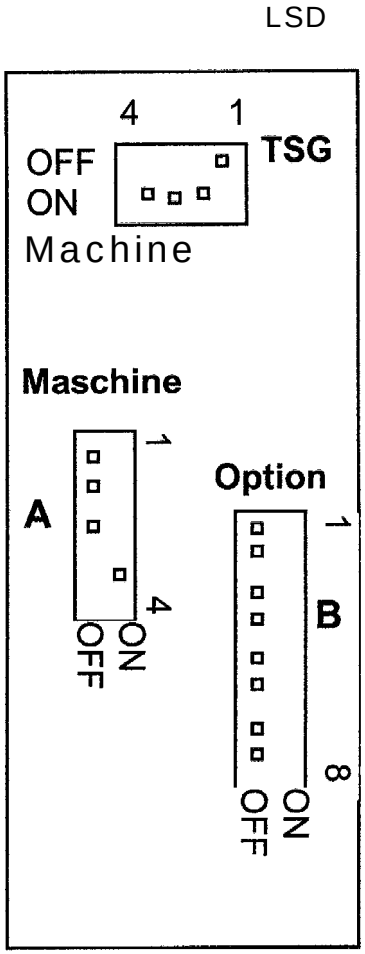
Option settings

LDS setting

Last error and reset

3. Check and set machine type

Control unit



3.1 Check and set machine type

1. Setting the correct machine type is absolutely necessary. To do so use the DIP-switch A on the control unit (see page 7).

2. For the B910 type the first three bars have to be positioned in the bottom line and the fourth bar in the top line. This setting results in the displayed number 8.

3. If the display does not correspond with these parameters, modify the DIP-switch combination.

   B 910
   1: OFF
   2: OFF
   3: OFF (= bars in bottom line)
   4: ON (= bar in top line)

3.2 Check and set options

1. The setting of all options on the DIP-Switch B of the control unit is absolutely necessary (see page 7)

2. The DIP-switches are assigned as follows:

   1 - 3: unassigned, i.e. “OFF”
   4: tool (set = “ON”)
   5:pre-sweeper (set = “ON”)
   6 - 8:unassigned, i.e. “OFF”

3. The option is set if the DIP-switch is ON. If not, -OP- is displayed when selecting the function on the control panel.

3.3 Check and set LDS

1. The LDS must be set to the correct battery type.
2. In the factory all machines are set for “GEL- Sonnenschein (maintenance-free)” batteries.
3. If different batteries are installed, modify the LDS setting as described below. Use the DIP-switch C on the control unit (see page 7)

The LDS is set following this chart

Displayed code →	**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	ON = 24 V					

3.3 Check and set LDS

“1” means ON; “0” means OFF

“Foreign” means all batteries **not** delivered by **Hako**

3.4 View and delete last error in display

Viewing

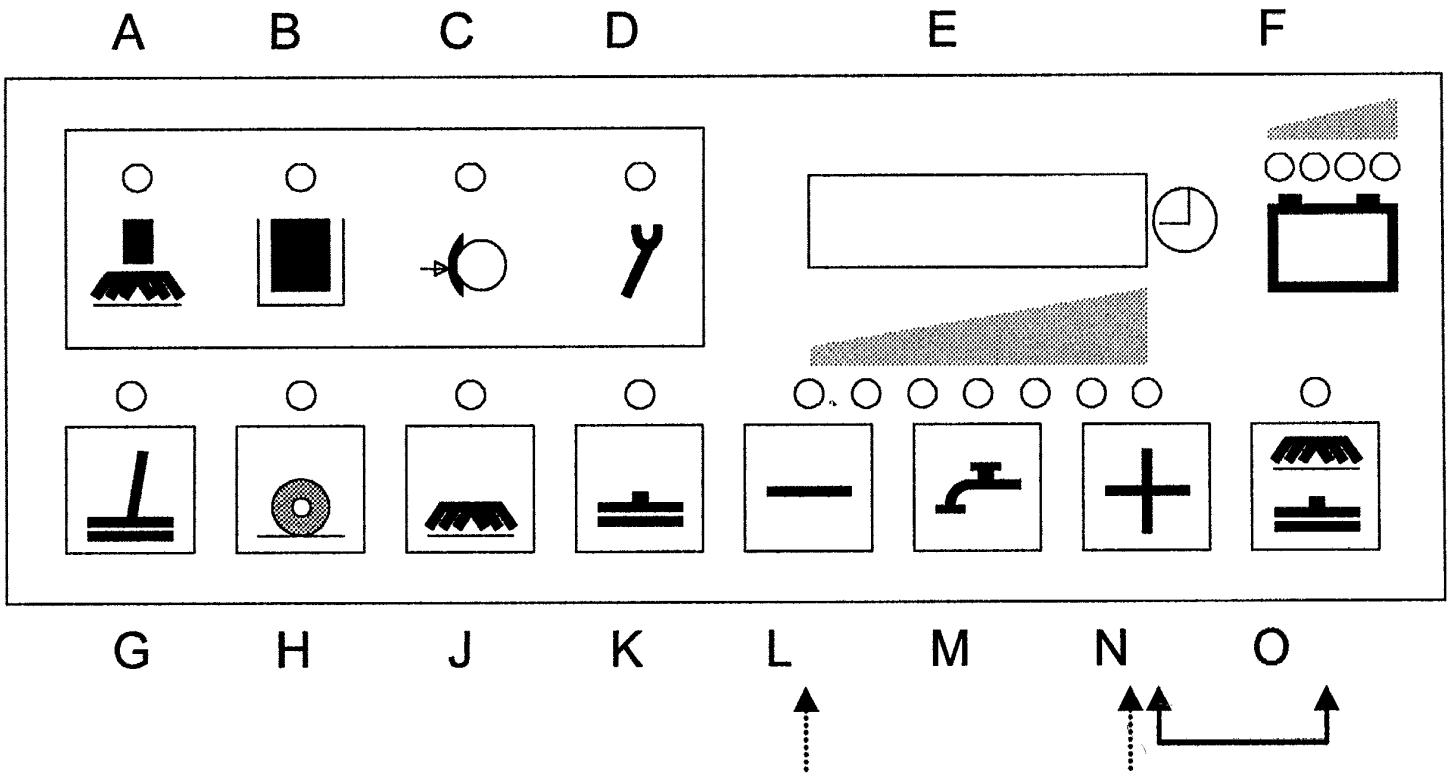
1. Depress “N” key three times, the 4-digit error code with flashing dots will appear (last eliminated error).
2. Quit the session by turning the key switch OFF (must not be executed when passing to “deleting”).

Deleting

1. Depress “G” key and hold until 0.0.0.0. is displayed
2. Release key, turn key switch OFF and ON.
3. 0.0.0.0. will appear (after display of software version) for approx. 3 seconds 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 various

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



4. Program various

Checking

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**	**Function with a given drive rheostat**	
		Brush head	**Squeegee**
1	Neutral	Brushes and water ON	Vacuuming remains ON
	Reverse	Brushes and water ON	Squeegee OFF + lifted

5. Program functions

Program code	Drive rheostat setting	Function with a given drive rheostat	
		Brush head	**Squeegee**
2	Neutral	Brushes and water ON	Squeegee lifted
	Reverse	Brushes and water ON	Squeegee OFF + lifted
3	Neutral	Brushes and water OFF	Vacuuming remains ON
	Reverse	Brushes and water ON	Squeegee OFF + lifted

5. Program functions

Program code	Drive rheostat setting	Function with a given drive rheostat	
		Brush head	**Squeegee**
4	Neutral	Brushes and water OFF brush head lifted (1 second delay for brushes to prevent brushes from being turned OFF when switching from forward to reverse travel)	Squeegee OFF + lifted
	Reverse	Brushes and water OFF brush head lifted	Squeegee OFF + lifted

5. Program functions

Program code	Drive rheostat setting	Function with a given drive rheostat	
		Brush head	**Squeegee**
5	Neutral	Brushes and water OFF (1 second delay)	Squeegee OFF + lifted
	Reverse	Brushes and water remain OFF	Squeegee OFF + lifted
6	Neutral	Brushes and water OFF brush head remains lowered	Vacuuming remains ON
	Reverse	Brushes and water remain OFF	Squeegee OFF + lifted

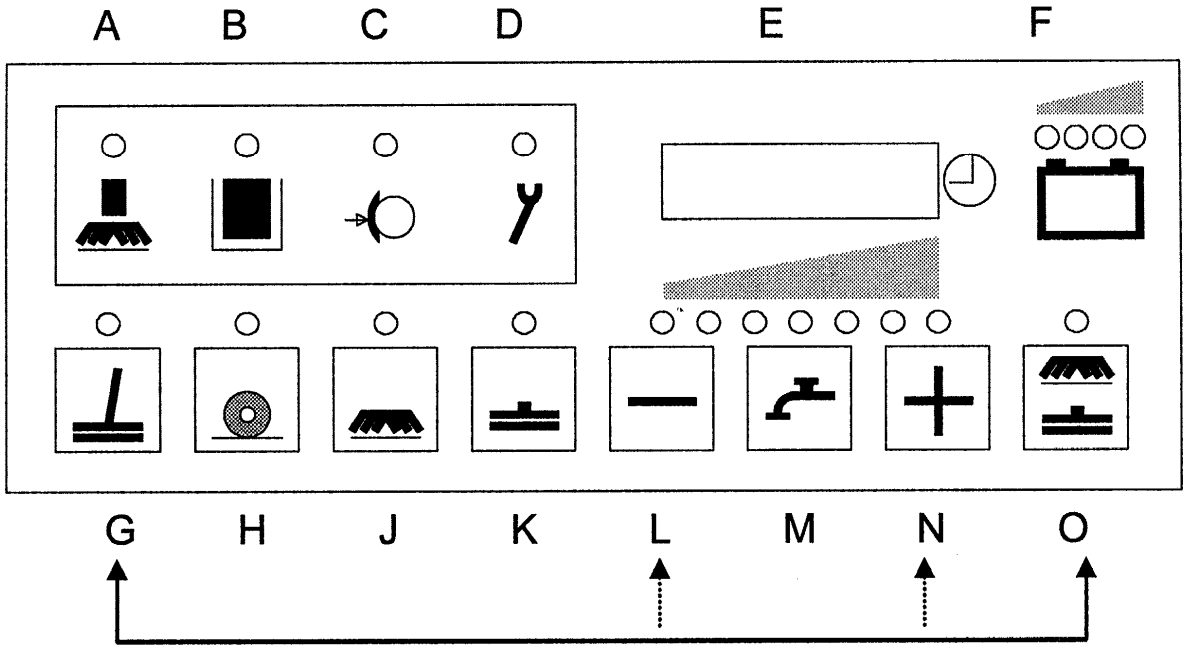
5. Program functions

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

“ON” means ‘turned ON’ and ‘lowered’.
“OFF” means ‘turned OFF’ only; the ‘lifting’ being indicated in addition.
“Squeegee OFF” means turned OFF with a delay of 15 seconds.

6. Particular settings according

Particular settings according to customer's requirements
(last error display and water stage selection)
The settings described in this paragraph may be modified following the customer's requirements. The settings made in the factory may be altered.



6. Particular settings according

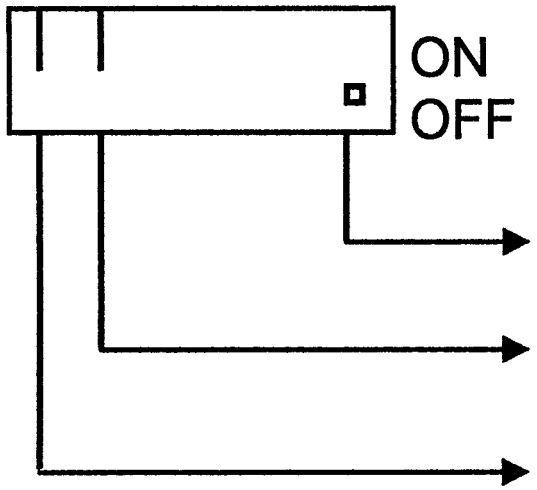
Entry in the programming step

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 dispay, 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 or always middle stage.

6. Particular settings according



actual setting

water stage

error display

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 eliminated error) will appear for approx. 3 seconds in the display after turning ON
   Down = OFF = error code (of eliminated error) is not displayed.

4. The setting is saved by pressing the green key (“O” key) 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” keys.

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 by pressing the green key (“O” key) until the dot appears at the right bottom in the display.

7. Settings on module 1/ Power electronic

The correct DIP-switch settings on module 1 are necessary since they have an influence on the electronic circuit breaker values for the lifting elements (brush head and squeegee).

DIP-switch settings:

1: OFF
2: ON

Circuit breaker values:

Brush head:	5.7 A
Squeegee:	1.9 A

8. Water pump

For check purpose of the water pump function, the voltage of the different stages can be measured on module 1 (A2:X2:6+7).
In case of measurement with measuring device Fluke 87, water in tank but suction turbine turned OFF, the result is:

stage 1: xxx V
(cannot be evaluated because of value variation caused by the pulses)
stage 2: approx. 4.5 V
stage 3: approx. 5.2 V
stage 4: approx. 6.4 V
stage 5: approx. 8.0 V
stage 6: approx. 11.0 V
stage 7: approx. 14.8 V

Proceed to measurement after the water pump has been completely connected!

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 LED’s alight.

8. Water pump

Furthermore, measurement of the water quantity is evident.
Turn the pump on and measure the water quantity delivered per minute.
In the operating instructions, the water quantity parameters are determined as follows:

Stage	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Water quantity l/ min	1,0	1,1	1,2	1,5	2,2	3,6	5,2
Water quantity (tool) l/ min	0,6	0,7	0,8	0,9	0,9	0,95	1,0

8. Water pump

If the correct voltage is applied at the pump but the water quantity does not correspond to the indications, check the hoses for being clogged or bent, the solenoid valve for complete opening and the valve plate diaphragms for their condition.

If incorrect delivery of the pump is caused by defects of the hoses at the brushes, the automatic standstill detection for water pump is activated.

8. Water pump

Automatic standstill detection for water pump:

The electronic module allows protecting the water pump in case of blocked delivery. I.e.: If the pump drains water from the tank but cannot deliver the water to the brushes the pressure at the upstream side of the pump increases. Without protective function of the module, the pump would continue delivery against the pressure. This procedure could damage the pump.
Due to the protective function of the module, however, blocked delivery of the pump is detected and the module automatically switches the pump off for 2 seconds. After these 2 seconds have elapsed, the pump is briefly switched on again and the module checks whether the pump now may deliver water or whether the water inlet at the brushes is still blocked.
If delivery is then possible, the selected stage of the pump remains ON. If delivery is still not possible and counter-pressure detected, the pump is switched off again for 2 seconds. This procedure is repeated until the defect is remedied.

9. How the drive control operates and its circuits

The drive control module is of the Curtis 1223 type and operates an individual LED for displaying an error. This diode is connected in the cable loom of the drive control module between the negative battery pole and the plug-in contact A4:X1:14. the LED is fastened to the cover and has to be unscrewed if the module is replaced.

The negative pole of the battery is constantly connected to BN(-) while the positive pole is constantly connected to BP(+) of the drive control module even if the key switch is turned off.
The drive control module is not yet operative since the release signal is still missing. After switching on the machine, the positive circuit of the battery is applied to the switching contact 30 of the K1 relay via the F5 fuse and the V3 diode to the A1:X4:3 contact of the control unit.

9. How the drive control operates and its circuits

Operation is released via the control unit A1 if the following conditions are met: the seat contact switch has closed and the machine is not in the active diagnosis mode. (Active diagnosis mode is only possible by means of the diagnosis device PN 105-021)
If released, a small relay on the control unit A1 closes the contact between A1:X4:3 and A1:X3:1. The positive battery circuit is then led to the contact A1:X3:1 which has contact with the coil of relay K1 as well. In this circuit, the coil of the K1 relay applies to battery voltage (24V) and the relay closes the switching contacts.
The positive circuit of the battery is thus led to the contact A4:X1:15 of the drive control module. This last step is the release signal for the drive control module.
The drive control then starts a self test which result either in a lighting LED (= operative) or, in case of error, a flashing LED.

The contact A4:X11:11 has to be within the positive battery circuit in order to have 100% of the speed at disposition.
The positive battery circuit is led from the switching contact of the K1 relay to the power electronic module A1:X3:3. If the relay located on the power electronic module closes the contact between A1:X3:3 and A1:X4:4 the positive circuit includes A4.X1:11 as well.

9. How the drive control operates and its circuits

As soon as this contact to A4:X1:11 of the drive control module is interrupted, only 50% of the speed can be used.
This may be the case if the battery is discharged (= red LDS) or the drive motor temperature is too high (thermal switch opened). Then, the small relay on the power electronic module will open the contact between A1:X3:3 and A1:X4:4 such that the positive battery circuit to the drive control module A4:X1:11 is interrupted.

The speed available for reverse drive amounts to 50% only. This percentage is regulated internally by the drive control module even if the positive battery circuit applies to A4:X1:11.

100% speed equals to 24V at the engine even if the battery voltage is a higher one.

If the machine is switched on but not moved for 25 minutes or longer, the drive control module switches the machine OFF automatically even if the seat contact switch has been continuously actuated. The machine has to be switched OFF and ON again before the drive control is operable.

The information on the travel drive direction comes from the drive control and is signalled to the power electronic module.

10. Diagnosis LED for travel drive control

The LED is located on the travel drive module
The signal is composed by 2 parts. In case of a 2,3 malfunction, the LED flashes twice, then pauses briefly, flashes three times and pauses longer. This signal is repeated until the malfunction is remedied.
Caution: If the ”Wrong start sequence” error applies for more than 5 seconds, the machine has to be turned OFF and ON again.

10. Diagnosis LED for travel drive control

LED shows	Malfunction	Remarks
OFF	AusTravel drive module is inoperable or LED efective	Check voltage supply for drive control (two terminals for B+ and B- each) Check fuses Does the release signal (B+) apply to A4:X1:15 ? Is LED wiring OK?
ON	Travel drive module is serviceable	Drive electronic module is operable If the drive motor does not turn round, check wiring of the drive motor (2 terminals for M1:P (=M2) and M1:N each)

10. Diagnosis LED for travel drive control

LED shows	Malfunction	Remarks
1,1	Control module defective or short-circuit in motor or motor cable	Check wiring of the drive motor (2 terminals for M1:P (=M2) and M1:N each)
1,2	Internal error of the drive control module or motor voltage error	Check voltage supply for drive control (two terminals for B+ and B- each) Check fuses Short-circuit between drive motor terminals (M1 or M2) and B+ or B-
2,2	Wrong start sequence (within the 5 second delay)	The drive rheostat is not in its neutral position when machine has been started or sat contact switch ahs been closed

10. Diagnosis LED for travel drive control

LED shows	Malfunction	Remarks
2,3	Wrong start sequence (within the 5 second delay)	The drive rheostat is not in its neutral position when machine has been started or seat contact switch has been closed; drive control module is not operable before the machine has not been turned OFF and ON again.
2,4	Connection A4:X1:4 defective	Check jumper between A4:X1:1 and A4:X1:4
3,3	Drive rheostat error	Check drive rheostat and its wiring. Check wiring to B+ or B- for short-circuit Correct type of drive rheostat?

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10. Diagnosis LED for travel drive control

LED shows	Malfunction	Remarks
4,1	Battery low	Check battery voltage at the drive control module (20V min.) Check wiring
4,2	Excessive battery voltage	Check battery voltage at the drive control module (max. 36V) Check battery type
4,3	Excessive temperature of drive control module	Overload? Incorrect installation of the module? Extreme ambient conditions? Measure current consumption (max. 22A in operation)

10.1 Signal measuring at the drive control

Check the following items when testing the drive control. If the respective signals are not applied the drive control does not work sufficiently.
In the circuit diagram the drive control is designed with A4.

1. Even if the key switch is still OFF, a voltage can be measured at the drive control module at BP(+) and BN(-)

2. Are the fuses F2 , F5 and the diode V3 OK?

3. Is the connection of the diagnosis LED OK?

4. If the key switch is in ON position and the seat contact switch is closed, B+ has to apply to A4:X1:15 (release)
   If not, check the following:
   - Is the K1 relay triggered and does K1 close the switching contact?
   - Does B+ apply to A1:X4:3 for triggering the relay and is the signal switched through to A1:X3:1?
   - Are the wires and terminals in good condition?

10.1 Signal measuring at the drive control

5. Is the drive rheostat OK? Is the jumper between A4X1:1 and A4:X1:4 OK?
   Drive rheostat: 6kΩ ± 15 %
   Neutral: approx. 3 kΩ
   Forward: approx. (300-330) Ω
   Reverse: approx. 6kΩ

6. Is connection between drive control module contact A4:X1:13 and power electronic module contact A1:X8:4 and between A4:X1:7 and A1:X8:1 OK?

10.1 Signal measuring at the drive control

7. Does B+ apply to A4:X1:11 in order to attain 100% of the speed?
   If not check the following:
   - Is the LDS red or the thermal switch of the drive motor opened (drive motor temperature too high)? In this case a reduced speed is required and B+ must not apply to A4:X1:11.
   - Is the K1 relay triggered and does K1 close the switching contact?
   - Does B+ apply to A1:X4:3 for triggering the relay and is the signal switched through to A1:X3:1?
   - Are the wires and terminals in good condition?
   - Does B+ apply to A1:X3:3 after the switching contact has closed and is the signal switched through to A1:X4:4?

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11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
1.2.5.2.	Thermal switch brush motor	Brush motor fan ok? Wire broken (break contact circuit)? Measure operating current (34 A max. Do not exceed 30 A during operation to avoid overload caused by uneven floor surfaces.) Check carbon brushes
1.2.6.1.	Block protection brushes, electronic circuit breaker or fuse	Measure operating current (34 A max. see code 1.2.5.2.)

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11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
1.2.6.3.	Electronic circuit breaker lifting element brushes	Jammed? Brush spring load too high? Measure operating current
1.4.6.1.	Electronic circuit breaker lifting element squeegee	Correct setting of DIP-switch on module 1/power electronic A2? Jammed? Measure operating current
2.2.5.2.	Fuse broom	Correct setting of DIP-switch on module 1/power electronic A2? Measure operating current (max. 7-8A)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
2.2.5.3.	Thermal switch broom	Broom jammed? Wire broken (break contact circuit) Measure operating current (max. 7-8A)
3.1.6.1.	Fuse module 1/power electronic A2	Check 10 A / 80 V fuse If the code for blocking protection of lifting element for brushes or squeegee is indicated as well check them; check water pump and valve.

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
3.1.6.7.	Fuse control unit A1	Check 7.5 A / 32 V fuse Check connection with pre-sweeper electronic (A1:X1:1 and A5:X1:2) (broken, short-circuited etc.)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
3.2.1.1.	LDS defective	Measure battery voltage on control electronic A1.X2 PIN 1 and 4 (even when machine turned OFF), if voltage is not ok check plug contacts for corrosion etc. and cable connection up to battery plug; check Dip-switch setting of battery selector if voltage and connection are ok replace control electronic

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
3.4.5.1.	Thermal switch drive motor	Is drive motor fan OK? Does travel drive respond smoothly? Parking brake setting ok? Did you perform an extended uphill ride? Wire broken (wiring to thermal switch or connectors badly plugged? Measure operating current (approx. 20 to 22A max.)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.1.2.1.	Module 1/power electronic A2 not recognised	Check connection between control electronic and module 1, Check control electronics module A1:X10:PIN1 and PIN2 to module 1 (A2:X22:PIN1 and 2); check voltage supply of module 1 if ok first replace control electronic then module 1

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11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.1.3.1.	Module 1/power electronic A2 no response (timeout)	Check connection between control electronic and module 1, Check control electronics module A1:X10:PIN1 and PIN2 to module 1 (A2:X22:PIN1 and 2); check voltage supply of module 1 if ok first replace control electronic then module 1
4.6.1.1.	Internal control unit (A1) error	Check contacts for corrosion and plugs, check voltage supply, if ok but still error code displayed replace CCU

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.6.2.1.	CAN bus error (no response - timeout)	Check 2 A / 32 V circuit breaker of control electronics module, check wiring between A1:X10:PIN 1 and PIN 2 and module 1 (A2:X22:PIN 1 and 2) as well as the contacts and plugs, check voltage supply of module 1 and control electronics module; check resistances (120 Ω) (60 Ω caused by parallel connection)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.6.3.1.	CAN bus error (bus error)	Check wiring between control electronics module A1:X10:PIN 1 and PIN 2 and module 1 (A2:X22:PIN 1 and 2) as well as the contacts and plugs, check voltage supply of module 1 and control electronics module; check resistances (120 Ω) (60 Ω caused by parallel connection)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.6.3.2.	CAN bus error (overrun)	Check wiring between control electronics module A1:X10:PIN 1 and PIN 2 and module 1 (A2:X22:PIN 1 and 2) as well as the contacts and plugs, check voltage supply of module 1 and control electronics module; check resistances (120 Ω) (60 Ω caused by parallel connection)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.6.5.1.	Wrong machine type setting	Check machine type setting at DIP-switch A on control unit A1 (see page 7 and 8)
4.6.5.2.	Set option impossible	Too many options set at DIP-switch B on control unit A1 (see page 7 and 8)? Check machine type setting at DIP-switch A on control unit A1 (see page 7 and 8)

11. Error reference chart with information on service display

Error code in display	Malfunction	Remarks
4.6.5.3.	Too many modules in the machine	Have all options been set on DIP-switch B on control unit A1 (see page 7 and 8) Check machine type setting at DIP-switch A on control unit A1 (see page 7 and 8)

12. Pre-sweeper: how to install the electronic and set options

If a machine is equipped with a pre-sweeper the supplied electronic has to be installed as well.

- Install electronic on the right below the control panel electronic and connect wires (plug A5:X1 and A5:X2).
- Mount circuit breaker (F3) in the at the front left and wire.
- Install pre-sweeper and connect broom motor (plug X2).
- Check lighting of the red LED on the electronic when the machine is turned ON. In this case the polarity of the connection is reversed and must be modified. Otherwise check the option setting.

12. Pre-sweeper: how to install the electronic and set options

Correct polarity

- Turn machine ON and check X1 PIN 1 for positive and PIN 2 for negative battery connection (always contact to negative pole in the machine)
- If not ok, modify wiring at pins (PIN 1 and 2) and check again. Thereafter check the option settings.

Setting options

- The DIP-switch B of the control unit defines the “pre-sweeper” option (see page 8)
- Switch No. 5 in ON position
  Check as described in chapter 3.2.