Service Manual

For the

KS32R

32” Rider Sweeper

For
Training
Trouble Shooting
Adjustments

12/03/2013

Contents

1.0 General Description

Note: Machine is shown with optional left side broom installed

2.0 Technical Data

		KS32R
Dimensions and weights		
Length with Side Broom	mm	1282
Width without Side Broom	mm	818
Width with 1 Side Broom (Standard)	mm	908
Width with 2 Side Brooms (Optional)	mm	998
Hight bove Steering Column	mm	1237
Turning Radius	mm	1580
Basic Weight (incl. Battery)	kg	285
Total Weight	kg	450

Drive Speed forward	Km/h	6
Wheel Rotation Speed on max. Speed	1/min	127
Drive Speed reverse	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^2/h	5340 / 6660
Climbing Ability	%	16 (1/min)

2.0 Technical Data

Filter area	m²	1,4
Plate Filter	Stk.	1
Flow Rate	m³/h	306
Low Pressure	Pa	126

Cylindrical Broom		
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

left / right / rear	mm	2 / 2 / 2
front close / open	mm	0 / 40

2.0 Technical Data

Diameter	mm	400
Bristle Length	mm	150
Wear Limit / Length of Bristlle	mm	70
Rotation Speed	1/min	100
Standart Bristles		PES (Polyethersulfone)

Hopper Volume	l	2 x 25

Front Wheel (Drive)	Amer	Adiprene red
Rear Wheels		Rubber Blend
Spec. Wheel Pressure Front / Rear l. / Rear r.	N/mm²	54 / 57 / 48

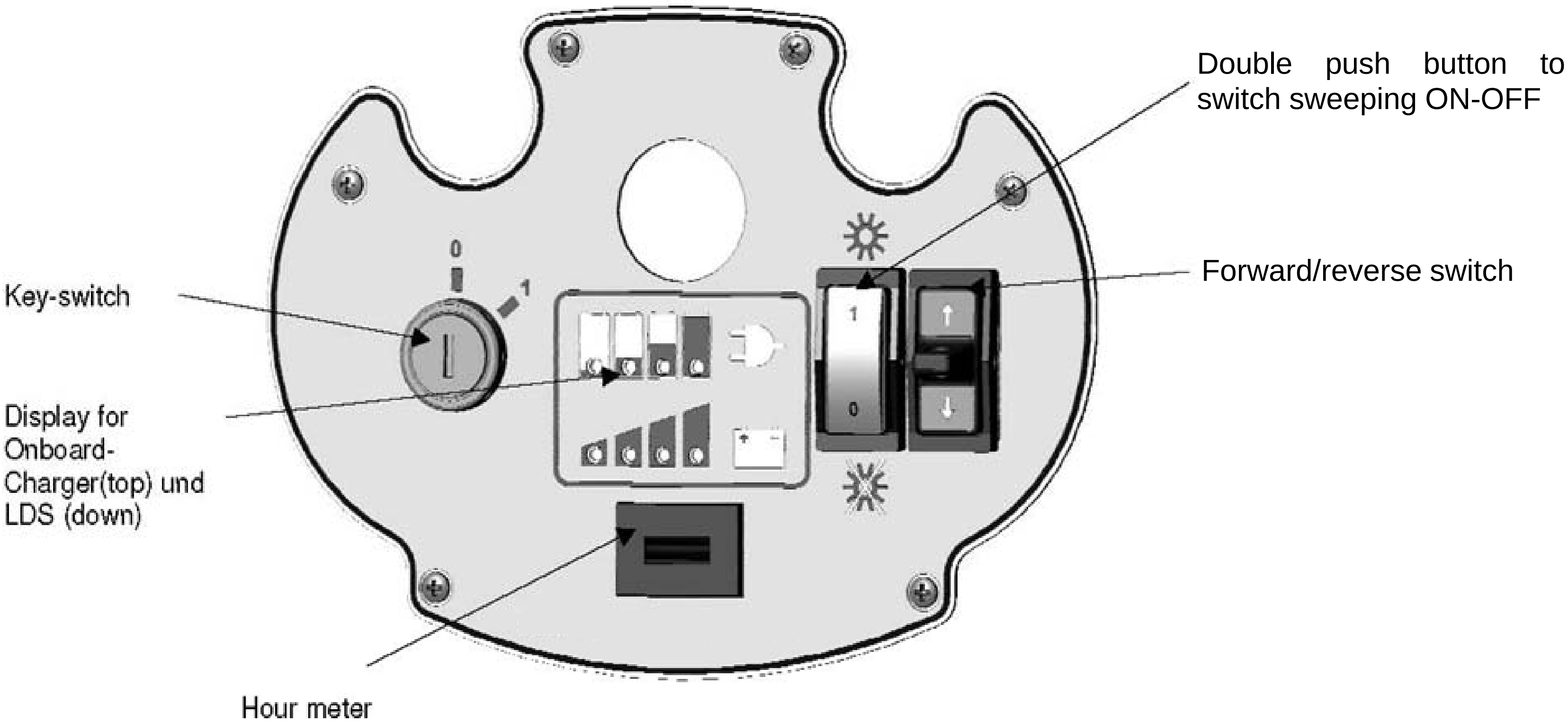
2.0 Technical Data

Battery	V / Ah	2 x 12 Volt 105 AH Gel
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
TotalCurrent Consumption on Sweeping	A	25

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 and Side Broom

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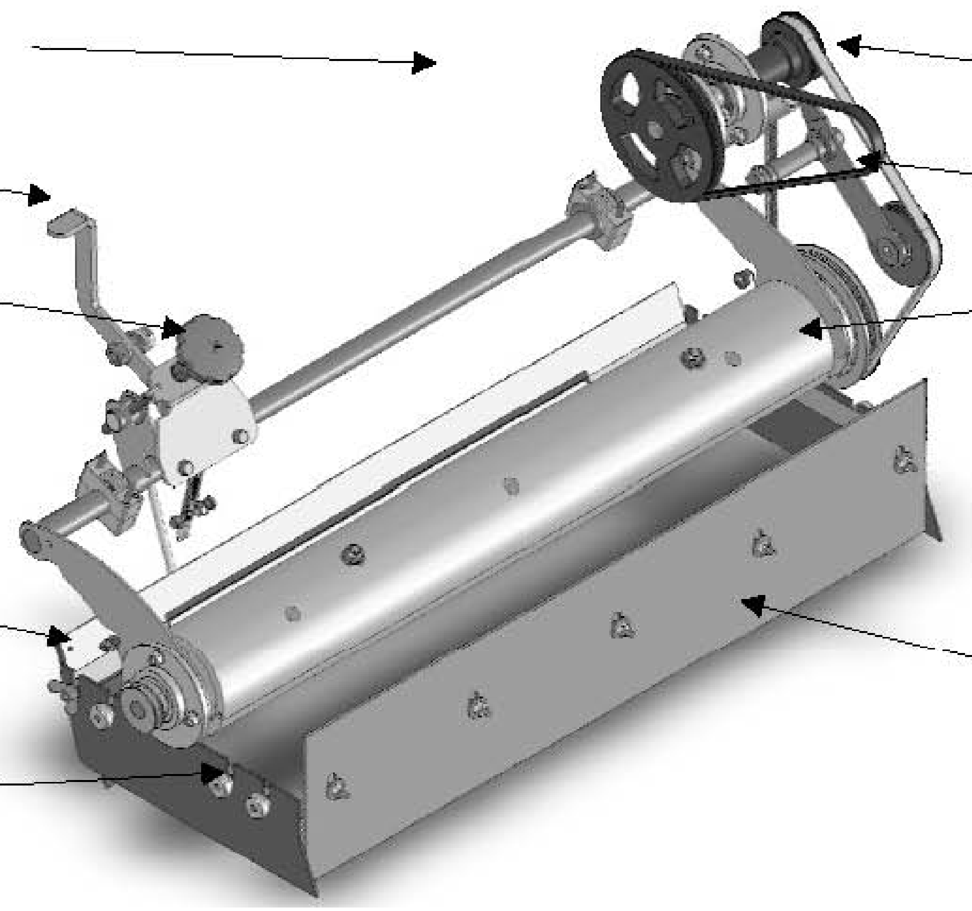


3.2 Cylindrical

Note: The main broom does not lower for the operation: the broom is always in the down position contacting the floor. (also in transport).

The brush material is K901.

To change the brush you have to remove both dust hoppers.

After this you could reach through the rear helical tunnel.

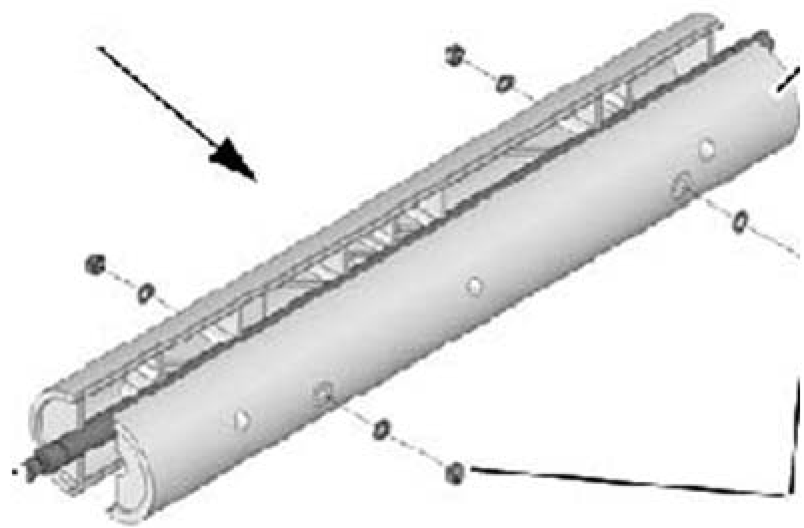
There you loose the nuts of one cylindrical half shell.

Then you have to “maneuver”-out the shell.

After this turn the broom about 180°.

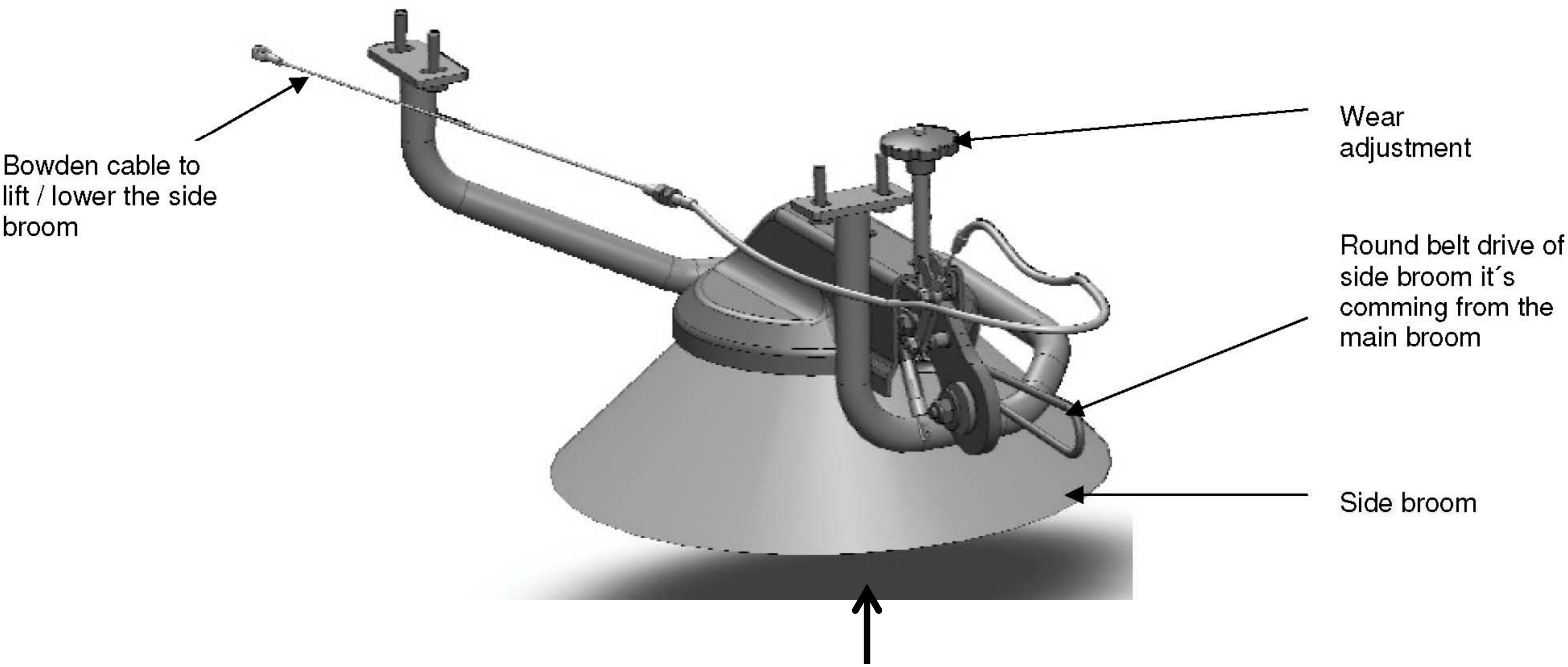
Then you could remove the second half shell.

The assembly follows the opposite sequence.



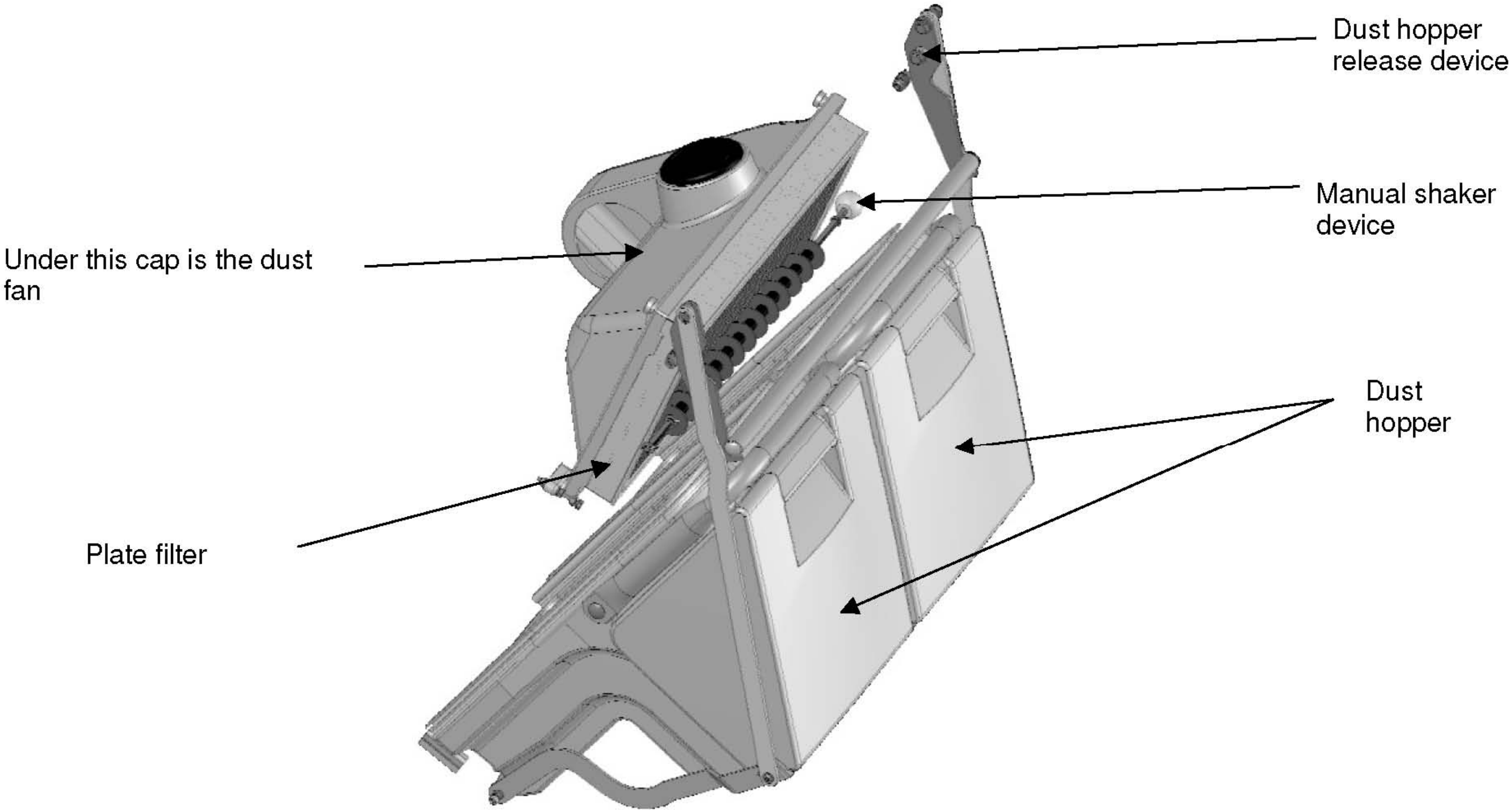
3.2 Side Broom

The material is PES. The changing is much easier as you only have to loose a hexagonal nut.



On the underside of the broom block there are hexagonal nuts and washers for mounting the side broom.

3.3 Dust Hopper and Dust Filter



To reach the fan and panel filter, you will 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:

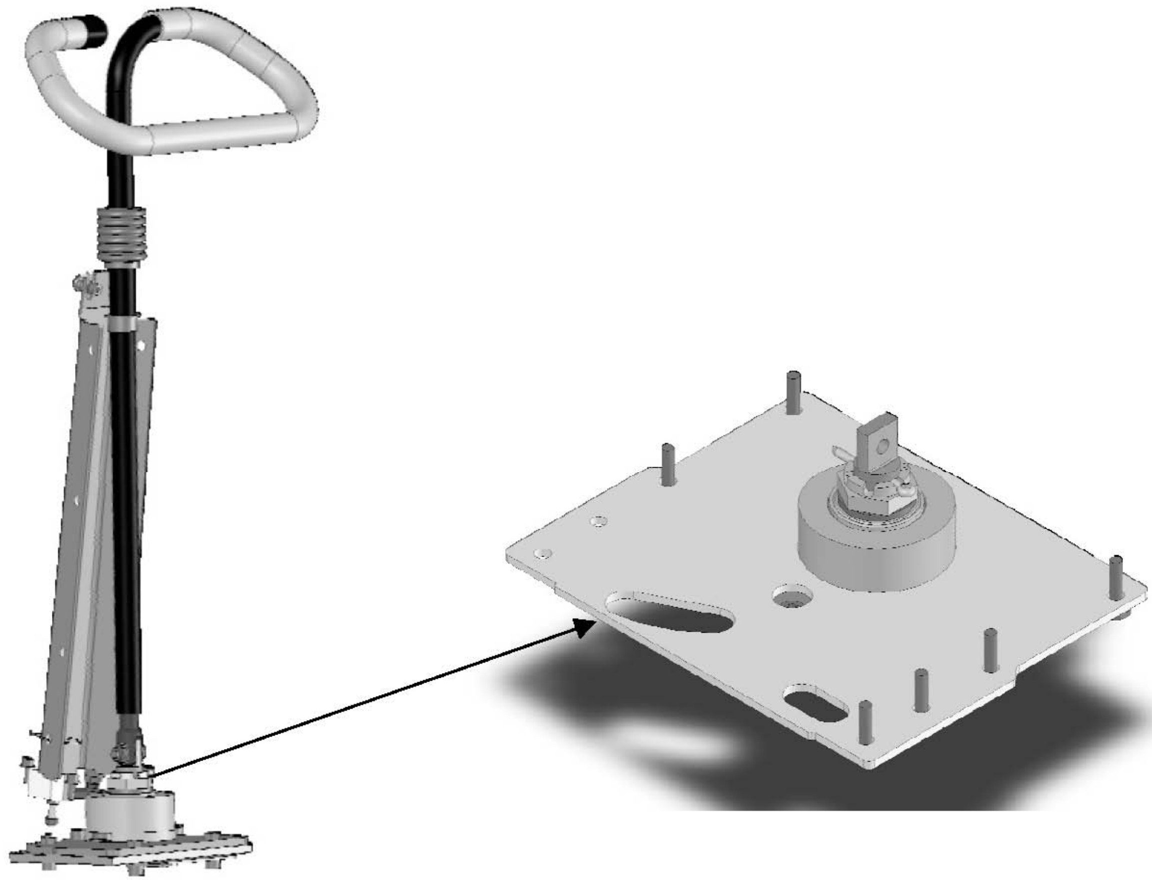
Tighten nut to 60Nm

Than loose nut after it –Turning steering wheel about 90°to the left and right.

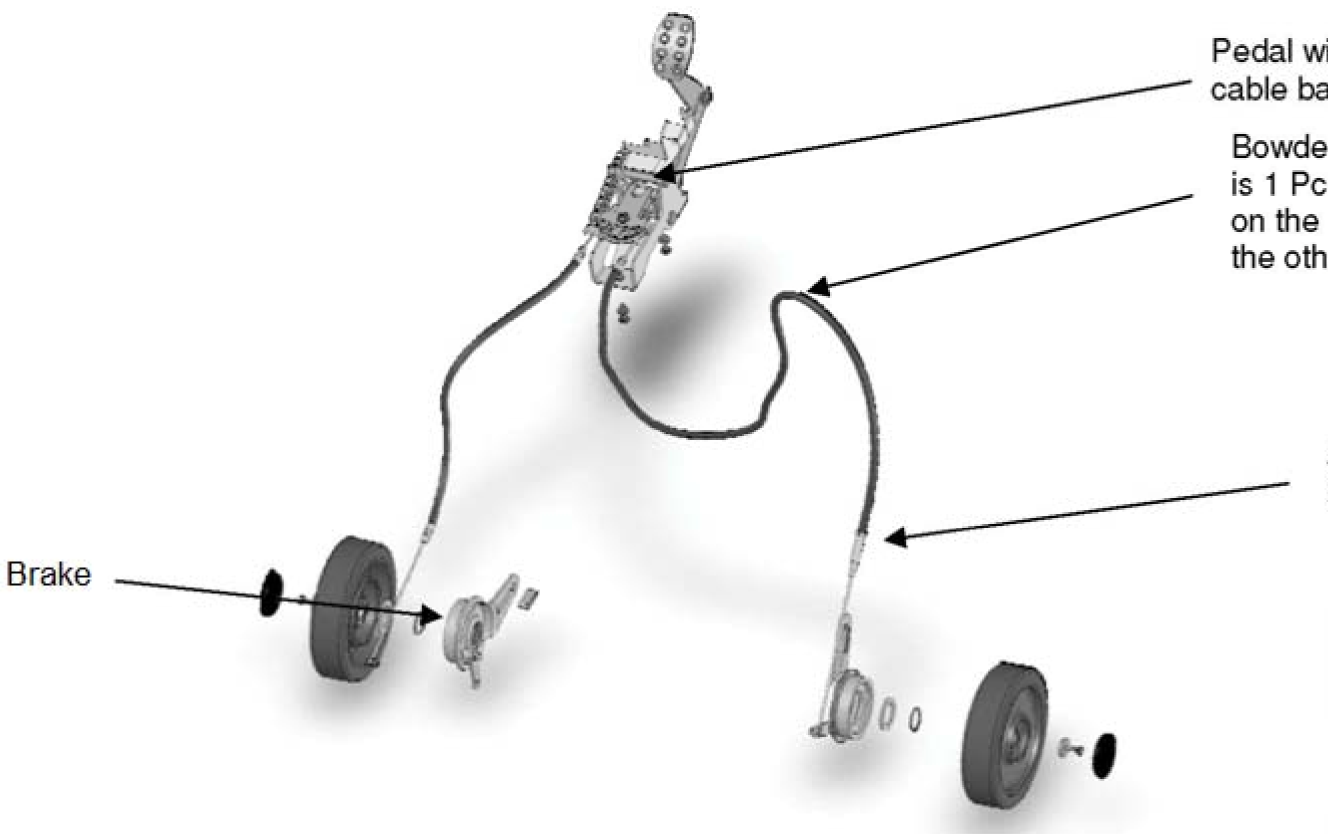
Tighten nut to 5Nm

If the cotter pin doesn´t fit, turn the nut until it fits.

Mount the cotter pin .



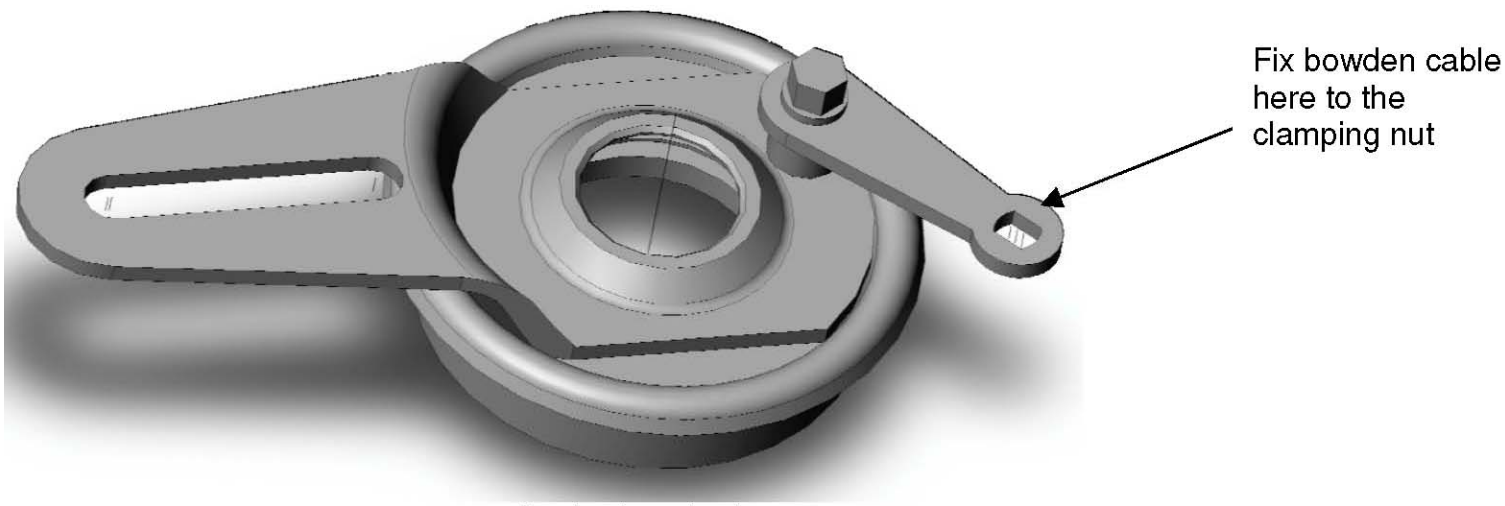
3.5 Brake



Pedal with bowden cable baffle
Bowden cable is 1 Pc. he turns on the baffle to the other wheel
Adjustment for brake point
Brake

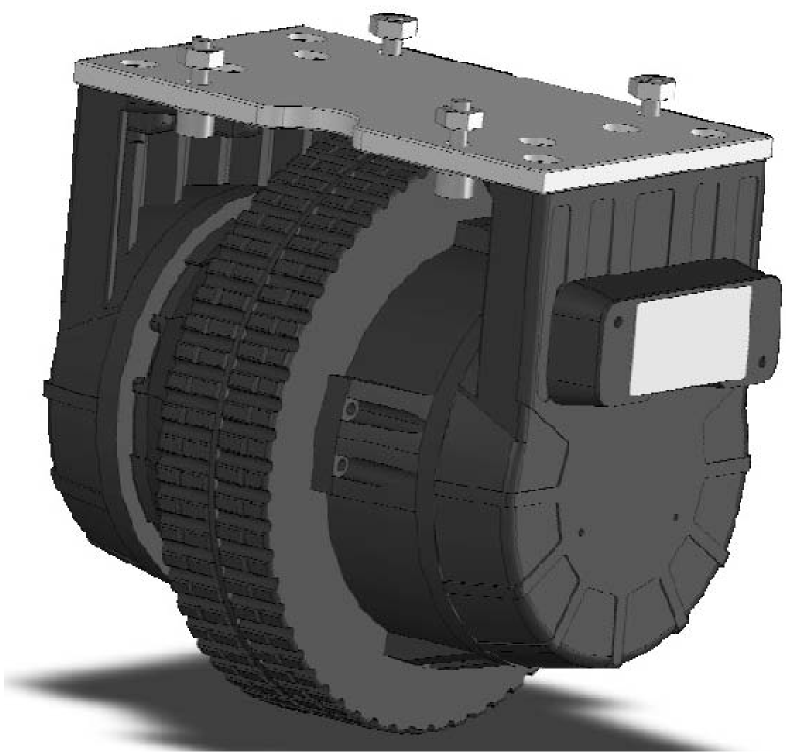
3.5 Brake

- The following steps are required to assemble the bowden cable 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 approx. 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 (approx. 10mm) and cut the rest.
- -The wheel have to turn barley at open brake, if not adjust the length of the bowden cable.
- -For this turn the length 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°bend SW17 wrench is helpful.



simple drum brake

3.6 Electric Drive



The travel drive assembly is complete. It includes the wheel.

3.6 Front Wheel Drive – Changing Wheel

Steps to be executed for changing the front drive wheel

1.

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

2.

Loosen fixing screws of plate and holder

3.

Remove holder between the plate and the brush flange

4.

Remove the lateral sealing plug

3.6 Front Wheel Drive – Changing Wheel

5.

Pull brush flange off the motor axle

7.

Loosen the
8 wheel bolts

6.

Remove brush flange

8.

Pull off the tire

3.6 Front Wheel Drive – Changing Wheel

9.

Check condition and cleanliness of slip rings

10.

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

11.

Tighten wheel bolts crosswise with 16Nm

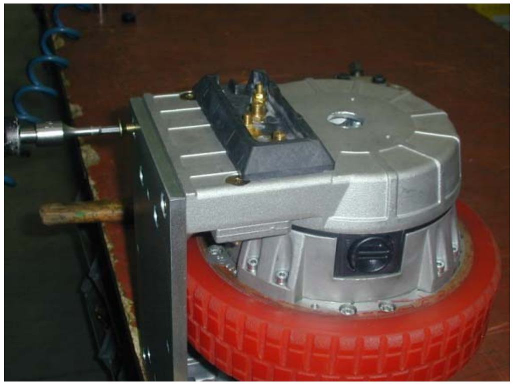
12.

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

3.6 Front Wheel Drive – Changing Wheel

13.

Place brush flange and drive in straight onto the motor shaft



14.

Screw fastening plate

15.

Insert sealing plug into borehole

16.

Then maintenance is completed.

Drive unit may be mounted to the machine.

4.0 Electric

4.1 The electrical circuit of the KS32R 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: When the power plug of the on-board charger **G2** is connected to the 120V 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.

4.1 Electric

LDS function If at the LDS **A2** X1/PIN1 voltage is applied, the output X1/PIN8 is energized. This activates the **K2** relay.

The **K2** relay switches power on the contacts 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.

4.1 Electric

Sweeping function The double push button **S3** is used to switch ON/OFF the sweeping (main broom motor **M2**).

It 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.

4.1 Electric

The drive controller **A1** also monitors 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

4.1 Electric

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 approx. 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 t

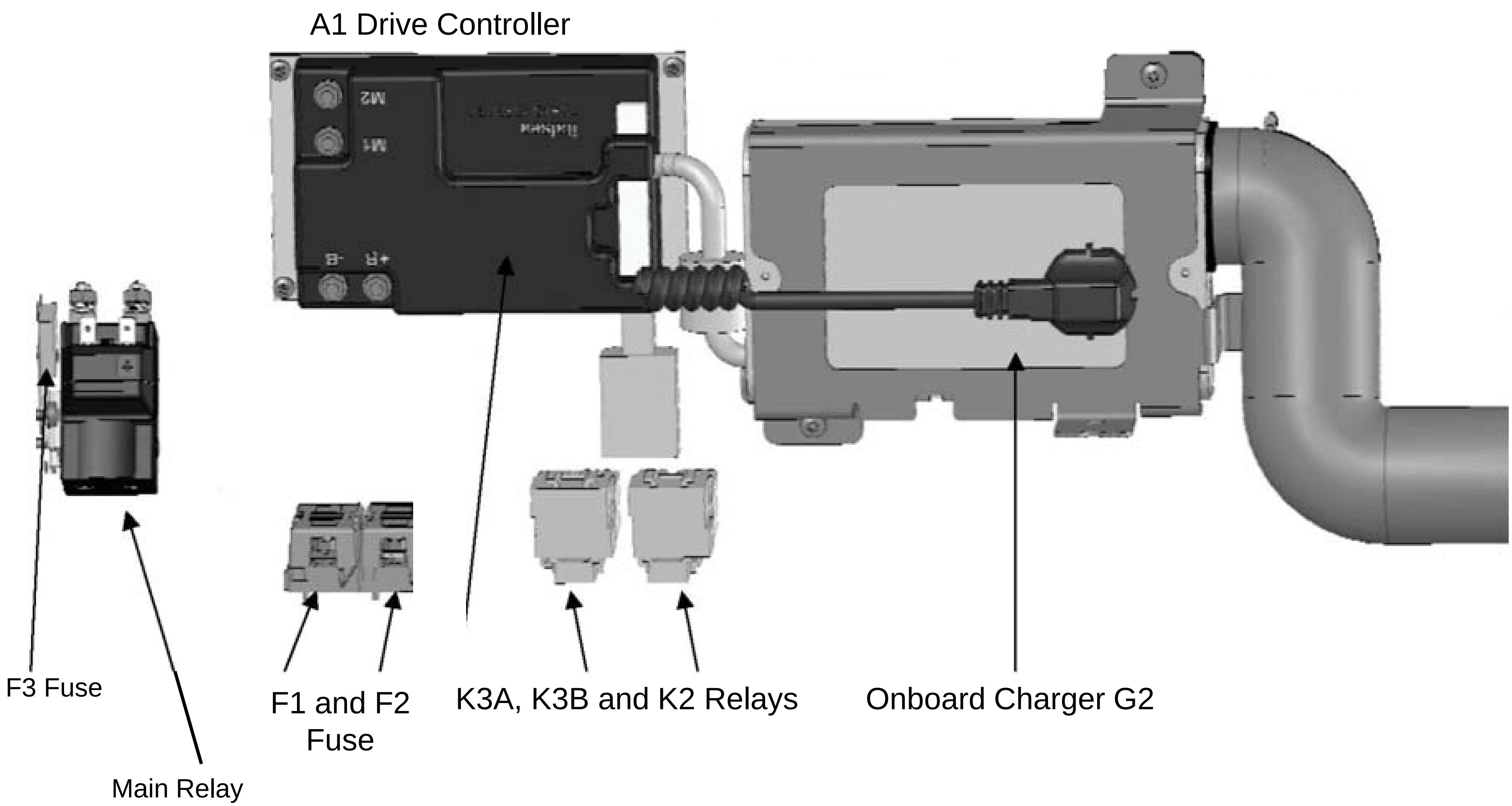
The relay K3A is energized from both sides. Therefore, the switch drops. This leads to two processes 1) Input X1/PIN6 changes from open signal to ground. This is processed by the drive controller **A1** so that it switches off the driving. 2) The ground connection to the coil of the relay **K1** is interrupted (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 KS32R is equipped with an onboard charger. It is also mounted in the electric box. The attached power cord is in a open chamber, on the right hand side of the machine.

There is also the shaker lever to clean the panel filter.

4.2 Electric Box



4.3 Drive Controller

The drive controller is not programmable.

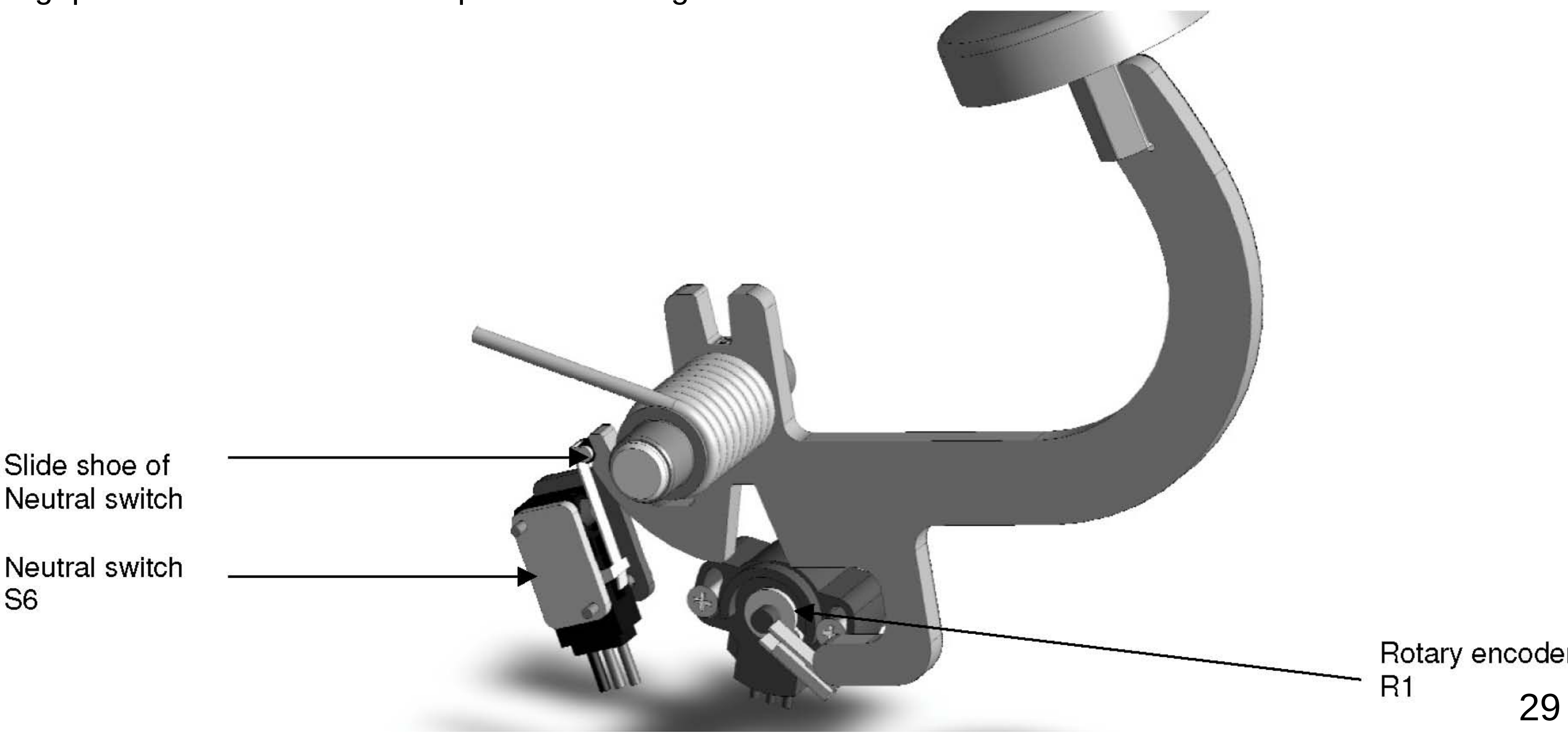
The seat switch is wired in the drive controller circuit.

This prevents accidental operation, when not sitting in the seat.

The error code LED indicator is located here

4.3 Drive Controller

The drive potentiometer **R1** receives from drive controller **A1** a 12V reference voltage supply. It has internally a fixed resistor of 1.7 k Ohm and is connected in series with a variable resistor 0-4 k Ohm. 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 , adjustment is not required. When mounting the potentiometer, it is important to ensure that, at the very moment when the neutral switch **S6** is operated, there still is a gap of 0.5 -1.5 mm between potentiometer guide and slide shoe.



4.3 Drive Controller Error Codes

Error/Alarm Code	Code Description	Trouble Shooting
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 neutral switch S6 closed to X1/PIN5	Attend starting sequence / check wires and plugs
Alarm A5 / 5 High temperature	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 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

4.3 Drive Controller Error Codes

Error/Alarm Code	Code Description	Trouble Shooting
Alarm A10 / 10 High voltage	High voltage	Battery voltage is above 45V; Check the 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^2PROM breakdown, internal controller failure	Change controller.

4.4 LDS (Low Discharge Signal)

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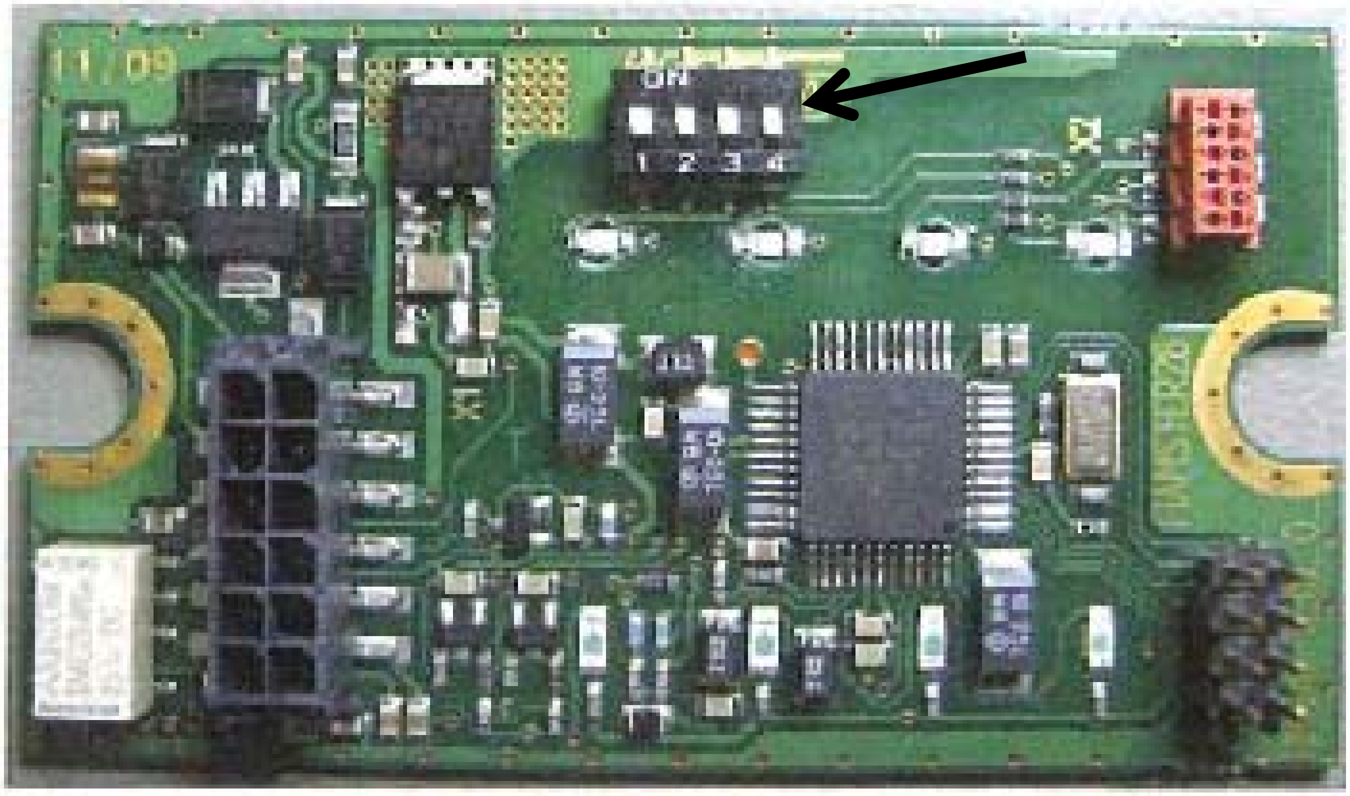


The LDS is mounted underneath the dash board.
The DIP switches allows the battery type to be changed.
This changes the voltage that the machine shuts down at, when the batteries are discharged.
NOTE: Setting the dip switches incorrectly may damage batteries.

4.4 LDS Settings

Dip Switch 1	Dip Switch 2	Dip Switch 3	Dip Switch 4	Battery Type
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:
  - Error 1) All LED´s flashing (Red and 3 x Green) 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 2) Only the Green LED´s flashing => at the moment not active.
- Note: Crown with offset = longer run time. Crown without offset = longer battery life.

4.4 Battery Types

Battery types defined

•GiS and GiV are flat plate batteries,

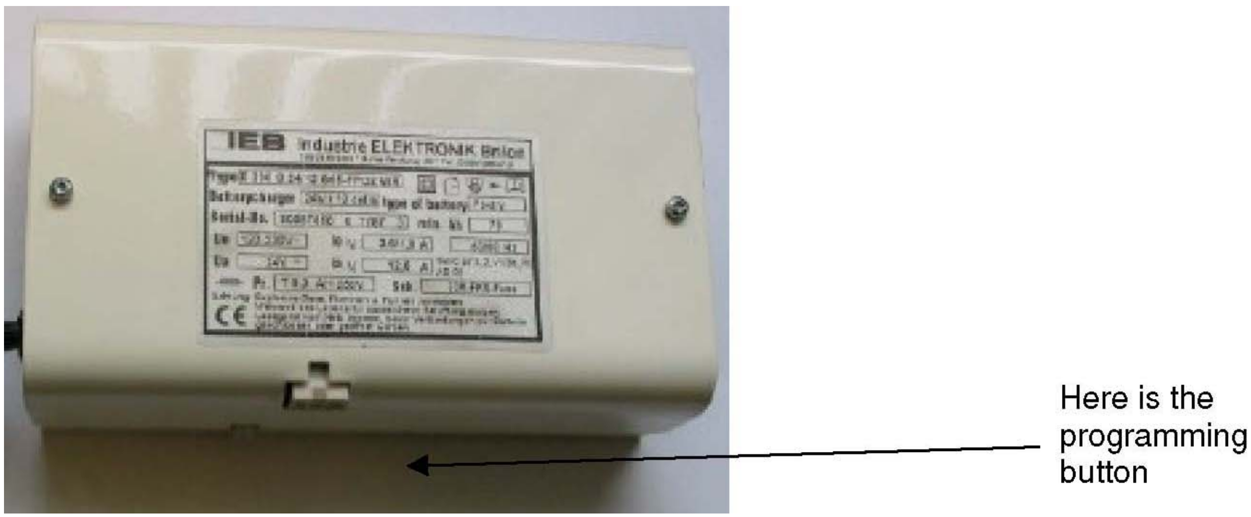
•PzS and PzV are tube plate batteries

•GiV and PzV are sealed, absolutely maintenance-free gel batteries

•GiS and PzS are sealed, low-maintenance AGM batteries with liquid electrolyte. AGM batteries are wrapping electrodes with fiberglass separators.

4.5 Charger

The KS32R comes standard with a built in charger. The charger is integrated into the sweepers 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.



To program a different charge characteristic follow these steps:

1. Plug charger into AC outlet-switch off charger by pressing programming button for 2-3s.
2. Press button again for more then 10s => Charger changes to programming mode and shows the current characteristic
3. To change characteristic press button < 1s => Characteristic changes to one position higher
4. To save a characteristic press button > 5s => new characteristic is programmed
5. To leave the programming menu press the button for 2-4s.

4.5 Charger Settings

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Programm (Die LED´s blinken)	0 ●○○○	1 ●●○○	2 ●○●○	3 ●●●○	4 ●○○●	5 ●●○●	6 Wie 2 ●○●●	7 Wie 2 ●●●●
Batterie-Spannung	24V	24V	12V	24V	24V	12V	12V	12V
Kapazität	70Ah-75Ah	25Ah-36Ah	70Ah-75Ah	70Ah-75Ah	25Ah-36Ah	70Ah-75Ah	70Ah-75Ah	70Ah-75Ah
Ladevor-schrift	Exide GiV	Exide GiV	Exide GiV	IEB IEB	IEB IEB	IEB IEB	Exide GiV	Exide GiV
Kennlinie	IUIoU	IUIoU	IUIoU	IUIoU	IUIoU	IUIoU	IUIoU	IUIoU
Ladezeit	13h-14h	10h-11h	13h-14h	10h-14h	8h-14h	10h-14h	13h-14h	13h-14h
Hauptladung I_1	9,0A	4,5A	9,0A	9,0A	4,5A	9,0A	9,0A	9,0A
U_1	28,2V	28,2V	14,1V	28,6V	28,6V	14,3V	14,1V	14,1V
$t_{Ic\,max}$ 1) / t_{HLmax} 2) / I um	9h 12h	9h 12h	9h 12h	9h 12h di/dt	9h 12h di/dt	9h 12h	9h 12h	9h 12h
Nachladung I_2	1,1A	0,4A	1,1A	0,9A-2,8A	0,3A-1,0A	0,9A-2,8A	1,1A	1,1A
U_2	33,6V	33,6V	16,8V	33,6V	33,6V	16,8V	16,8V	16,8V
t_{NL}	4h max LF=1,05-1,06	4h max LF=1,05-1,06	4h max LF=1,05-1,06	6h max du/dt	6h max du/dt	6h max du/dt	4h max LF=1,05-1,06	4h max LF=1,05-1,06
Ladeende I_3	1,1A	0,4A	1,1A	1,1A	0,4A	1,1A	1,1A	1,1A
U_3	27,6V	27,6V	13,8V	27,6V	27,6V	13,8V	13,8V	13,8V
t_{Aus}	---	---	---	---	---	---	---	---
t_{Ein}	unbegrenzt	unbegrenzt	unbegrenzt	unbegrenzt	unbegrenzt	unbegrenzt	unbegrenzt	unbegrenzt

↑ Default setting for factory supplied gel batteries

● = Indicates LED is on. ○ =Indicates LED is off.

4.5 Charger Status Indicator

Displayed via the top LED row on the LDS display

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

Note: If there is a error, the LEDs flash once per 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 (clean charger vents if needed)
11	Limit value of control is exceeded
12	Limit value of control is exceeded
13	Limit value of control is exceeded

5.0 Recommended Maintenance

Weekly Maintenance

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**

5.0 Recommended Maintenance

Every 125 Hours

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**

5.0 Recommended Maintenance

Every 250 Hours

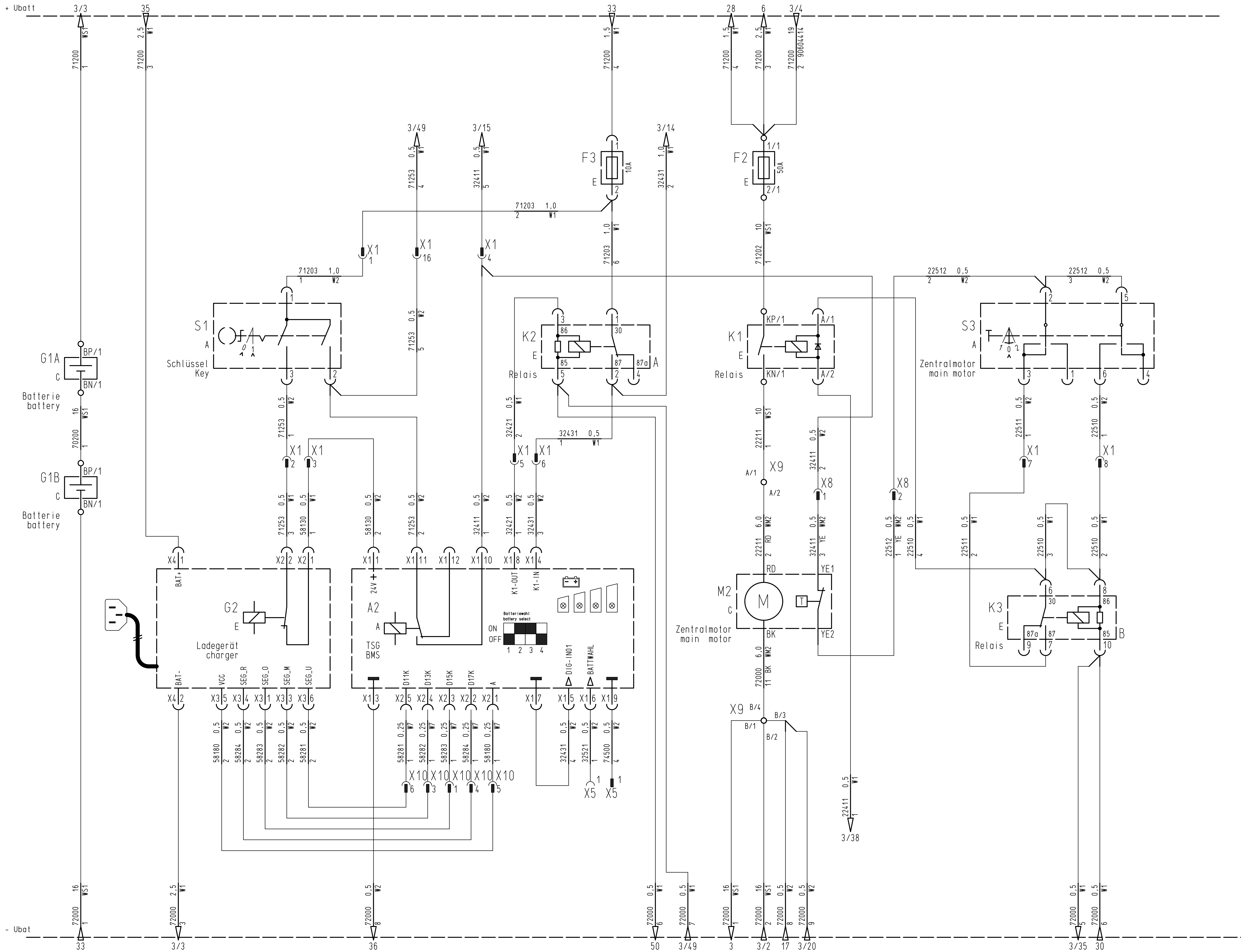
Activity	Interval
	every 250 operating hours
All maintenance work in accordance with Hako system maintenance I	**o**
Check fan belt; adjust belt tension or change fan belt, if necessary	**o**
Check the visual appearance of the vehicle	**o**
Test drive and function test of all safety-related components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

5.0 Recommended Maintenance

Every 500 Hours

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**

6.0 Notes



Legende

A2	battery management TSG
F2	fuse 70A main motor Sicherung 50A Zentralmotor
F3	fuse 10A key switch Sicherung 10A Schlüsselschalter
G1A	battery 12V 115Ah/105Ah Batterie 12V 115Ah/105Ah
G1B	battery 12V 115Ah/105Ah Batterie 12V 115Ah/105Ah
G2	battery charger 12,6A Batterieladegerät 12,6A
K1	relay main motor Relais Zentralmotor
K2	relay work mode Relais Arbeitsbetrieb
K3-B	relay main motor Relais Zentralmotor
M2	main motor Zentralmotor
S1	key switch Schlüsselschalter
S3	sweep switch Schalter Kehrbetrieb
X1	connector 16 pole electric box (W1-W2) Steckverb. 16pol. E-Kasten (W1-W2)
X5	connector 1 pole battery selection GiV/PzS Steckverbinder 1pol. Batteriewahl direkt GIV/PZ
X8	connector 2 pole therm.switch main motor Steckverbinder 2pol. Thermosch.Zentralmotor
X9	bolt connector 2 pole M6 main motor Klemmblock 2pol. M6 Zentralmotor
X10	connector 6 pole batterymanagement Steckverbinder 6pol. TSG

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					Verified				
A2 No.	Number appears	Change No.	Date	Name	Standard			Change No.	

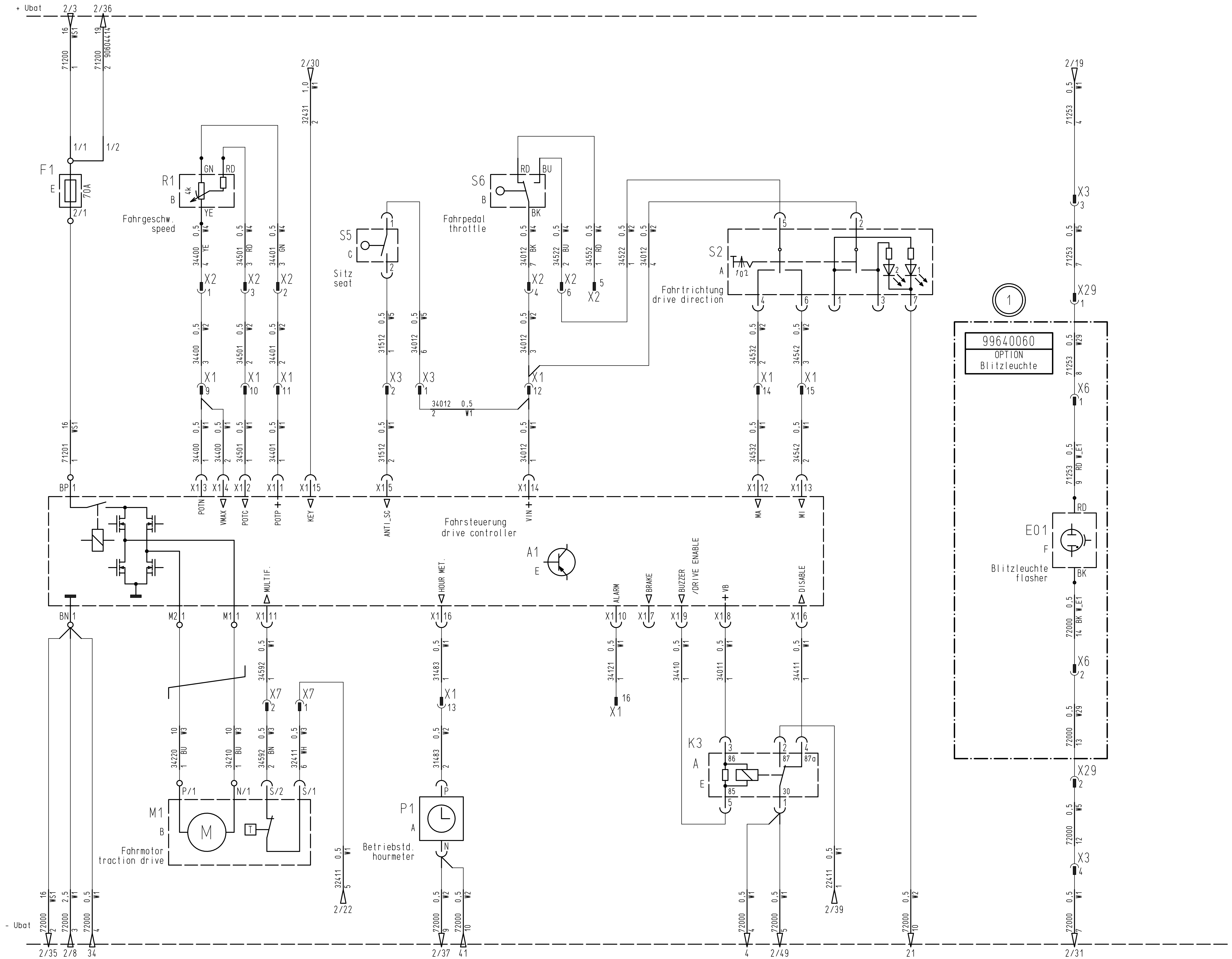
 (acc. DIN 34) KABI 470

Hako GmbH
D-23840 Bad Oldesloe

Type 6400-20 Dep. ELK

Drawing Number 91030890

No. of Sh. 4 | Sheet 2



Legende

A1	drive control unit Fahrsteuerung
E01	xenon warning beacon (opt.) Blitzleuchte (Opt.)
F1	fuse 50A drive motor Sicherung 70A Fahrmotor
K3-A	relay drive enable Relais Freigabe Fahrsteuerung
M1	drive motor Fahrmotor
P1	hour meter Betriebsstundenzähler
R1	drive potentiometer Fahrpotentiometer
S2	direction switch Fahrtrichtungsschalter
S5	seat with switch Sitz mit Schalter
S6	pedal switch neutral position Fahrpedalschalter Neutralstellung
X1	connector 16 pole electric box (W1-W2) Steckverb. 16pol. E-Kasten (W1-W2)
X2	connector 6 pole pedal (W2-W4) Steckverbinder 6pol. Fahrpedal
X3	connector 4 pole hood (W1-W5) Steckverbinder 4pol. Haube (W1-W5)
X6	connector 2 pole xenon beacon Steckverbinder 2pol. Blitzleuchte
X7	connector 2 pole therm.switch drive motor Steckverbinder 2pol. Thermosch.Fahrmotor
X29	connector 2 pole xenon beacon (opt.W5-W6) Steckverbinder 2pol. Blitzleuchte (W5-W6)

	1	1x	2839-00	15.02.13	Willsch	2012	Date	Name	Jonas 800	Name Schaltplan/schematic	Hako Hako GmbH D-23840 Bad Oldesloe	Drawing Number 91030890
						Drawn by	22.02.	MP	Replacem. for 2554-04			
						Verified						
A2	No.	Number appears	Change No.	Date	Name	Standard			Change No.	For this drawing we reserve all rights (acc. DIN 34) KABI 470	Type 6400-20 Dep. ELK	No. of Sh. 4 | Sheet 3

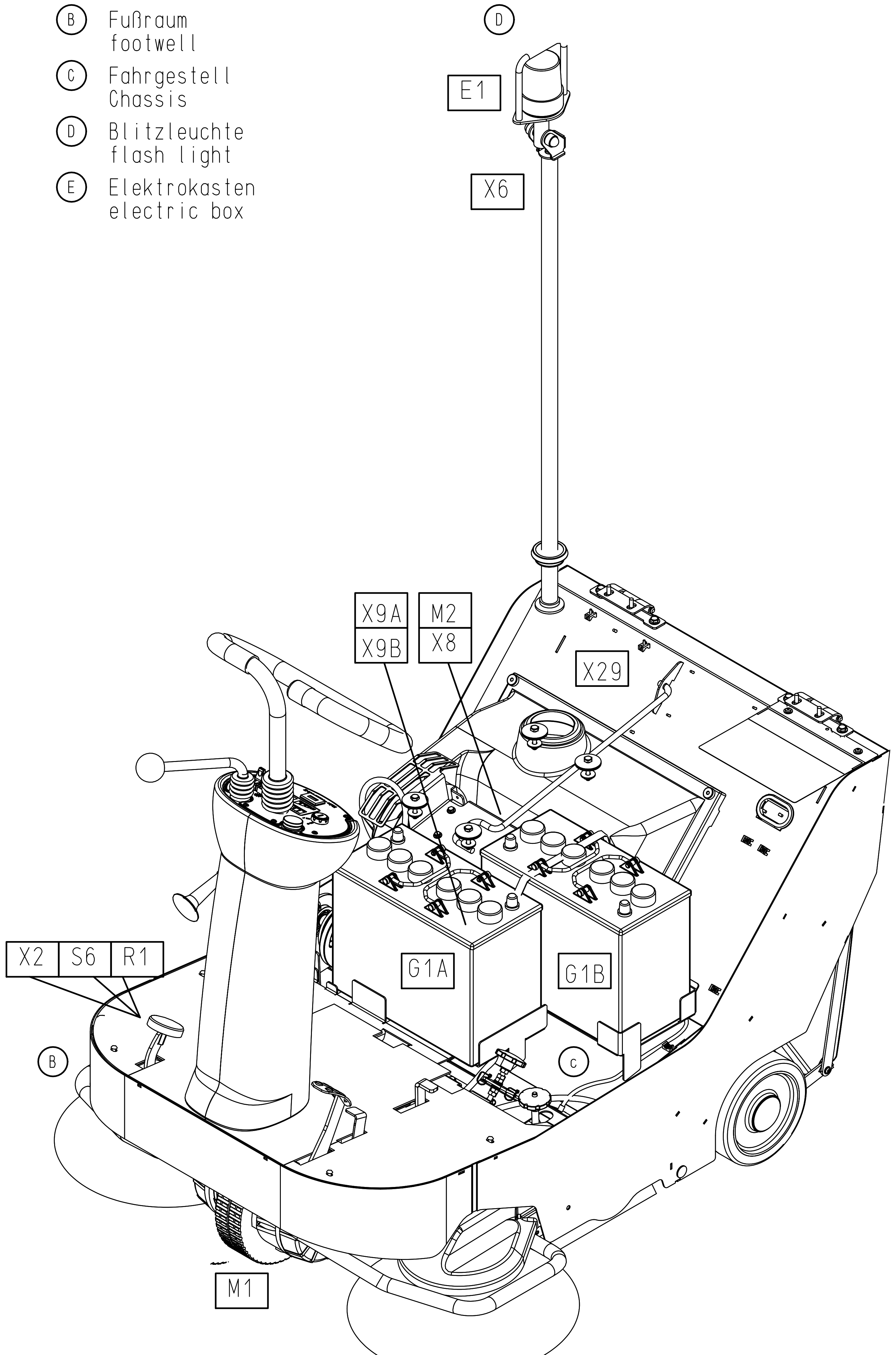
A Bedienfeld
dashboard

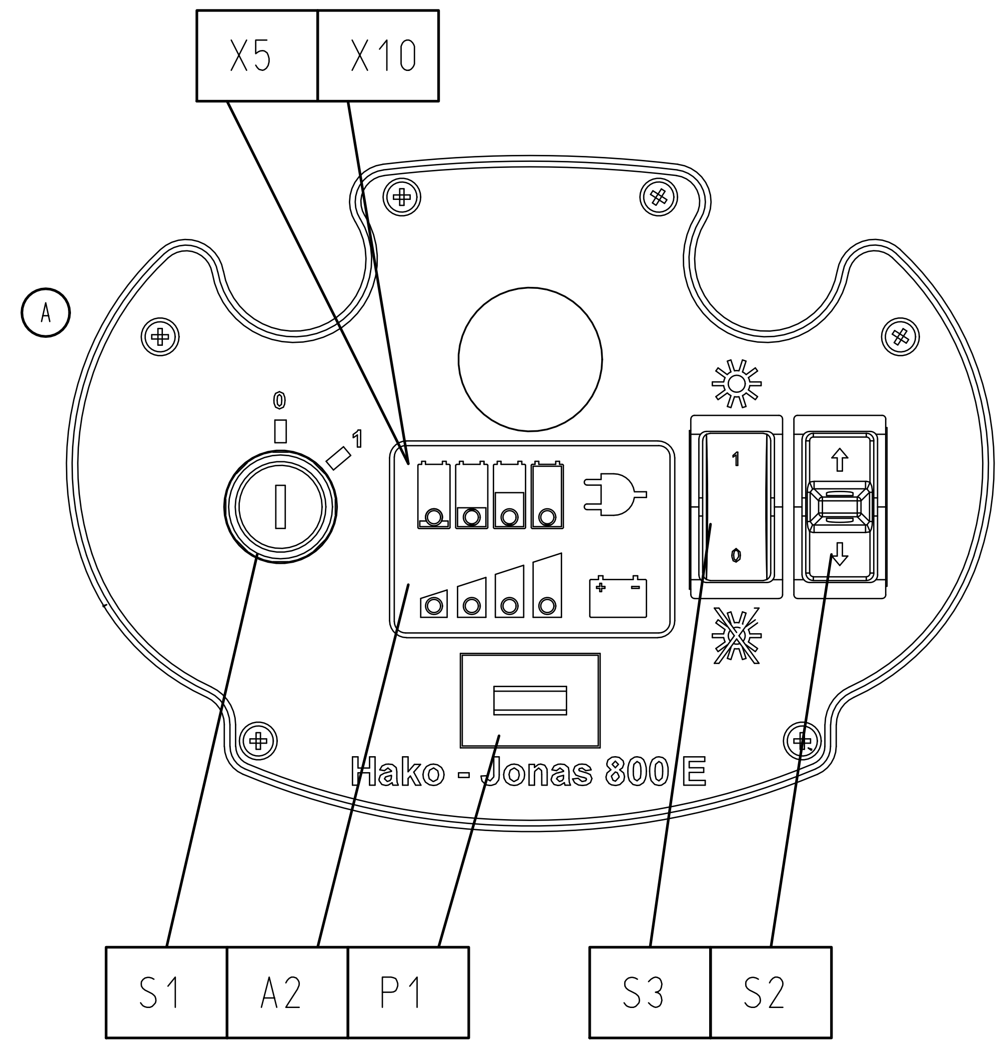
B Fußraum
footwell

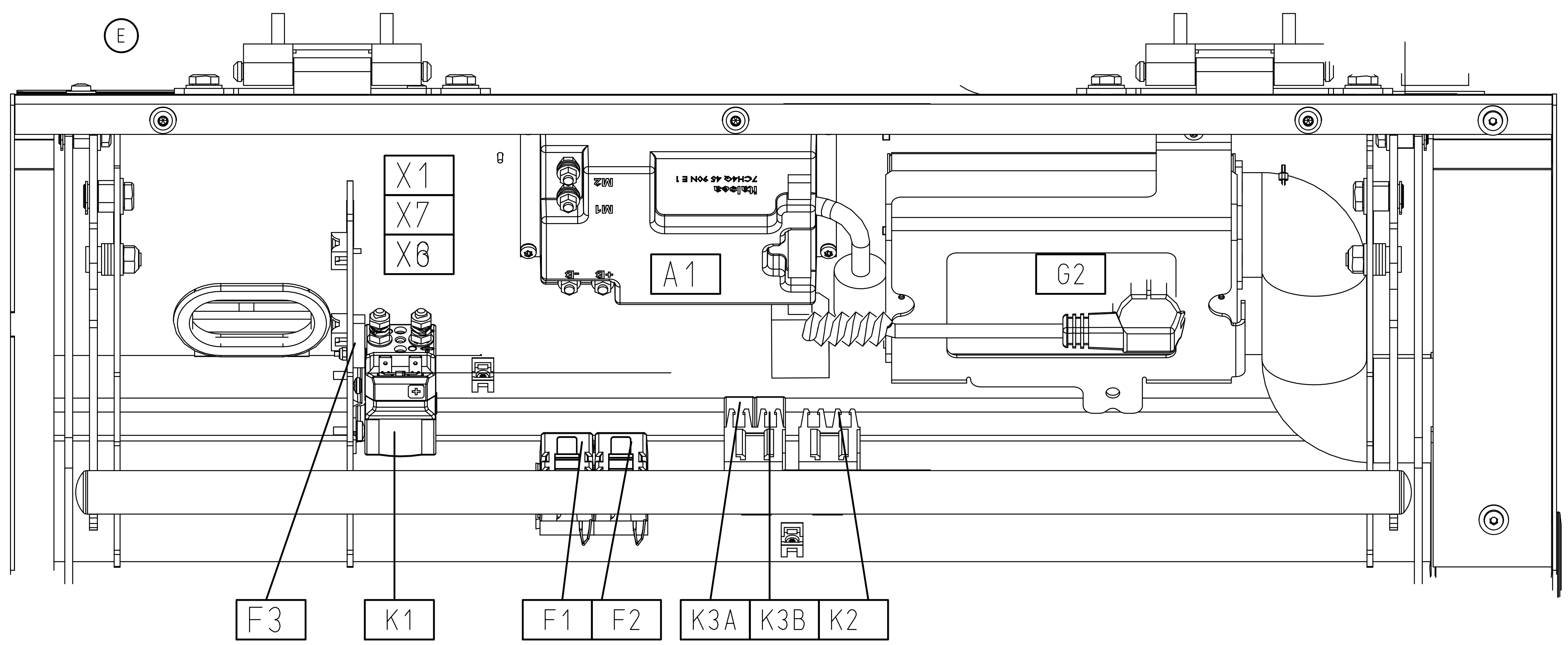
C Fahrgestell
Chassis

D Blitzleuchte
flash light

E Elektrokasten
electric box







All housings have to be labeled with device tags
Alle Gehäuse sind gemäß BMK-Liste zu Kennzeichnen

0	./.	2839-00	15.02.13	Willsch	2012 / Drawn by / Verified / Standard	Date 22.02.	Name MP	Jonas 800 / Replacem. for 2554-04 / Change No.	Name: Schaltplan/schematic / For this drawing we reserve all rights (acc. DIN 34) KABI 470	Hako GmbH D-23840 Bad Oldesloe / Type 6400-20 Dep. ELK	Drawing Number 91030890 / No. of Sh. 4 / Sheet 4
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