JHminiStrø

USER INSTRUCTIONS
Program version JH 1.91i ®

Table of contents:

Dear customer:

Congratulations on having acquired your JHminiStrø machine. These use instructions contain information important for correct, safe assembly of the machine.

JH Agro A/S works systematically to construct its products for complete user satisfaction. JH Agro A/S endeavours to construct its products so that they are as safe as possible. The machine does, however, have various functions that cannot be made completely safe. Safety rules in the form of warnings, both in these use instructions and in the form of transfers on the machine, have been defined.

It is therefore essential that you read these assembly instructions thoroughly before you begin to use the machine.

The use instructions have been written so as to give you detailed information about your new machine in the order you will need it. This applies to the machine's functions, installation, programming, use, ordinary maintenance and inspection.

These use instructions describe the newest model and JH Agro A/S therefore retains the right to change and improve the use instructions, as well as the design and construction of the machine, without being obliged to alter products previously delivered.

Sincerely yours,

JH Agro A/S

EU Conformity Declaration

JH Agro A/S
Lundholmvej 41
7500 Holstebro
Tel.:   +45 97428189

hereby declares that

Model/Type:

Serial number/year   _____

has been constructed in conformity with the Council Directive of 14 June on mutual approximation of the laws of the Member States on the safety of machines (98/37/EEC) with special reference to Annex 1 of the Directive on essential safety and health requirements in relation to the construction and manufacture of machines. The following harmonising standards have been used: EN 60204-1 and EN 294.
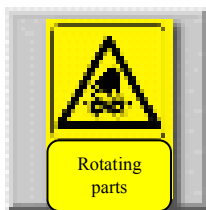
JH Agro A/S

_____   _____
Date   Ken Hyldgaard
               Managing Director

Safety rules

Read the safety rules given here and on the following pages, examine the warning transfers on the machine and think about how, in your daily use of the machine, you can ensure compliance with the safety rules.

Be aware of these three symbols on the machine and in the instruction book.

| **Keep your distance - there is the risk of accident** | **Risk of injury to the hands** | **Risk of injury to the hands** |
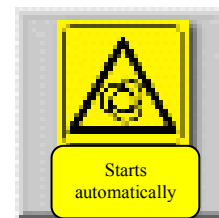
1. Make sure that children or adults unable to ensure their own safety do not come near the machine unless accompanied by adults who are able to operate it.

2. Make sure that the stall door is marked with the sign provided warning against being in the stall, in which there is a machine that may automatically start up.

3. **Never** clean, lubricate, service or repair the JHminiStrø without the main switch being turned off and locked.

4. **Never** throw hard or solid objects into the machine.

5. **Always** keep the guard in place and in order when the main switch is on or when you leave the machine with the main switch unlocked.

6. **Never** install larger fuses in the power installations than specified by the factory.

7. Power installation and power repair **must** be done by an authorised power installer or authorised Jørgen Hyldgård Staldservice service installer.

8. **Never** try to remove straw/sawdust or foreign objects from the hopper's movable parts if the main switch has not been shut off and locked.

9. Service inspection **must** be done once a year. Failure to do so may result in the machine not operating properly or in harm to unskilled personnel. The power must be off during all service/inspections.

10. Modifications to the machine may only be done by persons who have been authorised by the supplier to verify that any modifications meet the requirements of the EU Machine Directive and, if necessary, who are able to draw up an EU Conformity Declaration.

11. When the machine's batteries are replaced, they **must** be delivered to an approved disposal service.

6

Description of JHminiStrø

JH AGRO

Charge contact-rail

Main switch

Drive motor

Reset

Emergency stop

CPU

Empty sensor

Full sensor

Control cabinet

Emergency stop

Spread plate

Spread plate

Belt

Battery case
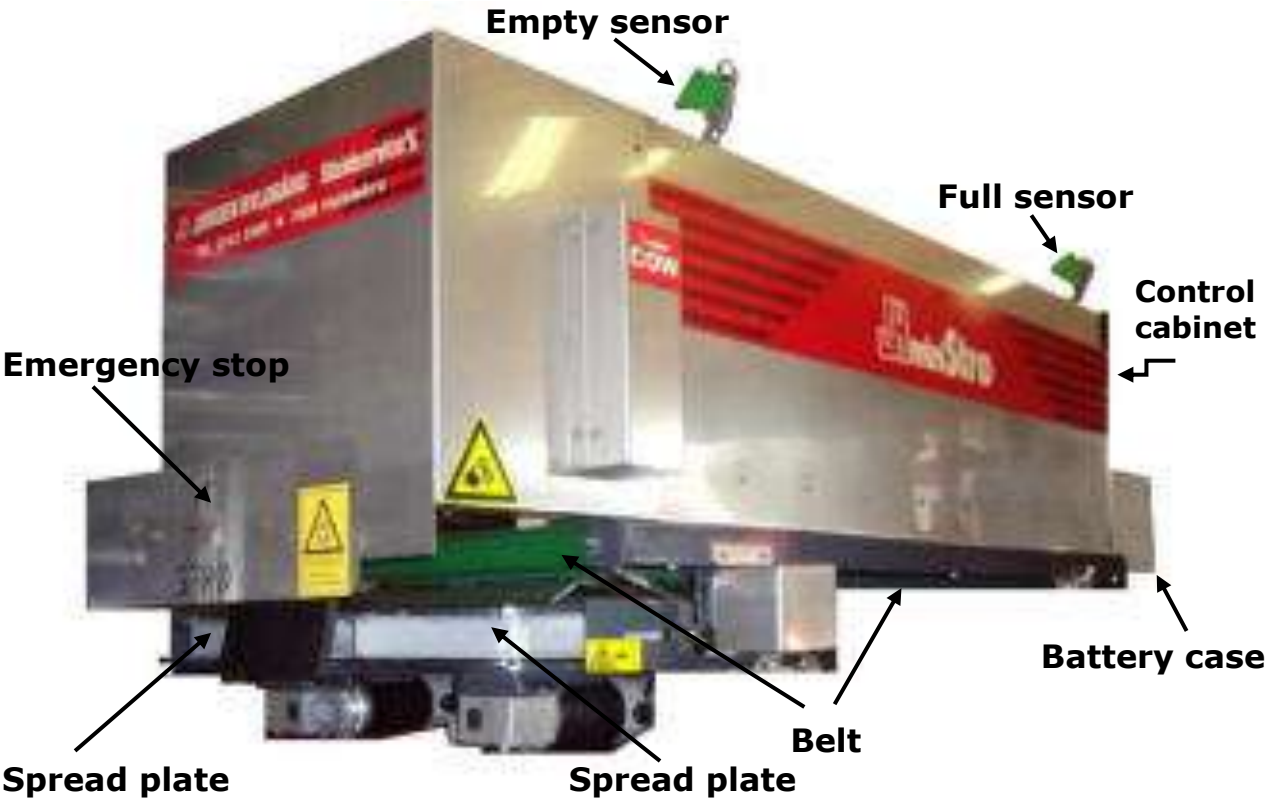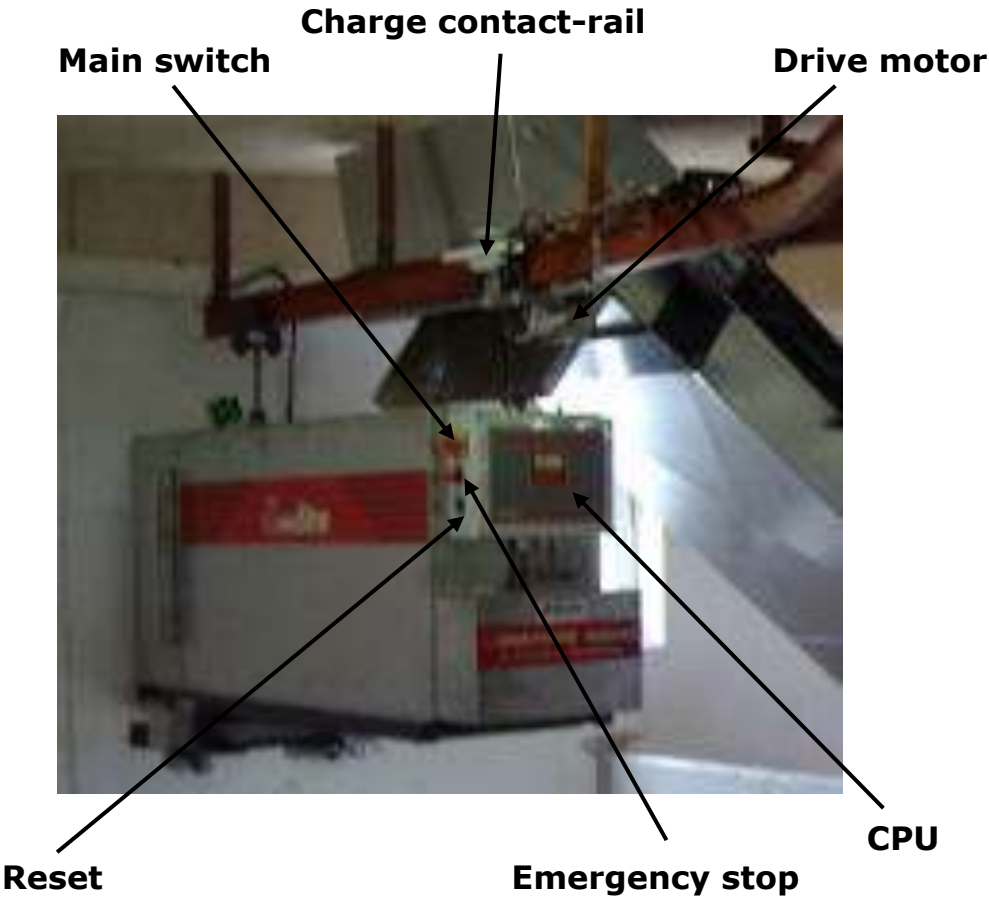
Function description:

a) JHminiStrø is a battery-driven, CPU-controlled spreader for automatic spreading.

b) The hopper is able to spread cut straw and sawdust automatically filled from the storage unit. The hopper is hung from a rail (IPE100/IPE120).

c) The system is based on the spreading being subdivided into tracks that are in turn subdivided into sections. The amount may be changed by adjusting the controls.

d) The hopper has various operation speeds: one speed when it spreads and another speed when it is not spreading or is run empty. Operation up to 30 m/minute

e) The hopper's functions are controlled by means of marker numbers entered into the CPU. A marker is affixed to the middle of the rail's underside at each position at which a function is performed. The marker is recorded by the hopper's inductive sensors and the CPU consecutively counts the home position up to the last marker number entered for each track.

f) At a programmed time, the spreading starts in the tracks programmed for the spreading time. The tracks are spread in the order entered. For example: (track 1, 8:01 a.m.) (track 2 8:02 a.m.) (track 3 8:04 a.m.) (track 4 8:03 a.m.). When the clock on the CPU reaches 8:01 a.m., track 1 starts. While the hopper is spreading track 1, the clock will overrun the other start times for tracks 2-3-4. These tracks will be set in the queue on the CPU's display in the order that the start time is overrun. In the example, these tracks are 2, 3 and 4.

g) The hopper will start forwards or backwards depending on what has been entered for the relative track. The machine will run forwards or backwards until it reaches the first marker number entered for the relative track, where it will begin spreading. The hopper will count the markers in the order it encounters them.

h) When the hopper starts spreading at the first marker entered (Start spreading, Section 1) for the relative track, it will continue spreading until it comes to the number entered in the CPU as (Spread section end). It will then start and stop again at sections 2, 3, 4, etc, if a value has been entered for these sections. When the hopper has finished, it will return to the home position, where the inductive sensor on the side of the trolley is activated and the hopper will begin charging the machine's batteries by means of the charge-contact rail's connection.

i) The hopper may run out of spread material while spreading in a given section. If the hopper is empty, this will be recorded by the hopper's empty sensor and the spreading will stop. The hopper will now return to the home position, where the storage unit for filling is located. The hopper will be filled with spread material until its full sensor and empty sensor are activated. When filling has been completed, the hopper will travel back to the place where it ran empty and begin spreading again.

j) The distance between the affixed markers determines how large the spreading overlap will be, since the hopper remembers the number of the last marker passed. 3-5 m is a reasonable distance between markers, since the hopper will spread a little less at the beginning and when it is about to become empty.

k) The hopper's capacity per load depends on the setting of the empty- and full sensor. A load with normal spreading with cut straw corresponds to 32 bed compartments and, with sawdust, 80 bed compartments, with spreading twice daily.

8

Product data model. Cow-Handy

1. Cubic content: 0.375 m³. This cubic content does not mean that this volume may be used up completely with all types of spread material. In practice, consumption of the volume will be 70-80%, depending on the nature of the spread material.

2. Total weight: The unladen weight is 125 kg. The spread material's weight is then added to the load.

3. Tracks and sections: It is possible to program up to nine different tracks with 10 sections, each of which may be started automatically at four different times.

4. Travelling speed: Up to 30 m per minute.

Batteries: 2 12 Volt 40-75 (depending on the model) Ah gel batteries (dry cell).

Capacity: Approx. 1000 bed compartments in loose housing.

7. Standard equipment: Complete spreader, rail ready, CPU control, 2 batteries, 1 charging unit, 40 markers, standard shredder, 1 contact rail for charging and 1 receiver for filling equipment.
Exclusive of electrical switch, control cabinet for filling equipment and storage units for spread material.

8. Extra equipment: Electrical switch controlled by the spreader's CPU. Special cylinders.

Product data Pig-Combi model.

1. Cubic content: 0.525 m3. This cubic content does not mean that this volume may be used up completely with all types of spread material. In practice, consumption of the volume will be 70-80%, depending on the nature of the spread material.

2. Total weight: The unladen weight is 200 kg. The spread material's weight is then added to the load.

3. Tracks and sections: It is possible to program up to nine different tracks with 10 sections, each of which may be started automatically at four different times.

4. Travelling speed: Up to 30 m per minute.

5. Batteries: 4 12 Volt 40-75 Ah gel batteries (dry cell).

6. Capacity: Approx. 2 minibig bales per day.

7. Standard equipment: Complete spreader, rail ready, CPU control, 4 batteries, 1 charging unit, 40 markers, standard shredder, 1 contact rail for charging and 1 receiver for filling equipment.
Exclusive of electrical switch, control cabinet for filling equipment and storage unit for spread material.

8. Extra equipment: Electrical switch controlled by the spreader's CPU. Special cylinders.

Noise: For both models, the equivalent and weighted noise level is under 70dB.

9

Measurement diagram: Cow-Handy model.

Note: Measurement D – the distance between the vertical uprights for the travel rail - is based on the fact that less than 200 mm clearance between the hopper and the vertical upright is not considered as safe.

The hopper is not suitable for spreading for horned animals.

Measurement diagram: Pig-Combi model.

Note: Measurement D – the distance between the vertical uprights for the travel rail - is based on the fact that less than 200 mm clearance between the hopper and the vertical upright is not considered as safe.

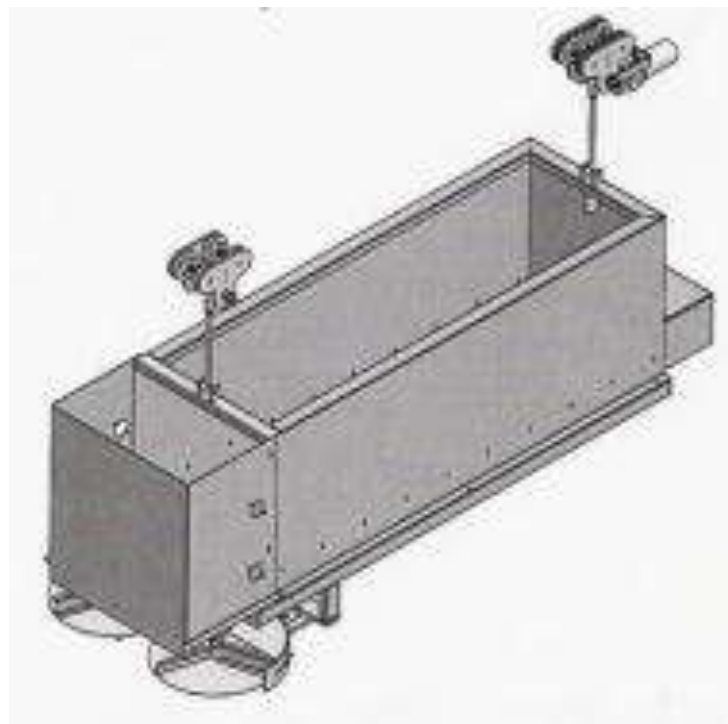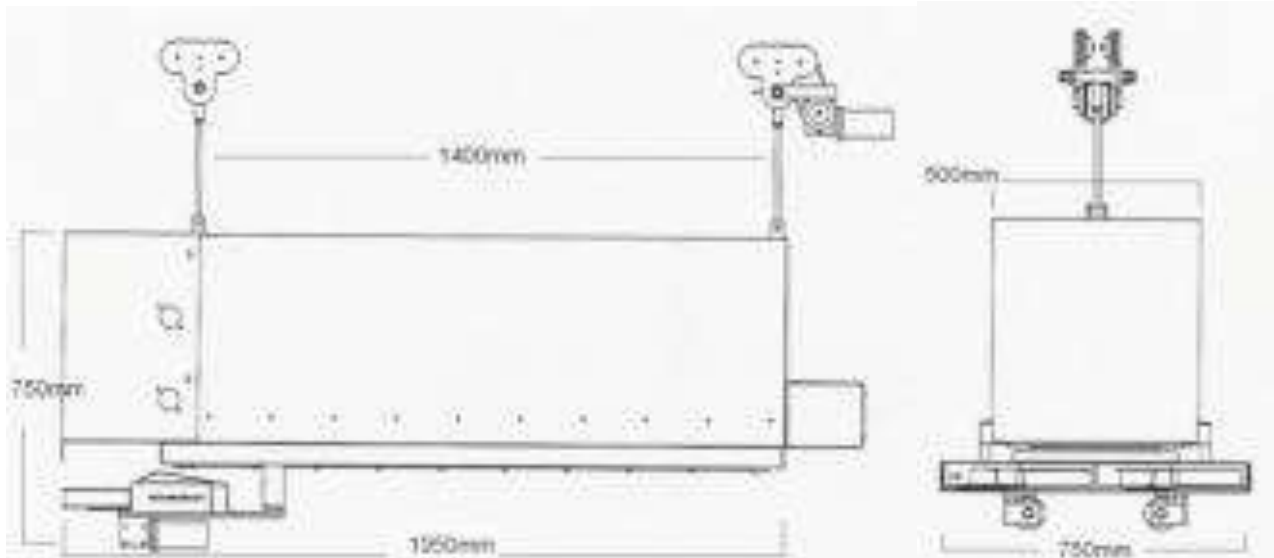The hopper is not suitable for spreading for horned animals.

Product Data   Sand model.

1.Cubic content: 0.375 m3. This cubic content does not mean that this volume may be used up completely. In practice, consumption of the volume will be 70-80%, depending on the nature of the spread material.

2. Total weight: The unladen weight is 125 kg. The weight of the sand is then added to this weight, for a possible total weight of up to 400 kg.

3. Tracks and sections: It is possible to program up to nine different tracks with 10 sections, each of which may be started automatically at four different times.

4. Travelling speed: Up to 30 m per minute, respectively.

5. Batteries: 2 12 Volt 40-75 (depending on the model) Ah gel batteries (dry cell).

6. Capacity: Approx. 1000 bed compartments in loose housing.

7. Standard equipment: Complete spreader, ready to rail, CPU control, 2 batteries, 1 charging unit, 40 markers, standard shredder, 1 contact rail for charging and 1 receiver for filling equipment.
Exclusive of electrical switch, control cabinet for filling equipment and storerooms for sand.

8. Extra equipment: Electrical switch controlled by the spreader's CPU. Special cylinders.

Noise:

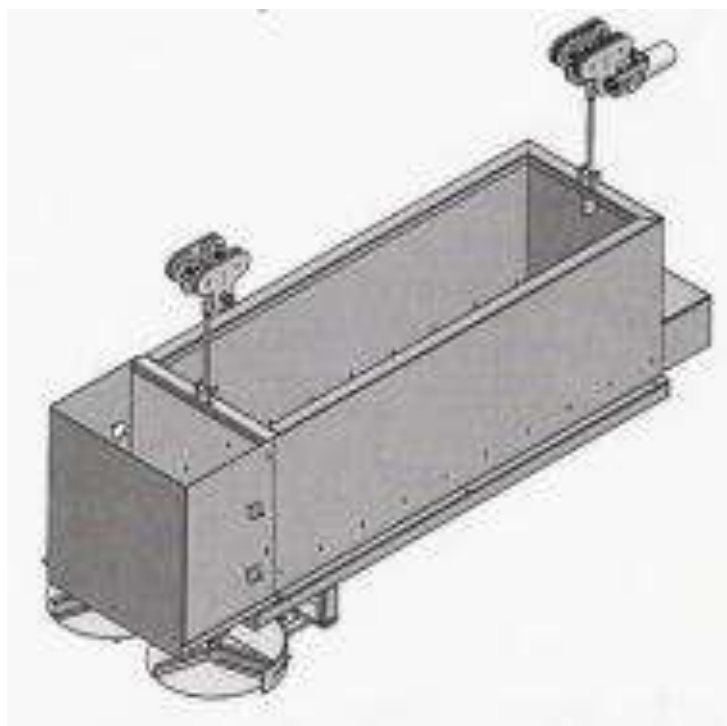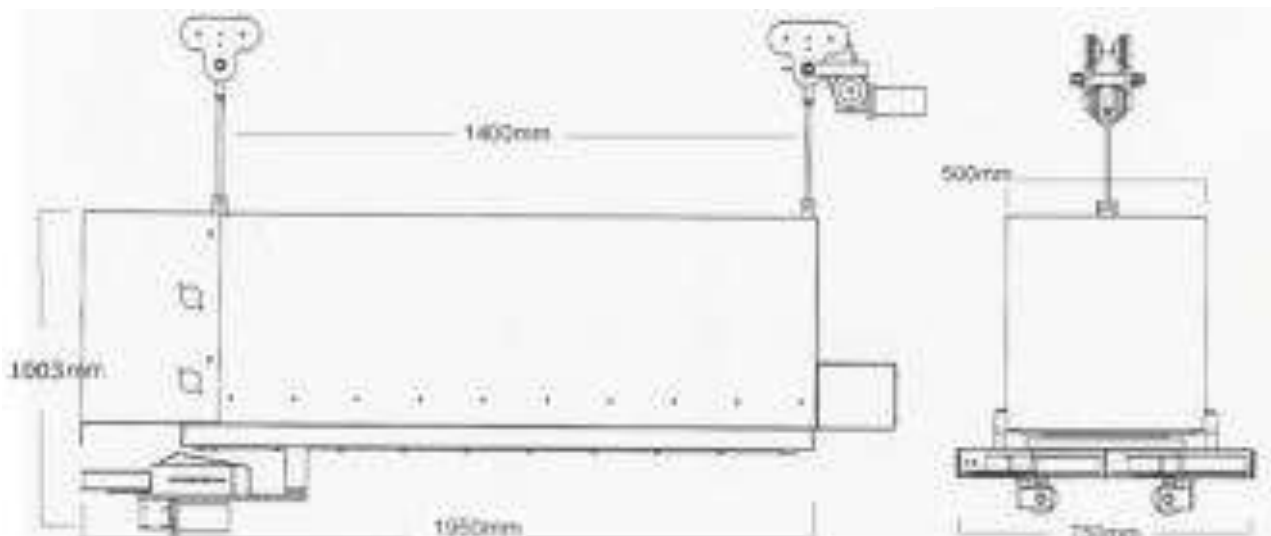The equivalent and weighted noise level is less than 70dB.

Measurement diagram: Sand model.
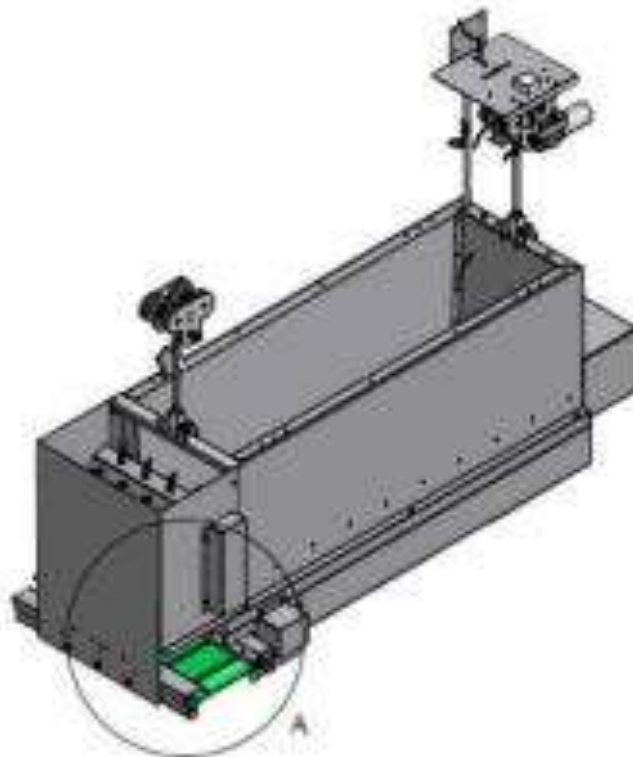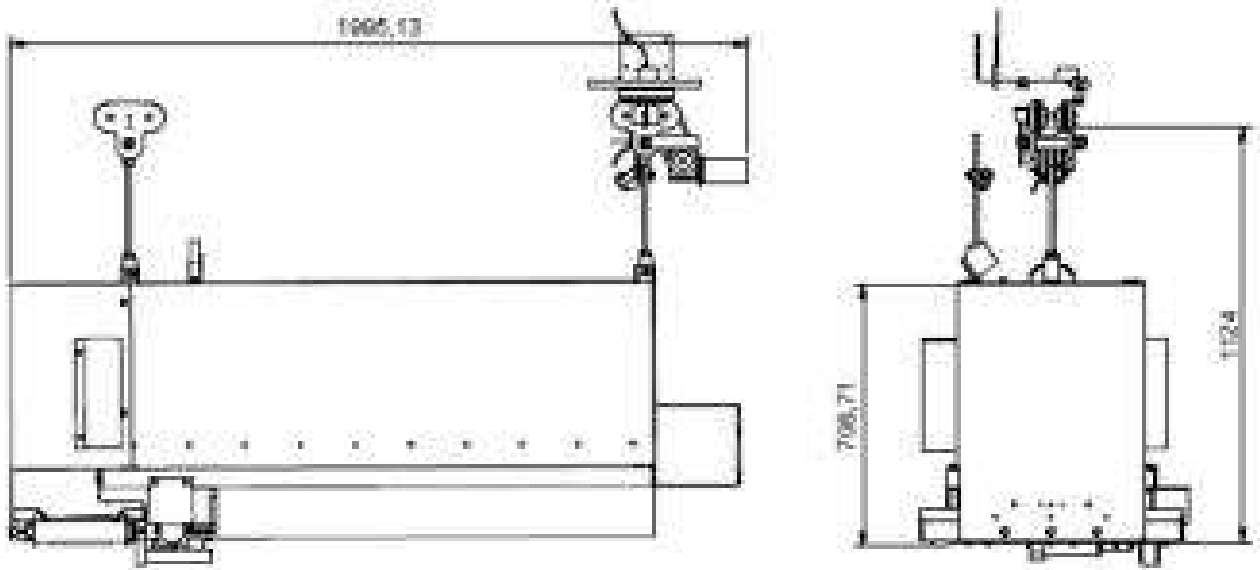
Note: Measurement D – the distance between the vertical uprights for the travel rail - is based on the fact that less than 200 mm clearance between the hopper and the vertical upright is not considered as safe.

The hopper is not suitable for spreading for horned animals.

Installation.

Installation of the spreader includes assembly of the travel rail in the stall, choosing the place on the rail where the hopper stops for filling, as well as the home position where it stops for battery charging between spread runs.

Travel-rail system:
The travel-rail is first set up in the stall in the most appropriate position with respect to spreading and to distance for securing (see the "Measurement diagram" section). For a maximum total weight of 125 kg. + plus spread material load (straw/sawdust), the following maximum distances are possible between the travel rail's hanging points.

IPE 100: 5000 mm   IPE 120: 6000 mm

The travel-rail system for the JHminiStrø Sand model must **always** be **IPE 120**. For a maximum total weight of 125 kg + sand load of approx. 200 kg = total weight of 325 kg, the following maximum distances are possible between the travel rail's hanging points.

IPE 120: 5000 mm - 7000 mm, depending on the stability of the suspension structure.

The travel rail may not be hung from a roof structure without the extra stress of the spreader's total weight having been taken into consideration.

The rail is usually mounted on a previously Installed beam as follows:

Beam

There must be a minimum of 150 mm clearance under the hopper.

The beam must be at least 2" (external dia. 60 mm, medium 3.6 mm).

1. **Spreader**
2. **Sawdust storage**
3. **Bed compartments**
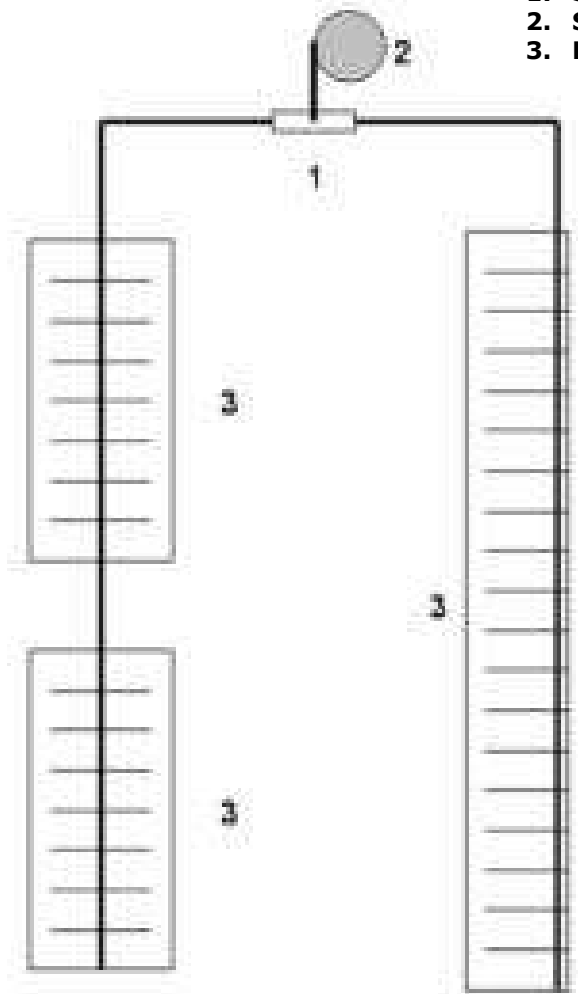
The fill position and the home position are one and the same
And may not be on curves. They may be on straight rail stretches only.

Assembly of JHminiStrø.

The JHminiStrø is delivered on a pallet. It is a good idea to use the pallet for manoeuvring the hopper while hanging it on the travel rail. Preparation and hanging is done in the following order:

1.   Hanging the hopper

The 2 trolleys are assembled on the rail as per the following drawings.

(Drawing A)
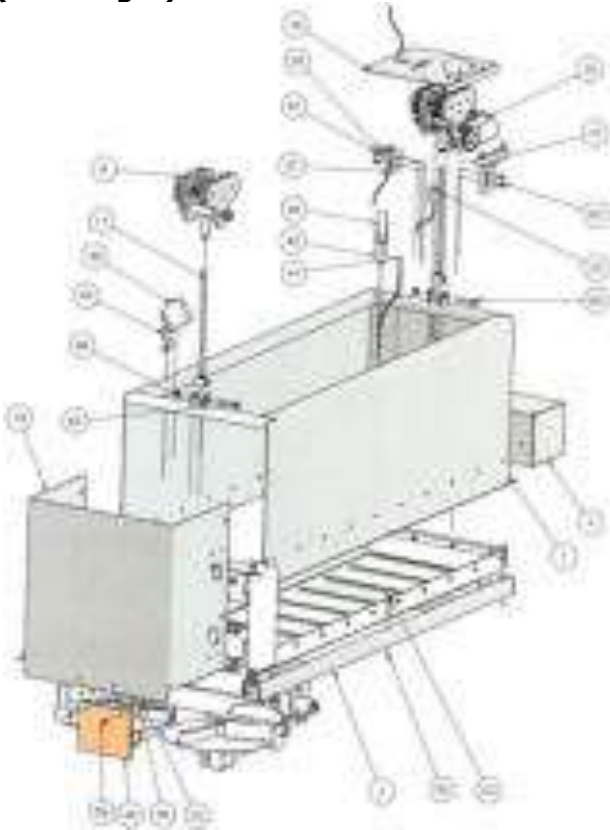
(Drawing B)
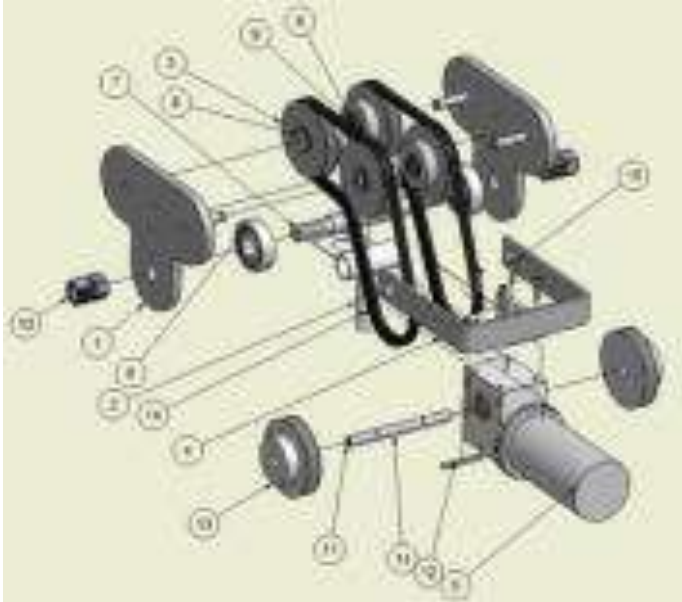
1. Hanging the hopper:

a) First, determine the length for the eyebolts appropriate
for filling with spread material. Shorten the 33-cm long eyebolt (Drawing A - point 11) so that it is appropriate for the desired filling height.

b) Then screw the eyebolt to the base plate. Screw the eyebolt all the way into the bottom of the base plate and then unscrew it 2 turns. (Remember to grease the threads).

c) Place the eyebolt (Drawing A – point 11) in the middle of the trolley's bearing axle (Drawing B – point 7) (Remember to assemble the eyebolt with the fitting for any inductive sensor, as well as 1 6304 bearing (Drawing B – point 6) followed by 1 washer in the end where the control cabinet is located Then assemble the following parts from both sides. Spacers depending on rail width – (IPE 100 0-1 IPE 120 4-6), then screw on 1 M 16-mm nut (Drawing B – point 10) on each side of the trolley (Drawing B – point 1) so that they are assembled on the rail. Position the belts (Drawing B - 14) loosely on the trolleys.

d) Hang the hopper from the eyebolt (Drawing A – point 11) between the two welded eyes on the body of the spreader. Use the 2 bolts (Drawing A – point 65) 10 x 70 with washers and lock nuts.

e) Assemble the drive motor (Drawing A – point 10) at the same end as the control cabinet on the spreader. Hook the drive motor's fitting (Drawing B – point 4) over the bearing axle and carefully pull the other over the bearing axle (Drawing B – point 7) on the other side. Assemble the belts on the trolley and drive motor (Drawing A – point 10), hold down on the end of the drive motor so that the belts are tight, screw on a 16-mm nut from each side, and a 16-mm nut on each side of the trolley at the other end, as counternuts.

f) Assemble the console (Drawing A – point 37) for the home-position inductive sensor in the threaded hole on the side of the trolley as shown in the drawing and then assemble the charge contact (Drawing A – point 17) on the opposite side of the trolley in the threaded hole. Adjust the contacts' height so that the end of the pins are 10-15 mm under the upper edge of the travel rail.

g) Pass the cables from the assembled units forward to the connection points as shown in the drawing and on the cable plan on the next page.

2. Inductive sensors:

The 2 inductive sensors (Drawing A – points 37 & 67), assembled on the trolley at the computer end of the hopper, are activated by markers affixed to the middle of the rail's underside and by another marker that must be assembled in the oblong hole on the charge console.

Sensor 1 (Drawing A – point 37), located in the middle of the rail's underside, continuously counts the marker numbers and thus controls the hopper's functions.

Sensor 2 (Drawing A – point 67) (home sensor) is located on the right, on the side of the trolley. It has two functions so that, when it is activated, the hopper will begin to fill, and so that it opens the charge circuit and begins to charge the batteries.

3. Markers:

The markers are affixed to the middle of the rail's underside. The length of 280 mm has been chosen to correspond to the hopper's reaction time. Place the markers where a start/stop spread function section is to occur. Place the marker at a distance of approximately 3-5 m, between each stop/start marker, since it will determine the size of the overlap when the machine has been run empty and will resume spreading when it has been filled. Always remember to use the short marker (length: 80 mm) where the machine must change track or fill with spread material.

The hopper counts the markers in increasing order, starting with the number programmed for the first marker to "start spreading" on each track. (Except for empty travel back to the filling position, the hopper will continue back until the home sensor is activated and then, after each filling, will count up to the last marker passed before it became empty).

The marker numbers for the hopper's route are programmed in the CPU, following the programming instructions.

4. Filling with spread material:

A sender has been assembled on the hopper's side (Drawing A – point 47). It sends a wireless signal to a receiver in the console (Drawing A – point 18) at the home position. The sender will send a signal to the receiver until the hopper is full. (The receiver in the console must be set sideways so that the sender and receiver are opposite each other).

The full- (Drawing A – point 46) and empty sensors (Drawing A – point 46) assembled at the front of the hopper must be adjusted so that they are activated approximately 10 cm from the bottom of the hopper (empty sensor). The full sensor is then adjusted according to how full the hopper should be. **(FULL- AND EMPTY SENSORS MUST BOTH BE ACTIVATED BEFORE THE MACHINE WILL STOP FILLING).**

5.   Home position:

the home position is where the hopper is parked between spreading runs and is the start/stop position for a spreading run.
The charge contact-rail connected to the charging unit is placed at the home position. The home marker is adjusted on the side so that when the hopper stops, the sender and receiver are opposite each other.

6.   Electrical track change:

Track changing to the right and left occurs with the help of an electrical actuator powered by the relative power unit by means of the sender on the hopper and the accompanying receiver and marker.

The electrical actuator has a stroke of 70 mm. The stroke length is determined by the built-in terminal contacts. It is therefore important for the actuator to be able to travel freely to both the shortest and longest external positions. At both external positions, the actuator must be able to move ½ - 1 mm in the assembly holes clearance (page 16, Image 2 – point **1)**. The stroke length when tracks are changed may be adjusted on the bolt (page 16, Image 2 – point **2**) on the switch.

A marker is placed for the track change, after which it is assembled, so that it passes in front of the hopper's sender when the machine stops at the marker.
The actuators' 2 cables are assembled in the control (brown + and blue -). The left/right change may be carried out by activating the throw-over relay in the control by means of the pushbutton.
NOTE! Grease the switch's movable parts thoroughly.

The electrical switch must always have a support point a maximum of 100 mm outside of each outflow leg. The support points are solidly connected so that there is no deflection that could interfere with the spreader's passage through the switch.

The spreader's drive wheel may never be placed in the switch when it is in operation.

(Image 1)

Support points

Support point

(Image 2)

(2)   (1)
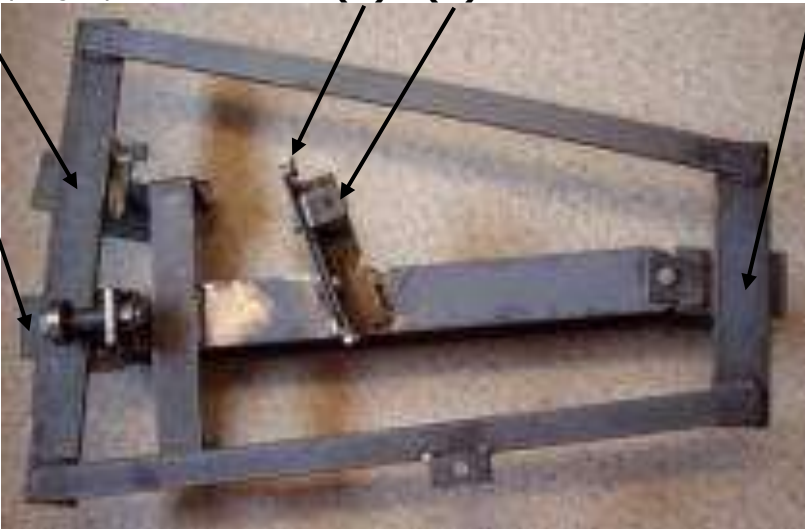
7.   Curves:

Curves may not have a radius of less than 900 mm. The inclination of the travel rail may be a maximum of 15 cm per metre and only on straight   stretches. Curves must be horizontal.

Power diagrams.

Main fuse

Shredder

Right plate

Left plate

Band

Drive

30 A

30 A

30 A

30 A

30 A

Main fuse

6# red 300 mm

Emergency stop

Reset

Main switch

6# red 2 pcs. 50 mm

6# red 2 pcs. 50 mm

6# red 200 mm

(Hvid = White) →

Styring = Control
Nød = Emergency
Hoved relæ = Main relay

Red motor Shredder
Red motor Right plate
Red motor Left plate
Red motor Band
Red motor Drive

Black Shredder
Black Right plate
Black Left plate
Black Band
Black Drive

Yellow Shredder
Brown Shredder
Yellow Right plate
Brown Right plate
Yellow Left plate
Brown Left plate
Yellow Band
Brown Band
Yellow Drive
Brown Drive

Motor Driver

Full   Empty   Position   Transmitter   Charger   Opt.

Description of control principles.

The minispreader is equipped with electronic control and is operated by means of a membrane keyset with 4 keys. The keys are named: **MODE**, **SCROLL UP**, **SCROLL DOWN** and **ENTER**

Parameters and status are read on the control's backlit 4 x 20 character display.

The following is displayed for approx. 2 seconds when the spreader is turned on: 2 sec.:

```
JH Staldservice A/S
www.
        jhstaldservice.dk
SW version 1.91i
```

☐　　☐　　☐　　☐

MODE　↑　　↓　**ENTER**
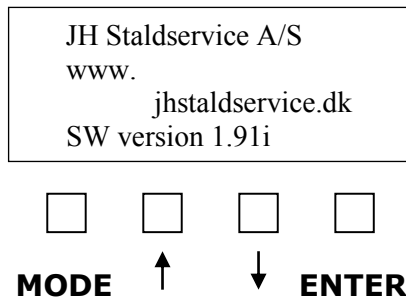
If the spreader is in the "home position", the control will continue with normal operation. If the spreader is not in the "home position", an alarm condition is activated and the spreader must be run back to the "home position" manually. See the menu topic "Man. motor operation"

```
13:04:02      Bat:  24.4 V
Stopped, 0     Pos:       0
Queue:
Menu  Start   Stop   Res.
```

☐　　☐　　☐　　☐

MODE　↑　　↓**ENTER**
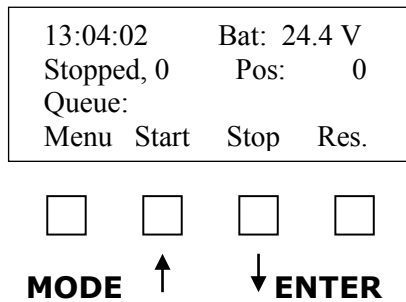
In order to set the minispreader to operating condition, push the "Start" button. The minispreader will then be ready to run the tracks and the display will show:

```
13:04:02      Bat:  24.4 V
In operation, 0       Pos:
0
Queue:
```

☐　　☐　　☐　　☐

MODE　↑　　↓**ENTER**
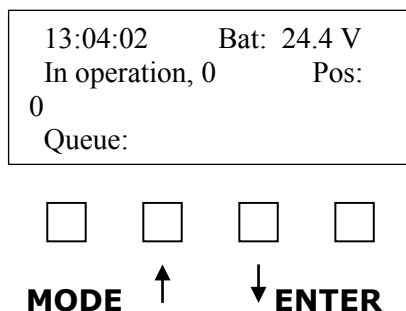
The control software functions on the basis of digital input and the variable parameters entered.
The control software for the minispreader may be subdivided Into the following subpoints:

a)　*Menu for entering of control parameters*
b)　*Control logic for track run*
c)　*Motor control with serial communication*

23

d) *Alarm functions and service routines*

a) The entering of variable parameters is described in the section **"Operating instructions"**.

b) Track running occurs at pre-programmed times or when the track number is entered manually in the "Run tracks" menu point. If the time for one track is reached while another track is being run, the new track is put in the queue and is run when the previous track has been completely run. The queue status is shown on the display. It is possible to stop the track run by pressing "Stop" It is possible to use remote control for start/stop instead of using the start/stop button on the display. If you do not want to run the remaining part of the track and any waiting tracks in the queue, press the "Res" button for at least two seconds.

The entire track is equipped with markers at appropriate distances. The markers are scanned by an inductive sensor and are used to determine where the spreader is on the track. There can be up to 99 markers per track. As the spreader moves away from the home position, an internal position counter counts up 1 each time a marker is passed and, on the way towards the home position, counts down 1 each time a marker is passed. The spreader can thus always determine where it is on the track. An action can be carried out at each marker, such as "Change track". The action to be carried out is pre-programmed in the "Tracks" submenu. Note that if the "Turn" action is used, the internal position counter still counts 1 up each time a marker is passed, even though the direction is towards the home position, since the track is still considered as "outgoing". When the "End track" action is reached, the spreader travels back to the turn position, turns and travels back to the home position.
If the "Spread backwards" action is used, the spreader travels back towards the home position from the marker defined as the start position for this function and the internal position counter counts 1 down each time a marker is passed. When the "End track" action is reached, the spreader continues to travel back towards the home position.
Note: If spreading is being run and the object sensor under the hopper is activated, the belt- and shredder motor will stop for as long as the sensor is activated. On- and off timers connected to this object censored are programmable.

The following actions are possible at a marker:

- End track
- Low speed (reduces the speed until normal speed is chosen again)
- Normal speed
- New belt speed
- Change switch
- Always change switch (also on the way back to load more straw)
- Turn
- Start spreading to the left/right/both sides (Start at one section)
- Stop spreading (Stop at one section)
- Stop travelling and spread for a specific period of time to the right/left/both sides
- Stop travelling and spread for a specific period of time or until the straw sensor under the hopper is activated on the right/left/both sides
- Skip spread section
- Start spreading on the right/left/both sides (Start at one section) End track automatically when hopper is empty.
- Stop travelling and spread until the hopper is empty. End track automatically when the hopper is empty.
- Run the spread plate forwards
- Run the spread plate back
- Run the equipment forwards

- Run the equipment back
- Turn on the IR pulse (wireless change signal)
- Spread max. time R&L
- Spread max. time R
- Spread max. time L
- Spread forward/backward R&L
- Spread forward/backward R
- Spread forward/backward L
- Turn forward/backward spread
- Stop at marker

- Fill empty hopper's spread bin at a specific time (must be programmed as the first action at position 0)
- Filling position for spread material (must be programmed as an action at position 0)
- Spread backwards (must be programmed as an action at position 0. Ordinary spread functions may only be used - no other functions may be used. The first action after "Spread back" must be "Skip spread section" at the position from which the machine is spreading backwards)
- Start direction backwards; travel in the opposite direction (towards the home position only)
- Forwards/back filling (toggle function) of the hopper's spread bin as the hopper travels forwards and back between the normal straw-filling position and straw-filling position +1 (must be programmed as an action at position 0)

- Sensor 2 relay on

There are several choices among the action possibilities referred to. It is also possible not to set anything specific at a marker.

Switch: while travelling along the track, there may be switches at which the spreader can be programmed to change position. Before a track change, the spreader will start to emit a wireless change-signal for the number of seconds preset in the "Technical settings" menu point, wait for a pre-programmed number of seconds and then continue travelling on the track. The following applies when the change function "Change track" is chosen: when the track has been completely run and the spreader is on the way back to the "home position", the switches are set after passage back to the original position. If "Always change track" is chosen, the switch will change position every time it passes. Note: the switch may not be used in a track where the "Spread backwards" function is used.

Empty spread bin: there are several possibilities for programming the filling function when the spread bin is empty. It is possible to program whether the spread is to be filled only when the hopper is empty. This setting is used when spreading with straw. When spreading with sawdust, you can choose to fill a half-empty hopper when the hopper is at the "fill position".

It is also possible to program the spreader to fill an empty spread bin at a specific time.

If the forwards/back (toggle function) of the hopper's spread bin is chosen, the hopper travels back and forwards between the normal straw-filling position and the straw-filling position + 1 so that the hopper can be better filled with certain types of spread material. You can choose how long you want the hopper to pause at each position marker. If the hopper travels forwards/back more than 20 times, this is interpreted as an error and the track run stops. The track run can be begun again by pressing "Start", which resets the toggle function's counter.

The home position is indicated by a special marker that activates the inductive home-position sensor. At the home position, the built-in batteries are charged. It is also normal at this position for the machine to fill with new spread material. The spreader emits a charge signal for a few seconds after the home position is reached and, when required, sends a wireless signal to the filling unit. It is possible to stop the filling by pressing "Stop".

Spread material may be loaded at other spread units than the spread unit at the home position. These filled units must be placed between the home position and the first marker where a spreading action is programmed. It is not possible to charge the built-in batteries at positions other than the home position. The use of another filling unit must be pre-programmed as an action at position 0. When the next track is run, the filling unit at the home position is automatically used again, unless this track has also programmed another filling unit as an action at position 0.

c) The 5 motors are controlled by serial communication. For each motor, information is sent about direction, speed (loading time), power limits, maximum excess power time and start/stop.

d) Alarms are recorded and displayed as in the following examples:

```
13:04:02        Bat: 19.1 V
Alarm: Low battery
Queue:
Menu   Start   Stop   Res.
```

☐ ☐ ☐ ☐

MODE ↑   ↓**ENTER**
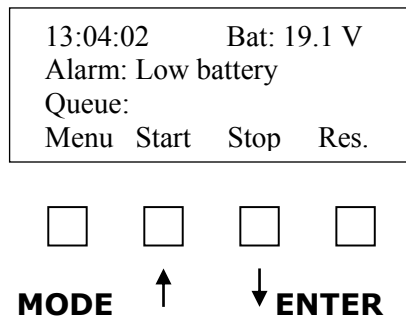
If the system goes into alarm condition, the minispreader will try to return to the home position. The system will then wait for the problem to be resolved and for the minispreader to be restarted. Note that, with some alarms, it is not possible to return to the "home position". The machine is restarted by pressing "Start", after which the minispreader will resume spreading from the position at which the alarm was triggered. If you do not want the minispreader to resume spreading, press "Res" before pressing "Start".

There are eight different alarms:
- Alarm for battery power less than 22.4 VDC. The battery power must be over 27.2 VDC in order for the minispreader to cancel the alarm.
- Alarm for more than 10-200 seconds (programmable) between each marker.
- Alarm for position loss.
- Alarm for excess power, drive motor.
- Alarm for excess power, belt motor.
- Alarm for excess power, shredder motor.
- Alarm for excess power, left plate motor.
- Alarm for excess power, right plate motor.
- Alarm for Forward/backward filling(pendling)

If several alarms are activated simultaneously, the display shifts between them at 2-second intervals.

Operating instructions

The minispreader is operated by means of a membrane keyset with 4 keys.
Parameters and status are read on the control's backlit 4 x 20 character LC display.
The keys are named: **MODE,SCROLL UP**, **SCROLL DOWN** and **ENTER** on the
membrane keyset. These are the keys' normal meanings. If the meaning of a key is
different for a short period of time, such as In a submenu, this will be indicated on the
bottom line of the display, directly above the key concerned.
The MODE key is used to shift between normal operation and a menu. When the
MODE key is pressed once, the display changes from normal operation to display a
menu that, by means of either **SCROLL UP** or **SCROLL DOWN**, you can choose
between the various submenus where the control parameters may be changed or
variables read. When the **MODE** key is pressed again, the menu goes back one step.
You may at any time change the display back to normal operation by using the **MODE**
key. The menu automatically shifts back to normal operation if no key is used for a
period of time.
Display image with normal operation, condition: stopped.

```
13:04:02        Bat: 24.4 V
Stoppet,0      Pos:        0
Queue:
Menu   Start    Stop    Res.
```

```
□      □      □      □
MODE   ↑      ↓ ENTER
```
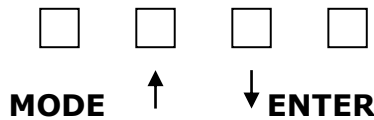
The display image with normal operation, condition: spread in operation, track is
being run and tracks 1, 2, 3, 4, 5 and 6 are waiting in the queue to be run. A
maximum of 9 tracks may be in the queue. Exceeding the queue is indicated with "<"

```
 13:04:02        Bat: 24.4 V
 In operation, 0         Pos:
0
  Queue: 123456
```

```
□      □      □      □
MODE   ↑      ↓ ENTER
```
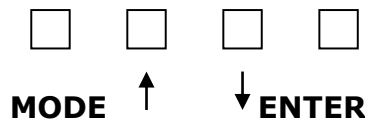
If the **MODE** key is pressed once, the display switches between the display image with
normal operation and a menu overview. Normal operation is stopped when the display
switches to the menu overview. When the **MODE** key is pressed again, if no other key
is used for some time, or if the setting of parameters is completed, the display shifts
back to normal operation and this text is briefly displayed:

```
Programming ended

SW version 1.52
```

The display will then show normal operation, condition:
Stopped. In order to set the minispreader to operating
condition, press "Start", after which the spreader will be ready
to run.

Menu overview:

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│    No. 1:.......Start times  │
│                             │
│   Return          Select    │
└─────────────────────────────┘
```

☐   ☐   ☐   ☐

MODE   ↑   ↓ **ENTER**

The first menu choice is "Start times" You can choose between the following menus by
using the **SCROLL UP** and **SCROLL DOWN** keys:

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│    No. 2:......Run tracks    │
│                             │
│   Return          Select    │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│    No. 3:....Tracks          │
│                             │
│   Return          Select    │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│    No. 4:..Settings          │
│                             │
│   Return          Select    │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│    No. 5:.....Set clock      │
│                             │
│   Return          Select    │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│ No. 6:…Technical settings   │
│                             │
│   Return          Select    │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│       MENU CHOICE:          │
│                             │
│                             │
```

No. 7: Man. motor operation.

Return   Select

```
+---------------------------------------+
|           MENU CHOICE:                |
| No. 8: Log function                   |
| Return               Select           |
|                                       |
+---------------------------------------+
```

By pressing the **ENTER** key, you may choose the desired menu.

Description of the individual menu points. Italics indicate a programmable parameter.

No. 1:   Start times

The menu point "Start times" is where you choose the track number for the track for which start times are to be defined.

```
+---------------------------------------+
|      Start times, track no.:          |
|                1                      |       *1 - 9*
|                                       |
| Return               Select           |
+---------------------------------------+
```

When the track number has been chosen, press "Select" and the relative track's start times are programmed. Up to 8 start times can be chosen for each track.

```
+---------------------------------------+
|       Start times:                    |
|       1. start: *13*:*04*             |       *00-23:00-59*
| Return               Select           |
|                                       |
+---------------------------------------+
```

A start time may be chosen as non-activated by entering a value of 00:00.

When the start time for track 1 has been programmed, press "Select" to return to the submenu where you may choose the track number for the next track for which the start time is to be set.

No. 2:   Run tracks

```
      track operation:
        Automatic


  Return          Select
```

 Automatic - Run track no. 1 now
- Run track no. 2 now - Run track
 no. 3
Run track no. 4 now -
 Run track no. 5 now - Run track
 no. 6 now - Run track no. 7 now
- Run track no. 8 now - Run track
 no. 9 now

Selection of automatic or manual start of the individual tracks. With automatic start, a spreaders starts at the pre-programmed start times. With selection of "*Run track no. x now'*", the track chosen is put in the queue and run when the programme is returned to normal operation. The control remains in automatic start and adds tracks at the pre-programmed start times.

No. 3:   Tracks

Tracks are defined by selecting what you want to happen at a particular marker. This is referred to as deciding the track's actions. Track definition is access-protected with a code set at the factory. This is indicated as follows on the display:

```
         Code?
           0
  Return            OK
```

The code set at the factory is 9. With **SCROLL UP** and **SCROLL DOWN,** the code is now set to the correct value and the operation is completed by pressing the **ENTER** key once. If the code is not correct, the following is now displayed:

```
      Incorrect code


```

and you are returned to the menu choice. If the code is correct, the "Tracks" menu continues. It has a submenu, in which the track number for the track to be defined is chosen.

```
   Actions, track no.:

```

Return   Select

When the track number has been chosen, press "Select" and the relative track's actions are then programmed. Up to 25 start actions can be chosen for each track. First, the marker at which the action is to occur is chosen:

```
Action at marker no.
        10
Return          Select
```
0 - 99

When the marker number has been chosen, the action to occur there is then chosen:

```
Marker:  10        Action:
         End track


Return              OK
```

End track - Low speed – Normal speed - New belt speed - Change
track - Always change track –Turn -
Spread to the right - Spread to the left - Spread to the right & left - End spread section - Spread set time R & L - Spread set time to the right - Spread set time to the left - Spread set time/full R & L - Spread set time/full R Spread set time/full L- Skip section - Spread empty to the right Spread empty to the left - Spread empty to the R & L - Spread empty set time- Run spreader forwards - Run spreader back - Run grain plate forwards - Run grain plate back - Turn on IR pulse - Fill hopper set time - Fill hopper at marker – Spread function back - /direction back- Forwards back fill

If *Spread to the right - Spread to the left - Spread to the right & left - Spread empty to the right - Spread empty to the left or Spread empty to the R & L are chosen, the* next selection is the spread width (spread speed) and spreader (hopper) speed.

```
Spreader speed %:
        80
```
60 - 100

Return   OK

```
┌──────────────────────────────────┐
│      Hopper speed %:             │
│             55                   │
│                                  │
│ Return              OK           │
└──────────────────────────────────┘
```
    5 - 100

If *Spread set time R & L - Spread hset timeto the right - Spread set time to the left - Spread set time/full R & L - Spread set time/full R Spread set time/full L- Spread empty to the left - Spread empty set time* are chosen, the next selection is the spread width (spread speed) and spread time, that is, the time the spreader (hopper) remains in one place and spreads.

```
┌──────────────────────────────────┐
│      Spreader speed %:           │
│             66                   │
│                                  │
│ Return              OK           │
└──────────────────────────────────┘
```
    60- 100

```
┌──────────────────────────────────┐
│    Spread time, seconds:         │
│             25                   │
│                                  │
│ Return              OK           │
└──────────────────────────────────┘
```
    5 - 100

If *New belt speed* is chosen, the next selection is the new time that applies for the track until another *New belt speed* is chosen

```
┌──────────────────────────────────┐
│      Belt speed, %:              │
│             12                   │
│                                  │
│ Return              OK           │
└──────────────────────────────────┘
```
    1 - 99

Spread actions that run over several positions end at the position where the action "End track" is selected

```
┌──────────────────────────────────┐
│     Action at marker no.         │
│             15                   │
│                                  │
│ Return              OK           │
└──────────────────────────────────┘
```

```
┌──────────────────────────────────┐
│          Action                  │
│      End spread section          │
│                                  │
│                                  │
└──────────────────────────────────┘
```

32

The next step is definition of the track's next action until the "End track" action is chosen and the track is ended.

The functions *Run spreader forwards, Run spreader back, Run grain plate forwards and Run grain plate back* operate with the help of linear actuators for the spread plate and grain plate, for instance back to the end position. All the motors stop for 10 seconds while the actuators run, after which normal speed is resumed. When the reset button is pressed, the spread plates and grain plate run back to the end position. The spread plate and grain plate are run back for return for straw (and battery charging). When the hopper is back in the spread position, the saved spread plate and grain plate positions are re-established.

Action at marker no.
24
Return   OK

Action
Run spreader forwards
Return   OK

Action at marker no.
24
Return   OK

Action
Run spreader back
Return   OK

Action at marker no.
26
Return   OK

Action
Run the grain plate forwards
Return   OK

```
 ┌─────────────────────────────┐
 │    Action at marker no.     │
 │             26              │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

```
 ┌─────────────────────────────┐
 │          Action             │
 │    Run grain plate back     │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

Example of the programming of one track:

```
 ┌─────────────────────────────┐
 │    Action at marker no.     │
 │             25              │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

```
 ┌─────────────────────────────┐
 │          Action             │
 │     Spread high speed       │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

```
 ┌─────────────────────────────┐
 │     Spreader speed %:       │
 │             85              │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

```
 ┌─────────────────────────────┐
 │   Spread time, seconds:     │
 │             25              │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

```
 ┌─────────────────────────────┐
 │    Action at marker no.     │
 │             26              │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

```
 ┌─────────────────────────────┐
 │          Action:            │
 │         End track           │
 │                             │
 │ Return              OK      │
 └─────────────────────────────┘
```

All programming of track definitions must always be ended with "*End track*". You are then returned to the submenu, where the track number for the track to be defined is selected. If all desired tracks have been programmed, press "Return" to return to normal operation. If you do not want to use one particular track, programme "*End track*" at marker no. 0 as the home position.

No. 4: Settings

This is where general settings applying to all tracks are selected.

```
Fill only empty hopper:
          Yes

Return              OK
```
Yes - No

Select whether the hopper is to be filled only when empty. This setting is used when spreading with straw. When spreading with sawdust, select *"No"* for "Fill only empty hopper", since a half-empty hopper can be filled with sawdust.

```
Fill sensor time sek.
          2

Return              OK
```
5 - 100

```
Belt speeds 1, %:
          70

Return              OK
```
5 - 100

```
Belt speeds 2, %:
          70
```
5 - 100

Belt speeds 1 and 2 are the conveyor belt's speeds when spreading to 1 side and to 2 sides, respectively.

```
Hopper speed low, %:
          40

Return              OK
```
5 - 100

"Hopper speed low" is the hopper's speed after a marker where *"Low speed"* is chosen.
"Hopper speed low is cancelled after *"Normal speed"* is defined as an action.

```
┌─────────────────────────────┐
│    Hopper speed high %:      │
│           70                 │        5 - 100
│                             │
│ Return              OK      │
└─────────────────────────────┘
```

"Hopper speed high" is the hopper's normal speed.

No. 5:   Set clock

```
┌─────────────────────────────┐
│        Set clock:           │
│          13: 00             │        00-23:01-59
│                             │
│ Return              OK      │
└─────────────────────────────┘
```

Setting the clock. The clock must be set after the power supply has been connected. When the menu is left, the clock will automatically start with the new time.

No. 6:   Technical settings

The technical settings are access-protected with a code. This is indicated as follows on the display:

```
┌─────────────────────────────┐
│          Code?              │
│            0                │
│                             │
│ Return              OK      │
└─────────────────────────────┘
```

Access to the programming mode is PIN-code protected by a number between 0 and 1000. The code set at the factory is 0. With **SCROLL UP** and **SCROLL DOWN, the code is now set to the correct value and the operation is completed by pressing the ENTER** key once. If the code is not correct, the following is now displayed:

```
┌─────────────────────────────┐
│                             │
│      Incorrect code         │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```

and you are returned to the menu choice. If the code is correct, the following is displayed:

```
┌─────────────────────────────┐
│        Code OK              │
│          0                  │        0 - 1000
│                             │
│                             │
└─────────────────────────────┘
```

36

Return   OK

With **SCROLL UP** and **SCROLL DOWN,** the code may now be set with another value, which applies until the next time access to the technical settings is attempted.

The motor control parameter "100% speed" may now be set.

```
Shredder, 100 % speed:
          150                        0 - 255

Return                  OK
```

For all motors is it possible to program a start ramp, stop ramp and max. current. At the end of programming the ramps it is possible to activate or deactivate the ramps.
TOO USE THE PROGRAMMED RAMPS YOU MUST HERE SELECT DEACTIVATED.

The parameters for the other motors appear after "100% speed" for the shredder motor.
The next parameter is set by pressing the **ENTER** key once.
Other specific settings may be chosen after all of the motor parameters have been set.

```
Marker alarm time, sec.:
          40                         10 - 200

Return                  OK
```

Alarm for the time between each marker. An alarm is activated if the hopper is immobile for a long time.

```
IR pulse time, sec.:
          3                          1 - 99

Return                  OK
```

'IR Pulse time" is the length of the pulse emitted by the infrared (IR) sender when a switch is changed.

```
Track change pause, sec.:
          10                         1 - 99

Return                  OK
```

"Track change pause" is the waiting time from when the pulse is emitted by the wireless infrared (IR) sender when a track is changed until the hopper resumes travelling.

```
On timer, sec.:
        0.5
        25.0


Return           OK
```

0.1 -

"On timer" is the time that must pass after activation before the object sensor under the bottom of the hopper stops the belt- and shredder motors.

```
Off timer, sec.:
        0.5

Return           OK
```

0.1 -25.0

"Off timer" is the time that must pass after deactivation before the object sensor under the bottom of the hopper starts the belt- and shredder motors.

```
Filling return pause, sec.:
        10

Return           OK
```

1 - 99

```
Max. no. toggles
        10

Return           OK
```

10 - 99

"Filling return pause" is the waiting time between when the straw filling stops until the hopper travels back to the last spread position.

```
Language
        DK

Return           OK
```

DK - SE - FI - DE – NL-UK

With the menu choice "Language", you may choose which of the available languages will be used in the display.

The next selection possibility in the submenu "Technical settings" is "Up/download of parameters set from/to PC".
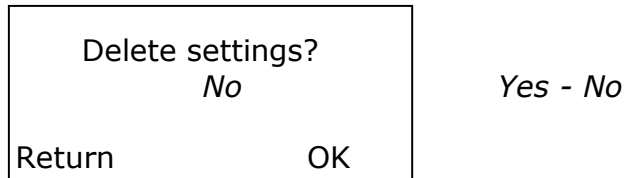
```
Up/download from PC?
        No
```

Yes - No

Warning: when downloading from a PC, all of the parameters are deleted and replaced by the parameters stored on the PC.
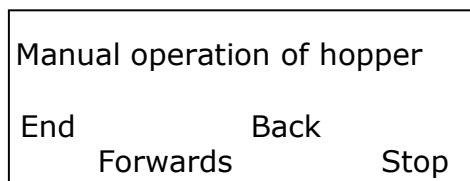
The last selection possibility in the submenu "Technical settings" is resetting of the parameters set at the factory.

```
┌─────────────────────────────┐
│      Delete settings?       │
│           No                │       Yes - No
│                             │
│ Return              OK      │
└─────────────────────────────┘
```

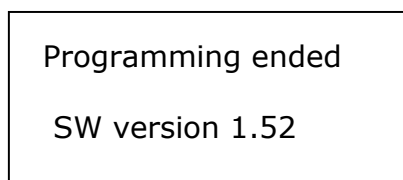**Warning:** all user-defined parameters are deleted and replaced by the factory settings.

No. 7: Manual motor operation.

Here you are able to choose manual operation of the various motors on the spreader. The manual operation of the drive motor is given as an example.

```
┌─────────────────────────────┐
│ Manual operation of hopper  │
│                             │
│ End            Back         │
│     Forwards        Stop    │
└─────────────────────────────┘
```

When "End" is pressed, you are returned to the previous submenu. Went "Forwards" is chosen, the hopper travels forwards at low speed until the "Stop" key is pressed or the home position is reached. Went "Back" is chosen, the hopper travels back at low speed until the "Stop" key is pressed or the home position is reached. Note that all switches must be set to the end position manually

When the setting of the desired parameters has been completed and you are returned from menu choice to normal operation, the following is briefly displayed:

```
┌─────────────────────────────┐
│   Programming ended         │
│                             │
│    SW version 1.52          │
│                             │
└─────────────────────────────┘
```

Service

The control programme contains certain routines that may be used for servicing and fault finding and that are not used by normal users of the machine.

Resetting the password:

Disconnect the power supply to the machine.
Press (and hold) all of the following keys **SCROLL UP**, **SCROLL DOWN** and **ENTER**
Connect the power supply to the machine.
Release the following keys **SCROLL UP**, **SCROLL DOWN** and **ENTER**
The password for technical settings has now been reset to 0 until the control is turned off and turned on again or until a new password is chosen.

Parameter list

Parameters	Factory setting	Minimum value	Maximum value	Unit
Start times	00:00	00:00	23:59	Timer: min.
Auto/man operation	Automatic			
Action at marker 0	End track			
Spread width	100	5	100	%
Hopper speed	100	5	100	%
Spread time	10	5	100	sec.
Fill only empty hopper	Yes			
Belt speed 1	100	5	100	%
Belt speed 2	100	5	100	%
Hopper speed, low	50	5	100	%
Hopper speed, high	100	5	100	%
Clock	00:00	00:00	23:59	Timer: min.
Technical settings Code	0	0	1000	
Motors 1-5, 100% speed	255	0	255	
Marker alarm time	20	10	200	sec.
IR Pulse time	3	1	99	sec.
Track change pause	10	1	99	sec.

On timer	0.1	25.0	0.5	sec.
Off timer	0.1	25.0	0.5	sec.
Fill return pause	5	1	99	sec.
Language	DK			

Service and maintenance of JHminiStrø spreader.

Checklist

1. Remember always to begin by pressing "Stop" on the keypad before any start-up or programming.
2. Always check the switch setting after manual home run.
3. Press "Reset" on the display (0/reset position)   after manual home run.
4. Avoid dust/humidity in the control cabinet.
5. Exercise caution with flat/data cable when, for example, changing fuses.

Daily.

1. Ensure that the home sensor and charging unit are blinking.
2. Check that the machine has completed the day's work, is at the home position and that no alarm has been activated.

Weekly.

1. Clean the spreader and remove any loose or stuck straw/sawdust.

Monthly.

1. Clean the filling station receiver and any switch receivers.
2. Disassemble the two hopper parts and clean the axles of old grass/straw and any foreign objects.
3. Clean the axles under the spread plates.
4. Tighten the drive-motor belts with the belt tighteners.
5. Loosen or brush off the belt-motor chain.
6. Check that the trolleys are tight.
7. Grease the hopper drive-chain.
8. Grease switches with light oil.
9. Tighten bolts after one month (new machine).

Every three months.

1. Check the bottom chain/belt.
2. Grease the belt-motor chain.
3. Disassemble and clean brush of carbon in the drive motor.

Yearly.

1. Yearly service by an authorised installer.

Service form
For all
JHministrø models.

This service form consists of general inspection to be carried out systematically every time the machine is serviced, and general inspection, such as replacement of worn parts (trolley, V belts, batteries, etc), depending on the age of the machine and hours of operation. The following checklist goes through all of the general and additional inspection points necessary to maintain problem-free spreading/feeding and optimal satisfaction with the machine.

Servicing must be done at least once per year. Inspection must be done by an authorised service assembler.

Customer's name:_____ **Tel.:** _____

Address: _____ **Machine no. :** _____

Check, replacement, adjustment out::   **x**   **Comments:**

Trolley:

Replace V belt ………………………………………...   ¤   _____
Check drive wheel, wheel bearings and track gauge……   ¤   _____
Clean and inspect carbon in drive motor ……………..…   ¤   _____
Replace/clean contact rail for charge circuit ………...   ¤   _____
Adjust inductive sensors (key distance approx. 5 mm.) ...   ¤   _____
General cable distance and feeding ……………………...   ¤   _____
Check hanging system and hanging bolts ……………..…   ¤   _____
Check safety wire, assemble if missing……………..……   ¤   _____

Shredder:

Clean cylinders and side plates …………………..…...   ¤   _____
Check cable and sprocket (grease)………………..……   ¤   _____
Clean and check for carbon in shredder motor…………..   ¤   _____
Check bearings (replace if necessary) ……………..…   ¤   _____

Spread plates:

Wear/straightening of throwers…………………………….. ¤

Clean and check for carbon in spreader motor…………..… ¤ _____

Tighten bolts on spreader plates………………………….. ¤ _____

Bottom belt:

Adjust and tighten belt …………………………………….. ¤ _____

Clean and grease cable ………………………………..…. ¤ _____

Blow loose litter out of belt roller ………………..……..…. ¤ _____

Control cabinet, crossfields and charging, etc :

Tighten all cable connections…………………………..…. ¤ _____

Check contacts and relays …………………………….…... ¤ _____

Clean control cabinet of any litter………………………….. ¤ _____

Check motor controls………………………………………... ¤ _____

Change switch cable………………………………………… ¤ _____

Check charge circuit for tension drop……………………… ¤ _____

Check battery condition……………………………………… ¤ _____

Test function buttons ……………………………………..…. ¤ _____

Possibly update to newer program version ……………... ¤ _____

Manual testing:

Shredder power consumption 2-5 amp. ………………….. ¤ _____

Spread motor, noise, power consumption 2-5 amp……..... ¤ _____

Belt-motor power consumption 0.2-0.8 amp. ……………... ¤ _____

Drive-motor power consumption 3-6 amp. ………………... ¤ _____

Rail system:

Clean and check receiver at switch/lift………………….….. ¤ _____

Charge apparatus condition ………………………………..… ¤ _____

Markers ……………………………………………………….. ¤ _____

Switch, greasing and adjusting…………………………….... ¤ _____

Check general rail condition……………………………….... ¤ _____

If necessary, alarm equipment…………………………….... ¤ _____

Filling equipment:

Grease bearings……………………………………..……… ¤ _____

Check and tighten chains …………………………………... ¤ _____

Make sure that timers and load amounts are appropriate... ¤ _____

Check carrier………………………………..………………… ¤ _____

Other comments:

_____

_____

_____

Servicing carried out at: _____ *and* _____

Next servicing on: _____ *and* _____

(Hours)   (date)

Date/signature:

Customer: _____   *Service installer:* _____

List of JHminiStrø parts:

Position	Part	Part no.	Part description
1	1	MS0006	Spread bin *Cow - Handy models*
	1	MS0406	Spread bin *Pig - Combi models*
2	4	MS0015	Belt equipment
3	1	MS0023	Bottom-frame weld
4	1	MS0030	Battery case with cover *Cow - Handy models*
	1	MS0746	Battery case with cover *Pig - Combi models*
5	1	MS0046	Spread house
6	2	MS0146	Motor EC100.240 SW2 3000 o/min 24VDC
	2	MS0149	Worm gear MVQ025 R=01:04
7	1	MS0038	Spread plate right/left
8	1	MS0038	Spread plate right/left
9	2	MS0066	Trolley, half, complete *Cow - Handy models*
9.1	1	MS0058	Trolley hang unit
9.2	1	MS0063	Axle for trolley-hanging unit
10	1	MS0072	Trolley with drive, complete *Cow - Handy models*
	2	MS0072	Trolley with drive, complete *Pig - Combi models*
11	2	MS0052	Hanging-unit fitting
12	3	MS0088	Shredder bearings
	6	MS0088-1	Oval flange bearing for shredder
13	2	MS0097	Axle for feed cylinder, weld
14	2	MS0086	Half feed-cylinder B *Cow model*
	2	MS0486	Half feed-cylinder B *Pig - Combi models*
15	2	MS0087	Half feed-cylinder A *Cow model*
	2	MS0487	Half feed-cylinder A *Pig - Combi models*
16	1	MS0146	Motor EC100.240 SW2 3000 o/min 24VDC
	1	MS0150	Gearmotor drive/feed 01:15
17	1	MS0102	Charge rail with plug
18	1	MS0103	Charge console
19	1	MS0009	Front guard *Cow - Handy models*
	1	MS0409	Front guard *Pig - Combi models*
21	1	MS0011	Belt roller
22	1	MS0012	Belt roller with sprocket
23	1	MS0024	Belt

Position	Part	Part no.	Part description
24	2	MS0040	Spread limiter
25	1	MS0076	Guide plate - spread plates
26	2	MS0077	Axle for spread plate
27	8	MS0084	Spacer bushing for cylinders
28	4	MS0085	Threaded brace for cylinders
29	16	M10	DIN 934 M10 nut A2
30	3	Set bolt	DIN 933 M6 x 80 set bolt A2
31	6	Washer	DIN 125-A M6 washer A2
32	41	ML06	DIN 985 – M6 lock nut A2
33	2	MS0093	Rubber strip against belt
34	2	MS0007	Terminal rail 1400 mm.
35	1	MS0094	Rubber strip against belt 485 mm
36	1	MS0008	Terminal rail 455
37	2	MS0154	Sensor - home/positions
38	1	MS0092	Fitting for position sensor
40	1	MS0152	Belt motor
41	1	MS0126	Hub sprocket 10 teeth
42	1	MS0109	Belt-drive chain 3/8" x 7/32"
Position	**Part**	**Part no.**	**Part description**
43	1	MS0112	Shredder chain 1/2" x 3/16"
44	1	MS0080	Spacer for motor
45	2	MS0161	Fitting for TAKEX photocell
46	2	MS0160	TAKEX photocell *Handy – Pig - Combi models*
	2	MS0160-1	TAKEX packing TAKEX photocell *Cow Handy-Pig-Combi models*
	1	MS0172	SNT Ultrasound sensor *Cow model*
	1	MS0160	TAKEX photocell *Cow model*
47	1	MS0157	DATEC fill sensor M12 sender
48	1	MS0124	Guard for chain drive
49	1	MS0078	Rubber limiters
50	1	MS0079	Terminal rail 20 x 180 m
51	4	Set screw	DIN 933 M8 x 25 set screw A2
52	4	Washer	DIN 125-A M8 washer A2
53	6	Set bolt	DIN 933 M6 x 80 set bolt A2
54	4	Set bolt	DIN 933 M8 x 100 set bolt A2 belt tightener
55	6	LM06	DIN 985 – M6 lock nut A2
56	2	Set screw	DIN 933 M8 x 16 set screw A2
57	24	Set screw	DIN 933 M6 x 16 set screw A2
58	10	Set screw	DIN 933 M6 x 20 set screw A2
59	2	Set screw	DIN 933 M5 x 16 set screw A2
60	6	Set bolt	DIN 933 M5 x 60 set bolt A2
61	4	Int. 6 sided	DIN 912 M4 x 12 int. Hexagon for belt motor
62	4	Wingnut	M6 Wingnut A2
63	1	MS0750	Key 4 x 4 x 50 mm
64	1	MS0062	Motor axle/shredder drive for trolley
65	2	Set bolt	DIN 933 M10 x 60 set bolt A2
66	2	LM10	DIN 985 – M10 lock nut A2
67	4	Set screw	DIN 933 M8 x 12 set screw A2
68	4	Set screw	DIN 933 M6 x 12 set screw A2

Position	Part	Part no.	Part description
70	1	MS8004	Control cabinet/control box
71	1	MS0004-8110	Flat cable/data cable for display
72	1	MS8003	Motor control
72.1	1	MS8003	Motor control - drive
72.2	1	MS8003	Motor control - belt
72.3	1	MS8003	Motor control - spread plate (*not on the Handy model*)
72.4	1	MS8003	Motor control - spread plate (*not on the Handy model*)
72.5	1	MS8003	Motor control - shredder
72.6	1	MS8003	Motor control - extra drive on selected models
74	1	Fuse	40 amp. plate fuse
80	1	MS0195	Grey CUBO box 75 x 125 x 100
81	1	MS0198	Red mushroom.button for stop ring
	1	MS0199	Contact element for stop ring
	3 m	MS8203	Cable 12 G 1.5 *Pig – Combi - Cow models*
	2 m	MS8204	Cable 3 G 1.0 *Pig – Combi - Cow models*
	11		Terminal strips
Position	**Part**	**Part no.**	**Part description**
	3	MS8025	Screwed connector M12 x 1.5
82	8	MS8026	Screwed connector M12 x 1.5
83	3	MS8027	Screwed connector M20 x 1.5
84	3	MS8028	Screwed connector M25 x 1.5
	3	MS8030	Nut M12 x 1.5
	8	MS8031	Screwed connector M12 x 1.5
	3	MS8032	Screwed connector M20 x 1.5
	3	MS8033	Screwed connector M25 x 1.5
	1	MS0120	Belt-motor guard
	1	MS0121	Shredder chain-drive guard *Pig - Combi models*
	1	MS0122	Shredder-motor guard *Pig - Combi models*
	1	MS0123	Shredder-motor guard *Cow - Handy models*
	2	MS0175	Emergency-stop plate
	2	MS8009	Pushbutton box with 1 hole
	2	MS0198	Red mushroom.button for stop ring
	2	MS0199	Contact element for stop ring
	4	Bolt	DIN 931 M8 x 100 bolt A2
	8	MS0197	Compression spring for stop ring
	8	Washers	DIN 125-A M8 washer A2
	12	M08	DIN 934 M8 nut A2
	1	MS0296	Battery DF 12 033 Y-1
	1	MS0297	Battery DF 12 040 Y

		1	MS0298	Battery DF 12 022 YF	
		2	MS0145	Brush set for DC motor EC100.240	

Main parts
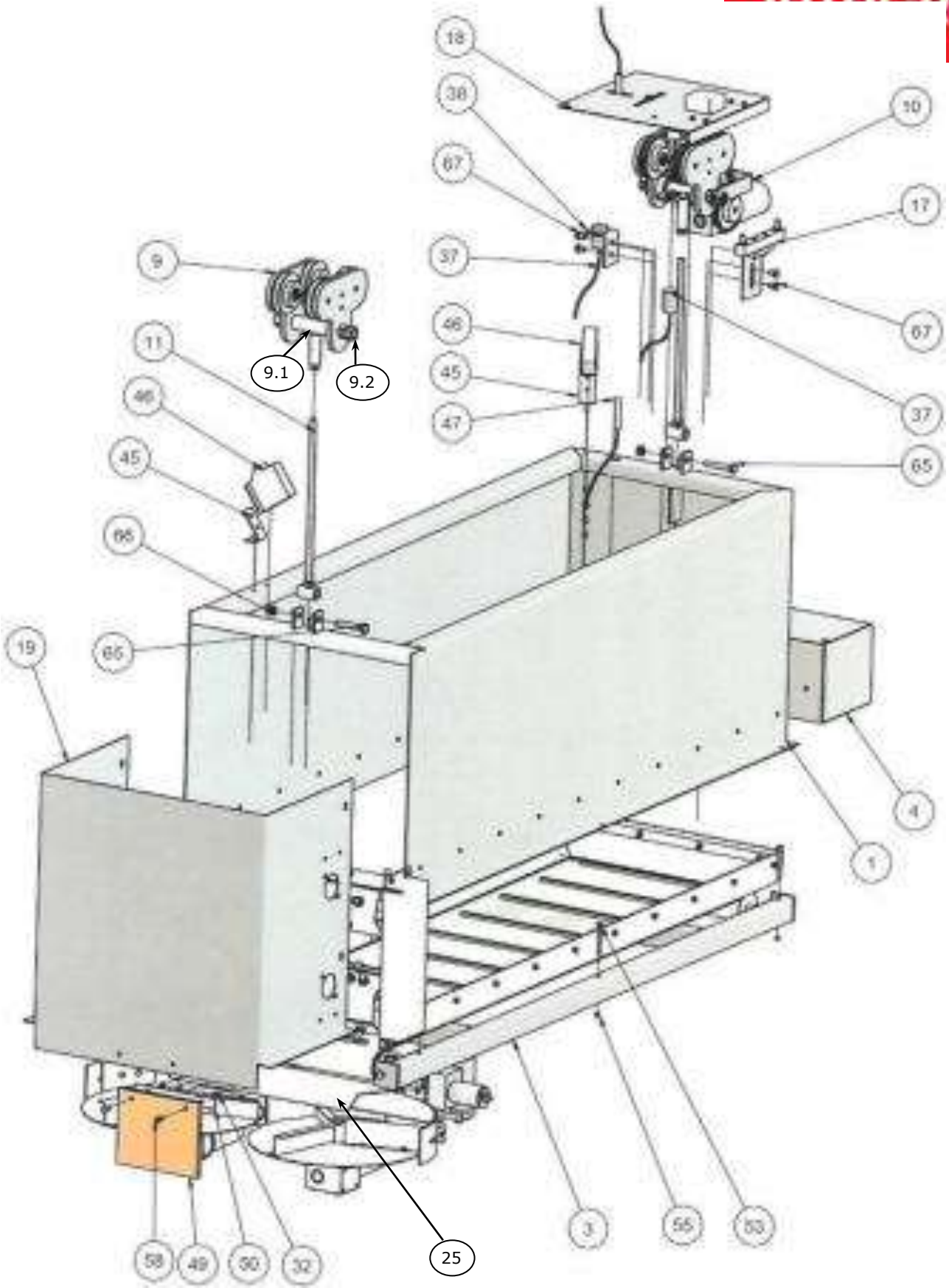
Spread parts
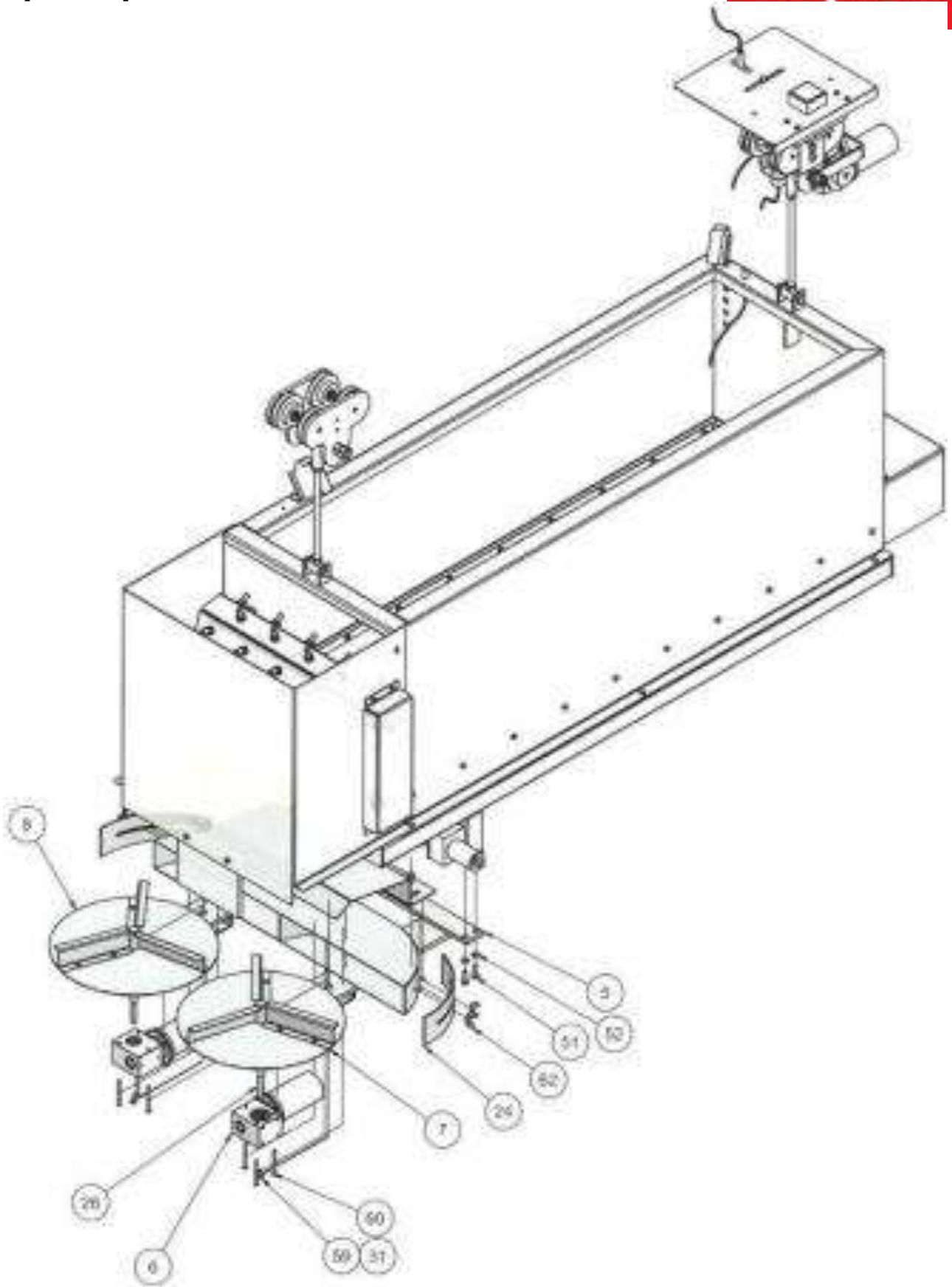
Feeder parts
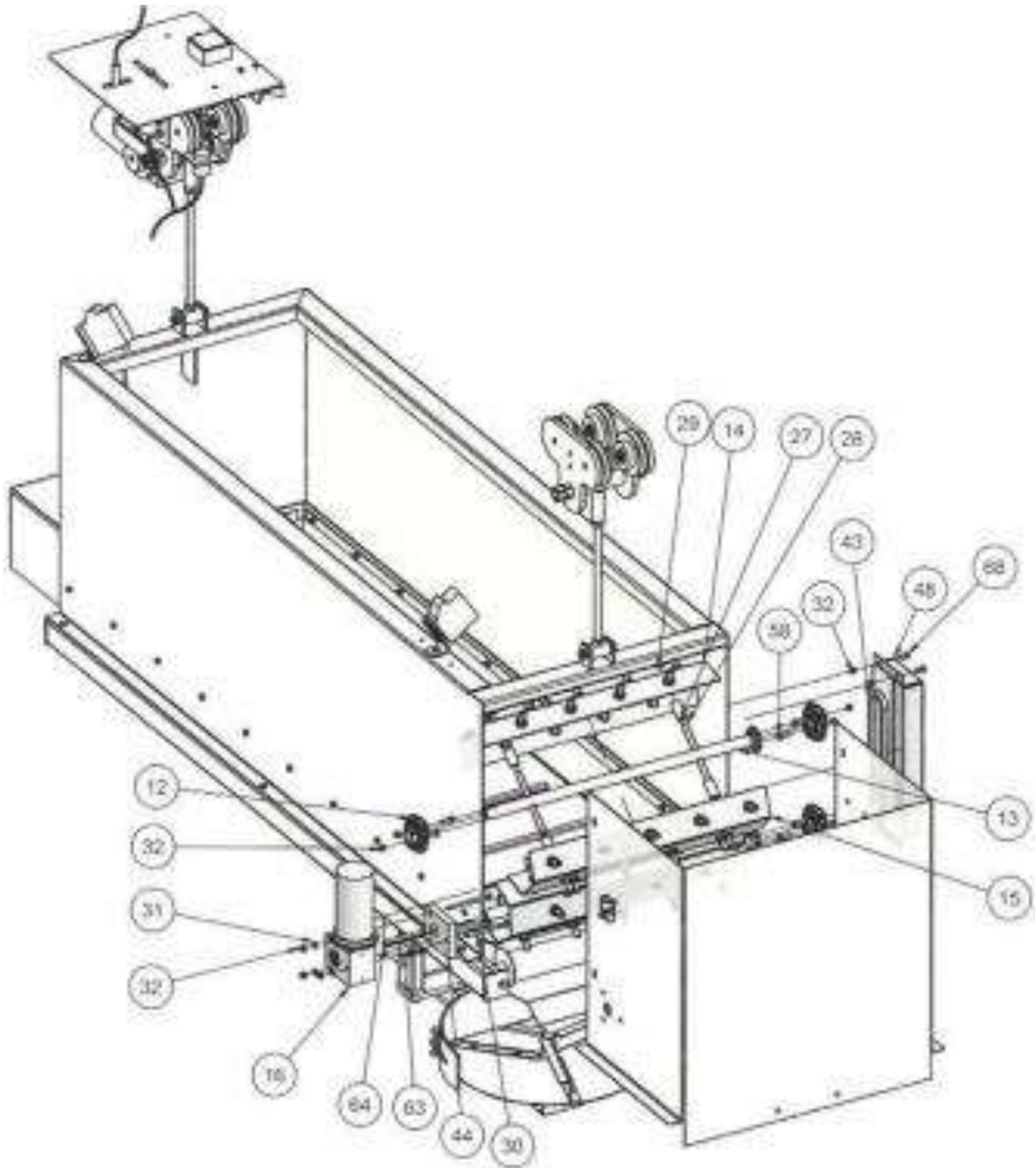
Belt
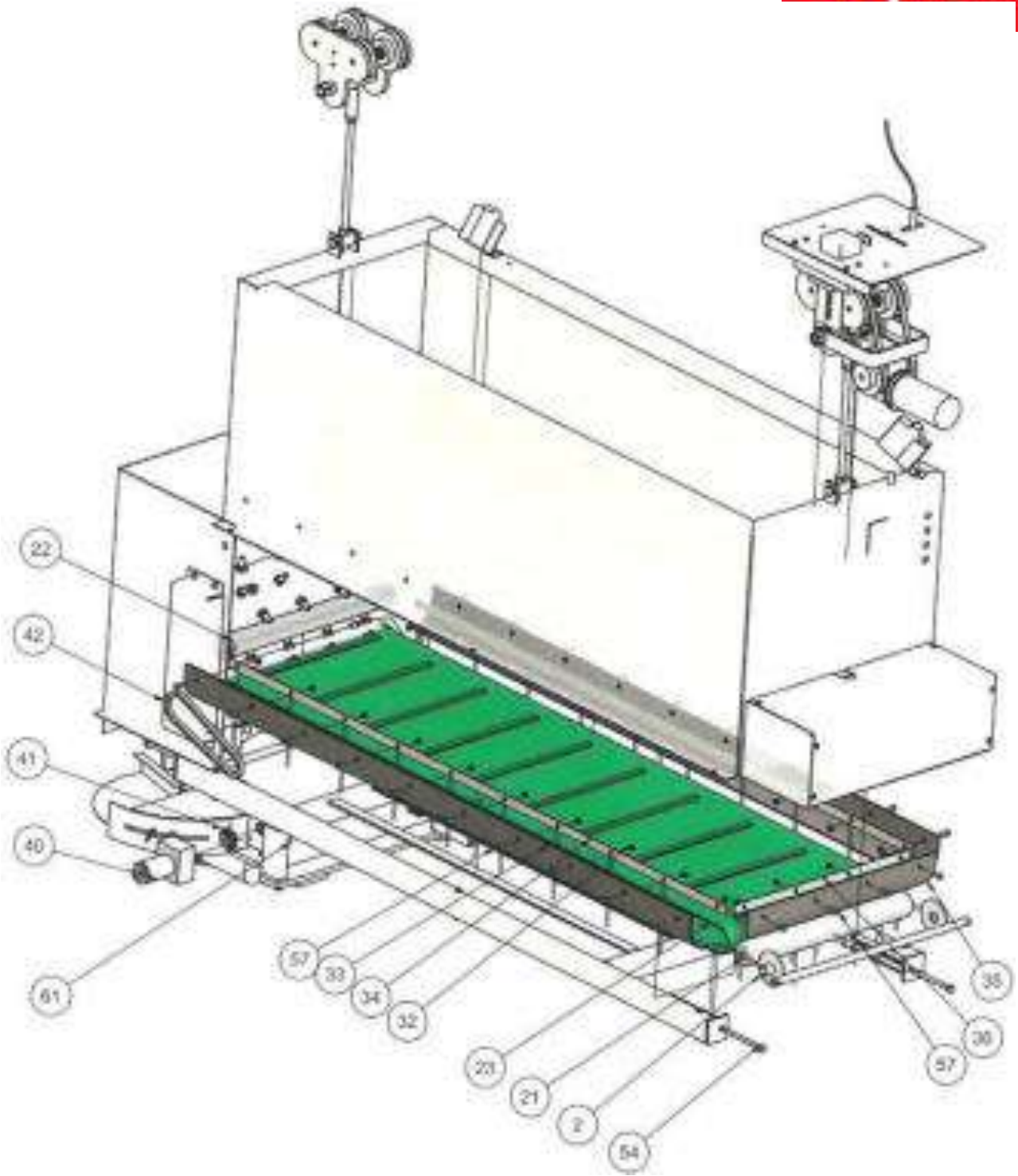
Trolley with drive
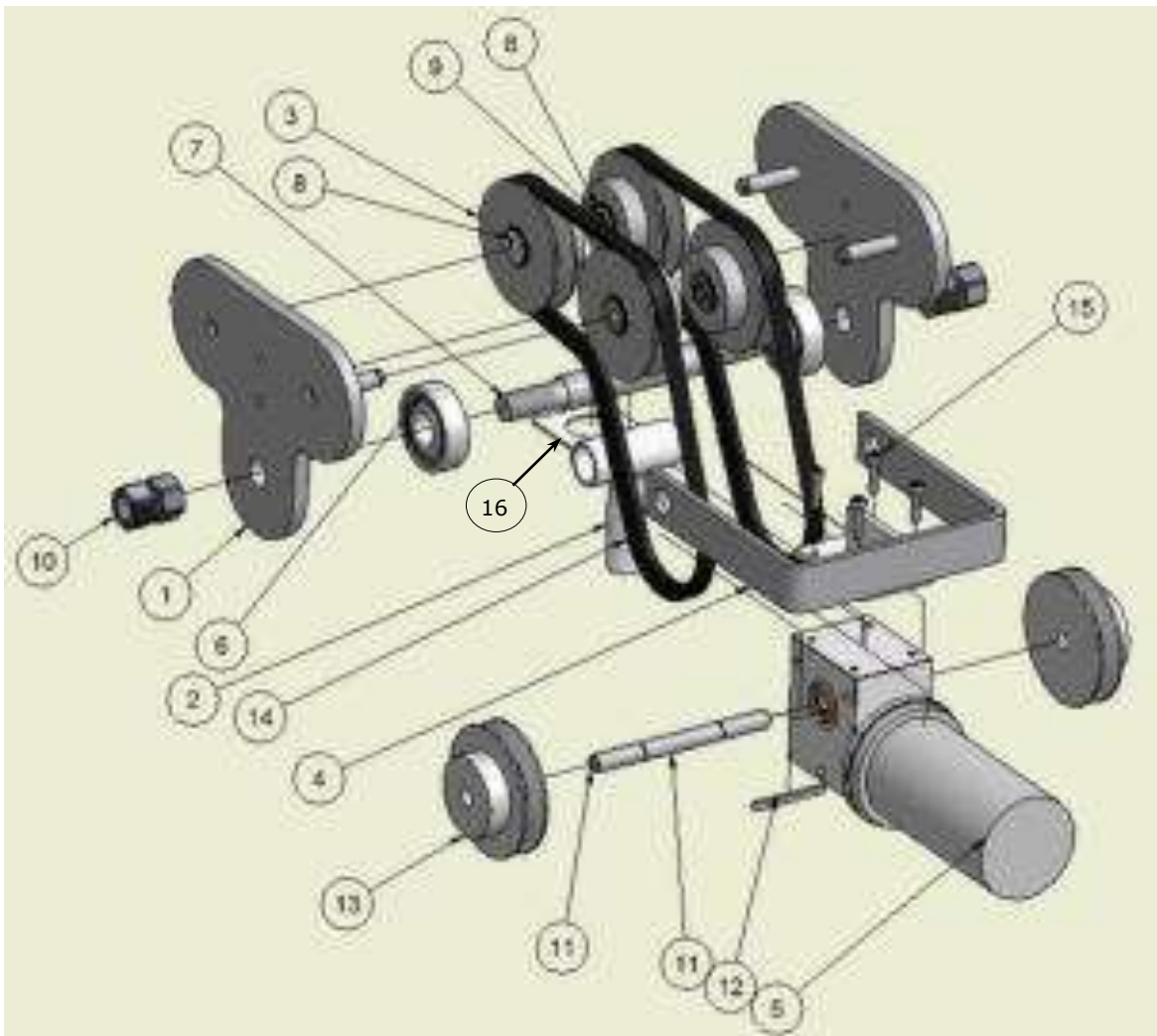
Part no. MS0072 – Trolley with drive, complete

Position	Part	Part no.	Part description
1	2	MS0061	Trolley gable, weld
2	1	MS0057	Trolley-hanging unit with drive
3	4	MS0065	Wheel for trolley with bearings
4	1	MS0071	Motor fitting for trolley with drive
5	1	MS0146	Motor EC100.240 SW2 3000 0/min 24VDC
6	2	MS0048	Bearing 6304-2RSH for trolley belt
7	1	MS0063	Axle for trolley-hanging unit
8	8	Washer	DIN 125-A
9	4	MS0067	Ext. locking ring 15 mm
10	4	M16	Nut 16 mm.
11	1	MS0062	Motor axle/shredder drive for trolley
12	1	MS0750	Key 4 x 4 x 50 mm
13	2	MS0073	V-belt wheel
14	2	MS0074	V-belt XPZ710
15	4	Int. 6 sided	M5-20 int. hexagon bolt
16	1	MS0169	Holder for home sensor

Main parts JHminiStrø Sand model
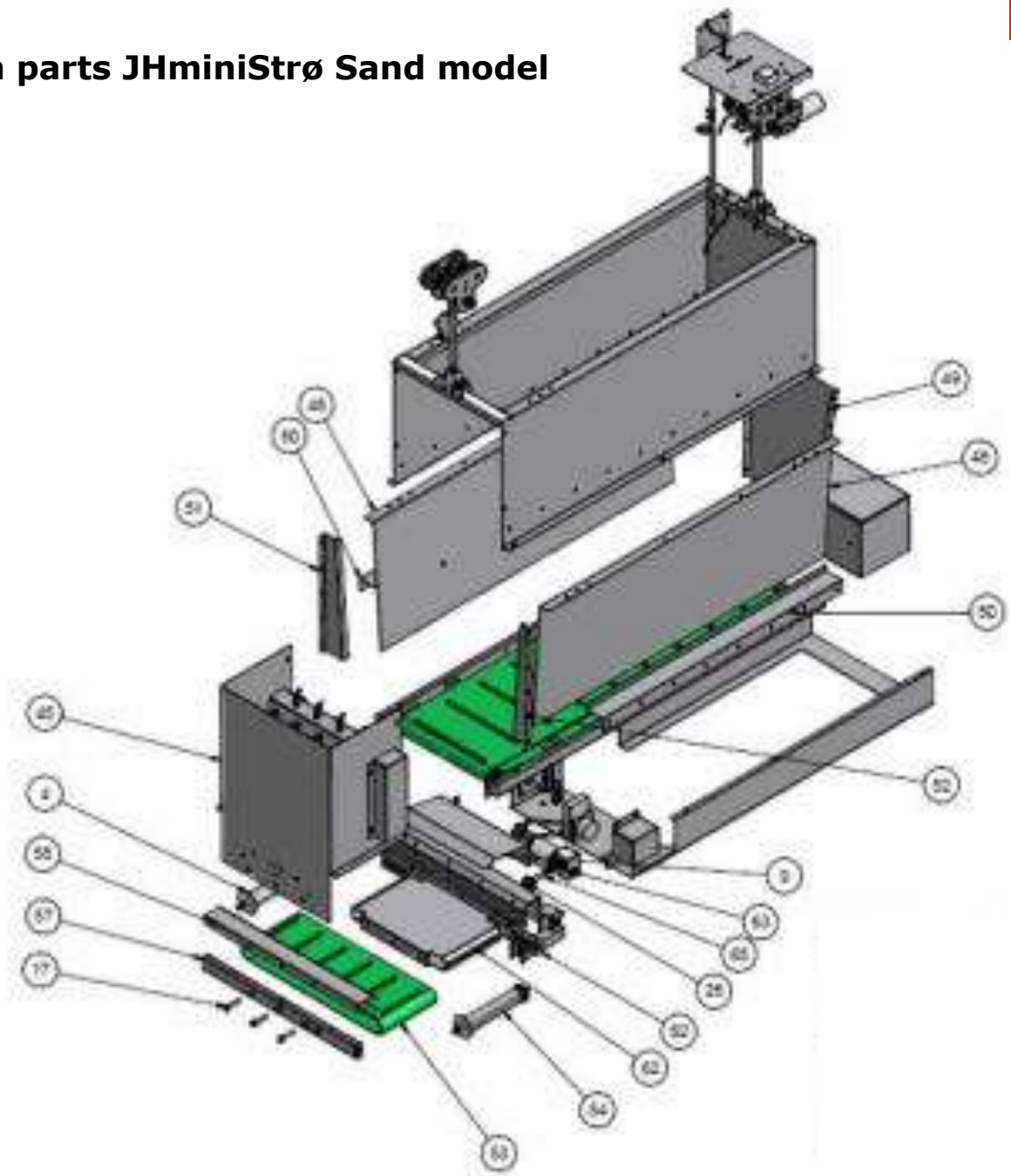
Position	Part	Part no.	Part description
4	6	MS0015	Belt guide
9	1	MS0076	Guide plate
17	32	DIN 933	Bolts
26	2	MS0159	Sprocket Z=10
45	1	MS0909	Front guard
48	2	MS0904	Guard for inner box
49	1	MS0905	Endplate for inner box
50	2	MS0907	Support for inner box
51	1	MS0908	Endcover inner guard right
52	1	MS0910	Endcover inner guard left
53	1	MS0914	Crossbelt
54	1	MS0911	Drive roller for belt
57	1	MS0916	Side piece for crossbelt, loose
58	1	MS0925	Side plate for forward crossbelt
62	1	MS0930	Bottom frame for crossbelt

63	1	MS0130	DC motor EC 180.240
65	1	MS0936	Motor axle for crossbelt

Control cabinet

Main switch

Emergency stop

Reset
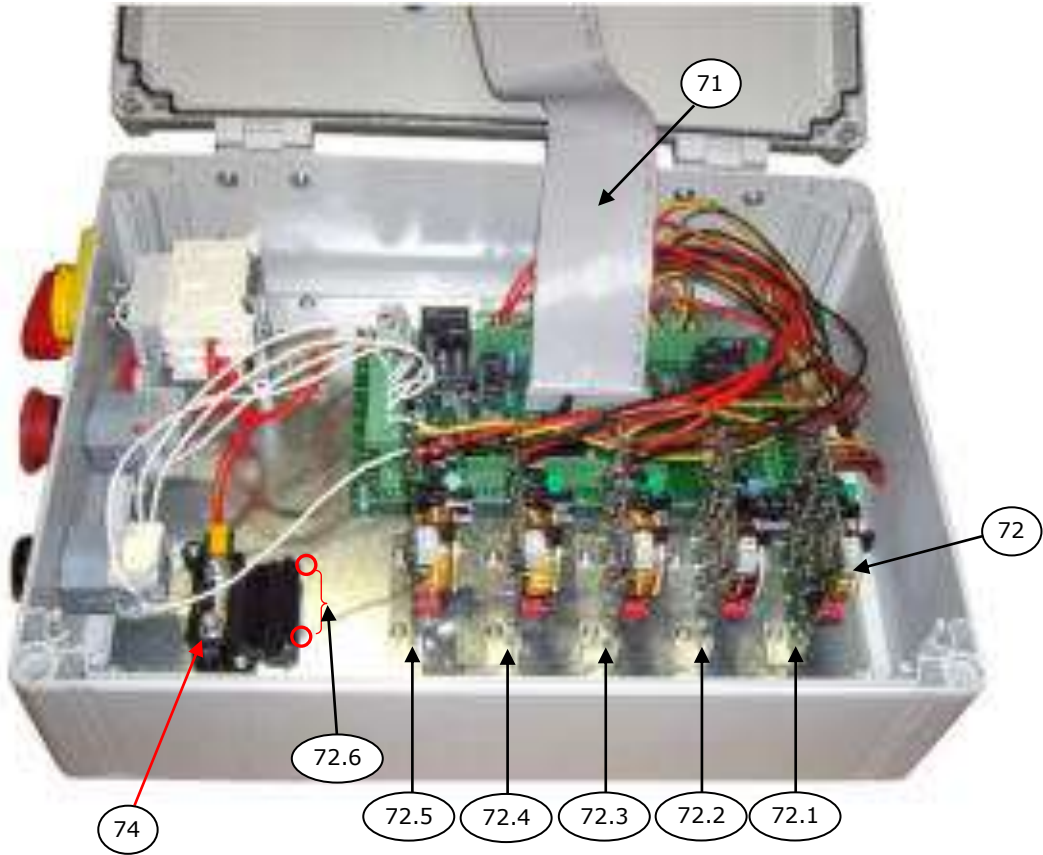
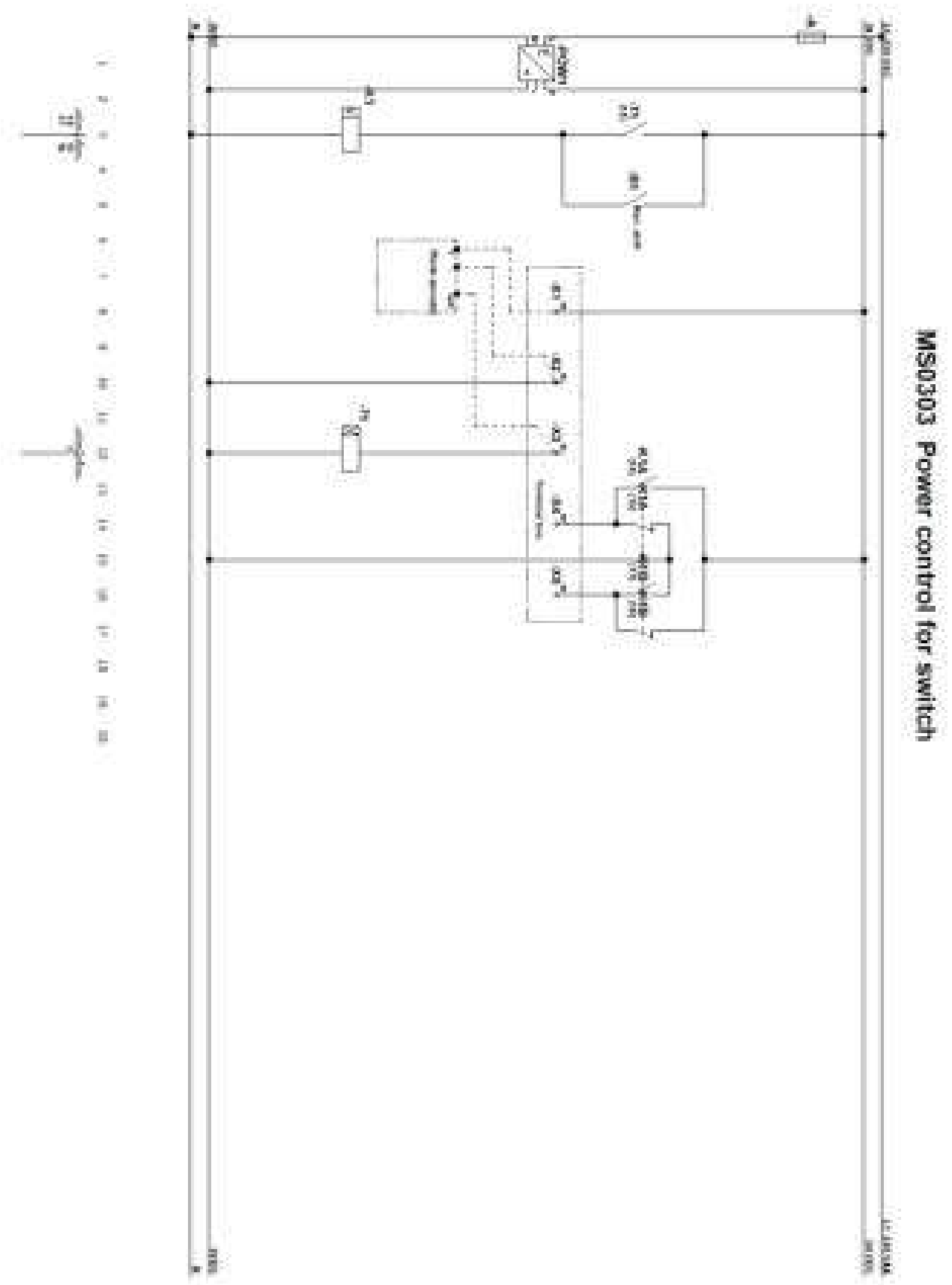# Connection box with emergency stop
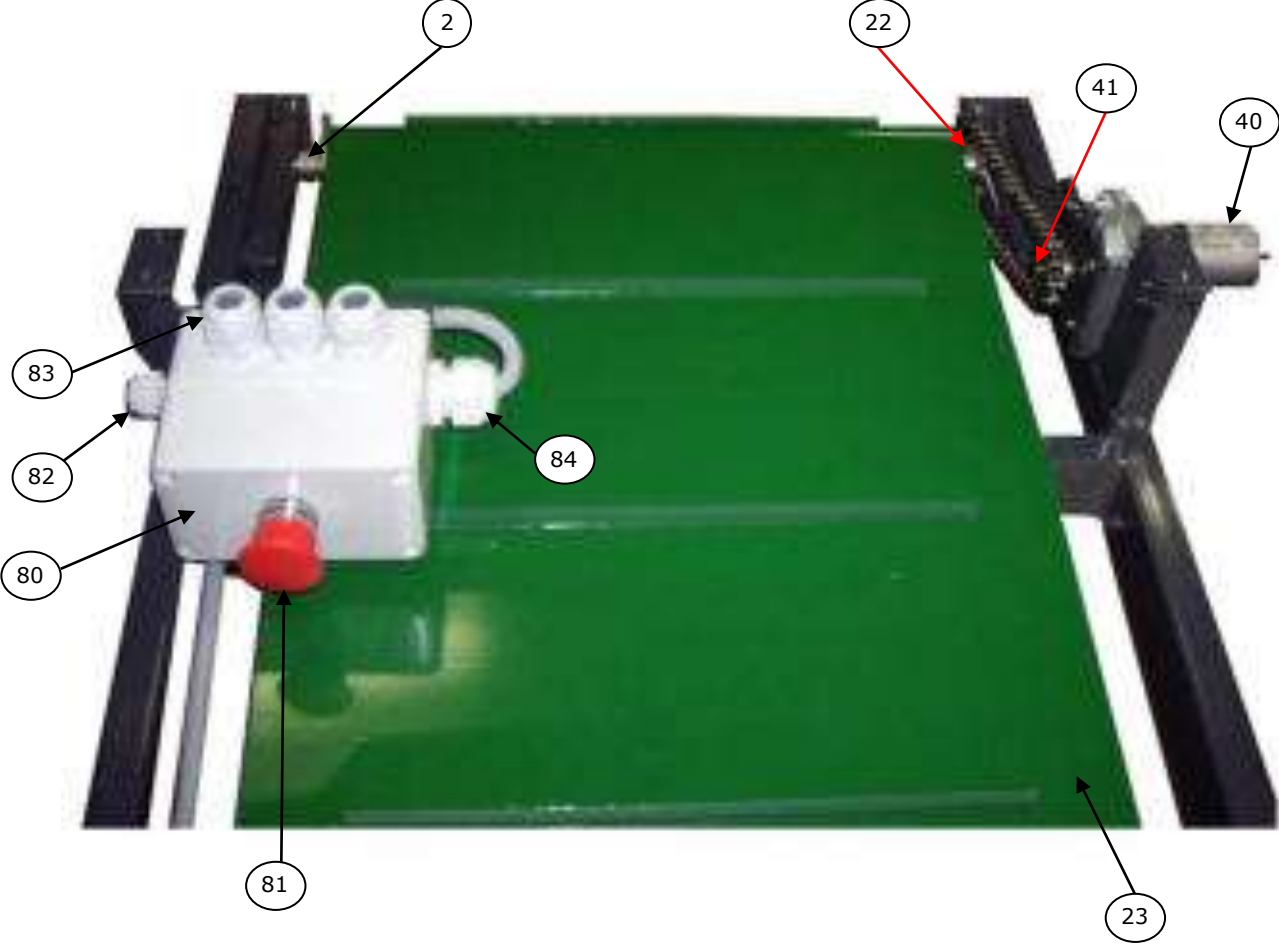
Power control for Switch (MS0303).

Moeller throw-over relay **Z-S230/WW** (14)

Tele-Hasse **time relay ODQ1** (16)

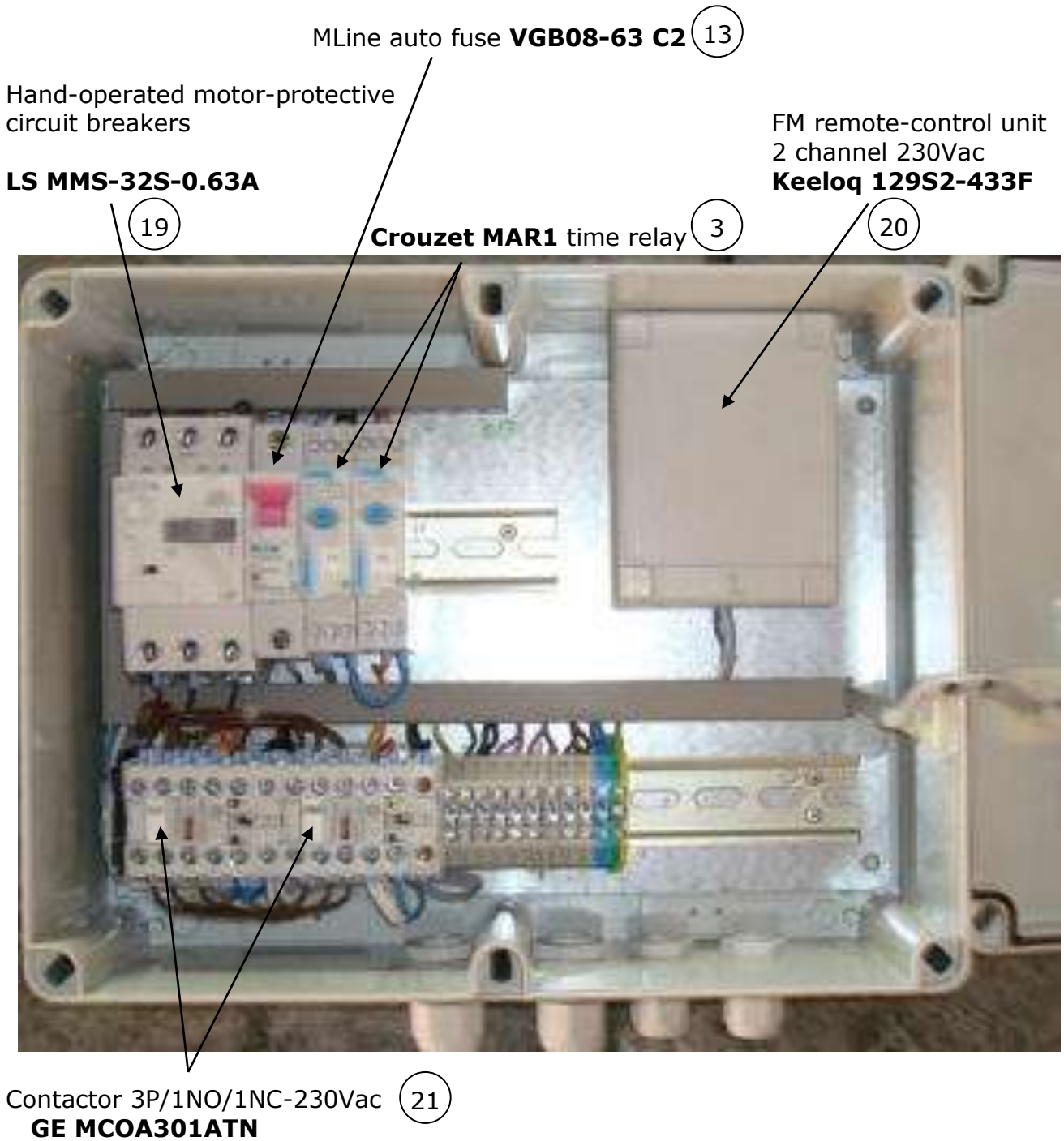MLine auto fuse **VGB08-63 C2** (13)

Power supply **DR4524 24VDC** (4)
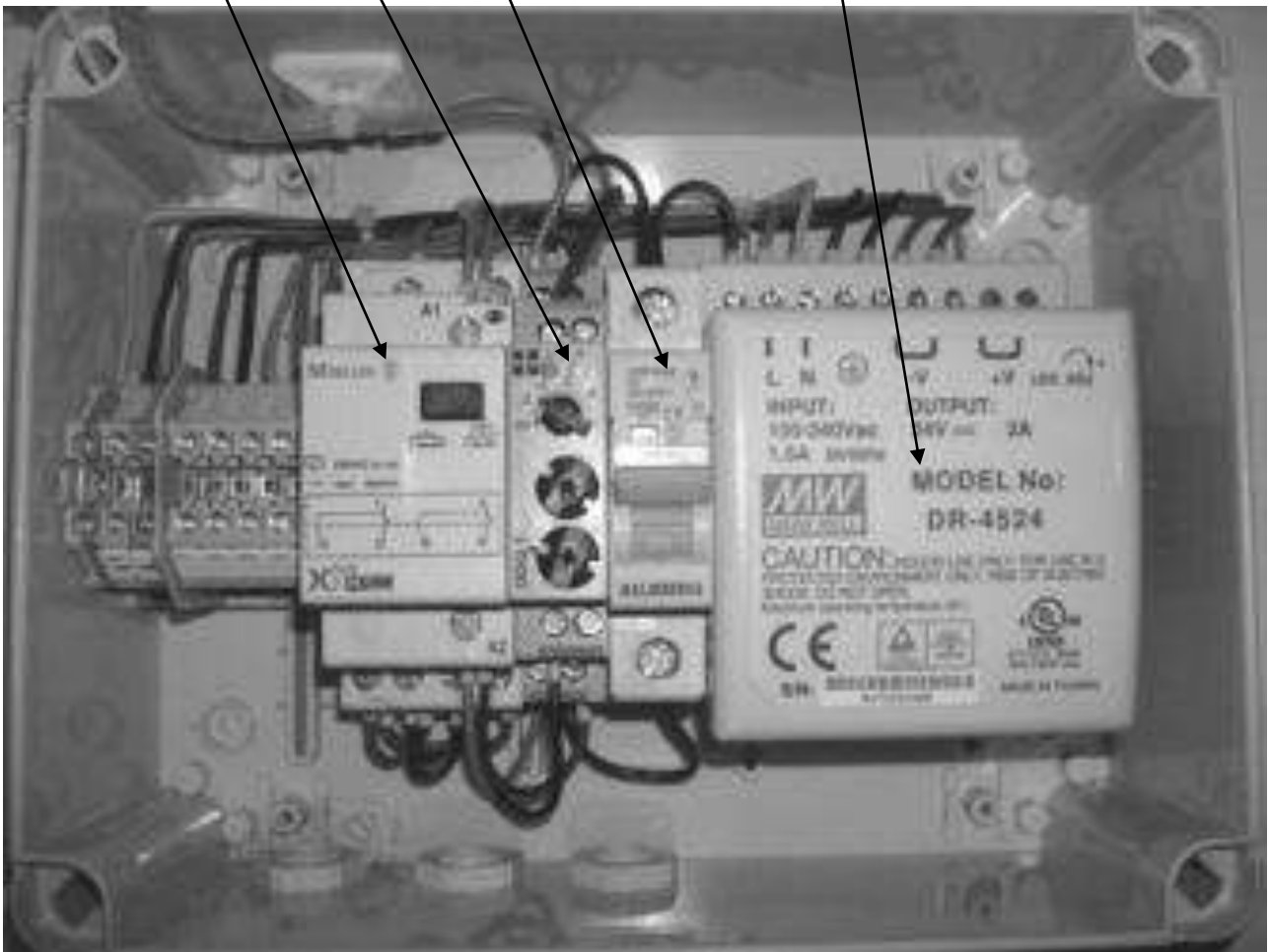
Terminal box:
1: Photo encoder +
2: Photo encoder –
3: Photo encoder out (+)
4: Actuator 24 VDC
5: Actuator 24 VDC

Connection.
L1: 230 VAC
N: none

Diagram: Power control for Switch.

MS0303 Power control for switch

Power control for Portlift with remote control (MS0405).

MLine auto fuse **VGB08-63 C2** (13)

Hand-operated motor-protective circuit breakers

LS MMS-32S-0.63A

(19)

FM remote-control unit
2 channel 230Vac
Keeloq 129S2-433F

Crouzet MAR1 time relay (3)　(20)

Contactor 3P/1NO/1NC-230Vac (21)
　GE MCOA301ATN

Terminal box:
1-2: Terminal – up – NC
3-4: Terminal – up – NO
5-6: Terminal – Down – NO

Contactor:
2T1 - U1
4T2 - V1　} Motor N
6T3 - W1

Connection.
L1
L2　} 3 x 400 VAC
L3

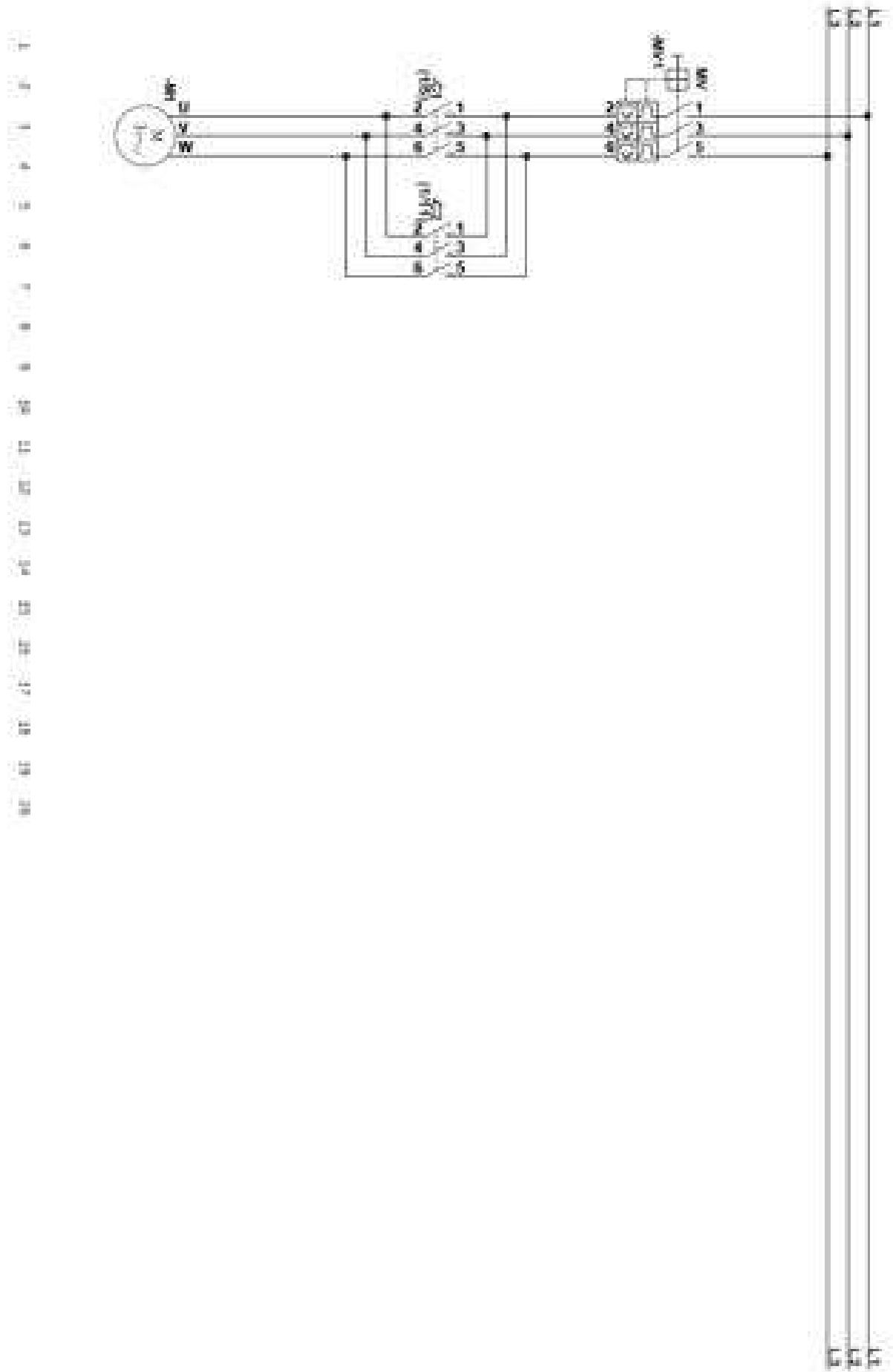# Diagram: Power control for Portlift with remote control.
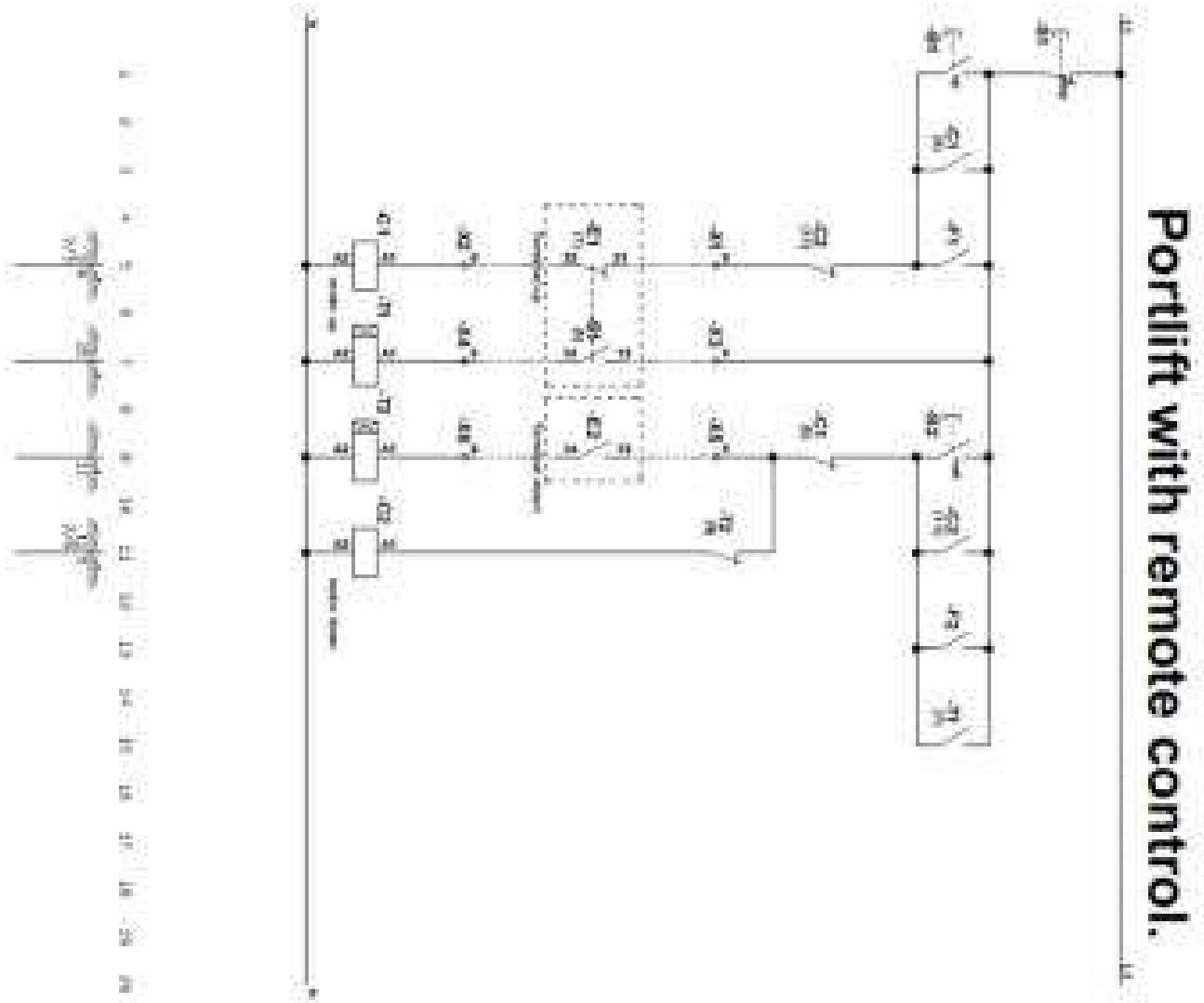
Diagram: Power control for Portlift with remote control.

Power for control Curtain lift - individual (MS0402).

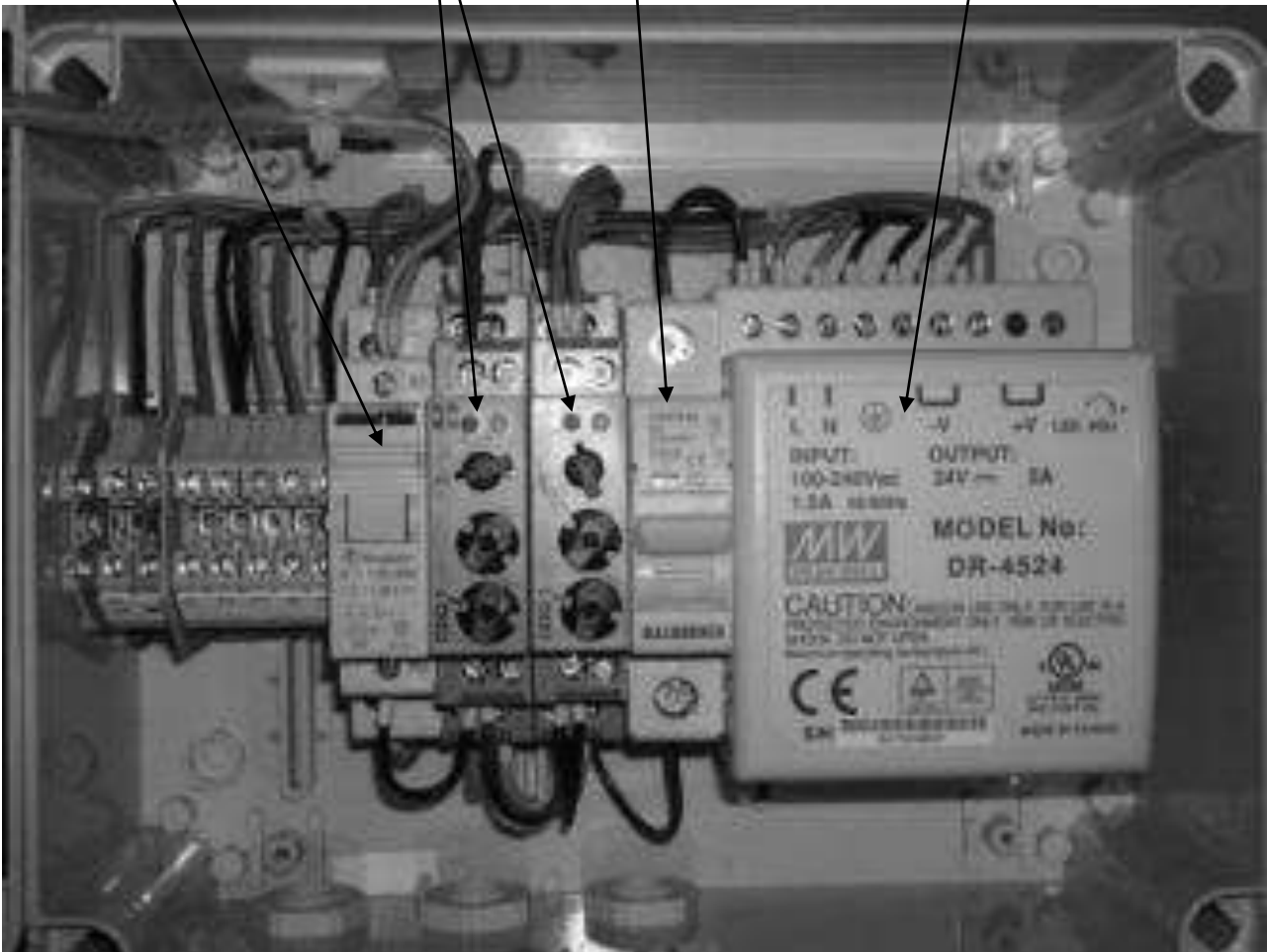Finder 20.21.9.024.4000 throw-over relay

(17)

MLine auto fuse VGB08-63 C2

(13)

Tele-Hasse **time relay ODQ1**
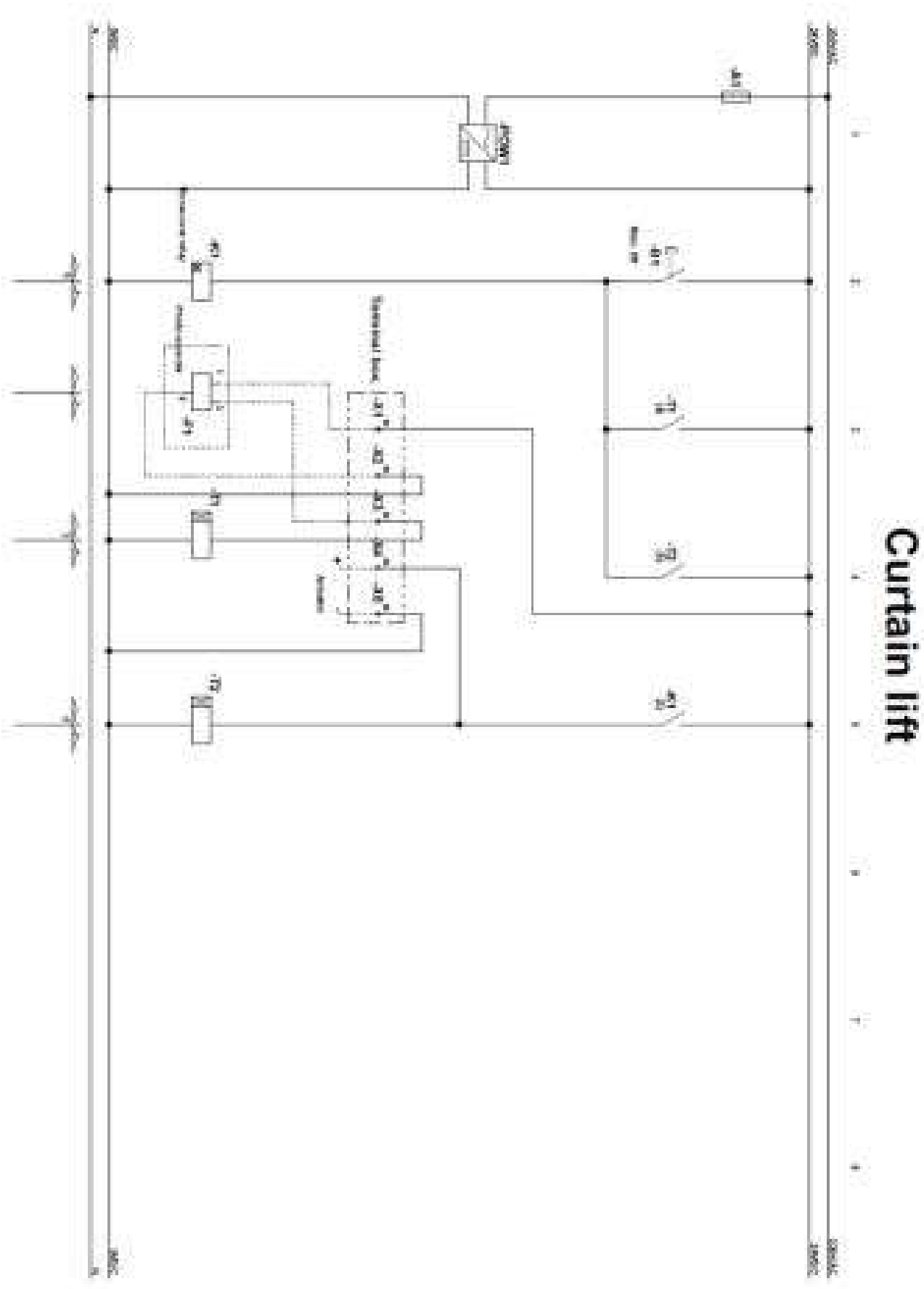
(16)

Power supply **DR4524-24VDC**

(4)

Terminal box:
1: Photo encoder +
2: Photo encoder –
3: Photo encoder out (+)
4: Curtain 24 VDC +
5: Curtain 24 VDC -

Connection.
L1: 230 VAC
N: none

Diagram: Power control for Curtain lift - individual (MS0402).

Power control for Curtain lift x 4

(MS0402-4)**.**

Interface relay
IFR-1L-24VDC
⑤

Crouzet Millenium 3
CD12 24VDC
⑱

Power supply
DR4524-24VDC
④

Auto fuse
MLine VGB08-63 C2
⑬

Terminal box:

1: + Receiver 1	
2: - Receiver 1	Curtain 1
3: + out Receiver 1	

4: + Receiver 2	
5: - Receiver 2	Curtain 2
6: + out. Receiver 2	

7: + Receiver 3	
8: + Receiver 3	Curtain 3
9: + out. Receiver 3	

10: + Receiver 4	
11: - Receiver 4	Curtain 4
12: + ex. Receiver 4	

13: + Curtain-lift relay 1
14: - Curtain-lift relay 1
15: + Curtain-lift relay 2
16: - Curtain lift relay 2
17: + Curtain-lift relay 3
18: - Curtain lift relay 3
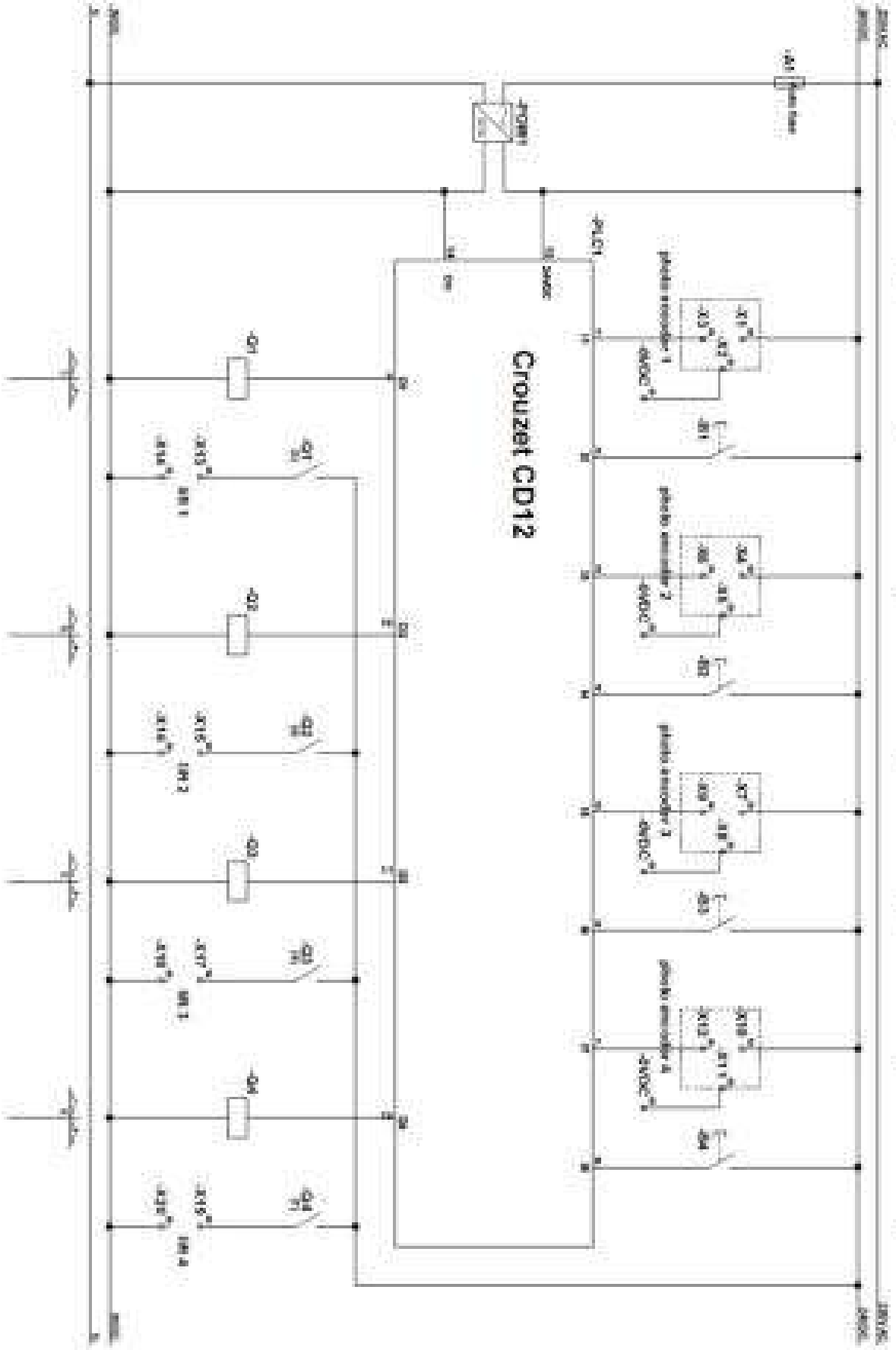19: + Curtain-lift relay 4
20: - Curtain-lift relay 4

Connection.
L1: 230 VAC

N: none

66

Diagram: Power control for Curtain lift x 4

Parts list for Power controls

Position	Part	Part no.	Description
1		MS0500	Hand-operated PKZMO-1 motor-protective circuit breakers 1.6A
2		PS10-27	Crouzet HIH current monitor relay
3		PS10-18	Crouzet MAR1 time relay
4		MS0505	Power supply type DR4524-24VDC
5		MS0507	IFR-1L-24VDC Interface relay
6		PS10-12	DILEM-10 24VDC contactor
7		PS10-19	Crouzet MUR1 pulse/pause relay
8		MS8011	DRA18-24VDC power supply
9		PS10-26	Crouzet current monitor relay 84871122
10		PS10-16	Moeller motor-protective circuit breakers PKZMO-12
11		PS10-11	Moeller DILM7-01 (24VDC) contactor
12		PS10-3	Moeller DILM25-01 (RDC24) contactor
13		PS10-28	MLine auto fuse VGB08-63 C2
14		PS10-23	Moeller throw-over relayZ-s230/WW
15		PS10-29	Crouzet Millenium PLC 3 XD26R 24VDC
16		PS10-17	Tele-Hasse time relay ODQ1
17		PS10-30	Finder 20.21.9.024.4000 throw-over relay
18		PS10-31	Crouzet Millenium 3 CD12 24VDC
19		PS10-32	Hand-operated motor-protective circuit breaker LS MMS-32S-0.63A
20		PS10-33	FM remote-control unit 2 channel 230 Vac, Keeloq 129S2-433F
21		PS10-34	GE MCOA301ATN Contactor 3P/1NO/1NC-230 Vac