



FUNK STRING PINSETTER

PINSETTER FUNCTION - TROUBLESHOOTING - PREVENTIVE MAINTENANCE

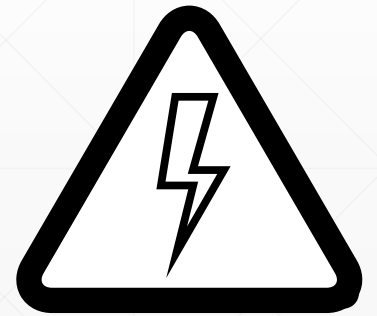
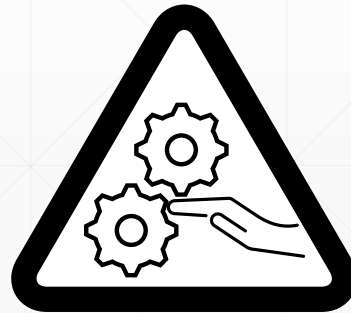
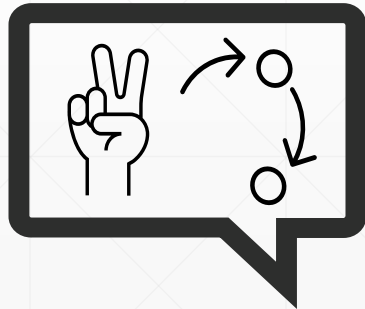
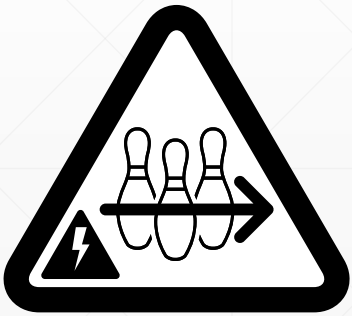
PINSETTER TRAINING GUIDE

- GLOSSARY OF COMMON TERMS
- SAFETY AND WARNINGS
- PINSETTER OVERVIEW
- PREVENTITIVE MAINTENANCE
- BASIC TROUBLESHOOTING
- CONTACTING FUNK SUPPORT



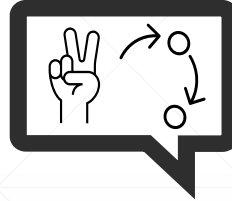
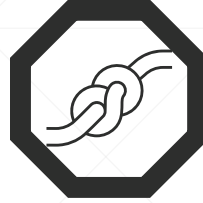
SAFETY AND WARNINGS

1. Ensure that individuals working on or around the pinsetters, elevators and ball returns are properly trained in their safe operation.
2. Tie back long hair and avoid wearing loose fitting clothing when working around the machines.
3. Follow your organizations LOCK OUT-TAG OUT procedures when servicing electrical components.
4. Ensure that all parts and tools are removed from the pinsetter and bowlers area before beginning the pinsetter operation.
5. Replace all covers and ensure tightness of nuts, bolts, and assemblies when completing service.
6. Use care at the front of the pinsetter, tripping the LIGHT BEAM will activate the machine while on and in an active state.



FUNK PINSETTER GLOSSARY

- **STRING TANGLE:** common occurrence when strings intertwine in ways that require the machine to work thru a sequence of programmed attempts to resolve the issue without employee intervention. Typically, the issues will resolve in 2-4 attempts.
- **STRING KNOT:** rare occurrence when strings crossover and cause a simple knot. The machine will not be able to resolve this issue and requires employee intervention.
- **STRING WAGON:** the transport-string pully system that lifts the pins and assists in clearing string tangles.
- **STRING REELS:** The spring tensioned reel that maintains the critical length of slack string for approved pin action and proper pinsetter functionality.
CRITICAL NOTE: over tightening strings WILL cause damage to your pinsetter. Maintain 1.5 to 2 inches of vertical play in all pins.
- **STRING ADJUSTMENT:** Simple adjustment to algin all the pins. This is a CRITICAL ADJUSTMENT for proper function and scoring.
- **"2-CLICKS BACK"** is the number of notches to release the String Reels after fully tightening them during a routine String Adjustment.
CRITICAL NOTE: 2-CLICKS BACK equals approximately 2 inches of string slack.
- **STRING BRAKE:** String control device that locks and holds the strings when retaining fallen pins. Also, a provides a critical function when clearing STRING TANGLES.
CRITICAL NOTE: string brakes should be positioned at the proper angle to avoid the edges of the string brake housing to make direct contact with the string.
- **PIN CENTERING BELL:** the component that controls the lift & center of the pins.



- **POWER BOX:** main controls for pinsetter power, PIN UP function, houses fuses and component control relays.
- **THERMAL CIRCUIT BREAKERS:** small indicator buttons on the front of the POWER BOX. Each breaker controls a specific component: #1 NOT USED #2 Accelerators and Lifts L1 #3 Accelerators and Lifts L2
- **POWER INVERTER:** control device on the side of the pinsetter that regulates the movement of the string wagon motor and the ball elevator.
- **POSITION SWITCH BOX:** control board and switches that recognize the position of the pinsetter for various machine states.
- **STEERING UNIT:** houses the main logic and power distribution components for the pinsetter, elevators, lighting and optional bumpers.
- **ELEVATOR:** motor & chain driven ball return component that lifts the ball from the ball pit to a height sufficient to return the ball to the bowler using gravity.
- **ACCELERATOR:** the motor the accelerates the return of the ball to the bowler.
- **SWEEP:** the gate that drops in front of the pins during the pin set cycle
- **LIGHT SENSOR:** Tight beam of red light that MUST be properly aligned with the reflector for the pinsetter to recognize and properly score the ball. CRITICAL NOTE: a constant green light indicates the light beam is aligned. A constant orange and green indicates the sensor is NOT ALIGNED.
- **REFLECTOR:** Simple reflector the returns the light beam to the LIGHT SENSOR. CRITICAL NOTE: you should be able to see a faint red dot in the reflector when properly aligned.

FUNK PINSETTER GLOSSERY cont.



■ FUSE INDEX:

KEY	FUSE	SPEC	LOCATION	FUNCTION
Pg.#	1 of 4	3.15 A	POWER BOX (F-3)	LINE 1 PINSETTER INVERTER
Pg#	2 of 4	3.15A	POWER BOX (F-4)	LINE 2 PINSETTER MOTOR
Pg#	3 of 4	3.15 A	POWER BOX (F-7)	LINE 1 ACCELOATOR MOTOR
Pg#	4 of 4	3.15 A	POWER BOX 4 (F-6)	LINE 2 ACCELOATOR MOTOR
Pg#	1 of 2	3.15 A	POWER BOX 5 (F-1)	STEERING UNIT SWITCH
Pg#	2 of 2	3.15 A	POWER BOX 6 (F-2)	STEERING UNIT DIRECT POWER
Pg#	1 of 1	3.15 A	POWER BOX (F-8)	PIN DECK LIGHT
Pg#	1 of 1	3.15 A	STEERING UNIT-BUMPER CONTROL (F-1)	24V POWER SUPPLY
Pg#	1 of 1	2 A	STEERING UNIT- DISPLAY INTERFACE (F-1)	24V POWER SUPPLY
Pg#	1 of 2	1.6A	STEERING UNIT- MAIN CPU 24V	24V POWER SUPPLY
Pg#	2 of 2	.63A	STEERING UNIT- MAIN CPU 5V	5V POWER SUPPLY
Pg#	1 of 1	3.15A	STEERING UNIT- MAGNETIC INTERFACE (F-1)	24V POWER SUPPLY



WEEKLY MAINTENANCE

“2-CLICKS BACK” - KEEP IT CLEAN – KEEP IT FOCUSED – KEEP IT TIGHT

WEEKLY PINSETTER CHECKLIST

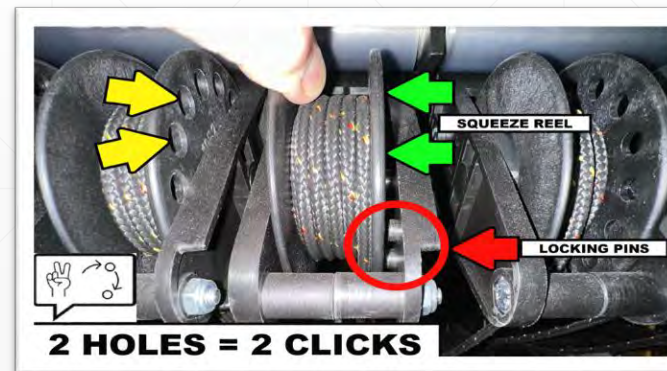
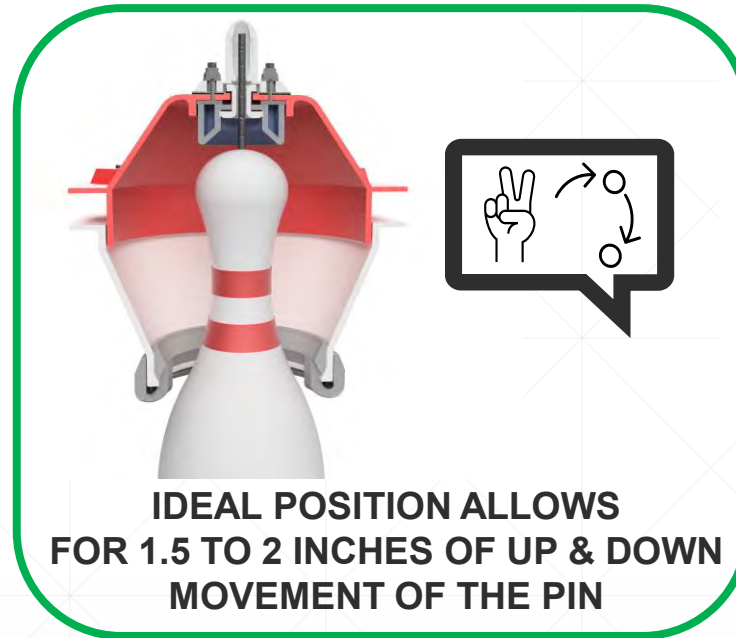
SUPPLIES NEEDED: FLASHLIGHT

❑ INSPECT STRINGS ALL STRINGS

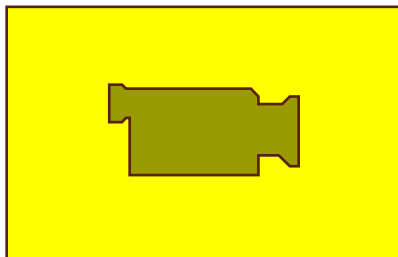
- ✓ Inspect each string for signs of uneven wear. Look for fuzzy, frayed or shiny string segments.
- ✓ Inspect, adjust & tighten (if needed) each string brake. The string should be exiting center of each String Brake so that is NOT contacting the edge of the brake housing.

❑ STRING ADJUSTMENT *CRITICAL*

- ✓ TIGHTEN each of the 10 pin strings
- ❑ “2-CLICKS BACK” on the String Reels to loosen the 10 pin strings approx. 1.5 to 2 inches.
- ❑ Tug each of the 10 pin strings to ensure there is a proper amount of vertical play in the pin.
- ❑ When properly adjusted, all the Pins will land on the pin deck at the same time.



PINS MUST HAVE 1.5 TO 2 INCHES OF UP & DOWN MOVEMENT IN THE PIN CENTERING BELL FAILING TO MAKE THIS SIMPLE ADJUSTMENT WILL CAUSE THE STRING BRAKES TO FAIL PREMATURELY



STRING ADJUSTMENTS

“2-CLICKS BACK”

FUZZY & FRAYED

REPEAT AFTER ME

“2-CLICKS BACK”

STRING ADJUSTMENT



1. ON THE POWER BOX: Flip the PIN UP switch to raise all pins to the UP position
2. ON THE POWER BOX: Flip the STOP switch to disable the pinsetter string motor
3. WITH THE PINS RAISED: Identify the SPRING LOADED LEVER requiring adjustment
4. RELEASE THE STRING REEL: With your LEFT THUMB pinch the outside edge of the STRING REEL (GREEN ARROWS) SLIDE the reel to the LEFT to clear the locking pin (RED ARROW) keeping pressure against the STRING REEL while making the adjustment.
5. ADJUST STRING REEL: With the STRING REEL pinched to the left. ROLL THE REEL to first tighten all 10 pins then LOOSEN each STRING REEL “2 CLICKS” to allow for 1-1.5 inches of vertical slack in each string.
6. LOCKING THE STRING REEL: Ensure that the the STRING REEL locks into the locking pins (GREEN ARROW)

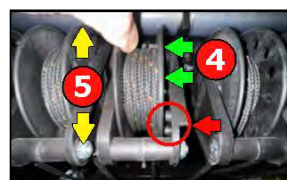
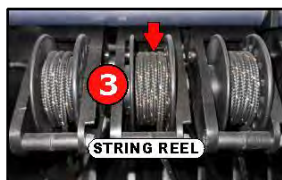
Once the STRING REEL is locked back in place, there MUST be 1 to 1.5 inches of string slack for VERTICAL PLAY in the PIN.

Tug each pin string to ensure the pins moves freely in the PIN CENTERING BELL- FAILURE TO DO SO MAY RESULT IN DAMAGE.

7. After making the needed adjustments, cycle the pinsetter to ensure the adjustment resolved the issue.



POWER BOX

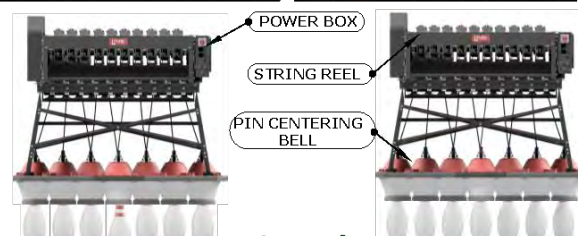


Pin String Adjustments are a routine maintenance function that will need to be performed WEEKLY for optimal pinsetter & accurate scoring functionality.

When adding NEW STRING, this adjustment will need to be done DAILY for the FIRST WEEK.

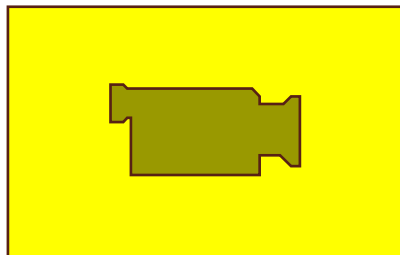
For optimal scoring and pin action, replace “frayed” - “fuzzy” or damaged strings right away.

*USBC requires minimum 53” string length from the top of a pin to the front outside edge of the Pin Centering Bell.



REQUIRES ADJUSTMENT
PIN HANGS LOWER THAN THE REST & HITS THE PIN DECK BEFORE THE OTHERS

IDEAL ADJUSTMENT
THERE MUST BE 1-1.5 inches of slight vertical play in PIN CENTERING BELL



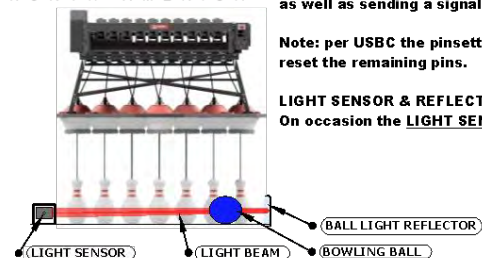
LIGHT SENSOR ADJUSTMENT

The **LIGHT SENSOR** on each lane emits a tight beam of red light that is mirrored back onto itself from the **REFLECTOR** across the face of the pin deck (as shown in the example to the left).

Breaking the beam of light activates the "scoring function" of the pinsetter activating the ball return (if it is not already on) as well as sending a signal to the **STRING BRAKE** to stand by to register fallen pins.

Note: per USBC the pinsetter allows for a maximum of 6 seconds of pin action before beginning to retract the strings and reset the remaining pins.

LIGHT SENSOR & REFLECTOR MUST be cleaned and calibrated regularly to ensure pinsetter operation. On occasion the **LIGHT SENSOR HOUSING** or **REFLECTOR** may come out of alignment, this **WILL** cause the pinsetter to have an error.



PROPER LIGHT SENSOR ALIGNMENT IS CRITICAL FOR PINSETTER FUNCTIONALITY

LIGHT SENSOR:

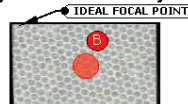
1. Check for proper alignment weekly
2. Sensor will only show a **GREEN LED LIGHT** when properly aligned with a faint red light that can be seen in the **LIGHT REFLECTOR**
3. If the **GREEN & ORANGE LED LIGHTS** are lit on the **BALL LIGHT SENSOR** then the **LIGHT BEAM** is **NOT** ALIGNED

TO ALIGN LIGHT BEAM: -7mm socket required-

1. **SLIGHTLY** loosen the (3) 7mm nuts (A) on the **LIGHT SENSOR HOUSING** ***DO NOT REMOVE NUTS OR WASHER***
2. Make small adjustments to the **LIGHT SENSOR** while looking thru the **HOUSING** to verify the faint red light can be seen in the center of the **REFLECTOR**. (B)
3. Tighten the 7mm nuts to re-secure the **BALL LIGHT SENSOR** and test the **BALL DETECT** functionality to ensure functionality.

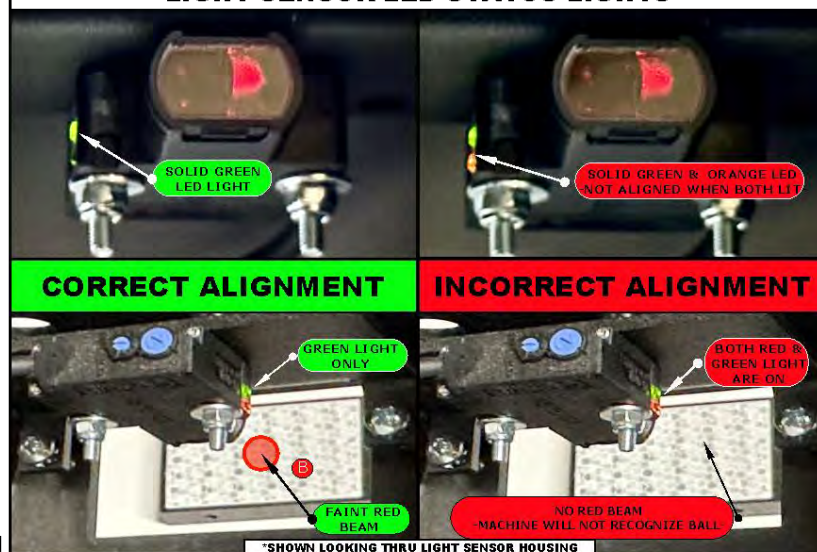


LIGHT SENSOR IN HOUSING



LIGHT REFLECTOR IN HOUSING

LIGHT SENSOR LED STATUS LIGHTS

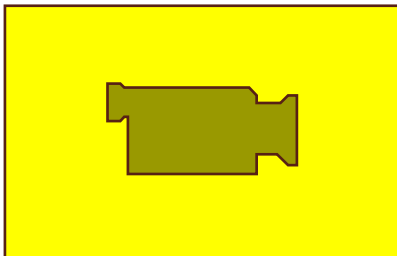


LIGHT SENSOR ALIGNMENT

ORANGE & GREEN?

SEE THE RED DOT NOW?

GREEN IS GOOD!



The **POWER BOX** is located on the front right of the pinsetter houses the PCB that controls basic pinsetter functions, fuses, and relays.

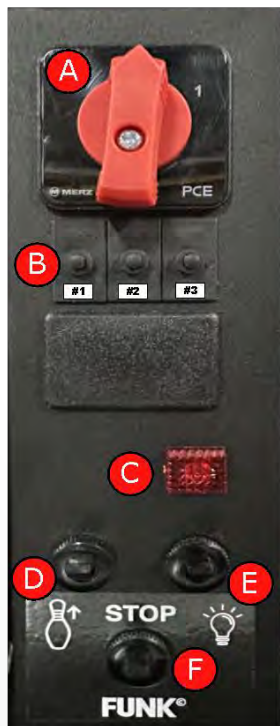


*** REFER TO YOUR ORGANIZATIONS "LOCK OUT, TAG OUT" PROCEDURES PRIOR TO ACCESSING ELECTRICAL COMPONENTS, PERFORMING WEEKLY OR MONTHLY MAINTENANCE, OR REPLACING ASSEMBLIES ***



POWER BOX SWITCH POSITION: 0=OFF 1=ON

* shown in the PINSETTER OFF position



A **MAIN POWER SWITCH** - used to disable electrical power in order to safely service the pinsetter and the associated components

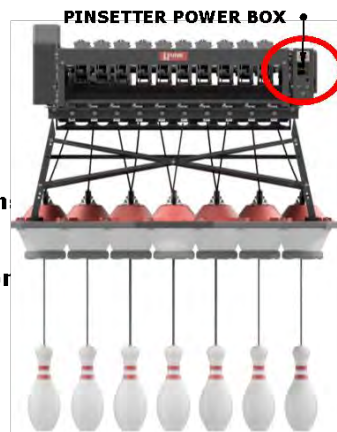
B **THERMAL CIRCUIT BREAKER** used to reset faults on:
#1=NOT USED #2=ACCEL & LIFT LINE 1 #3=ACCEL & LIFTS LINE 2

C **POWER INDICATOR LIGHT**
Indicates power is being received from the Steering Unit

D **PINS ON TOP -SERVICE MODE-**
Used to raise all pins off the deck into the PIN CENTERING CUP
This function is also used to adjust string length

E **PIT LIGHTS** - Two position switch-
UP: Pindeck lights turn on with pinsetter activation
DOWN: Pindeck lights always ON or DMX Control

F **PINSETTER STOP**
UP: Pinsetter STOP
DOWN: Pinsetter NORMAL OPERATION



POWER BOX

FUNCTION

FUSES

RELAYS



N O R T H A M E R I C A

STRING BRAKE QTY. 10 per MACHINE

CUT AWAY - STRING PATH

◀ FRONT OF PINSETTER

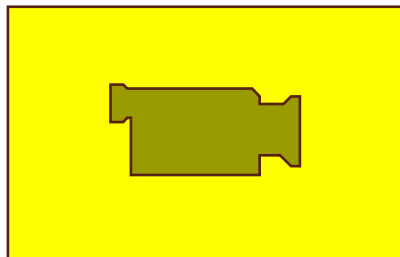
STRING BRAKE - STRING PATH - STRING WAGON

STRING WAGON ASSEMBLY

FUNCTION

POSITIONS

RELAYS

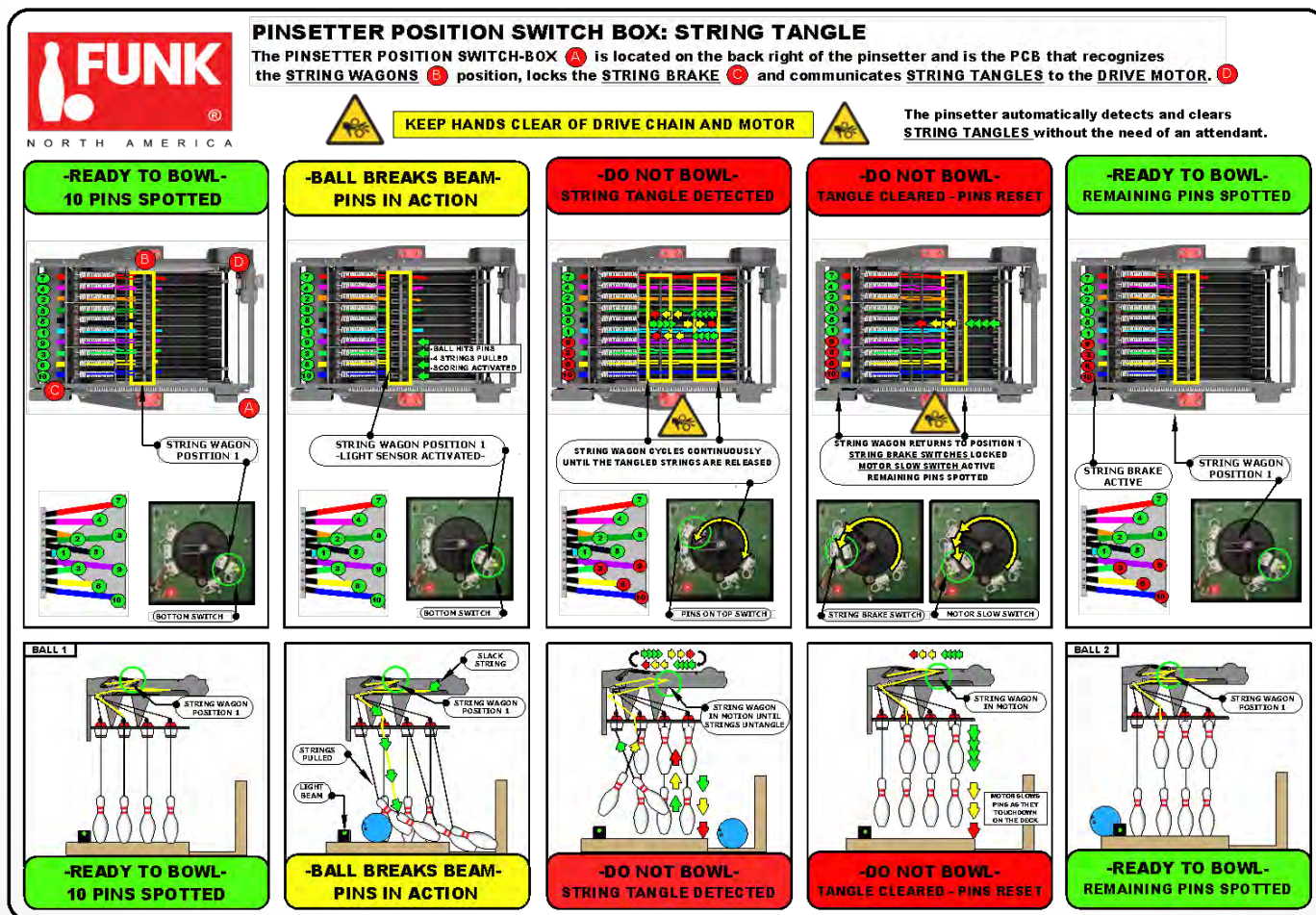


STRING TANGLES & STRING KNOTS

CUSTOMER CONVERSATION

CLEARING KNOTS

RELAYS



TRAINING POSTERS



LIGHT SENSOR ADJUSTMENT

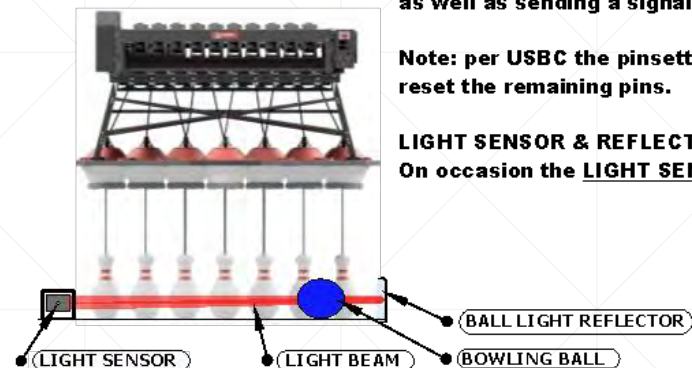
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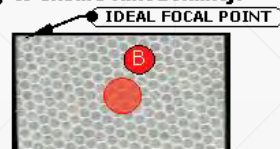
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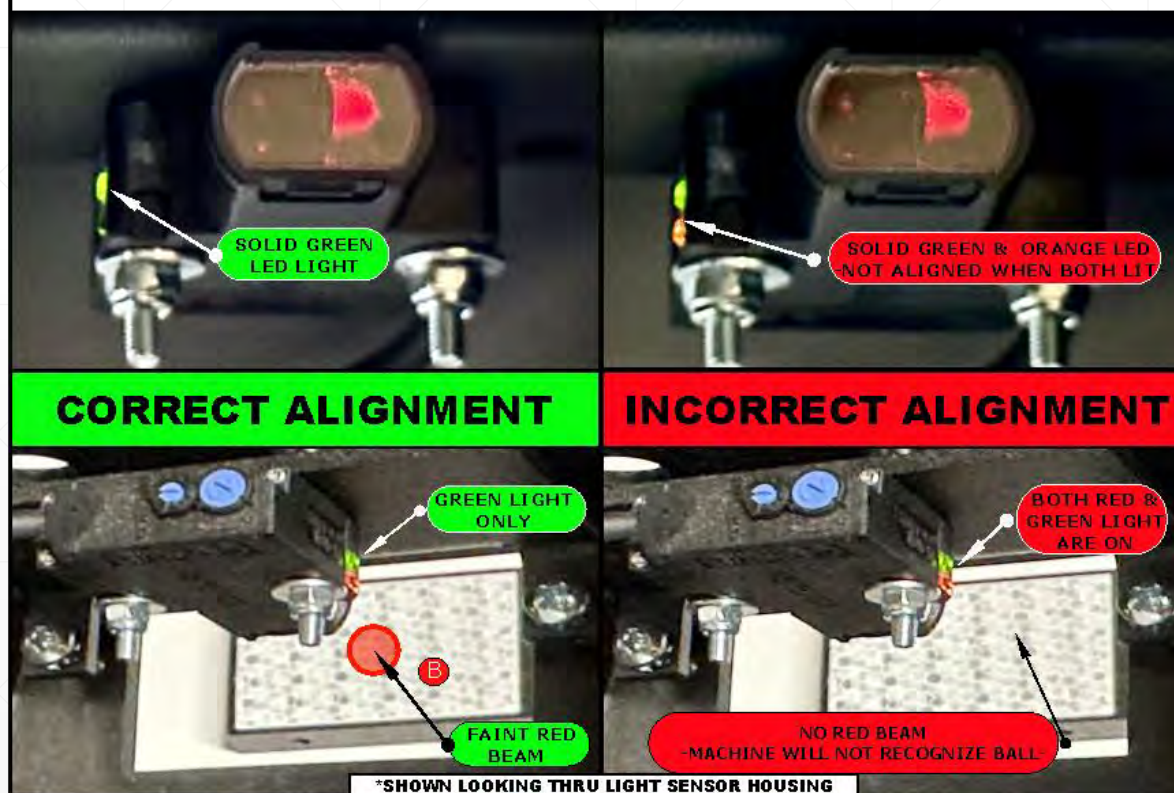


LIGHT SENSOR IN HOUSING



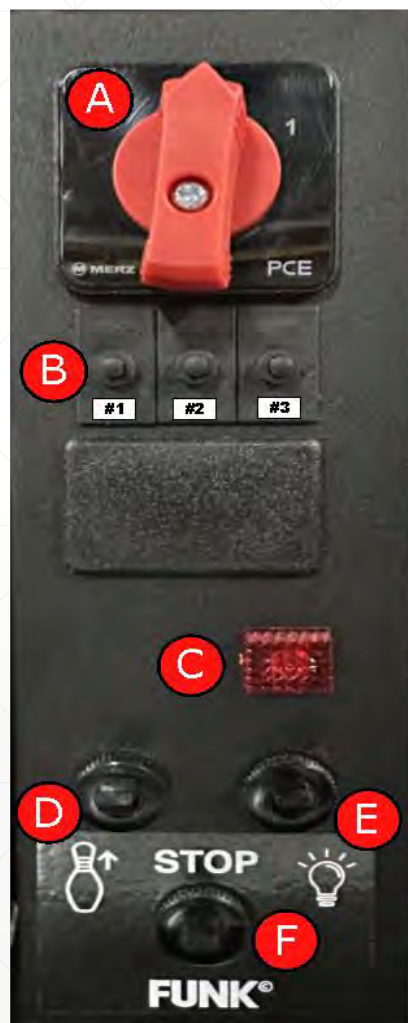
LIGHT REFLECTOR IN HOUSING

LIGHT SENSOR LED STATUS LIGHTS





NORTH AMERICA



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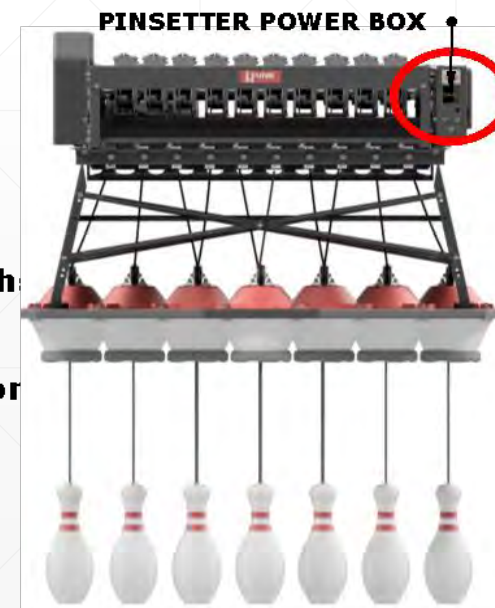
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POWER BOX SWITCH POSITION: 0=OFF 1=ON

* shown in the PINSETTER OFF position

- A** **MAIN POWER SWITCH** - used to disable electrical power in order to safely service the pinsetter and the associated components
- B** **THERMAL CIRCUIT BREAKER** used to reset faults on:
#1=NOT USED #2=ACCEL & LIFT LINE 1 #3=ACCEL & LIFTS LINE 2
- C** **POWER INDICATOR LIGHT**
Indicates power is being received from the Steering Unit
- D** **PINS ON TOP -SERVICE MODE-**
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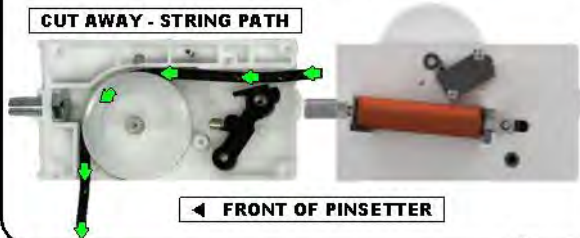




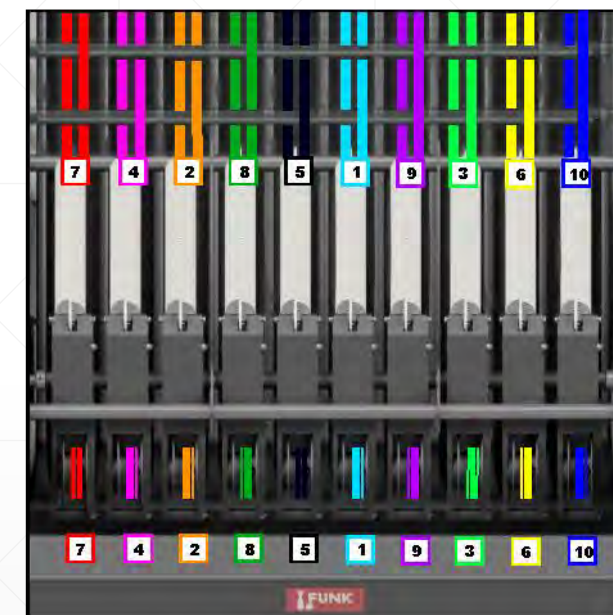
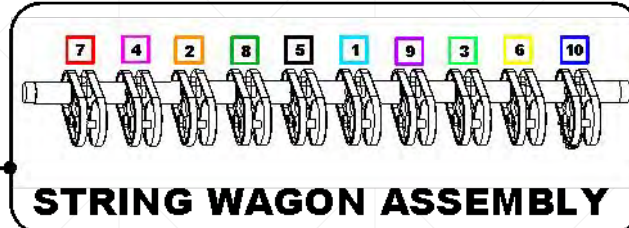
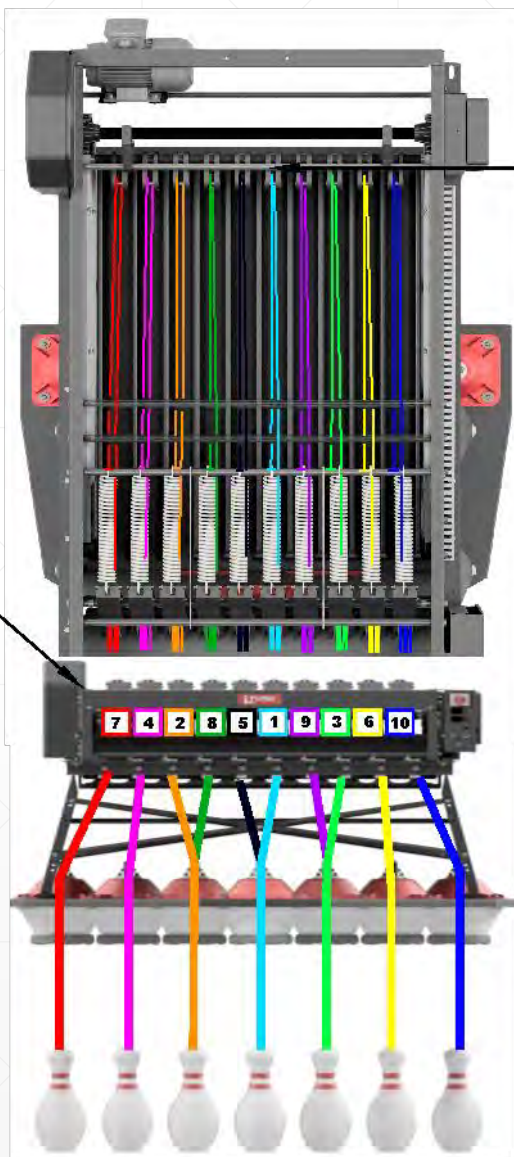
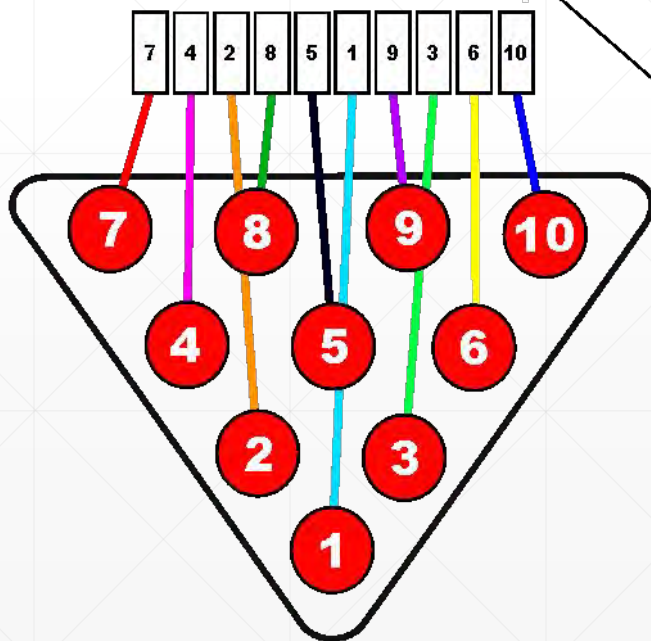
STRING BRAKE - STRING PATH - STRING WAGON

STRING BRAKE QTY. 10 per MACHINE

CUT AWAY - STRING PATH



← **FRONT OF PINSETTER**



PIN CENTERING BELL

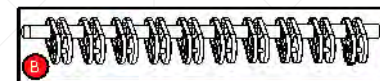


PINSETTER POSITION SWITCH BOX

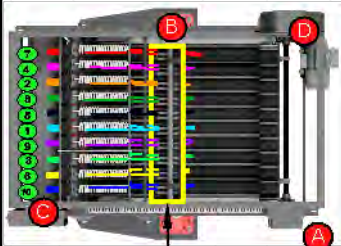
The PINSETTER POSITION SWITCH-BOX (A) is located on the back right of the pinsetter and is the PCB that recognizes the STRING WAGON (B) position, locks the STRING BRAKE (C) and communicates STRING TANGLES to the DRIVE MOTOR (D).



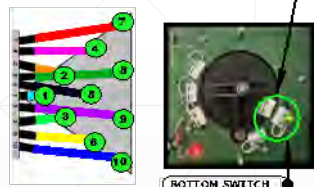
KEEP HANDS CLEAR OF DRIVE CHAIN AND MOTOR



**-READY TO BOWL-
10 PINS SPOTTED**

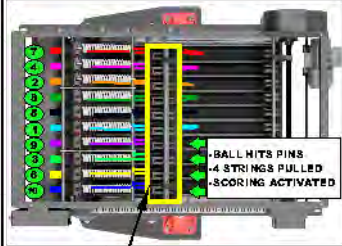


STRING WAGON
POSITION 1



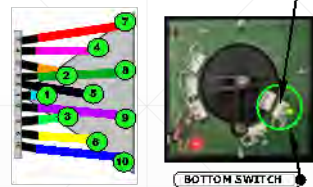
BOTTOM SWITCH

**-BALL BREAKS BEAM-
PINS IN ACTION**



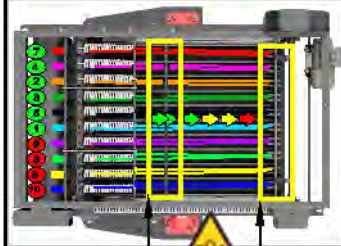
-BALL HITS PINS
-4 STRINGS PULLED
-SCORING ACTIVATED

STRING WAGON POSITION 1
-LIGHT SENSOR ACTIVATED-



BOTTOM SWITCH

**-DO NOT BOWL-
FALLEN PINS CLEARED***

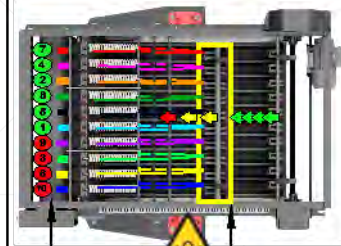


STRING WAGON MOVES TO POSITION 2
MAG-SWITCH ROTATES TO PINS ON TOP
ALL PINS TO UP POSITION



PINS ON TOP SWITCH

**-DO NOT BOWL-
PINS RESET- BALL RETURNED**



STRING WAGON RETURNS TO POSITION 1
STRING BRAKE SWITCHES LOCKED
MOTOR SLOW SWITCH ACTIVE
REMAINING PINS SPOTTED



STRING BRAKE SWITCH

**-READY TO BOWL-
REMAINING PINS SPOTTED**



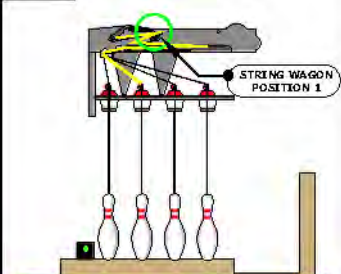
STRING BRAKE
ACTIVE

STRING WAGON
POSITION 1



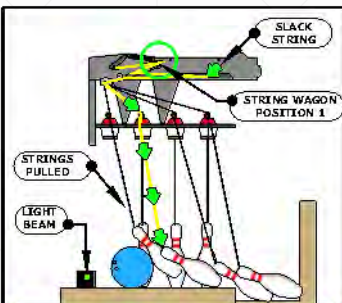
BOTTOM SWITCH

BALL 1



STRING WAGON
POSITION 1

**-READY TO BOWL-
10 PINS SPOTTED**



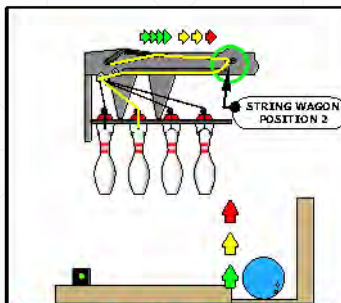
SLACK
STRING

STRINGS
PULLED

LIGHT
BEAM

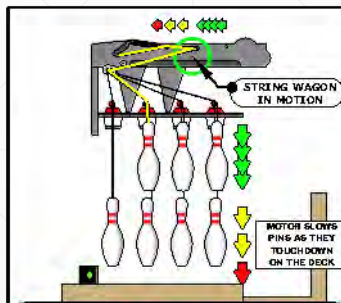
STRING WAGON
POSITION 1

**-BALL BREAKS BEAM-
PINS IN ACTION**



STRING WAGON
POSITION 2

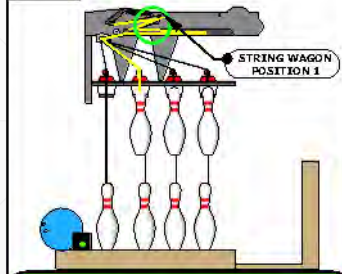
**-DO NOT BOWL-
FALLEN PINS CLEARED***



STRING WAGON
IN MOTION

**-DO NOT BOWL-
PINS RESET- BALL RETURNED**

BALL 2



STRING WAGON
POSITION 1

**-READY TO BOWL-
REMAINING PINS SPOTTED**

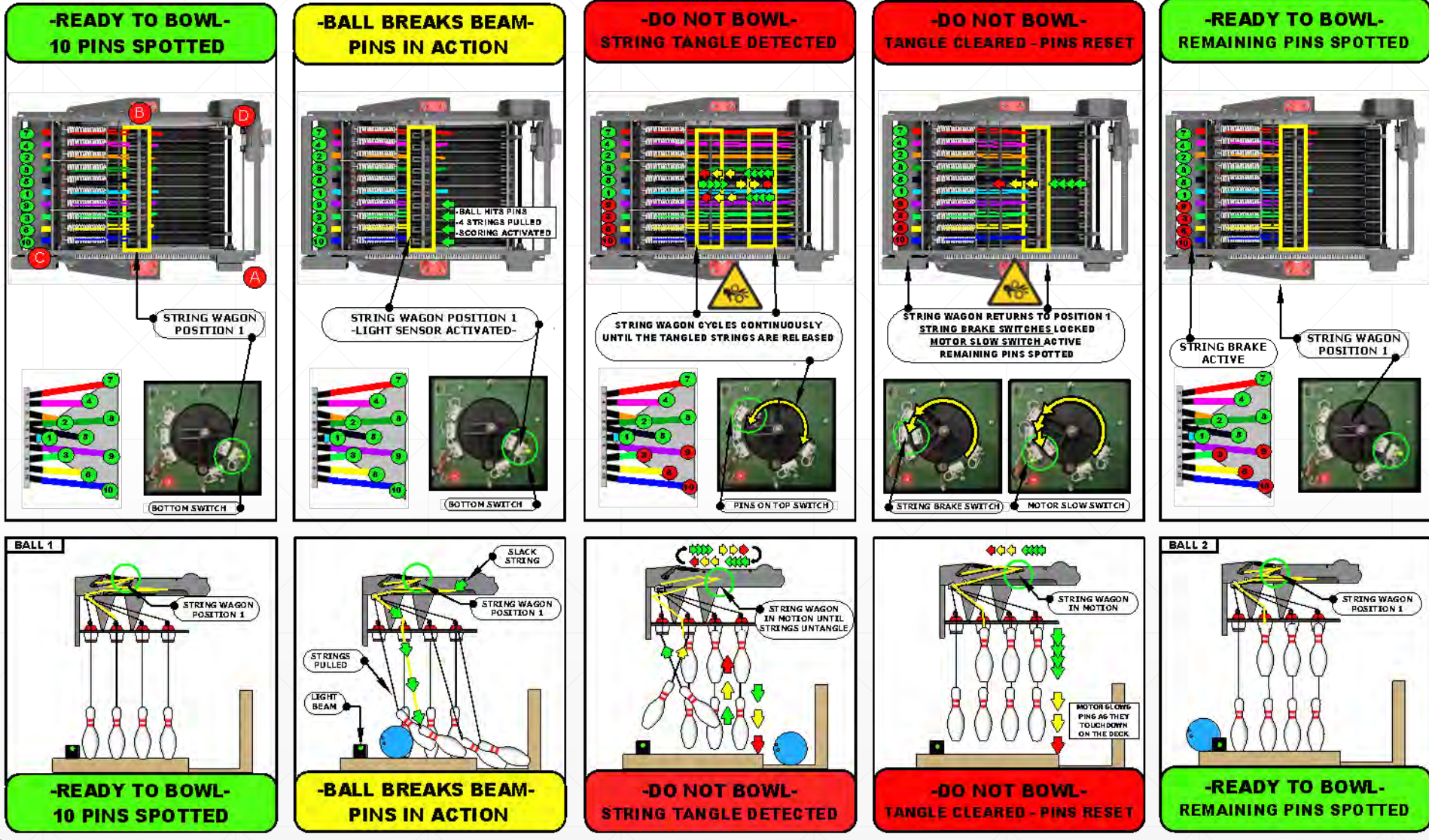


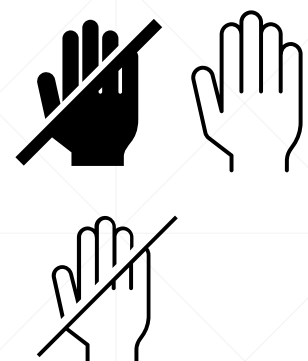
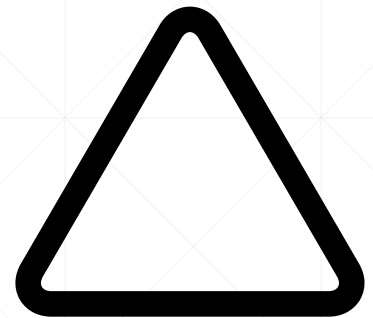
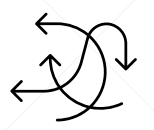
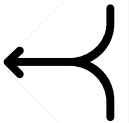
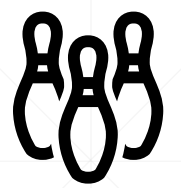
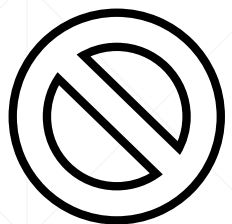
PINSETTER POSITION SWITCH BOX: STRING TANGLE

The PINSETTER POSITION SWITCH-BOX **A** is located on the back right of the pinsetter and is the PCB that recognizes the STRING WAGONS **B** position, locks the STRING BRAKE **C** and communicates STRING TANGLES to the DRIVE MOTOR. **D**

KEEP HANDS CLEAR OF DRIVE CHAIN AND MOTOR

The pinsetter automatically detects and clears STRING TANGLES without the need of an attendant.





- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

