# Operating instructions

## Bowling Pinsetter

# KF-65

# KF-4000

## F-Rdl-BW

FUNK Bowling

Karl Funk GmbH & Co. KG

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# EC declaration of conformity

## according to 2006/42/EC, Annex II, No. 1 A

The content of the EC declaration of conformity corresponds to Annex II, No. 1 A, of Directive 2006/42/EC.

Manufacturer of the machine:

Karl Funk GmbH & Co. KG

An der Schnellstraße 6

D-88437 Maselheim-Äpfingen

Authorized representative of the manufacturer:

Karl-Heinz Funk

An der Schnellstraße 6

D-88437 Maselheim-Äpfingen

Considered machine:

| | |
|---|---|
| general name | Bowling pinsetter machine |
| Model | KF-65 / KF-4000 |
| Type | F-Rdl-BW |
| Year of construction | |

We hereby declare that the above-mentioned machine is in compliance with all relevant provisions of the EC Machinery Directive 2006/42/EC. The machine is also in compliance with the only relevant provisions of the following EC Directives:

1. 2014/35/EU
2. 2014/30/EU

The following harmonised standards (or parts thereof) have been applied:

1. DIN EN 292

The following standards and technical specifications were also applied:

2. ZH 1/460 :1989-10
3. DIN V 8418
4. DIN V 66055
5. VDI 4500

*Note: References to EC directives, harmonised standards and standards and specifications can be found in the standards search*

Maselheim-Äpfingen, September 3, 2025

Karl-Heinz Funk

# Operating instructions based on DIN EN ISO 20607

| | |
|---|---|
| Designation | Bowling - Pinsetter Machine |
| Year of construction | Series product |
| Manufacturer | Karl Funk GmbH & Co. KG<br>An der Schnellstraße 6<br>88437 Maselheim-Äpfingen |
| Specialist | SUEDSPITZE Safety Engineers<br>Engineering partnership Maximilian Frank & Laura Wachter<br>Maximilian Frank<br>Haitelweg 12<br>89179 Beimerstetten |
| Date | 25-09-03 |

## Read before commissioning!

This operating manual is intended to enable all persons working on the machine to carry out the tasks that arise safely and correctly.

Every person who operates, maintains or repairs the machine must have read the operating instructions, in particular the safety regulations, before commissioning.

These operating instructions must be available on the machine at all times. The operator must ensure that all necessary information for the safe operation of the machine is made available to the operating personnel. If the operating instructions are available in electronic form, the operator must ensure that the operating personnel are able to inspect the operating instructions.

The original version of this operating manual is written in German.

Therefore, we ask you to read the relevant information carefully and to observe it carefully.

ATTENTION! Please inform yourself about the national regulations (occupational safety, environment) before using the machine for the first time.



## Content

## 1. General, important safety instructions

1. Only professionally instructed persons may put the machine into operation. The guarantee and warranty expires if damage is caused by improper operation.
2. We would like to point out that no liability is assumed for damage caused by non-compliance with these operating instructions.
3. The operator of the machine must ensure that at least one copy of the operating instructions is kept in the immediate vicinity of the machine and is accessible to persons working with the machine.
4. The operator must ensure that the safety and hazard instructions on the machine are observed and that the information signs are in a clearly legible condition.
5. Never work without the prescribed personal protective equipment (e.g. safety footwear).
6. The machine may only be operated if there is sufficient lighting (recommended between 300 – 500 lux).
7. Wear tight-fitting clothing and a hairnet if you have longer hair. Do not wear loose or loose clothing (ties, shirt sleeves, jewellery, etc.).
8. Activities with a risk of moving in may only be carried out without gloves. If gloves are required for individual activities, the machine must first be brought into a safe condition.
9. If the emission sound pressure level is 80 dB (A) or more, hearing protection must be worn at the workplace.
10. Never leave the machine in operation without supervision.
11. Secure the machine so that it cannot be turned on by children. Persons who have not been instructed may not operate the machine.
12. During maintenance work or troubleshooting during ongoing bowling operations, secure the lane against thrown throws while people are in the danger zone. Instruct players not to continue the game until they have been approved by staff.
13. Before using the machine, make sure that it is in perfect condition (perform a visual inspection before starting work). Pay particular attention to any damage to the safety plug or electrical connection. Never operate the machine with defective, crushed or bare cables.
14. Plug the safety plug into a safety socket suitable for the machine. The supply line for the machine may only be connected to a safety socket or to a junction box. Have the safety socket or junction box checked by a qualified electrician beforehand.
15. During maintenance and cleaning work, the machine must be switched off at the main switch or the earthed plug must be removed. Activities on the electrical equipment of the machine may only be carried out by qualified electricians. The 5 safety rules of electrical engineering must be observed:
    - Unlock machine
    - Securing the machine against restarting
    - Have the absence of voltage determined by a qualified electrician
    - Grounding and short-circuiting machine
    - Cover or fence off adjacent live parts
16. Do not reach into moving parts of the machine when the machine is switched on.
17. Always turn off the machine when you are not using it.

18. Stay with the machine until it has come to a stop.
19. Repairs can only be carried out by qualified specialists! Repair work may only be carried out by persons who are qualified for the respective repair measure and are familiar with the corresponding occupational safety requirements.
20. Protect machine from moisture.
21. Check the machine regularly for damage. Replace damaged parts only with original parts and have them replaced by qualified specialists. The warranty and warranty is void if accessories and spare parts are used that are not approved for use on the machine.
22. To avoid inadequate lighting, we recommend the installation of light sources in accordance with national occupational health and safety regulations (e.g. Workplace Directive).
23. All persons who work on the machine must be trained on the basis of these operating instructions before starting work. In particular, persons who work on the machine must comply with the measures described in chapter 1.1 safety signage described above.
24. Note that there is a risk of slipping on oiled bowling lanes.

| | |
|---|---|
|  | DANGER!<br><br>Danger to life due to technically imperfect machine or improper use!<br><br>The machine may only be used in a technically perfect condition and in accordance with its intended purpose, safety and hazard awareness in compliance with these operating instructions. All malfunctions, and in particular those that may affect safety, must be rectified immediately before the machine is started.<br><br>Everyone who works on or with the machine is responsible for complying with these safety aspects! |

## 1.1. Description of the pictograms, symbols and warnings used

| **Warning sign** | | **Mandatory signs** | |
|---|---|---|---|
| **Pictograph** | **Description** | **Pictograph** | **Description** |
|  | W001 General Warning Sign<br><br>The combination of the symbol W001 and the signal word "danger" indicates an imminently dangerous situation that will lead to death or serious injury if not avoided.<br><br>The combination of the symbol W001 and the signal word "warning" indicates an imminently dangerous situation that will result in death or serious injury if not avoided.<br><br>The combination of the symbol W001 and the signal word "caution" indicates an imminently dangerous situation that will result in death or serious injury if not avoided |  | M001 General Mandatory Sign<br><br>This combination of symbol and signal word indicates a potentially dangerous situation that can lead to property damage and environmental damage if not avoided. |
|  | W008 Crash Hazard Warning |  | M003 Use hearing protection |
|  | W011 Slip hazard warning |  | M004 Use Eye Protection |
|  | W004 Laser Beam Warning |  | M008 Use Foot Guard |
|  | W012 Electrical Voltage Warning |  | Use M009 Hand Guard |

| | | | |
|---|---|---|---|
|  | W017 Hot Surface Warning |  | M010 Use Protective Clothing |
|  | W018 Automatic start-up warning |  | M012 Handrail Use |
|  | W019 Warning of crushing hazard |  | M021 Unlock Before Maintenance or Repair |
|  | W024 Hand injury warning |  | M014 Head Protection Use |
|  | W025 Warning of counter-rotating rollers | | |
|  | W016 Toxic Substance Warning | | |

| Prohibition signs | | International pictograms / others | |
|---|---|---|---|
| **Pictograph** | **Description** | **Pictograph** | **Description** |
|  | P001 General prohibition sign |  | F001 Fire extinguisher |
|  | P002 No smoking |  | ANSI Z535.3 - DANGER |
|  | P003 No open flame; Fire, open ignition source and smoking prohibited |  | ANSI Z535.3 - WARNING |
|  | P006 Prohibited for industrial trucks |  | ANSI Z535.3 - CAUTION |
|  | P009 Climbing prohibited - In the meaning of climbing prohibited for unauthorized persons |  | ANSI Z535.3 - NOTICE |
|  | P022 Food and drink prohibited |  | ANSI Z535.3 - SAFETY INSTRUCITONS |
|  | P024 No trespassing on the area |  | Symbol for the separate collection of waste electrical and electronic equipment |
|  | P031 Switching prohibited | | |
|  | D-P006 Unauthorized access prohibited | | |

## 2. Intended use

The F-Rdl-BW pinsetter machine is designed for the automatic installation of pins on bowling lanes.

The complete system consists of the pinsetter with drive motor and control cabinet, control system and ball elevator or ball accelerator.

The score can be displayed via monitor or projector.

The control cabinet offers the possibility of connecting a ball elevator for above- and below-ground ball return or a ball accelerator for underground ball return.

Any mode of operation that goes beyond the design-related construction is contrary to its intended purpose.

In the event of improper use, any warranty of the supplier expires. It is necessary that the work steps described in the chapter Workflow or in the operating instructions are adhered to.

In the event of deviations, it is necessary to carry out a new risk assessment in accordance with the Machinery Directive and to document the changes in the relevant documents.

The machine is designed exclusively for use inside buildings.

The use of the machine for purposes other than those mentioned is prohibited.

Other intended uses are the set-up of the machine, the execution of cleaning and maintenance work, as well as troubleshooting, troubleshooting and repair.

Reasonably foreseeable misuse exists in particular through the use of products not approved for this machine and improper use of the ball accelerator / ball elevator. This could lead to potentially dangerous situations, which is why it is important to stick to the intended methods of use and approved materials.

Furthermore, there is in principle the possibility that existing/intended separating protective devices are dismantled or triggered by means other than the components provided for this purpose. The above-mentioned incorrect applications are to be explicitly prohibited in the operating instructions as well as by written operating instructions, and the use of the system is also to be expressly limited in the operating instructions to the above-mentioned intended use.

The present documentation refers exclusively to the operation of the machine in the manner described in the chapters 3.2 documented configuration. In the event of relocation of the machine or changes to the assemblies/configuration, the risk assessment must be repeated for the affected machine parts or, in the event of significant changes within the meaning of the Product Safety Act, for the respective machine.

The assembly and initial set-up of the machines is carried out by our own specialists in cooperation with the suppliers/manufacturers of the incomplete machines or components.

The present risk assessment does not cover the construction, transport and commissioning of the plant, as these product life phases have already been completed.

The machine is operated, maintained and repaired exclusively by trained skilled workers or semi-skilled workers, who are intensively trained on the system on the basis of existing training documentation.

In principle, it is possible and common to replace individual components installed on the system with identical components. This does not constitute a significant change / significant change within the meaning of the EC Machinery Directive or the Product Safety Act.

In addition to this documentation, the documents provided by the respective manufacturer (such as operating instructions, installation instructions, assembly instructions) of the installed components and (incomplete) machines apply.

## 2.1. Instruction and training

As an entrepreneur/operator, you are obliged to inform or instruct the operating personnel about existing legal and accident prevention regulations as well as about existing safety devices on the machine. This obligation also extends to such safety devices installed in the vicinity of the machine. The various professional qualifications of the employees must be considered.

The operating personnel must have understood the instruction and it must be ensured that the instruction is observed.

This is the only way to ensure that your staff works in a safety- and risk-conscious manner. Compliance with the contents of the instruction should be checked regularly.

As an entrepreneur/operator, you must therefore have every employee confirm your participation in a briefing in writing.

## 2.2. Noise emissions of the machine during activities

The noise emissions of the machine were measured on the same machine types. These can be requested from the manufacturer. Under common operating conditions with optimal settings, the maximum noise emission of the machine is below the usual limits (e.g. from the Machinery Directive).

When configuring the machine, care must be taken to ensure that there are no unnecessary noise emissions that exceed the measured values. If this is unavoidable, e.g. due to technical measures, effective hearing protection is essential to protect all persons in the immediate vicinity of the machine!

Depending on the activity or the duration of the activity, the operator must determine whether suitable hearing protection is required as part of a risk assessment.

# 3. Machine Description

## 3.1. Specifications

| | | |
|---|---|---|
| Pinsetter Length: | 2000 | mm |
| Pinsetter Width: | 1000 | mm |
| Height Pinsetter: | 950 | mm |
| Power Consumption Load | 0,37 | kW/h |
| Weight machine | 130 | kg |
| Total weight Pinsetter | 165 | kg |
| Space required for the machine | 2200x 1100 | mm |
| Sound Power Level (LWAC) | 59 | ~Db |

## 3.2. Function

During the actuation process, the main motor is started. The cable pull shaft (page 26) is driven from the upper stopping point over the concentricity downwards or forwards. The pins are set at slow speed shortly before touchdown. The engine switches off. If the light barrier throw (page 14) is interrupted by the thrown ball, the elevator or ball accelerator and the ball passage or ball lifter are started. The fallen pins are placed above the microswitch on the string switch (page 17) and sends the information to the CPU (page 19). The main motor is started, the pins are pulled up and centered by the centering bells (page 25). To prevent the fallen pins from being placed, the next time the string switch is adjusted (page 18) for a short time a string brake (page 18) is activated. The remaining pins are provided. During the next actuation, the pins are pulled up and all string brakes are mechanically released. The individual positions of the cable pull shaft are determined on the cam disc (page 16) and also sent to the CPU. If the pins are blocked during the centering process, a microswitch on the string untangling (page 17) and the main engine is stopped. The pins fall down due to their own weight. The microswitch is closed and the centering process can be repeated.

# 4. Light Barrier Throw

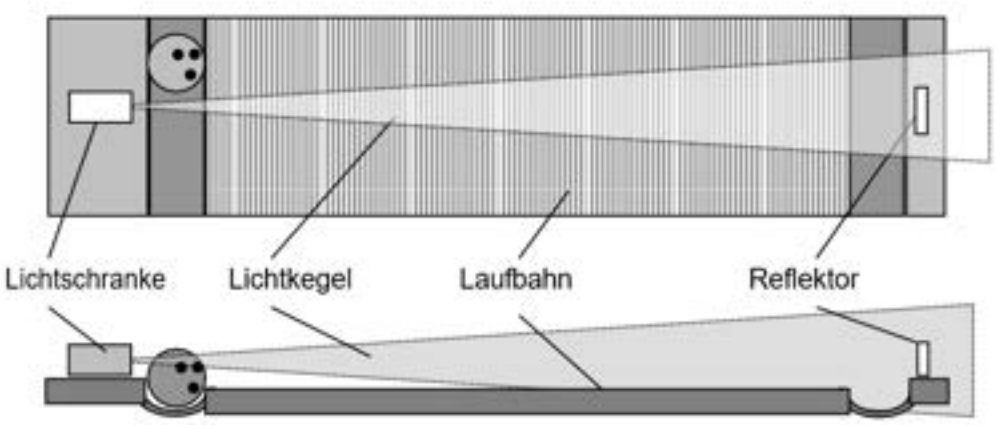
## 4.1. View

## 4.2. Spare parts

| Designation | No. |
|---|---|
| Light barrier incl. cable and plug | 7013218 |
| Light Barrier Holder Throw | 7007695 |
| Reflector foil | 7013219 |
| Reflector Holder Throw | 7012603 |

## 4.3. Function

To ensure that the bowling machine functions properly, the light barrier must be correctly adjusted and the readiness indicator (green LED) must be lit. The photoelectric sensor function can be controlled on the LED display (red LED) on the back of the photoelectric sensor. The light cone emitted by the light barrier must be centered over the reflector. The adjustment is made via the 3 fastening screws on the light barrier. When darkening the room, the light beam becomes visible on the reflector. Pin assignment see page 15.



# 5. Light barrier foul-line

## 5.1. View

## 5.2. Spare parts

| Designation | No. |
|---|---|
| Light barrier incl. cable and plug | 7013218 |
| Light Barrier Holder V-Line Metal | 10012289 |

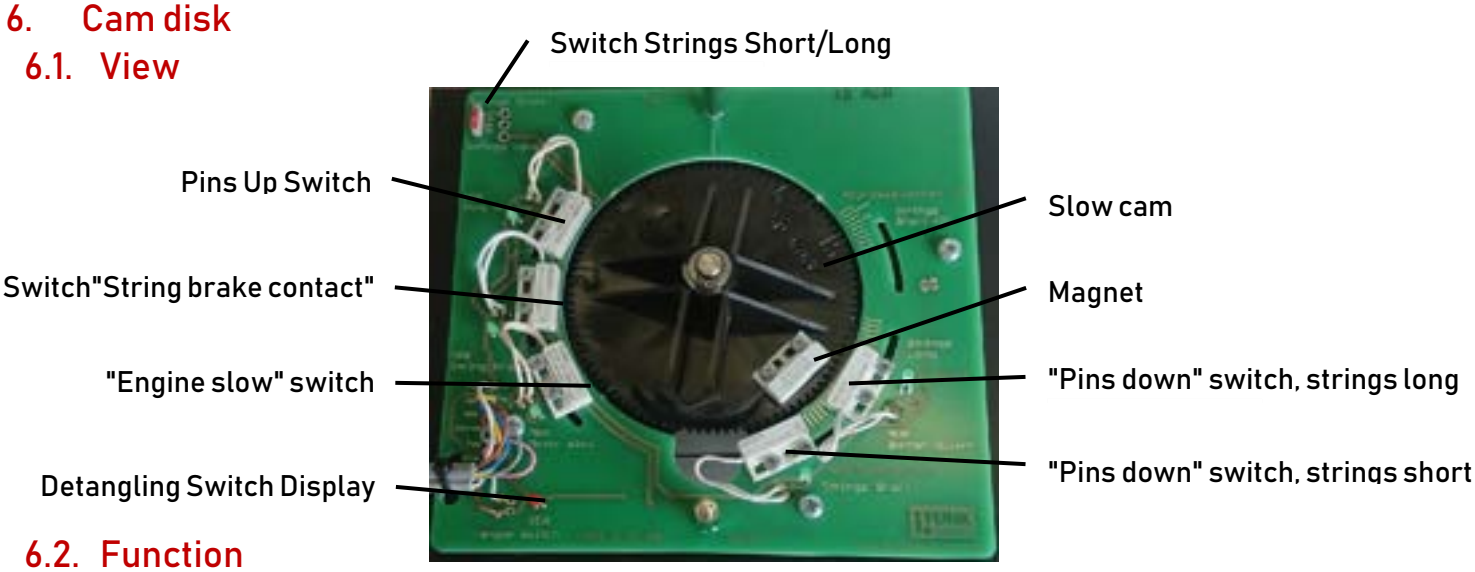
## 5.3. Function

If the light barrier foul-line is triggered during the throw, the fallen pins will not be evaluated.
For adjustment and adjustment, see page 14.

| Assignment 4-pin. Mate N-Lok Connector | | |
|---|---|---|
| Pin 1 | blue | GND |
| Pin 2 | brown | +24V |
| Pin 3 | | |
| Pin 4 | black | PNP output |

# 6. Cam disk

## 6.1. View




## 6.2. Function

The cam disc rotates counterclockwise during operation and activates the individual switches (reed switches) via the magnet on the cam disc. When the switch is activated, the green LED next to the switch lights up. In order to adjust the position of the switches, the 2 screws must first be loosened.

*"Pins up" switch:*

Machine starting position, pull shaft is held by the mechanical brake (Fig.12.4).

*"String brake contact" switch:*

Activation of the string brakes for a few seconds. The strings of the previously fallen pins are blocked by the string brake during the positioning process after the second throw and remain up.

*"Motor slow" switch:*

The pins are set at slow speed just before touchdown.

*Detangling Switch Indicator:*

If the pins are blocked during the centering process, the microswitch on the string untangling is opened and the light-emitting diode goes out.

*"Pins down, strings short" switch:*

stop position pull shaft

*switch "Pins down, strings long":*

stop position cable pull shaft

*switch "Short/long strings":*

reed switch strings short or strings long, active

## 6.3. Spare parts

| Designation | No. |
|---|---|
| Cam disc (circuit board incl. cable set) | |
| Reed Switch MK13 | 7017023 |

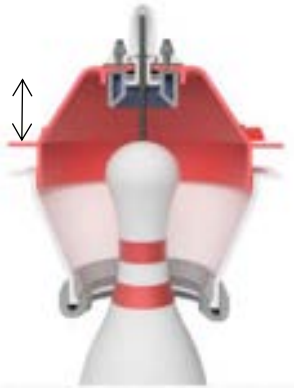
## 7. Detangling

If the pins are blocked during the centering process, the String Detangler Switch (Page 26) will be opened. The light-emitting diode on the curve switch goes out and the main motor is stopped.

Article No. (see exploded drawing)

## 8. Pulley

The correct adjustment of the pin strings is of great importance for the proper functioning of the bowling positioner. After that, it has to snap back into place.
This setting must be reviewed at least weekly.
When reinstalling the system or pulling in a new string, a daily check is recommended at the beginning (usually in the first week), as the new strings stretch.



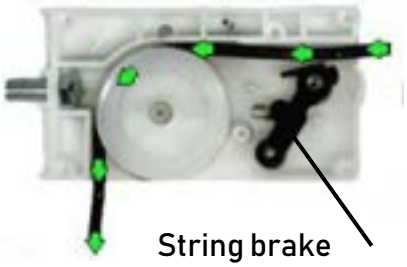

If the string length is correctly adjusted, the pins must have a slight vertical play of approx. 4-5cm in the centering bell at the upper holding point.
This can be checked by pulling on the pin strings.

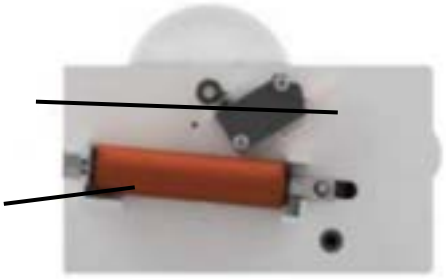
If the pin strings are set too long, the centering of the pin is not sufficient and the pin can tip over or be positioned inaccurately during the setting process.

If the pin strings are set too short, the drive is unnecessarily loaded and the string untangling switch can be triggered.

## 9. String switch

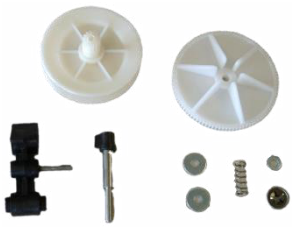
The tin strings run over the string switch. Here, the fallen pin is registered by a mechanical contact. Stiff string switches, as well as damaged strings, increase the string resistance and have a negative effect on the pinfall result. It is therefore necessary to regularly check the string switches for their smooth running and the strings for damage. Cleaning agents and lubricants should be avoided with the string switch:
The pull magnet operates the string brake.




### 9.1. Spare parts

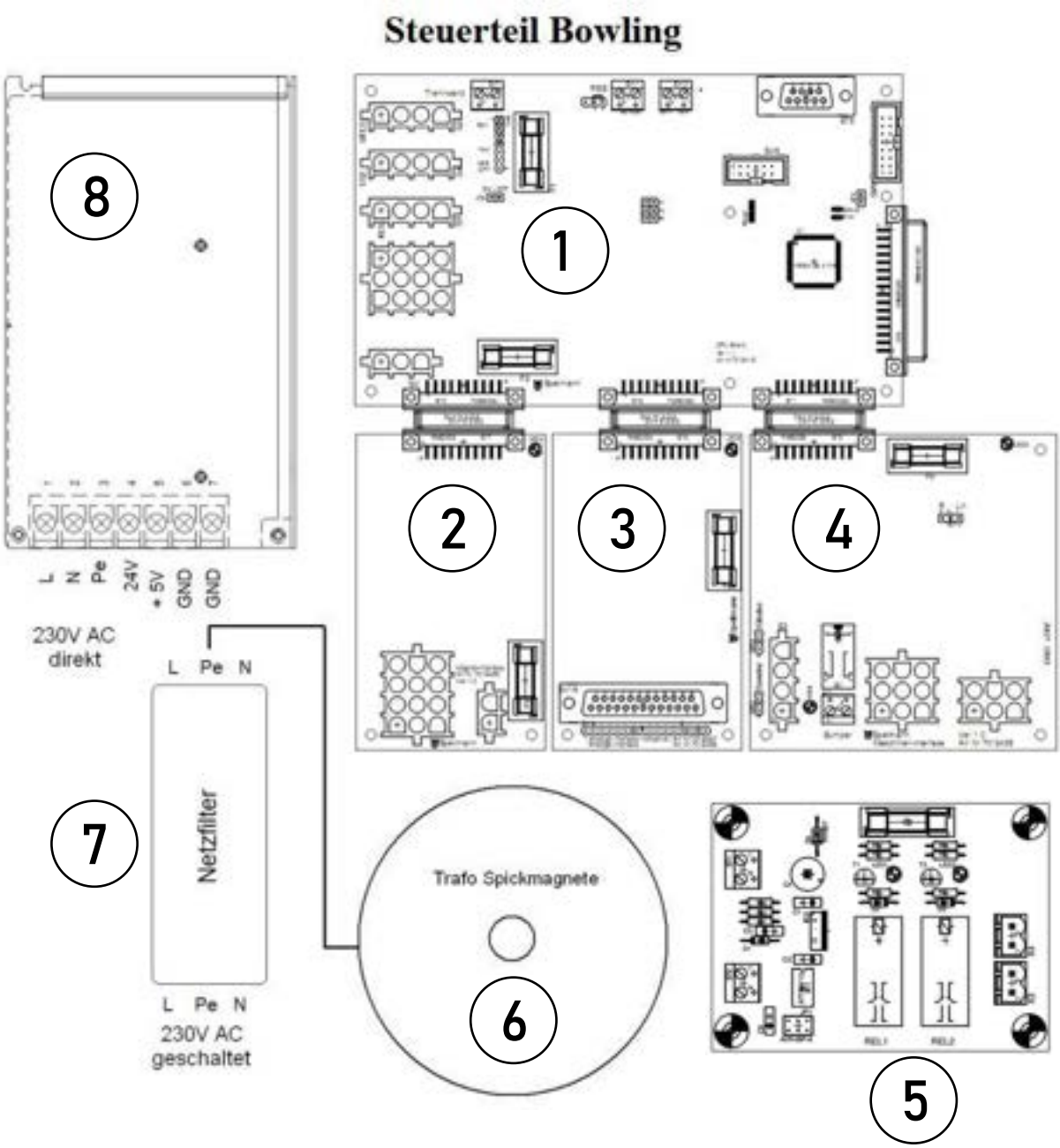
Pos. 4



Pos. 5

| Pos. | Designation | Art.Nr. |
|---|---|---|
| 1 | String switch | 31003900 |
| 2 | Micro switch with lever | 10013017 |
| 3 | Pull magnet 24V | 30103013 |
| 4 | String Switch Repair Kit Large | 30103930 |
| 5 | String Switch Repair Kit Small | 30103929 |

## 10. Control cabinet




1 – CPU

2 – Magnet-Interface

3 – Display-Interface

4 – Pinsetter-Interface

5 – Bumper circuit board

6 - Toroidal transformer

7 - Mains filter

8 - Switching power supply

## 10.1. Function

CPU(1) :

is powered by the switching power supply (8). The information from the light barriers as well as microswitches to the cable switch are routed to the CPU. The CPU communicates with the scoring system via 9-pin Sub-D connector ST5. The system can be switched off or on via the scoring system. Without the scoring system, the system can be bridged and switched on by a cable protector on the plug marked "Schloss". The cable protector should not be used when operating with a scoring system, as this can lead to malfunctions of the scoring system.

Magnet interface (2)

is the interface between the CPU and the pull rod of the string brakes (see 9). The voltage of the string brakes is provided via the toroidal transformer (6) and interference suppression filter (7) on connector S1. (green LED on / power switched, Relais 2 on)

Display interface (3)

Display unit "Attraction" (optional)

Pinsetter interface (4)

is the interface between CPU and cam disk, power box and control of the bumper board via a potential-free relay contact. This is supplied with power via the switching power supply (green LED on).

Bumper board (5):

is supplied with voltage (24V) via the switching power supply.

Bumper motors are controlled

Toroidal transformer (6):

converts 230V to 24V AC.

Mains filter (7):

Input 230VAC, output 230VAC

Switching power supply (8):

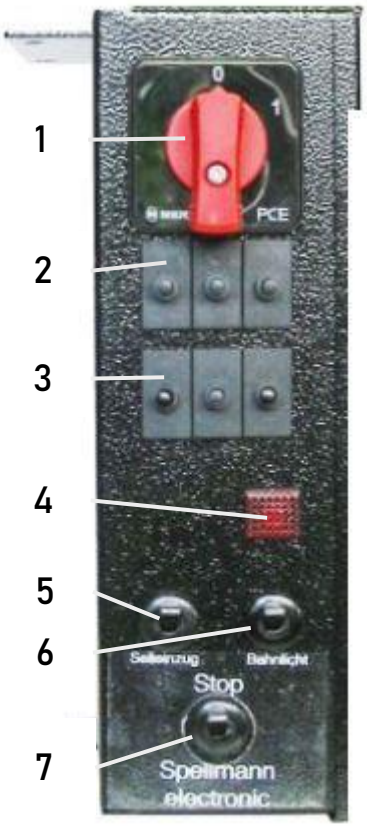
converts 230VAC to 24VDC/ and 5VDC

## 10.2. Spare parts

| Pos. | Designation | Art.Nr. |
|---|---|---|
| 1 | CPU board | 7012415 |
| 2 | Magnet Interface Board | 7012436 |
| 3 | PCB Display Interface | 7012438 |
| 4 | PCB Machine Interface | 7012435 |
| 5 | PCB Bumper Control | 7012535 |
| 6 | Toroidal transformer 120VA / 24VAC | 7001271 |
| 7 | Line filter | 7012884 |
| 8 | Switching Power Supply 230VAC/24VDC/5VDC | 7012588 |

## 11. High voltage box

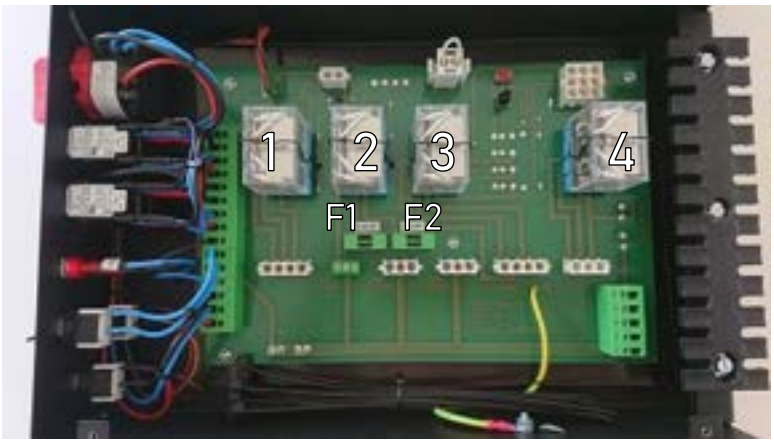
The control relays for the drive motors are located in the high-voltage box.




Main switch: (1)
"Off" switch: de-energizes the entire system.
Switch "On": Relay 2 is switched on via the CPU with a time delay.
-> (system on)
fuse resettable (2)
machine motor
fuse resettable (3)
elevator / ball lifter
Indicator lamp 230V (4)
lights up when system is activated
switch cable retraction (5)
top: cable shaft moves backwards (pins raise), Machine stops
bottom: normal operation
switch railway light (6)
top: if the system is switched off via the scoring system, the track light also goes out.
bottom: track light can then be switched on again
Machine stop switch (7)
top: System stop.
in case of string entanglements, the stop switch must be used, otherwise all results in the display will be deleted.

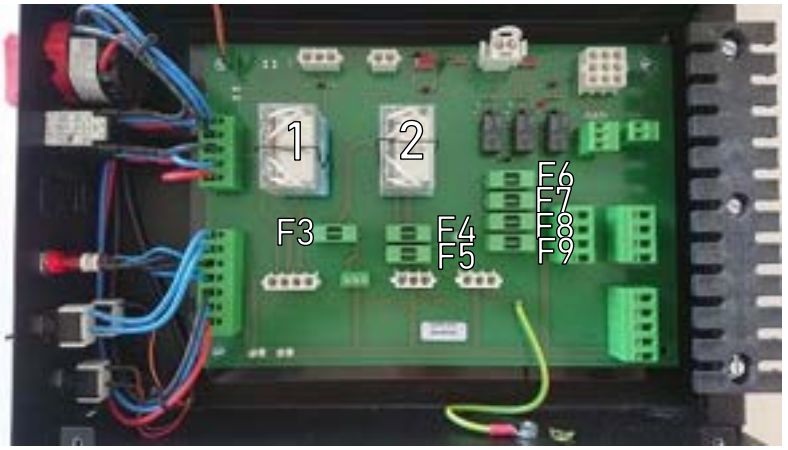
## 11.1. EU version; 3 phases (L1-L2-L3 = 400V; L1-N = 230V)

Relay 1
Ball lifter / elevator / ball passage
Relay 2
Relay 2 is switched via the CPU with a time delay.-> (power switched)
Relay 3
main motor fast
relay 4
main motor slow
fine fuse F1
230VAC direct (switching power supply)
F2
230VAC switched (toroidal transformer)

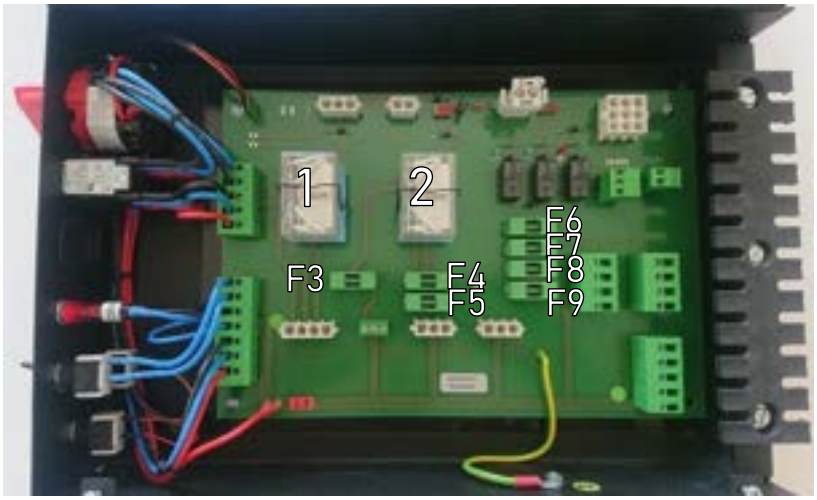



## 11.2. Version USA; 1Phase ( L1-L2 = 230V; L1-N = 110V)

Relay 1
Ball lifter / elevator / ball passage
Relay 2
Relay 2 is switched via the CPU with a time delay. -> (power switched)
Fuse F3
pin lighting (relay 2)
Fuse F4
230VAC switched (toroidal transformer)
F5
230VAC direct fuse (switching power supply)
F6-F7, F8-F9
frequency converter, accelerator
frequency converter FU1
Main motor is controlled by frequency converter



## 11.3. JAPAN version; 3 phases ( L1-L2-L3 = 200V; no N)




Relay 1
Ball lifter / elevator / ball passage
Relay 2
Relay 2 is switched via the CPU with a time delay. -> (power switched)
Fuse F3
pin lighting (relay 2)
Fuse F4
200VAC switched (toroidal transformer)
F5
200VAC direct fuse (switching power supply)
F6-F7, F8-F9
frequency converter, accelerator
frequency converter FU1
Main motor is controlled by frequency converter

## 11.4. Spare parts

| Pos. | Designation | Art.Nr. |
|---|---|---|
| 1-4 | LY4 / 24VDC relay | 7001149 |
| F1-5 | Fuse Fine 3.15AT | 7006557 |
| 2 | Fuse resettable 1.5A | 10020055 |
| FU1 | Frequency converter 0.75kW | 70132170 |

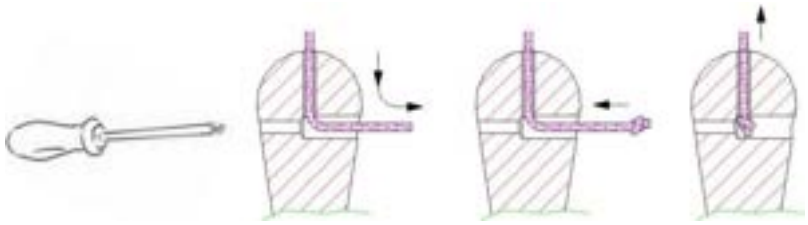
FU1

# 12. Wear Material / Maintenance

## 12.1. Strings on pins renewed

| Designation | Art.Nr. |
|---|---|
| Pin 1 piece | 40003031 |
| Pin 10 pieces | 40003032 |
| Seil (5,3mm/50m) | 31009904 |

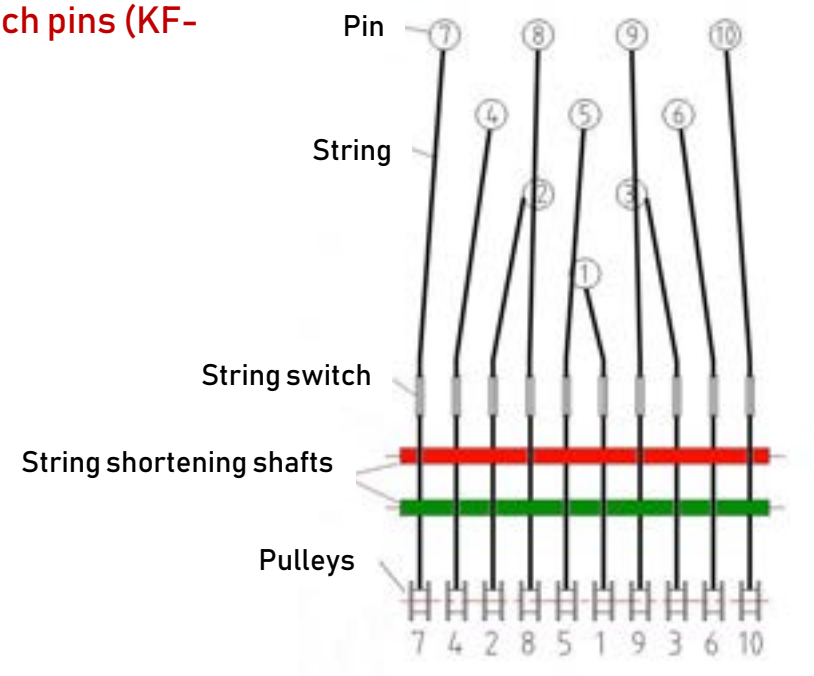
Cut off the defective string above the pin, use a screwdriver to remove the remaining string with knots. Insert the new string end at the top and guide it through the larger horizontal hole with slight twisting movements. If necessary, push it with a screwdriver.



## 12.2. Pulling strings into the machine (KF-65)

The strings of pins 1-6 are guided through the string guide over the front string shortening shaft. The strings of pins 7-10 are guided via the rear string shortening shaft. Due to the string shortening, fallen pins cannot get into the elevator or ball accelerator.

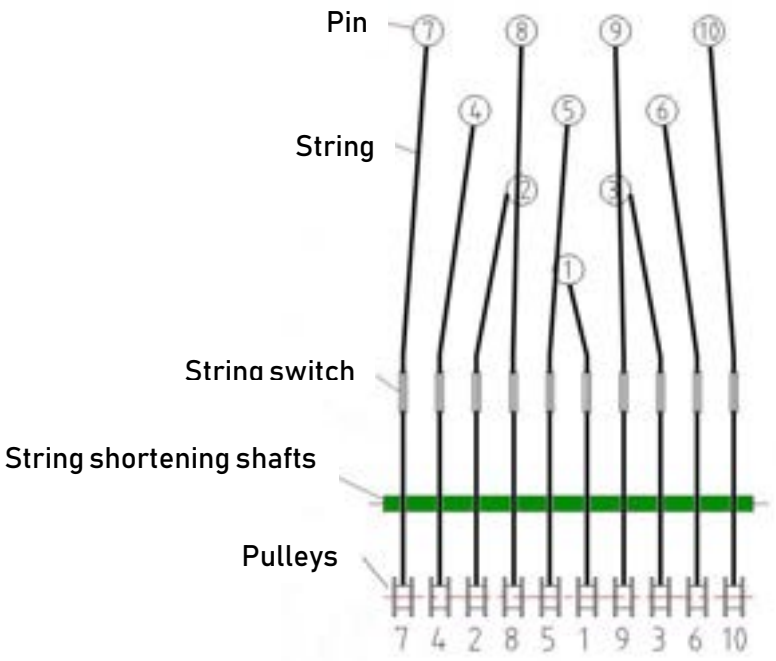
## 12.3. Assignment of string switch pins (KF-65)



## 12.4. Pulling strings into the machine (KF-4000)

The strings of all pins are guided through the string guide over the shortening shaft. The USBC-compliant KF-4000 variant adheres to the prescribed rope length. Due to the string shortening, fallen pins cannot get into the elevator or ball accelerator.

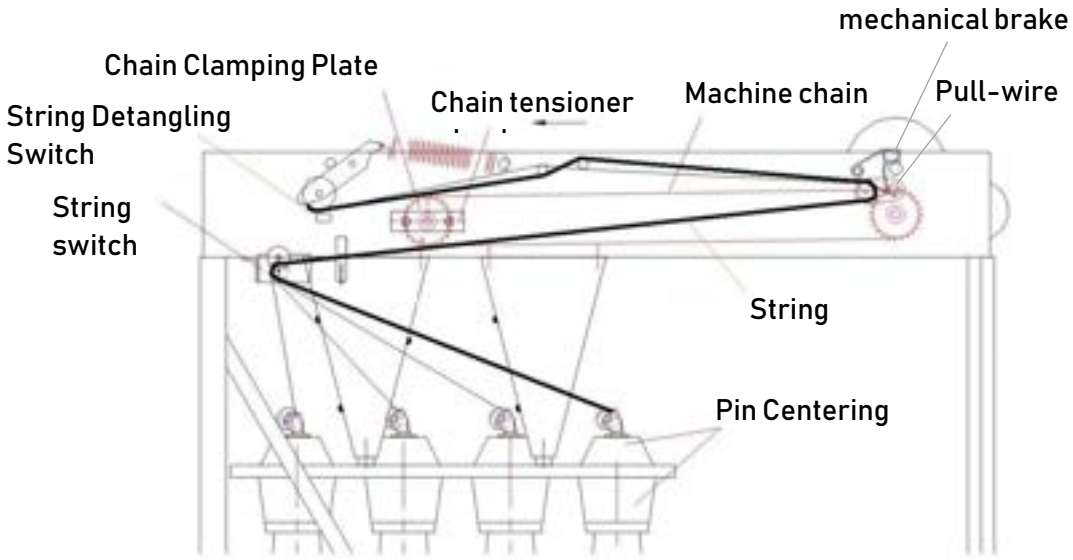
## 12.5. Assignment of string switch pins (KF-4000)




## 12.6. Pin Centering / Spare Parts

| Pos. | Designation | No. |
|---|---|---|
| 1 | String roll holder complete for Pin 1 | 31022900 |
| 2 | String roll holder complete for Pin 2-10 | 31023900 |
| 3 | Centering top | 31024003 |
| 4 | Stop pad for pin | 31024006 |
| 5 | Centering bushing for stop pad | 31024007 |
| 6 | Centering flange white | 31024008 |
| 7 | Clamping ring with steel ring | 31024009 |

## 12.7. Maintenance work on the mechanics




The bowling machine has a low-maintenance design. Regular maintenance work includes the following activities:

1. Retighten the machine chain and grease with spray oil. The machine chain can be tensioned via the chain tensioning wheel or via the chain tensioning plate.
2. Checking the pin centering
3. Functional test of the string switches and the string detangler switch
4. Checking the pins and the pin strings for wear

The maintenance intervals are based on the operating hours of the system.

## 13. Troubleshooting

*For all maintenance work and repairs, the main switch must be set to "0"!*
When repairing the high-voltage box, it is essential to disconnect the mains plug from the mains. *(The stop switch is only for eliminating string tangles)*

| Error | Possible causes | Solution | Reprimand |
|---|---|---|---|
| After switching on, the pins are not set, red indicator light on the power box lights up | Stop switch on the high-voltage box is set to STOP | Set stop switch to ON | Page 21 |
| | String switch on the high-voltage box is set to STRING RETRACTION | Set the string switch to non-string retraction | Page 21 |
| | Thermal fuses for servo motor on the high-voltage box have tripped | Notify Customer Service Press Thermal Fuse | Page 22 |
| | Motor AB relay in the power box defective | Notify Customer Service or Replace Relays | Page 22 |
| | String untangling switch defective | Replace the string detangler switch | Page 17 |
| After switching on, the pins are not set, red indicator light on the power box does not light up | Power supply to the machine has failed | Establish power supply | Page 21 |
| | Main switch on the high-voltage box is set to OFF | Turn on the main switch | Page 21 |
| | Switch-on relay (2) in the high-voltage box defective | Notify Customer Service or Replace Relays | Page 22 |
| | Faulty fuse in the control cabinet | Notify Customer Service or Renew Fine Shearing | Page 22 |
| Ball was played, pins fall, machine does not respond | Power supply to the machine has failed | Establish power supply | Page 21 |
| | Thermal fuses for servo motor on the high-voltage box have tripped | Notify Customer Service Press Thermal Fuse | Page 22 |
| | Motor AB relay in the power box defective | Notify Customer Service or Replace Relays | Page 22 |
| | Faulty fuse in the control cabinet | Notify Customer Service or Renew Fine Shearing | Page 22 |
| Machine resets after some time, without a ball being played | Machine light barrier is set incorrectly | Notify customer service or readjust machine light barrier | Page 14 |
| | Machine light barrier is defective | Replacing and adjusting the machine light barrier | Page 14 |

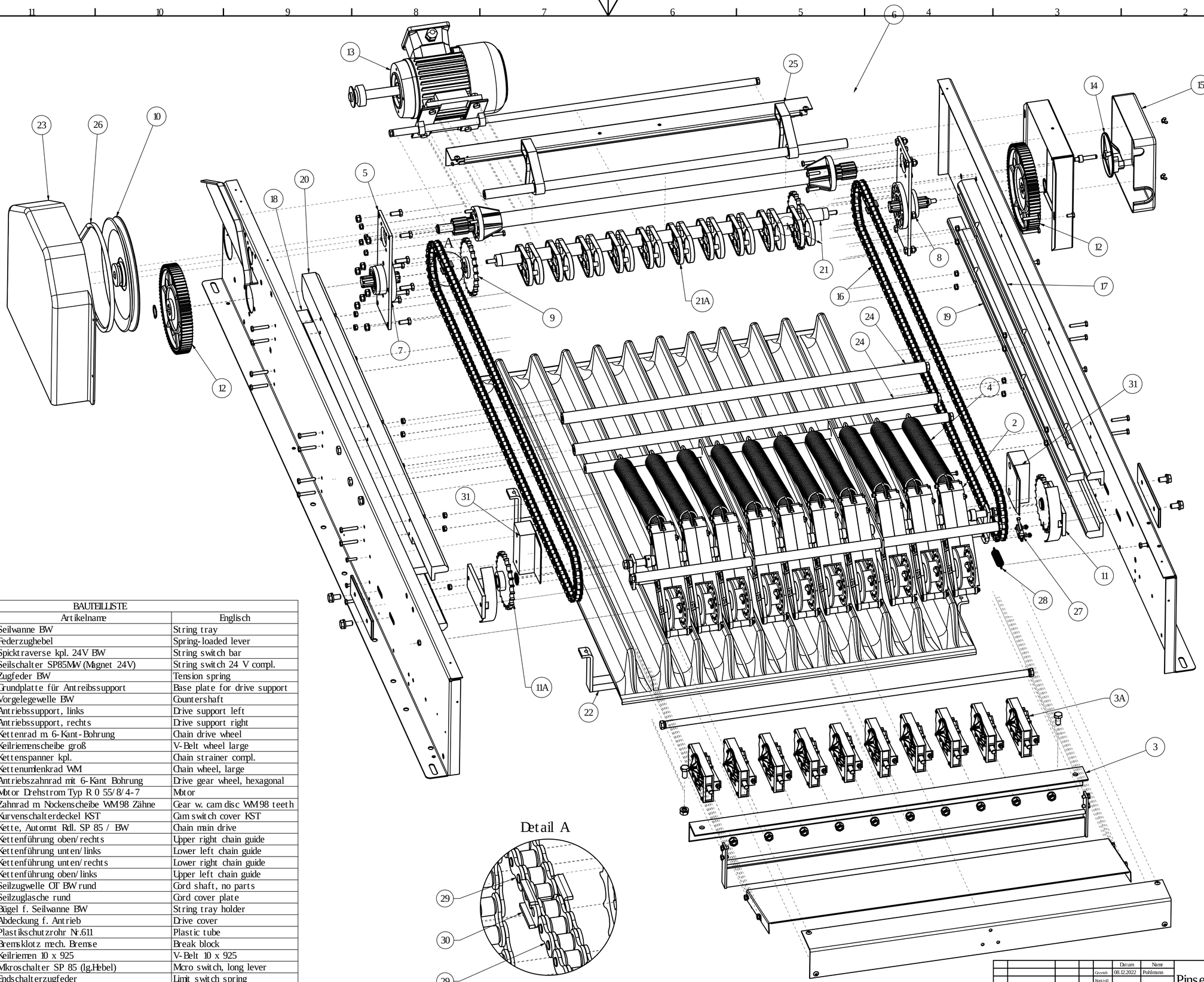
| | | | |
|---|---|---|---|
| Pins fall over when placed on the pin deck | Pinch string too long | Retension the string via the string reserve pulley | Page 17 |
| | Centering parts worn | Renew centering | Page 17 |
| | Pin defective | Renew Pin | Page 17 |
| | Bottom plate on the pin defective | Renewing the floor slab | Page 17 |
| Pins are always pulled up and down | Pin string too tightly tensioned (string untangling switch trips) | Regulate tension of the pinstrings via string reserve pulley | Page 17 |
| Pins do not remain at the top of the centering bell when the machine is switched off | Pin string too tightly stretched | Regulate tension of the pinstrings via string reserve pulley | Page 17 |
| | Switch "pin up" on cam disc shifts too early or is defective | Adjust reed switch<br>Renew reed switch | Page 16 |
| Machine does not stop in the final position, but runs through | Switch "pin up" on cam disc is shifted too late or defective | Adjust reed switch<br>Renew reed switch | Page 16 |
| Fallen pins do not stay up on the 2nd throw | Peg strings too thin or damaged | Checking / renewing pin strings | Page 24 |
| | String brake stuck in the string switch | Checking / renewing string switches | Page 18 |
| | Pull magnet defective or pull magnet stuck | Replace the pull magnet | Page 18 |
| | Electrical connection interrupted or no control available | Check electrical connection<br>Notify customer service | Page 20 |
| | Switch-on relay (2) in the high-voltage box defective | Notify Customer Service or Replace Relays | Page 22 |
| Balls don't come back | Ball lifter or ball accelerator in the engine room is not running | Remove ball / pin from ball lifter or ball accelerator | Page 24 |
| | Ball or pin jammed in accelerator | | |
| | Flat belt or V-belt or the tension too low | Tensioning or renewing belts | |
| | Several balls are in the return lane | Remove balls from return lane | |
| | Ball transport wheel defective | Replacing the ball transport wheel | |
| | Electrical connection of ball lifter or ball passage interrupted | Check the electrical connection | Page 22 |
| | Circuit breaker on the high-voltage box tripped | Push thermal fuse | Page 22 |
| Sweep flap stops at an angle | Sweep string too loose | Retighten the sweep string | |

## 14. List of compatible Scoring Software

- Funk Nexus
- Spellmann SNE
- Steltronic
- BMS

## 15. Exploded drawing with parts list

see next page




| BAUTEILLISTE | | | |
|---|---|---|---|
| OBJEKT | Artikelnummer | Artikelname | Englisch |
| 1 | 7007616 | Seilwanne BW | String tray |
| 2 | 7005591 | Federzughebel | Spring-loaded lever |
| 3 | 7007617 | Spicktraverse kpl. 24V BW | String switch bar |
| 3A | 8008040 | Seilschalter SP85MW (Magnet 24V) | String switch 24 V compl. |
| 4 | 7012765 | Zugfeder BW | Tension spring |
| 5 | 7008791 | Grundplatte für Antreibssupport | Base plate for drive support |
| 6 | 7006784 | Vorgelegewelle BW | Countershaft |
| 7 | 7006718 | Antriebssupport, links | Drive support left |
| 8 | 7006725 | Antriebssupport, rechts | Drive support right |
| 9 | 8001215 | Kettenrad m. 6-Kant-Bohrung | Chain drive wheel |
| 10 | 7007158 | Keilriemenscheibe groß | V-Belt wheel large |
| 11 | 7006720 | Kettenspanner kpl. | Chain strainer compl. |
| 11A | 7006749 | Kettenumlenkrad WM | Chain wheel, large |
| 12 | 8001214 | Antriebszahnrad mit 6-Kant Bohrung | Drive gear wheel, hexagonal |
| 13 | 8007814 | Motor Drehstrom Typ R 0 55/8/4-7 | Motor |
| 14 | 7006764 | Zahnrad m. Nockenscheibe WM98 Zähne | Gear w. cam disc WM98 teeth |
| 15 | 8006756 | Kurvenschalterdeckel KST | Cam switch cover KST |
| 16 | 7006753 | Kette, Automat Rdl. SP 85 / BW | Chain main drive |
| 17 | 7011786 | Kettenführung oben/rechts | Upper right chain guide |
| 18 | 7011783 | Kettenführung unten/links | Lower left chain guide |
| 19 | 7011784 | Kettenführung unten/rechts | Lower right chain guide |
| 20 | 7011785 | Kettenführung oben/links | Upper left chain guide |
| 21 | 7006613 | Seilzugwelle OT BW rund | Cord shaft, no parts |
| 21A | 7005580 | Seilzuglasche rund | Cord cover plate |
| 22 | 7014021 | Bügel f. Seilwanne BW | String tray holder |
| 23 | 7005501 | Abdeckung f. Antrieb | Drive cover |
| 24 | 7005585 | Plastikschutzrohr Nr.611 | Plastic tube |
| 25 | 7006751 | Bremsklotz mech. Bremse | Break block |
| 26 | 7006746 | Keilriemen 10 x 925 | V-Belt 10 x 925 |
| 27 | 8001211 | Mikroschalter SP 85 (lg.Hebel) | Micro switch, long lever |
| 28 | 7005602 | Endschalterzugfeder | Limit switch spring |
| 29 | 7006734 | Kettenschloss, einfach | Chain lock, simple |
| 30 | 7006735 | Kettenschloss, spezial | Chain lock, special |
| 31 | 7006745 | Schutzkeil | protective guard |

| | Datum | Name |
|---|---|---|
| Gezeich. | 08.12.2022 | Pohlmann |
| Kontroll. | | |
| Norm. | | |
| Maßstab | 1 : 4 | |

Pinsetter

FUNK

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