

# Sweepmaster B 800 R

(6400.20)

Schulung / Training  
Fehlersuche / Trouble  
Shooting  
Einstelltdaten / Adjustments  
Baukomponenten/Zulieferer  
Components/Suppliers



From may 2014 the machine names are changed. The „old“ name Jonas for sit-on sweepers is changed into Sweepmaster for all sweepers. The differentiation which machine is it exactly is done by the indication of kind of drive, sweeping width and operation concept (close to the old Hakomatics). In this training manual are the old names used. Here a comparison of the „old“ and „new“ names for this machine.

**Jonas 800 E**

**Sweepmaster B 800 R**

P means petrol-/gasoline-, D means diesel- and B stays for battery-model. The LP driven machines are still an option and didn't have an own name. The R means, it's a sit-on machine and the H stays for high dump.

## Contents

<b>1.0</b>	<b>General Description</b>	<b>3</b>
<b>2.0</b>	<b>Technical Data</b>	<b>7</b>
<b>3.0</b>	<b>Design and Mechanics</b>	<b>11</b>
3.1	Operation	12
3.2	Cylindrical Broom and Side Broom	13
3.3	Dust Hopper und Dust filter	16
3.4	Steering	17
3.5	Brake	18
3.6	Electric Drive	20
<b>4.0</b>	<b>Electric</b>	<b>25</b>
4.1	Electrical description	26
4.2	Electric Box	28
4.3	Drive Controller	30
4.4	LDS	34
4.5	Charger	36
<b>5.0</b>	<b>Service</b>	<b>38</b>

# 1.0 General Description



The Jonas 800E is, at the moment, the smallest sit-on sweeper of Hako. It is a combination of the Hamster 800 and the Jonas 900. The sweeping unit (sweeper, dust extraction, filter and hopper) is taken from the actual Hamster 800E. The drive, and the view (optic) is from the Jonas 900E.



The Jonas 800 is only existing in the electric version. As options it has a left side broom (factory only) and a flash light. At the moment the carpet option is still in discussion.

## **2.0 Technical Data**

		<b>Jonas 800E</b>
<b>Dimensions and weights</b>		
Length with Side Broom	mm	1282
Width without Side Broom	mm	818
Width with 1 Side Broom	mm	908
Width with 2 Side Brooms	mm	998
Hight bove Steering Column	mm	1237
Turning Radius	mm	1580
Basic Weight (incl. Battery)	kg	285
Total Weight	kg	450

<b>Driving- and Sweeping Performance</b>		
Drive Speed forward	Km/h	6
Wheel Rotation Speed on max. Speed	1/min	127
Drive Speed revers	Km/h	4
Wheel Rotation Speed on max. Speed	1/min	85
Sweeping Width without / with Side Broom	mm	670 / 890
Sweeping Width with 2 Side Brooms	mm	1110
Teoretical. sweeping Performance with 1 / 2 Side Brooms	m <sup>2</sup> /h	5340 / 6660
Climbing Ability	%	16 (1/min)

<b>Filter System</b>		
Filter area	m <sup>2</sup>	1,4
Plate Filter	Stk.	1
Flow Rate	m <sup>3</sup> /h	306
Low Pressure	Pa	126



<b>Jonas 800E</b>		
<b>Cylindrical Broom</b>		
Length / Diameter	mm	670 / 250
Wear Limit Diameter	mm	200
Rotation Speed	1/min	500
Sweeping Mark	mm	45 +/-10
Number of Bristle Array (2 Half-Shell)	Stk.	each 10
Standart Bristles		K901

<b>Distance Seal Face (Broom Area)</b>		
left / right / rear	mm	2 / 2 / 2
front close / open	mm	0 / 40

<b>Side Broom</b>		
Diameter	mm	400
Bristle Length	mm	150
Wear Limit / Length of Bristlle	mm	70
Rotation Speed	1/min	100
Standart Bristles		PES

<b>Dust Hopper</b>		
Hopper Volume	l	2 x 25

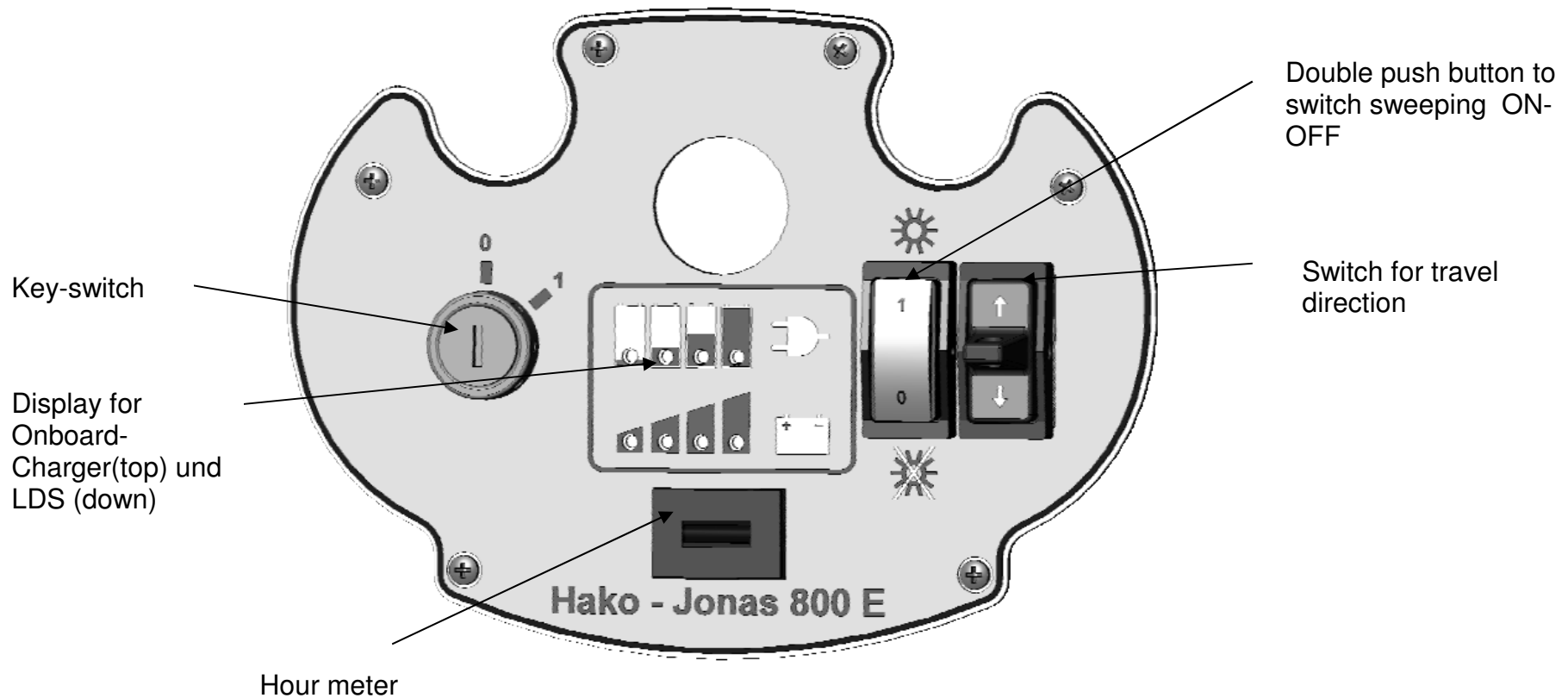
<b>Wheels</b>		
Front Wheel (Drive)	Amer	Adiprene red
Rear Wheels	Blickle	Gummiblend SG65A
Spec. Wheel Pressure Front / Rear l. / Rear r.	N/mm <sup>2</sup>	54 / 57 / 48

<b>Electrical System</b>		
Battery	V / Ah	2x 12/105
Total Power	KW	1,5
Power Drive Motor	W	600 (60min)
Current Consumption Driving Plane Area / 16% Climbing	A	7 / 60
Power Sweeping Drive	W	600
Current Consumption Sweeper and Dust Extraction	A	16
Current Consumption Sweeper + Side Br.. + Dust Extr.	A	16,5
Total Current Consumption on Sweeping	A	25

<b>Noise Emission Level</b>		
Noise Pressure Level according DIN IEC 60335-2-72	dB(A)	66
Sound Power Level according DIN IEC 60335-2-72	dB(A)	82

## **3.0 Design and Mechanics**

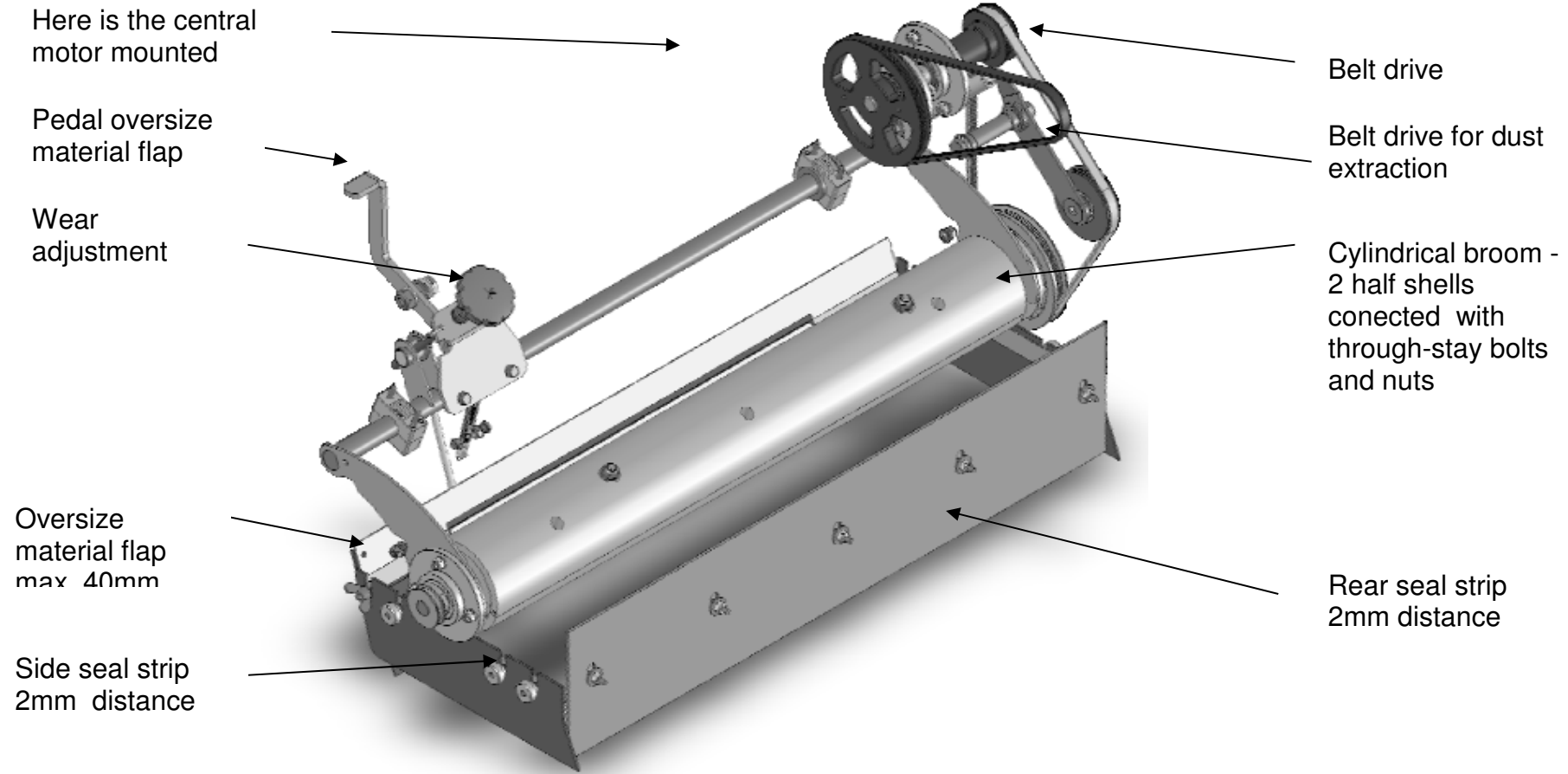
## 3.1 Operation



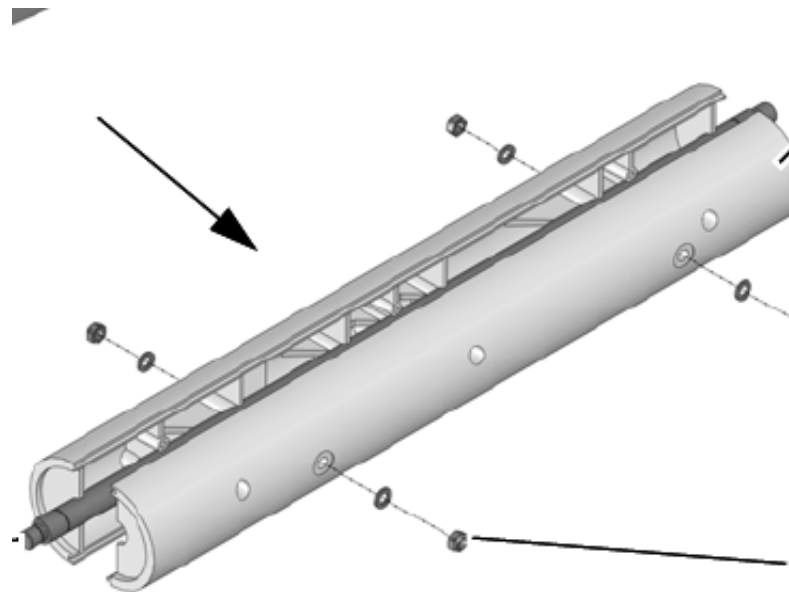
The travel pedal is right of the steering column. The brake pedal, and the park brake lock, is left. Also the pedal for the oversize material flap is on the left side, close to the seat console.

## 3.2 Cylindrical Broom and Side Broom

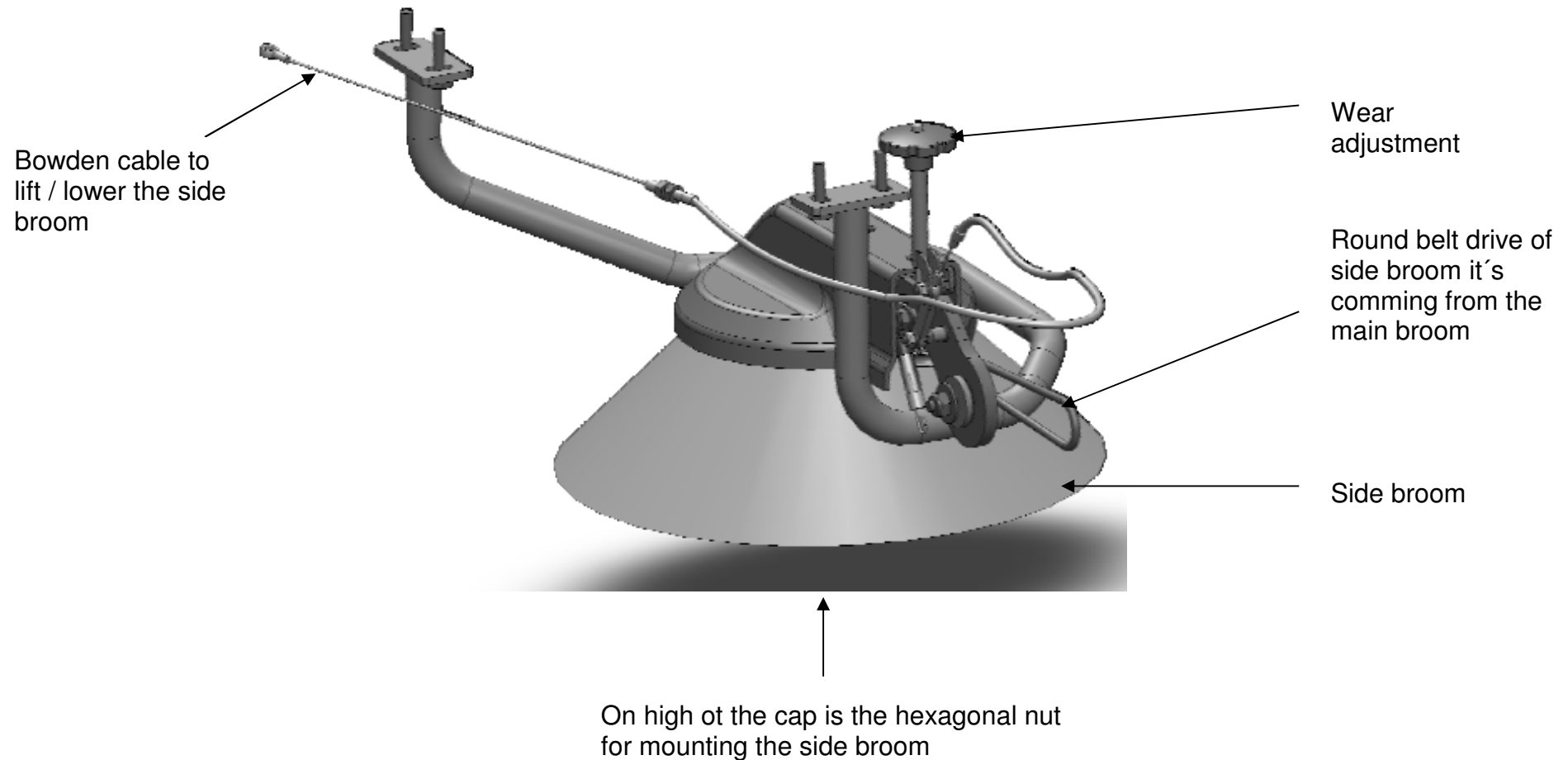
The sweeping unit is taken from the Hamster 800.



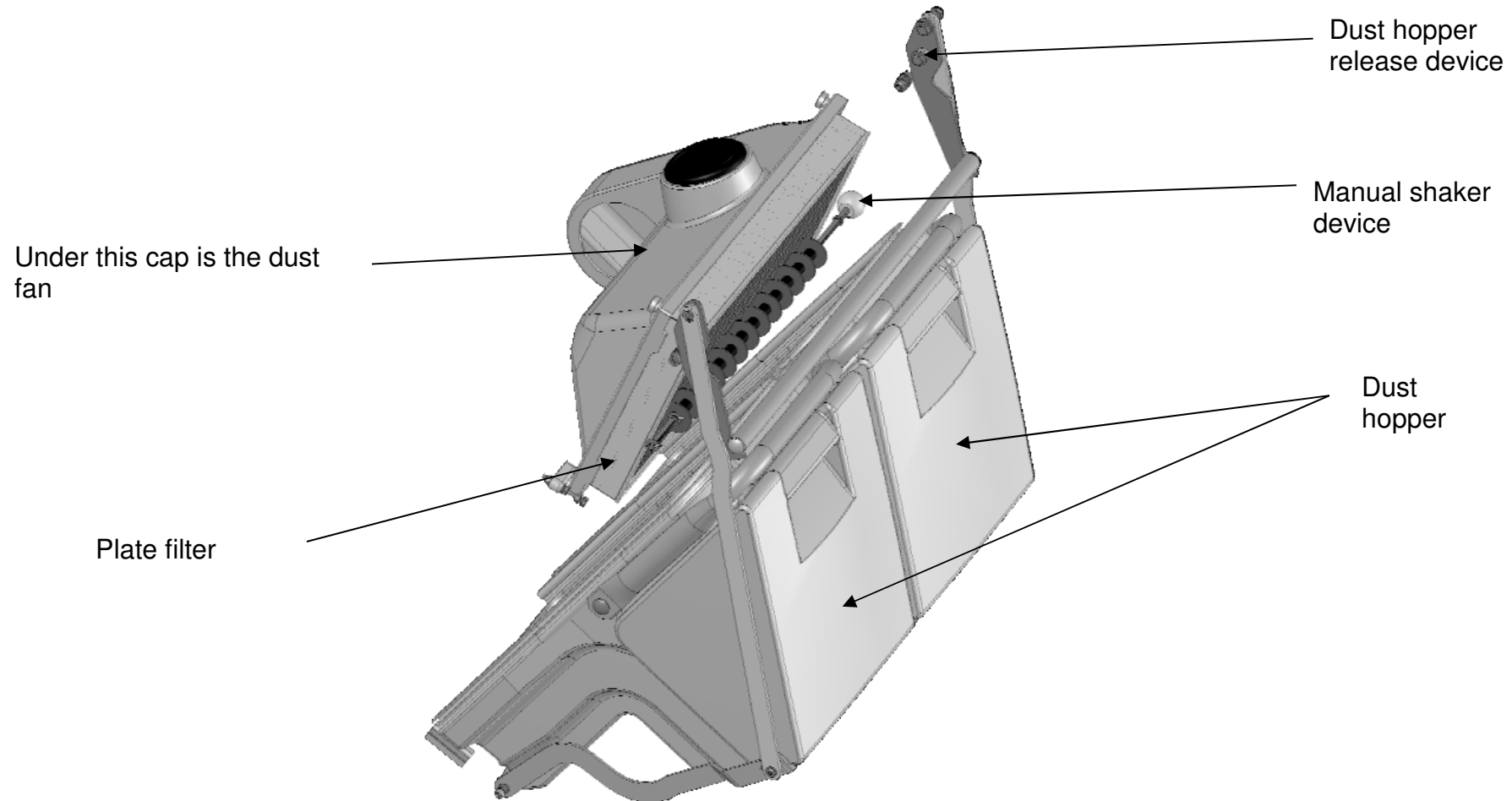
The main broom isn't lowered for the operation; that means the broom is always with ground contact (also in transport). The material is K901. To change it you have to remove both dust hoppers. After this you could reach through the rear helical tunnel. There you loose the nuts of one cylindrical half shell. Then you have to „manoeuvre“-out the shell. After this turn the broom about 180°. Then you could remove the second half shell. The assembly follows the opposite sequence.



The side broom is also from the Hamster 800. The material is PES. The changing is much easier as you only have to loose a hexagonal nut.



### 3.3 Dust Hopper and Dust Filter



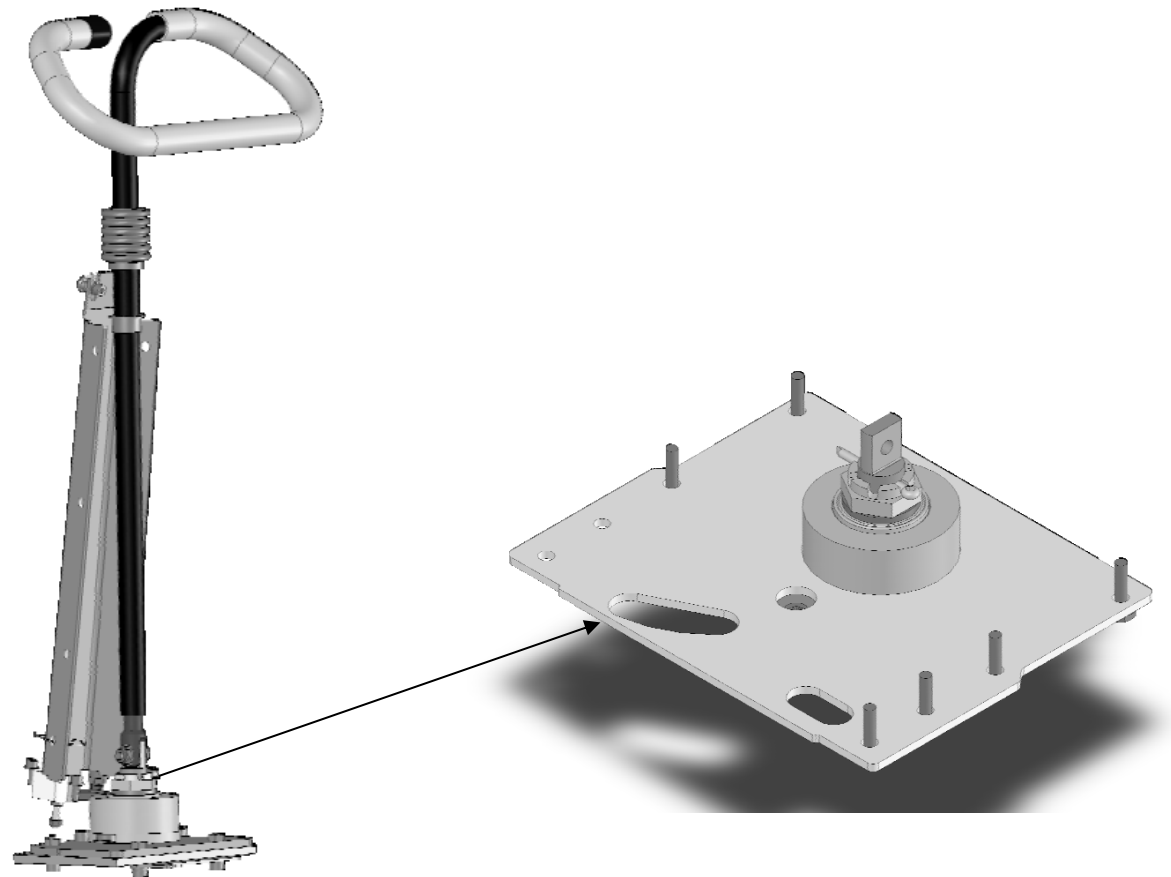
To reach the fan and the plate filter you have to open the seat cover and then remove the cap.



## 3.4 Steering

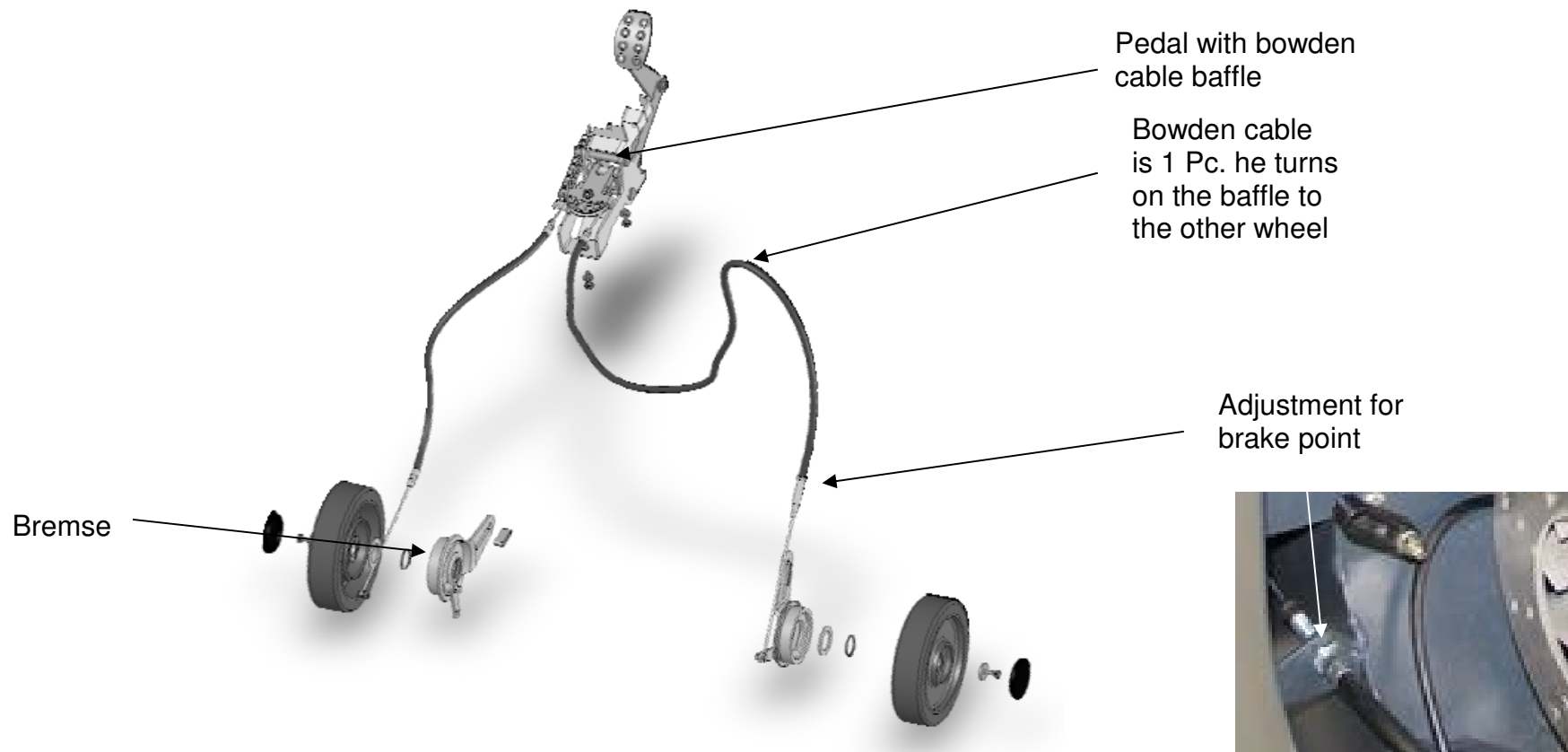
The steering link operates directly to the carrier plate where the electric drive is mounted. To adjust the tapered roller bearings follow this instructions:

- Tight nut with 60Nm
- Loose nut after it
- Turn wheel about 90° to the left and right
- Tight nut with 5Nm
- If the bores for the cotter pin doesn't fit turn till they fit.
- Mount the cotter pin



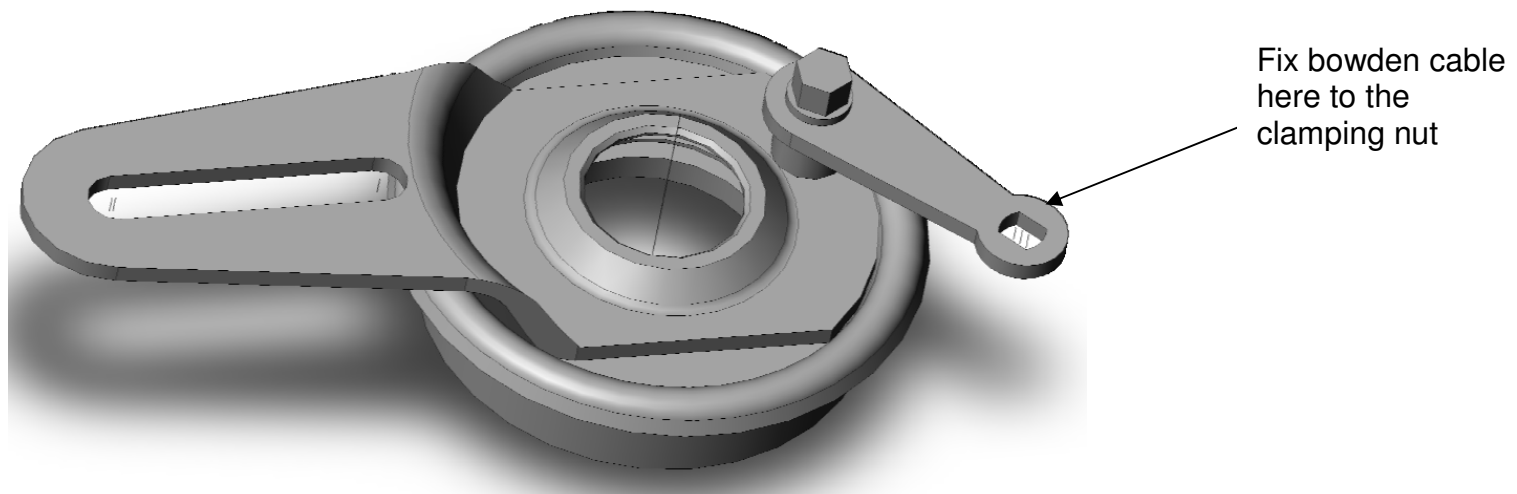
## 3.5 Brake

The brake operates mechanically via the bowden cable to the rear wheels. The park brake interlock the brake pedal in the brake applied position.



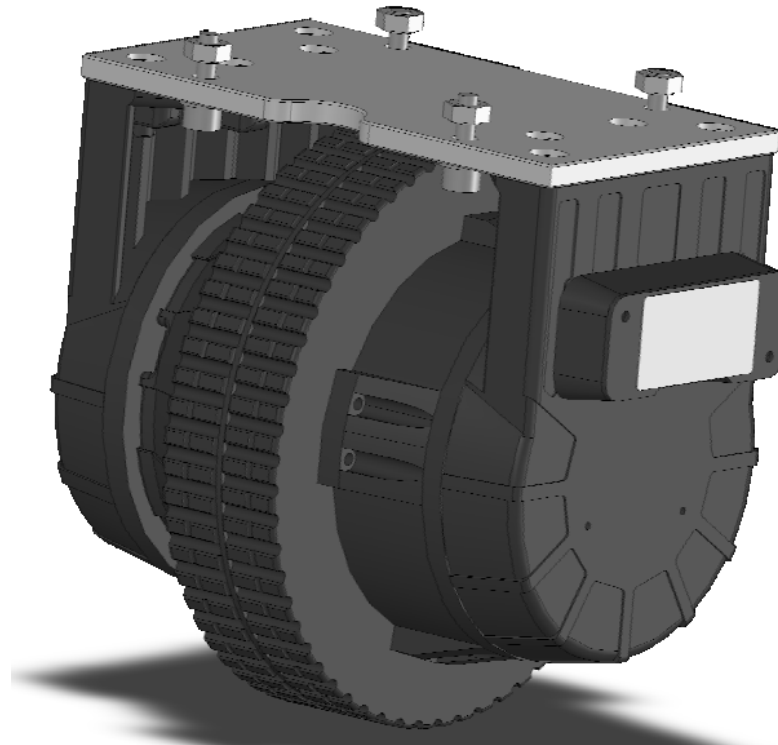
The following steps are required to assemble the bowdencable and to adjust the brake:

- The cable coating of the bowden cable remains in the machine
- Contrive the cable into the cable coating on one side and fix it to the clamping nut (overlap for appr. 10mm)
- Guide cable around the deflection roller and contrive it to the second part of the cable coating
- Tight pull-out the cable and fix it to the other clamping nut.
- Over lap the end (appr. 10mm) and cut the rest.
- The wheel have to turn barley at open brake, if not adjust the lenght of the bowden cable.
- For this turn the lenght adjusting screw (on R.H. side: close to the dust fan) by loosening the lock nut and turning of the other one. Therefore a 90° angulate SW17 wrench is helpfull.



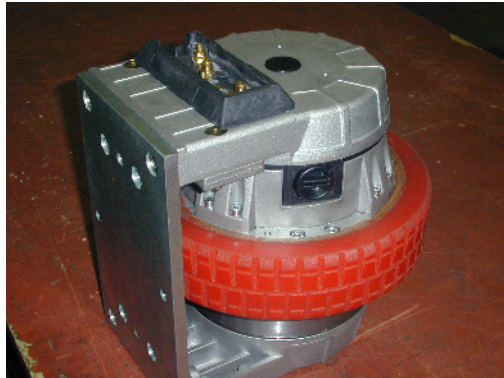
simple drum brake

## 3.6 Electric Drive



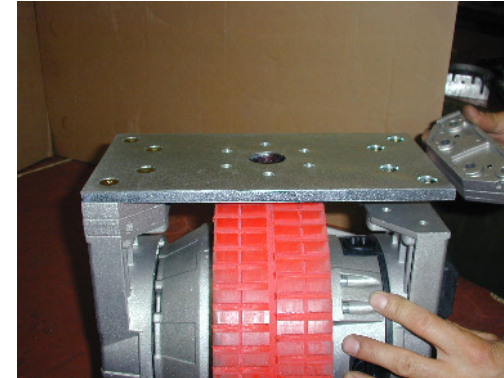
The travel drive is complete incl. wheel from AMER. For spare part supply we have some single parts of it in stock.

Steps to be executed for wheel changing



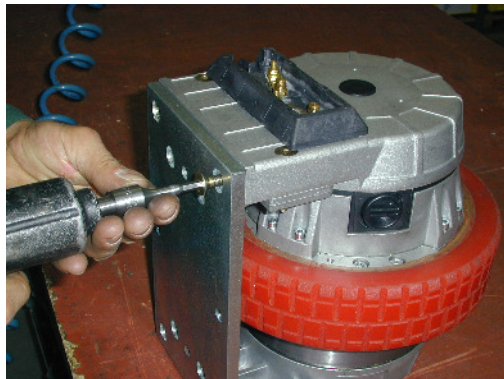
1.

Dismount drive unit at the separation point between the wheel support plates



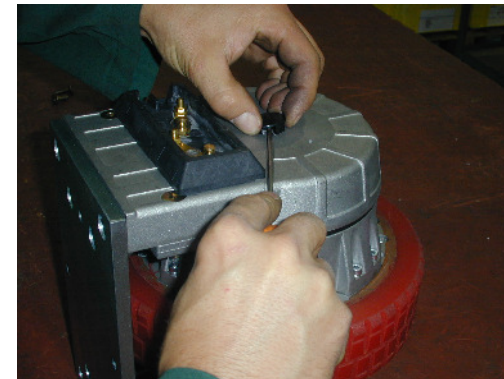
3.

Remove holder between the plate and the brush flange



2.

Loosen fixing screws of plate and holder



4.

Remove the lateral sealing plug



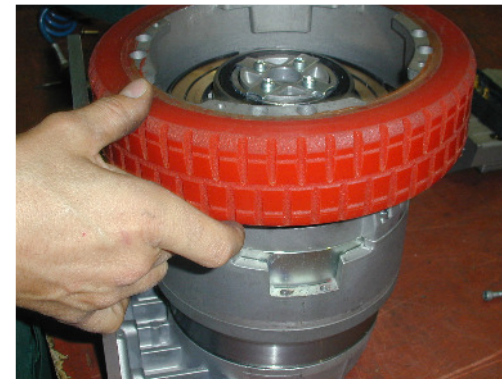
5.  
Pull brush flange off the engine axle



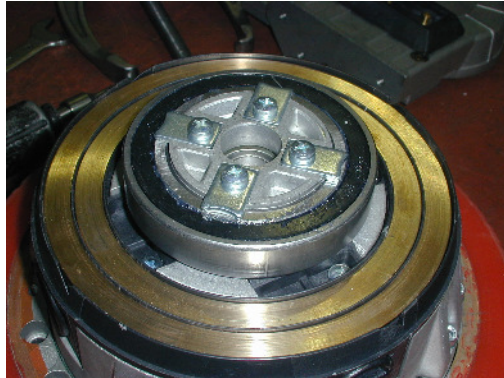
7.  
Loosen wheel bolt (8x)



6.  
Remove brush flange



8.  
Pull off tyre



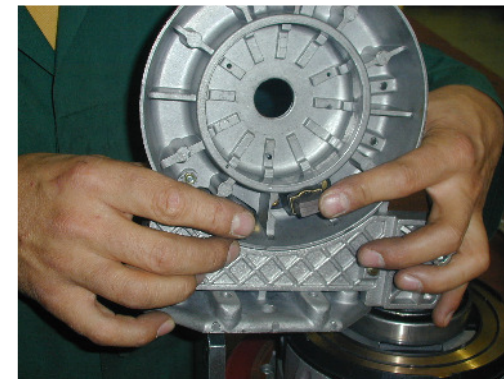
9.  
Check condition and  
cleanliness of slip rings



11.  
Tighten wheel bolts  
crosswise with 16Nm



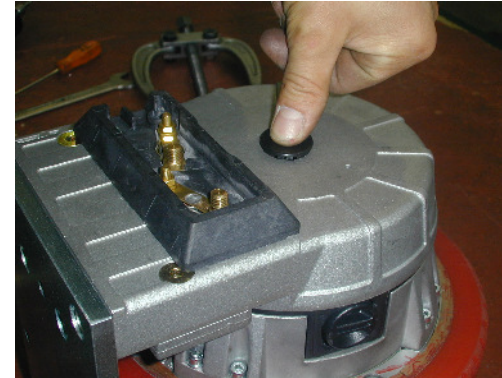
10.  
Insert new tyre and tighten  
wheel bolts crosswise and  
hand-tight



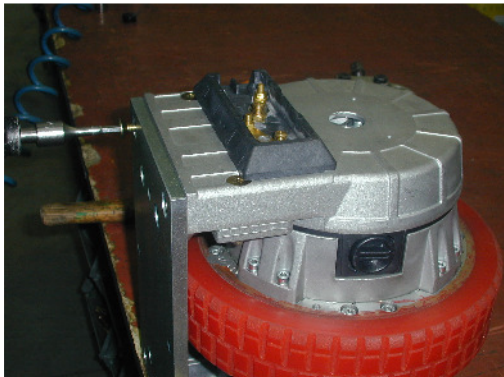
12.  
Check carbon  
brushes for wearing  
and smooth running  
in the brush holder



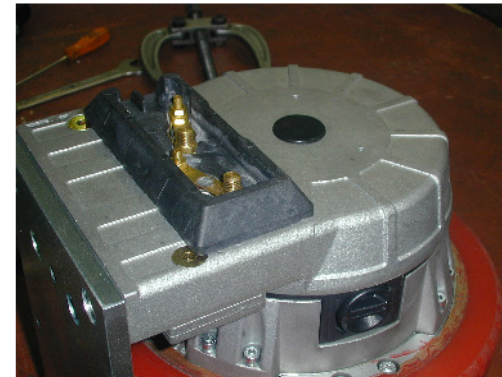
13.  
Place brush flange and drive in  
straight onto the engine shaft



15.  
Insert sealing plug  
into borehole



14.  
Screw fastening plate



16.  
Then maintenance is  
completed.  
Drive unit may be  
mounted to the  
machine.



## 4.0 Electric

## 4.1 Electrical Description

The electrical circuit of the Jonas800E has some logical operations that are controlled by the LDS board, the drive controller and relays. Here is a brief description of the logic circuit:

### Loading / Operating conditions

If the power plug of the on-board charger **G2** is connected to the 230V AC net the internal relay E will open. Through this the voltage supply to the LDS **A2** X1/PIN1 from the key switch **S1** PIN3 is interrupted. Then the LDS is switched off. The LED's to indicate charging are powered by the charger. If the plug is disconnected and the key switch is turned ON, the LDS has power, i.e. it's in function.

### LDS function

If at the LDS **A2** X1/PIN1 voltage is applied, the output X1/PIN8 is energized. This leads to a switching of the relay **K2** PIN4 to PIN2. Through this, the current path to the input X1/PIN4 at the LDS will be closed. This feedback is evaluated by the LDS A2. If it does not work the error code 1 (all the LEDs of the battery indicator will flash) is shown.

At the same time the internal relay A will switch the output X1/PIN12 to X1/PIN10. Now, a current path from the key switch **S1** PIN2 to LDS A2 X1/PIN11, to the temperature switch S/1, connected in driving the motor **M1** and to the drive control **A1** X1/PIN11 is closed. It is used to evaluate the motor temperature and the signal path when the TSG will stop driving.

The supply of pull-up coil of the relay **K2** lead to the supply voltage of the drive controller; path **F3** PIN2 => **K2** PIN30 to PIN2 => **A1** X1/PIN15.

### Sweeping function

The double push button **S3** is used to switch ON/OFF the sweeping (central motor **M2**). He is supplied, with power on the path **A2** X1/PIN10 (when LDS is active) => temperature switch **M2** YE1 to YE2 => **S3** PIN2 and PIN5. Now, if the switch S3 is pressed (turn on), the relay **K3B** is energized on the pull-up coil. At the same time PIN6 and PIN9 are energized. This is, independent of the switching state of the coil at relay K3B, to energize the relay **K1**. When the switch S3 is released the PIN6 of relay K3B generates a catch (as the coil falls off slower than the push button). The switched relay K1 provides the central motor **M2** through the path **F2** PIN2 => **K1** KP/1 to KN/1 => **M2** RD. By pressing again the button S3 (turn off) the power supply of the relay K3 PIN9 to PIN6 is interrupted.

Therefore, also K1 drops. This leads to switching off the sweeping function. The activation of the temperature switch (M2) has the same effect.

The drive controller **A1** is used additionally to monitor the seat contact switch.

### Driving

If the drive controller **A1** X1/PIN15 has correct power supply it is active. Additionally, if the plug X1/PIN11 (temperature switch drive motor o.k.) is supplied and the main power supply BP1 is energized works the output X1/PIN14 and the potentiometer output X1/PIN1. By actuating the accelerator pedal, the neutral switch **S6** is switched through BK to BU. Through this, the direction switch **S2** is supplied with power. Furthermore, the seat contact switch **S5** is supplied with electricity. If it is closed (seated operator), the input can be read at X1/PIN5. This is necessary for the internal release of driving. When choosing a direction of travel is either a switched input from PIN5 to PIN4 or PIN6. Thus the voltage to the driving control A1 X1/PIN12 or X1/PIN13 is lead back. This signal is used internally to determine direction. The actual excitation of the driving motor **M1** is carried out by the processing the drive potentiometer signal. On drive potentiometer **R1** GN is the 12V output voltage of the drive controller **A1** X1/PIN1. At YE is a ground signal from the drive controller A1 X1/PIN3. The voltage signal at the RD drive potentiometer output, depending on the displacement is 0V (min.) to 12V (max). It is read at X1/PIN2 into the drive controller and processed by characteristic curves.

### Monitoring of seat contact switch

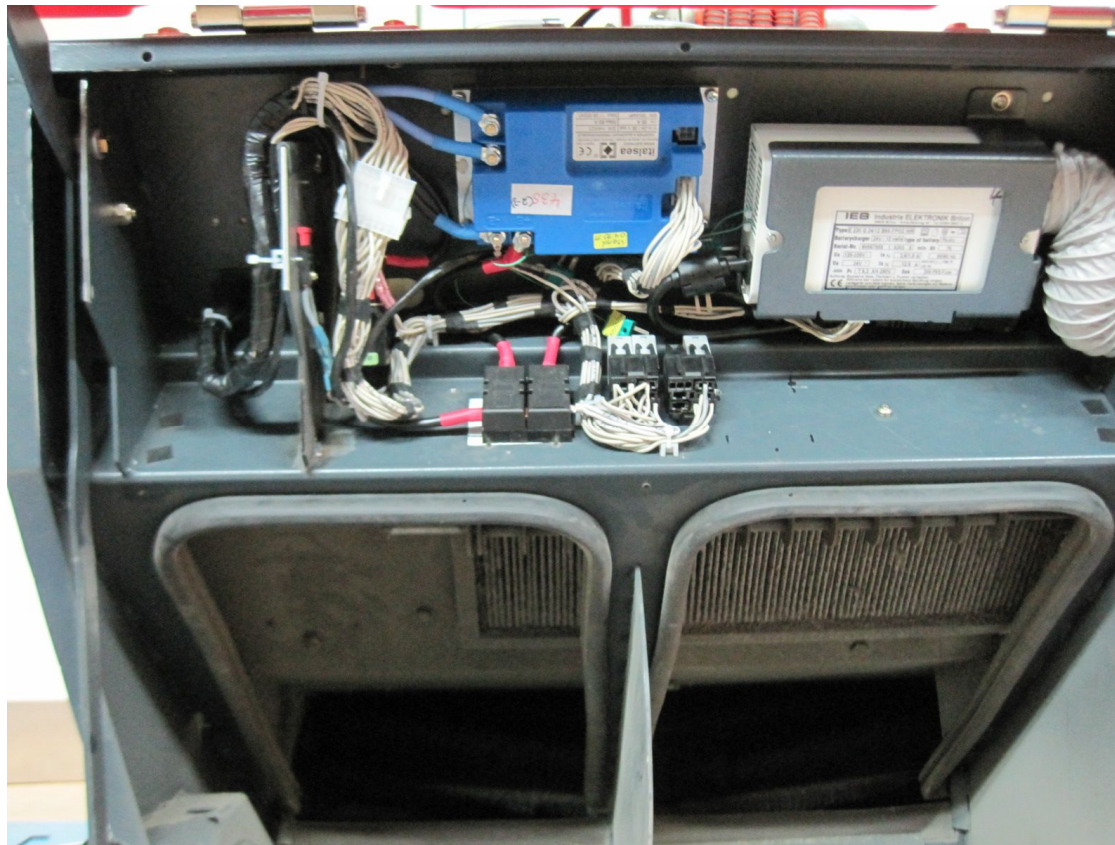
If seat contact switch **S5** is interrupted during operation there is no signal anymore to X1/PIN5 of Controller **A1**. This leads to an internal program procedure that will change, after appr. 2.5s, X1/PIN9 from ground (Normal) to voltage (SWITCHING STATUS). If the seat contact switch is closed within 2.5s, the normal operation continues. In the NORMAL state, the coil of the relay K3A is energized as X1/PIN8 is supplied with +12V. This ensures that the input X1/PIN6 is without a signal. And further more a ground connection to the coil of relay K1 is present (central motor M2 can be supplied with power). The SWITCHING STATUS of the output X1/PIN9 causes the coil of the relay K3A is energized from both sides. Therefore, the switch drops. This leads to two processes

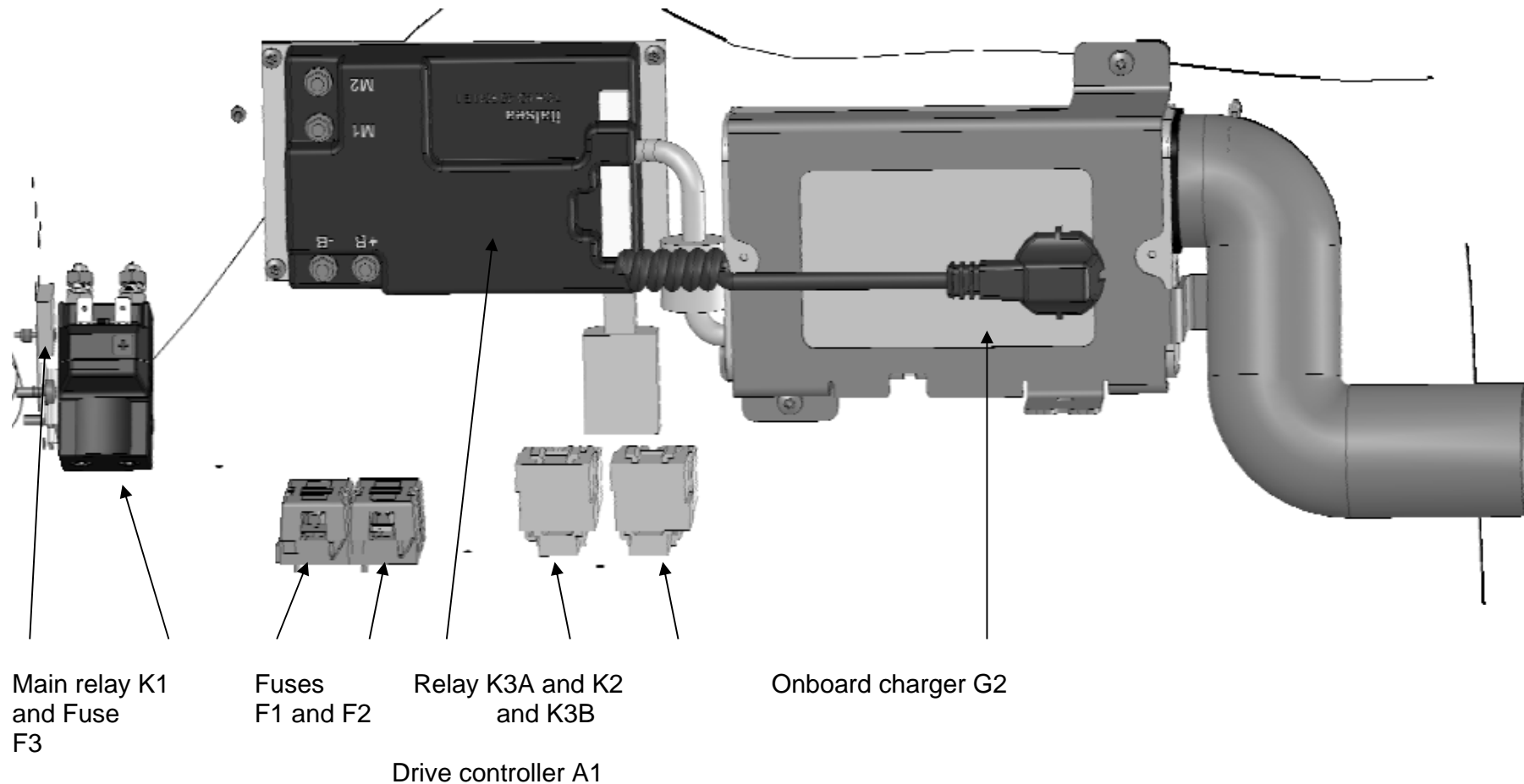
- 1) Input X1/PIN6 changes from open signal to ground. This is processed by the drive controller **A1** so that it switches off the driving.
- 2) The ground connection to the coil of the relay **K1** is interrupted (no signal). Therefore, K1 drops down and stops completely the sweeping function (sweeping and vacuuming)

This can only be released through the key switch **S1** ON-OFF.

## 4.2 Electric Box

The Electric box is located behind a bolted panel above the hopper. Here are all important components of the electrical system, with the exception of the control switch and the drive potentiometer. The Jonas 800E is standard equipped with an onboard charger. It is also mounted in the Electric box. The attached power cord is in a open chamber, on the r.h side, mounted. There is also the lever to jiggle the plate filter.



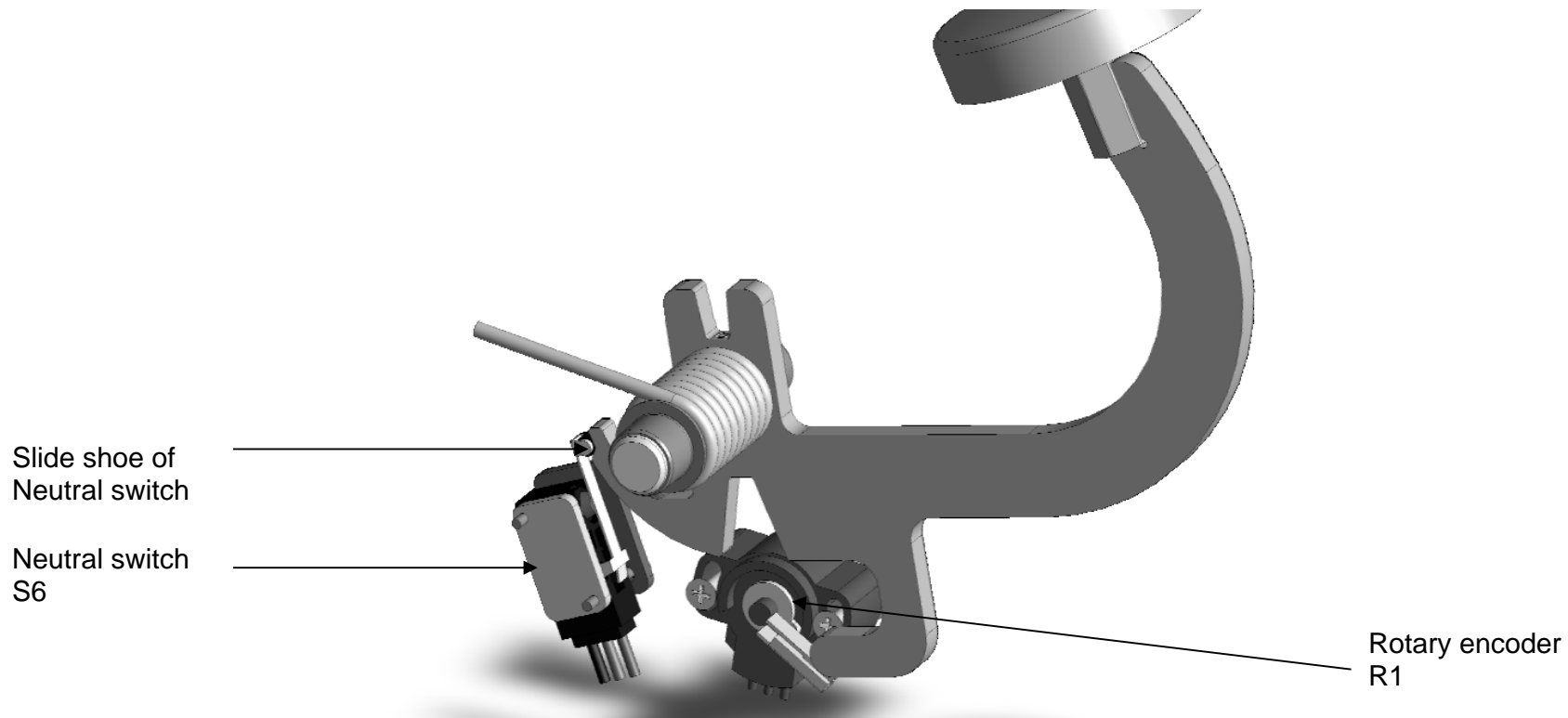


## 4.3 Drive Controller

The drive controller is from Italsea. It is close to the drive controller of J900E respectively J980E. But it is not programmable. On the drive controller software is an additionally logic for seat control switch.



The drive potentiometer **R1** receives from drive controller **A1** a 12V reference voltage supply. It has internally a fixed resistor of 1.7 kOhm and is connected in series with a variable resistor 0-4 kOhm. A voltage between 0V and 12V is given back to the control (between X1/PIN2 and X1/PIN3). This leads, by internal characteristics, to a corresponding activation of the traction motor **M1**. When you replace the drive controller or potentiometer no adjustment must be carried out. When mounting the potentiometer it is only important to ensure that, at the very moment when the neutral switch **S6** is operated, still is a gap of 0.5 - 1.5 mm between potentiometer guide and slide shoe.



The error LED could show the following flash codes:

Anzeige/Blinksignale Fehlermeldung	Bedeutung	Störungsbeseitigung
Alarm A1 / 1 FORWARD switch ON	At key-on travel direction switch S2 is closed to X1/PIN12	Attend starting sequence / check wires and plugs
Alarm A2 / 2 REVERS switch ON	At key-on travel direction switch S2 is closed to X1/PIN13	Attend starting sequence / check wires and plugs
Alarm A3 / 3 Potentiometer error	Failure of potentiometer; Cable break or not plausible value	Check wires of potentiometer
Alarm A4 / 4 Potentiometer not in neutral	At key-on neutralswitch S6 closed to X1/PIN5	Attend starting sequence / check wires and plugs
Alarm A5 / 5 High temperatur	Protection against over heating	wait a few minutes / if necessary check motor about overload
Alarm A6 / 6 Power level	Damage at the power amplifier of the controller	Change controller
Alarm A7 / 7 High current	Short circuit in motor circuit	Check motor wiring; if o.k. and there is still alarm => change controller.
Alarm A8 / 8 Fuse / Relay	Power fuse or Internal relay is damaged	Check power fuse or change controller
Alarm A9 / 9 Low voltage	Low voltage	Check battery charge condition



# Service-Handbuch

## Service-Booklet

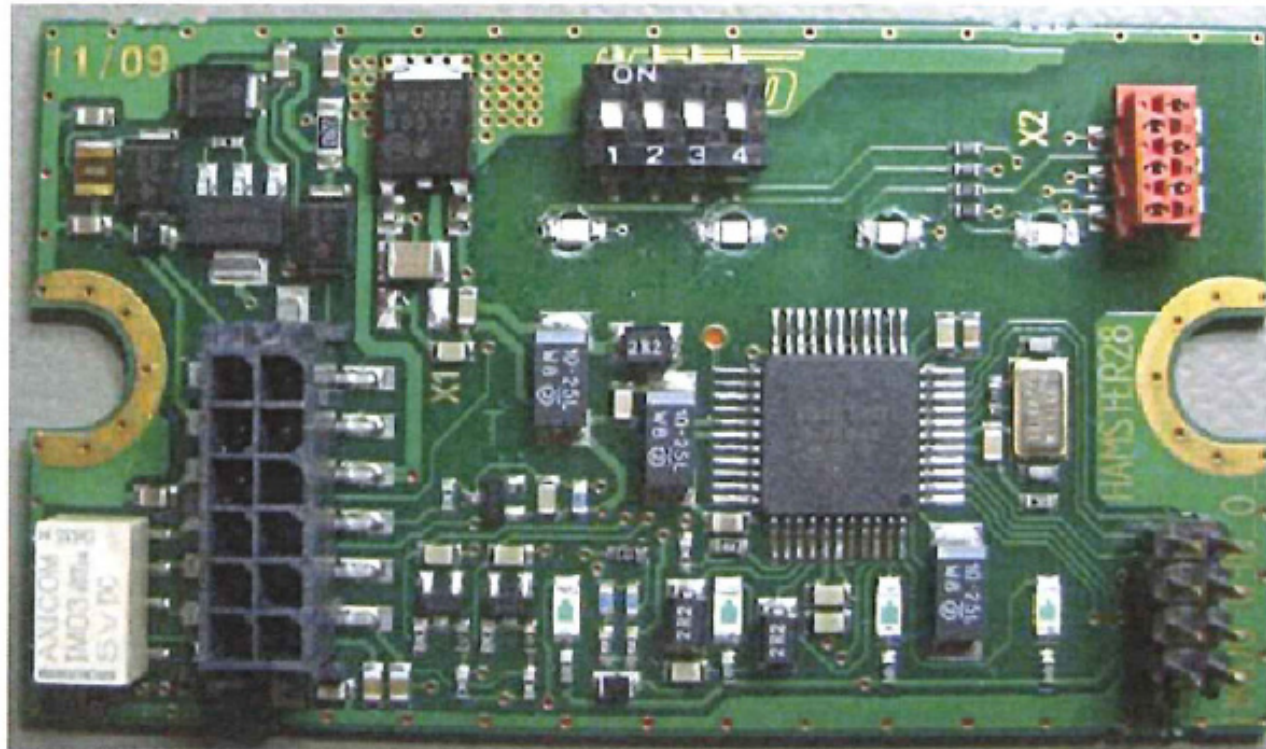
Seite 33 von 43



Alarm A10 / 10 High voltage	High voltage	Battery voltage is above 45V; check batteries
Alarm A11 / 11 Overload current	Protection against overload; Current >70A	Check motor current
Alarm A12 / 12 Locking device ON	Seat contact switch > 2,5s open	Check seat contact switch and wires. Reset of this alarm is with key switch ON-OFF
Alarm A13 / 13 Key switch off	No function of key switch	Check connection and wires of key switch
Alarm A14 / 14 E2PROM breakdown	E <sup>2</sup> PROM breakdown, internal controller failure	Change controller.

# Service-Handbuch Service-Booklet 4.4 LDS

Seite 34 von 43



The LDS is mounted underneath the dash board. Via a DIP-Switch it is possible to change the battery type. As, at the moment, there is only one battery type it is factory programmed.

DIP-Schalter 1	DIP-Schalter 2	DIP-Schalter 3	DIP-Schalter 4	Batterietyp
OFF	OFF	OFF	OFF	Crown without Offset
ON	OFF	OFF	OFF	Crown with Offset
OFF	ON	OFF	OFF	GiS, foreign
ON	ON	OFF	OFF	GiS
OFF	OFF	ON	OFF	PzS foreign
ON	OFF	ON	OFF	PzS
OFF	ON	ON	OFF	GiV
ON	ON	ON	OFF	PzV
OFF	OFF	OFF	ON	Hoppeke AGM
ON	OFF	OFF	ON	empty
OFF	ON	OFF	ON	empty
ON	ON	OFF	ON	empty
OFF	OFF	ON	ON	empty
ON	OFF	ON	ON	empty
OFF	ON	ON	ON	empty

If all Dip-switches are ON, then the wired detection is used.

The LDS could show via the LED's (LDS; bottom row) the following error messages:

- 1) All LED's flashing (Red and 3 x Green)
- 2) Only the Green LED's flashing

Error message 1 means that PIN 4 of LDS has no return signal

=> Check output PIN8; Check relay K2;  
Check fuse F3; Check wiring and  
plugs at the relevant components

Error message 2 means

=> at the moment not active

# Service-Handbuch

## Service-Booklet

### 4.5 Charger

The Jonas 800E comes standard fitted with a charger-type **B65-E230 G24/12 FPO2 WR** from IEB. The charger is integrated into the vehicle electrical system and can not be removed. The charger is delivered with the characteristic curve for the standard battery (currently the only version). It is possible to modify these characteristics. For this, the charger must be released from the holder, because the programming button is located on the bottom side.

The state of charge is displayed on the LDS (top row). Here also error messages may be shown.



Here is the programming button

To program a different charge characteristic follow these steps:

- switch off charger (press programming button for 2-3s)
- Press button for more then 10s => Charger changes to programming mode and shows the current characteristic
- to change characteristic press button < 1s => Characteristic changes to one position higher
- to confirm a characteristic press button > 5s => new characteristic is programmed
- to leave the programming modus press the butto for 2-4s

Overview of the available battery types (standard is characteristic 0):

IEB Industrie Elektronik Brilon		Kennlinientabelle - Hako							
		Batterieladegerät 24V 12A 90587858							
		Filon Futur S				Typ: E 230 G 24/12 B65-FPO2 WR			
Programm (Die LED's blinken)	0 Werks- einstellung	1	2	3	4	5	6	7	Bemerkungen
Batteriespg.	24V	24V	24V	24V	24V	12V	24V	24V	
HAKO- Batterie	105Ah GIV					70Ah GIV 76Ah GIV 80Ah AGM	70Ah GIV 76Ah GIV 80Ah AGM		
Batterietyp	alle	GiV	GiV	PzS/GiS	PzS	alle	alle	AGM	
Kapazität allgemein	100Ah – 117Ah	70Ah – 105Ah	100Ah – 145Ah	80Ah – 100Ah	100Ah – 125Ah			115Ah	
Kennlinie	IUIoU IEB	IUIoU	IUIoU	IUIoIa	IUIoIa	IUIoU IEB	IUIoU IEB	IUIoU	
Ladevor- schrift	IEB	Herstellervorgabe	Herstellervorgabe	Herstellervorgabe	Herstellervorgabe	IEB	IEB	Herstellervorgabe	
Ladezeit	9h-14h	10h-14h	12h-14h	8h-10h	9h-11h	10h-14h	10h-14h	10-14h	
Hauptladung									
I <sub>1</sub>	12,6A	12,6A	12,6A	12,6A	12,6A	9,0A	9,0A	12,6A	
U <sub>1</sub>	28,56V	28,2V	28,2V	28,8V	28,8V	14,3V	28,6V	28,8V	
t <sub>ic max</sub> <sup>1)</sup>	9h	9h	9h	7h	10h	9h	9h	---	
t <sub>HLmax</sub> <sup>2)</sup>	12h	12h	12h	10h	12h	12h	12h	12h	
I <sub>um</sub>	1,3A-4,0A di/dt	1,12A	1,6A	4,0A	5,0A	di/dt	di/dt	1,8A	
Nachladung									
I <sub>2</sub>	1,3A-4,0A	1,12A	1,6A	4,0A	5,0A	0,9A-2,8A	0,9A-2,8A	1,8A	
U <sub>2</sub>	33,6V	2,80V/Z	2,80V/Z	2,80V/Z	2,80V/Z	16,8V	33,6V	33,6V	
t <sub>NL</sub>	6h max du/dt	4h max LF=1,05-1,06	4h max LF=1,05-1,06	4h max LF=1,17-1,20	4h max LF=1,17-1,20	6h max du/dt	6h max du/dt	2-4h 0,5 * IHL	
Ladeende									
I <sub>3</sub>	1,60A	1,12A	1,60A	4,0A	5,0A	1,1A	1,1A	1,8A	
U <sub>3</sub>	27,6V	27,6V	27,6V	33,6V	33,6V	13,8V	27,6V	27,0V	
t <sub>Aus</sub>	---	---	---	8h <sup>3)</sup>	8h <sup>3)</sup>	---	---	---	
t <sub>Ein</sub>	unbegr.	unbegr.	unbegr.	15min <sup>3)</sup>	15min <sup>3)</sup>	unbegrenzt	unbegrenzt	unbegrenzt	

<sup>1)</sup> Zwangsabschaltung / Fehlermeldung  
<sup>2)</sup> Zwangsumschaltung auf Nachladen (I2)  
<sup>3)</sup> Zyklisch  
 Die minimale Einschaltgrenze ab der das Ladegerät den Ladevorgang startet, beträgt 0,2V/Z.  
 Zwischen 0,2V/Z und 1,9V/Z fließt ein Nennstrom von 10% I<sub>1</sub>. Falls die Spannung innerhalb von 30min nicht >1,9V/Z ist, erscheint eine Fehlermeldung.

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Displayed via the top LED row on the LDS display

operating status	LCD-/ LED- Indicator				malfunction number
Main charging $U_{bat} < 1,9V/Z$	X				
Main charging		X			
Backup charging			X		
Conservation charging				X	
operating status during malfunction*					
Battery malfunction	X				1..2
Time malfunction		X			3..4
Control malfunction			X		11..13
Temperature malfunction				X	6

\* If there is a malfunction the frame/under LED flashes once a second.

## Description of errors:

- 1 Battery missing; Connected reverse poled; Cell voltage < 1,25V
- 2 Cell voltage > 2,4V
- 3 Longer than 30min. cell voltage < 1,5V
- 4 Phase of constant current takes too long
- 6 Temperature in charger too high
- 11 Limit value of control is exceeded
- 12 Limit value of control is exceeded
- 13 Limit value of control is exceeded

## **5.0 Service**

Activity	Interval	
	daily	weekly
Check battery charge; charge battery, if necessary	o	o
Clean broom space of cylindrical broom	o	o
Clean panel air filter using shaking device	o	o
Empty the dirt hopper	o	o
Check side broom for signs of wear and damage; change, if necessary		o
Check cylindrical broom for signs of wear and damage; change, if necessary		o
Check sweeping pattern of side broom; adjust, if necessary		o
Check sweeping pattern of cylindrical broom; adjust, if necessary		o
Check seals in broom space of cylindrical broom for signs of wear and damage; change, if necessary		o
Check seals on dirt hoppers; change, if necessary		o
Check seals of dust vacuum; change, if necessary		o
Cleaning the vehicle		o



Activity	Interval
	every 125 operating hours
Check battery and charger	o
Check side broom for signs of wear and damage; change, if necessary	o
Check cylindrical broom for signs of wear and damage; change, if necessary	o
Check sweeping pattern of side broom; adjust, if necessary	o
Check sweeping pattern of cylindrical broom; adjust, if necessary	o
Check seals in broom space of cylindrical broom for signs of wear and damage; change, if necessary	o
Check seals of dirt hoppers; change, if necessary	o
Check seals of dust vacuum; change, if necessary	o
Check the function of the parking brake and service brake	o
Check dust vacuum; clean or change panel air filter, if necessary	o
Check the electric system (lighting, fuses, relays and control lamps)	o
Check the visual appearance of the vehicle	o
Test drive and function test	o

Activity	Interval
	every 250 operating hours
All maintenance work in accordance with Hako system maintenance I	o
Check fan belt; adjust belt tension or change fan belt, if necessary	o
Check the visual appearance of the vehicle	o
Test drive and function test of all safety-related components	o

Activity	Interval
	every 500 operating hours
All maintenance work in accordance with Hako system	o
Check electrical systems (operating panel, on-board charger, battery poles, cables, seat contact switch, lighting, fuses, relays and control lamps)	o
Check the carbon brushes of the drive motor and central motor for ease of movement and signs of wear; change, if necessary	o
Check the retaining screws; retighten, if necessary	o
Check actuating lever for folding apron, cylindrical broom, side broom, brake pedal, parking brake and accelerator; spray with oil to ease movement. if necessary	o
Check brake linings and Bowden cables in the brake system for signs of wear; change, if necessary	o
Check side broom for signs of wear and damage; change, if necessary	o
Check cylindrical broom for signs of wear and damage; change, if necessary	o
Test drive and function test of all safety-related components	o