USER'S MANUAL

TWIN BEAD DEVICE

FOREWORD

This manual is a guidebook for using the BEAD device correctly. Assembling and adjustment of the device and items to notice when using the device are described in this manual.
Please read this manual thoroughly and use the device after understanding the contents.

This manual may contain discrepancies in detailed information when compared with the actual product due to continued research and improvements. If any question about the product or the contents of this manual arises, please consult your ZSK distributor.

Please keep this manual near the machine for immediate reference.

IMPORTANT SAFETY INSTRUCTIONS

To use the device safely, it is necessary to handle it correctly. Please read the IMPORTANT SAFETY INSTRUCTIONS described in this manual thoroughly and do not handle this device until you fully understand the contents. Since items to notice when handling this device are described in below signal terms that follow warning marks in this manual, be sure to observe them.

Definitions of signal terms are as follows:

DANGER Safety instructions labelled “Danger” must be observed in order to avoid the risk of personal injury.

This symbol marks instructions in the operator's guide whose infringement can give rise to personal injury or damage to property.

Risk of injury from electric shock.

CAUTION Safety instructions labelled “Caution” must be observed in order to avoid the risk of damage to property.

Risk of crushing by moving machine parts.

Risk of piercing by moving mechanical parts (needles, borers).

Risk of burning by hot components (magnets, motors).

NOTICE Instructions labelled “Note” must be observed to avoid malfunctions/operating errors.

CONTENTS

1. ITEMS TO NOTICE WHEN USING THE DEVICE

The device is intended for use only for its intended purpose and in a technically safe and serviceable condition.

DANGE

Inappropriate use may be danger. Cause physical injury or damage to property.

SAFETY PRECAUTIONS

To work on the embroidery machine equipped with devices only allowed trained personnel.

Daily visually check the integrity of electrical connections and isolation.

Forbidden to operate in rooms with humidity higher than 95%.

Forbidden to operate with wet hands.

Forbidden to operate near flammable items.

CAUTION

Do not strike with heavy objects on the body of the Cutting Element.

Do not install and remove the Magnet Separator with bare hands. It is necessary to use a suitable metal object.

Operator's fingers in the cutting zone during device operation are forbidden.

Avoid contact with the Cutting Element's protection screen.

2. PURPOSE AND DESCRIPTION

Twin Bead device is designed for embroidering glass beads on woven and non-woven materials on ZSK embroidery machines.

The device can be used in the embroidery machines with the control system MSCF (MCP35) and JAFA embroidery head type.

GENERAL TECHNICAL SPECIFICATIONS

Number of Positions beads: **2** (**A**, **B**)
Number of operating modes: **3 (W, A, B)**
Maximum speed: **(W, A - 700 st./min; B- 900 st./min)**
Embroidery Space Limit:

- Right **60 mm (R) / 25 mm (L)**
- Left **25 mm (R)/ 60 mm (L)**
- Front **130 mm**
- Behind **10 mm**

Supply voltage **+24 V (±10%)**
Consumed power **1,5 A**
Size: **190x260x440 (mm)**
Weight, net **4100 g**

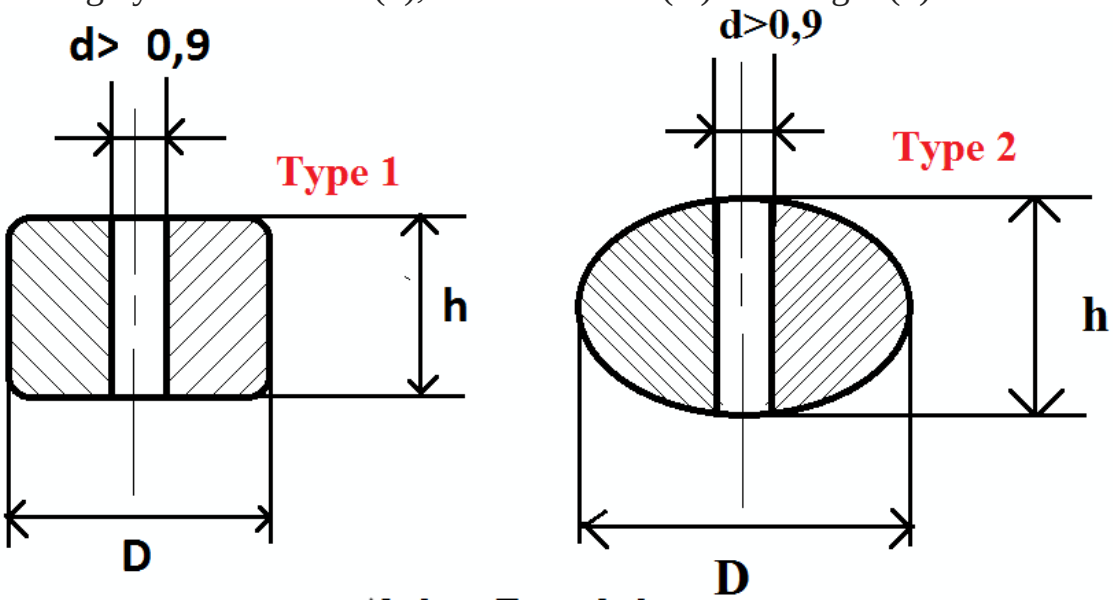
BEADS

Bead Diameter (D) **2≤D≤2,8mm**
Bead height (h) **h≤ 1,5 … 1,8mm**
Inner diameter of beads (d) **d≥0,9mm**

POSITION	**Allowed combination of bead diameters (mm)**					
B-front	**2,0**	**2,5**	**2,7**	**2,5**	**2,7**	**2,7**
A-back	**2.0**	**2.0**	**2.0**	**2,5**	**2,5**	**2,7**
Note 1	Bead replacement in tweezers is performed automatically at the beginning of a new design and during embroidery when returning.					
Note 2	Embroidery with beads from position **A** is possible in the presence of beads in position **B**.					
Note 3	With a constant change of beads A to B in the process of feeding the beads from position A, the beads can drop out from position B. ***We recommend*** that you use the following sequence of beadwork, if possible, for example in your design: AAAA then BBBBBBBBB next AAAAAA and so on.					

3. Characteristics of beads

- Use only glass beads!
- Sorting by hole diameter (d), outer diameter (D) and height (h).



2,0 < D<2,8 mm

H=1,5…..1,8 mm

Important!

Before using it is recommended to check the beads for compliance with the specified parameters.

Inner diameter (d) - using needle No. 90.

Bead Diameter (D) - using calipers.

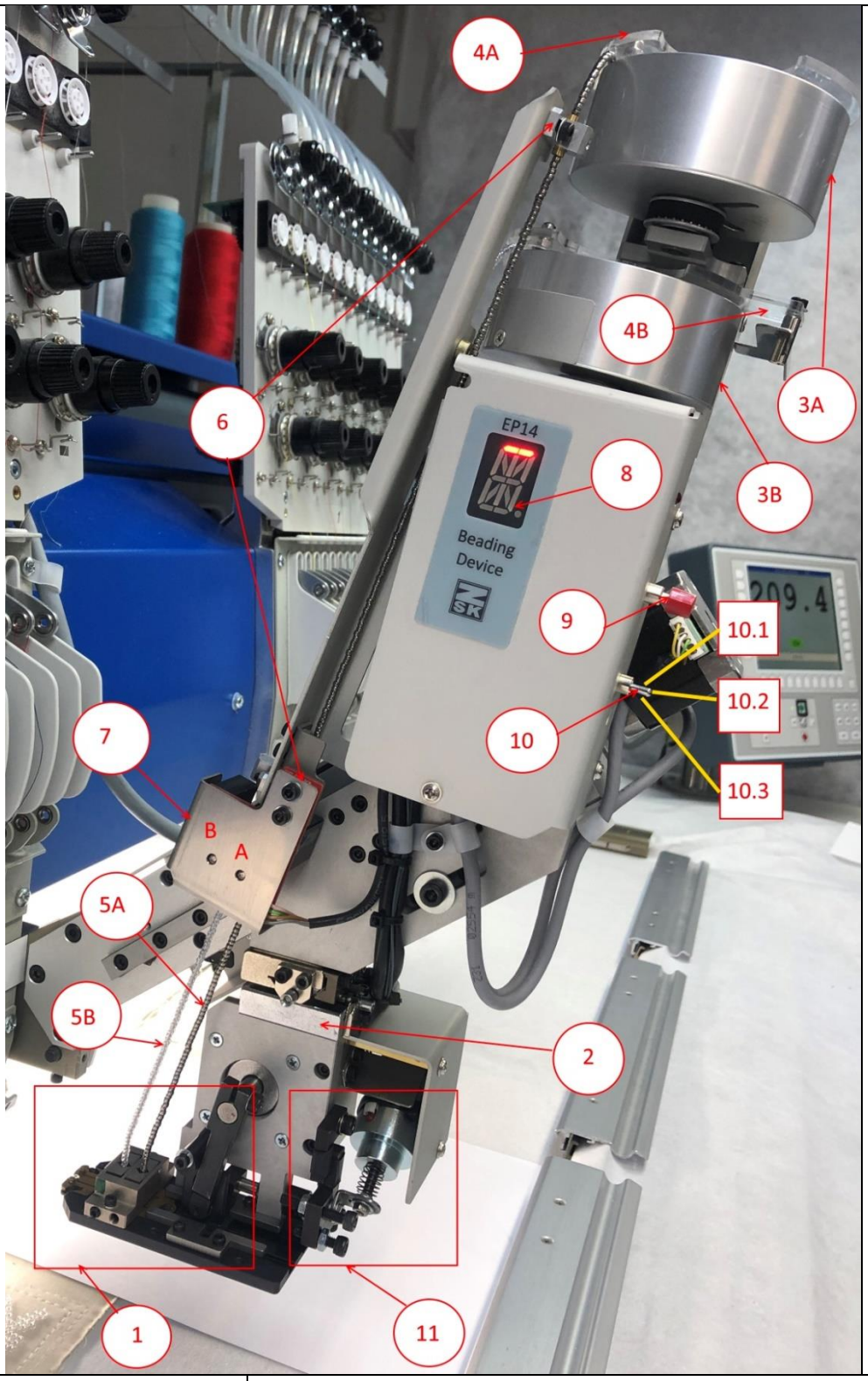
It is not recommended to use beads with a difference in diameter (D) of more than 0.2 mm at the same time.

Recommended thread and needle:

- Threads - monofil No. 100 and more and Polyester No. 60 and more
- Needles - DB x K5 SS Nm 65/9

4. DEVICE OPERATION. CONTROLS AND INDICATING (MEANS)

4.1



1 - Bead feeder	**6** – Bead loading guides
2 – Caliper for an accurate installation of the bead feeder	**7** - Bead Control Sensor
3 - Loading drum	**8** - LED indicator
4 - Loading drum cover	**9** - Control button
5 - Bead loading string (string)	**10** - Switch (10.1 – up;10.2 – neutral; 10.3 – down)
	11 - Color change mechanism

4.2

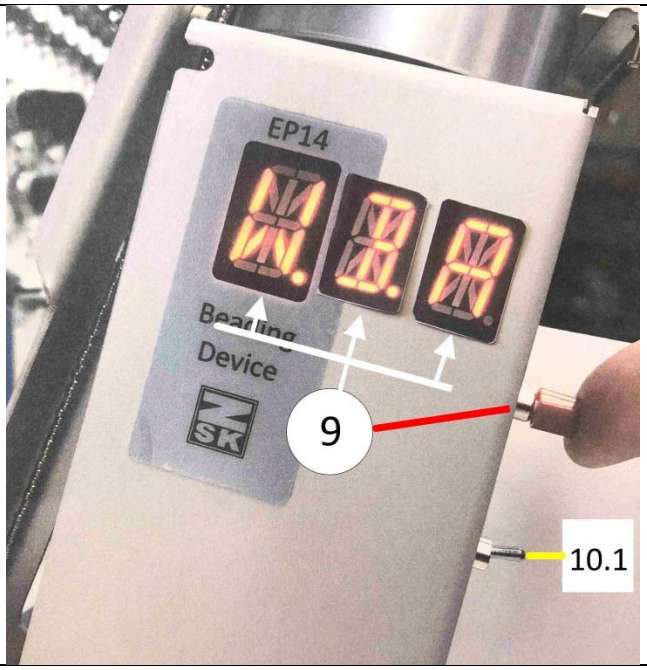
Device Modes

W- double (change of beads in accordance with the design);

A- single (no bead changes in accordance with the design). Only Beads A.

B- single (no bead changes in accordance with the design). Only Beads B.

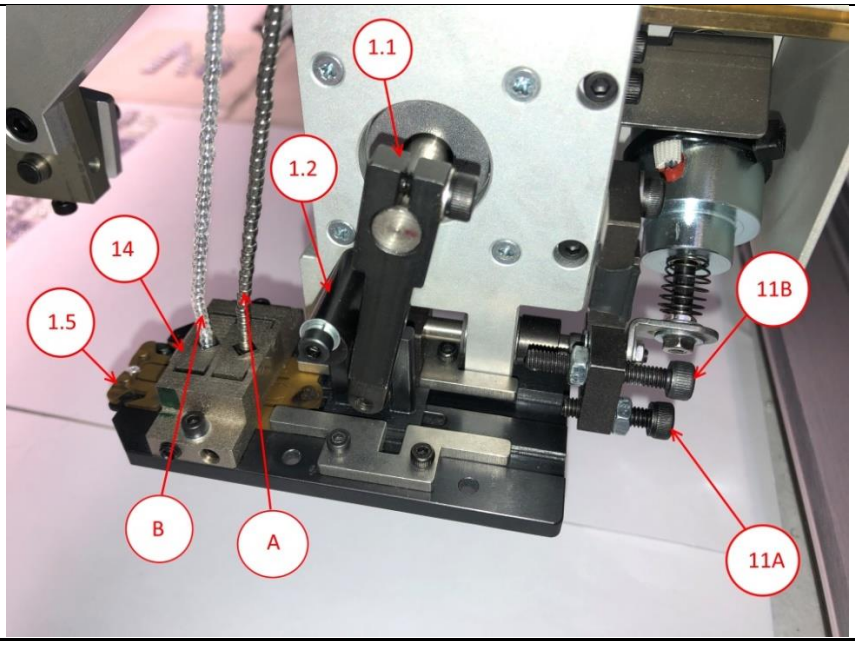
1. Set the switch up (10.1);
2. Press and hold button **9** until symbol appears **W/A/B;**
3. Press the button to select the desired one **W/A/B;**
4. Release the button.



4.3

Bead feeder

1.1 - lever
1.2 - front eccentric
1.4 - Twin loader
1.5 - tweezers
11A - Adjusting screw for loading A
11B -Adjusting screw for loading B



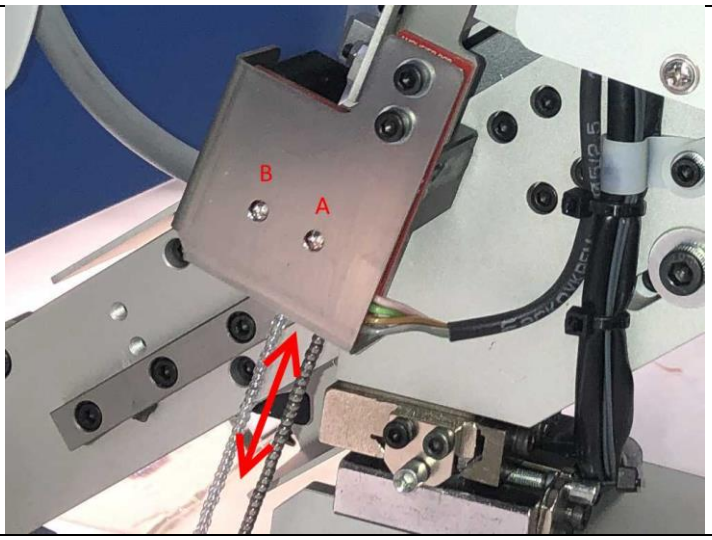
4.4

States of Bead Control Sensor

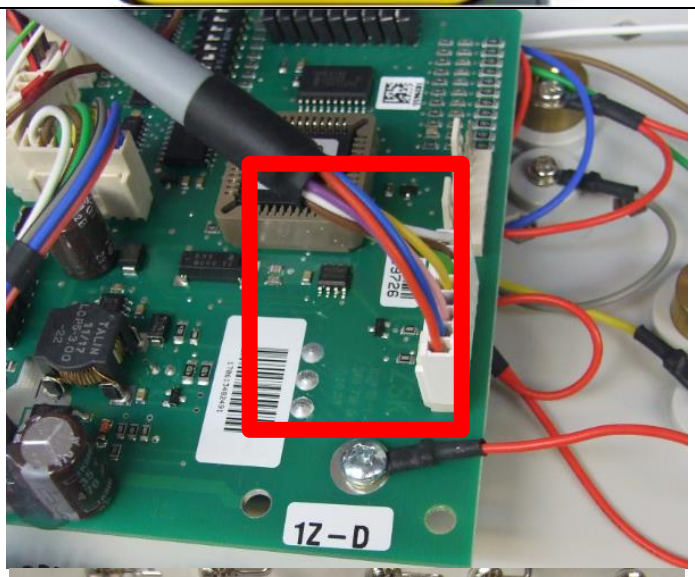
The movement of the beads along the string (A or B) activates the optical sensor.

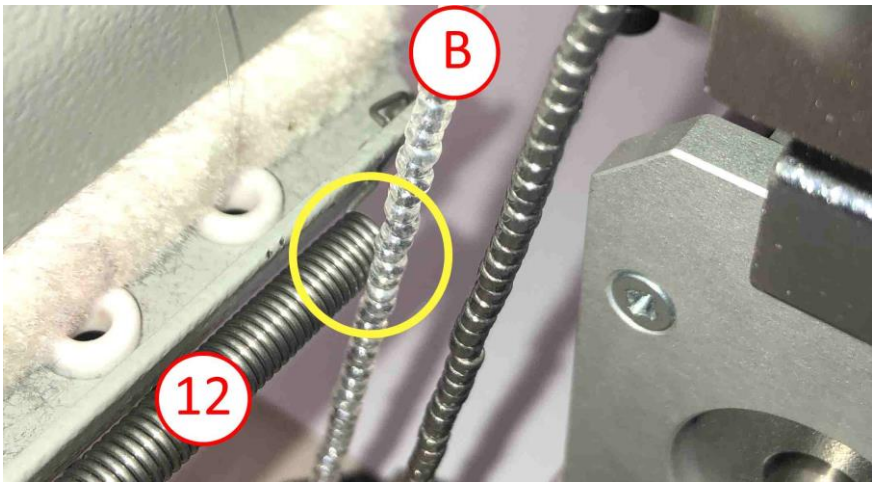
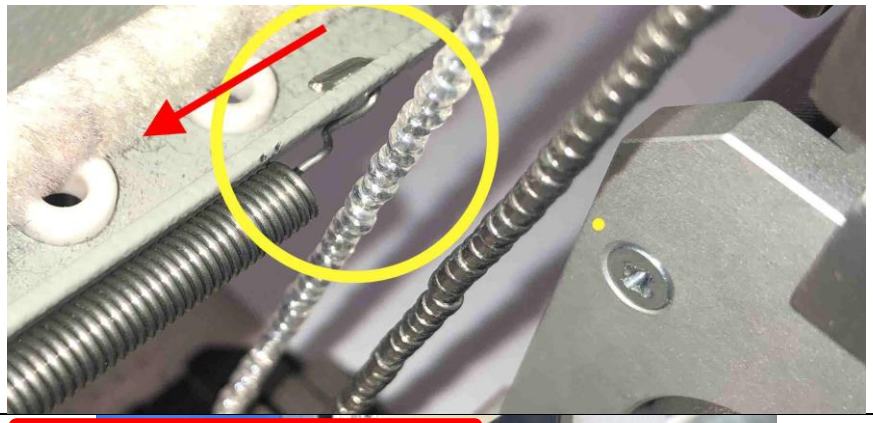
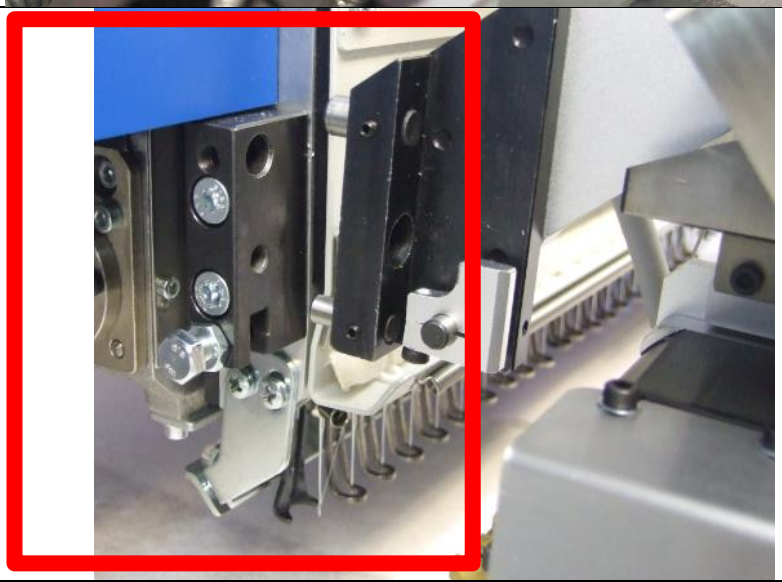
At each displacement of the beads, the **LED blinks**.

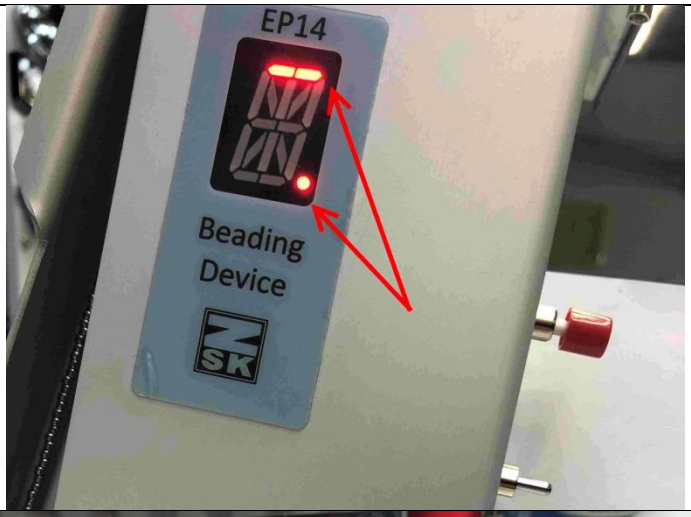
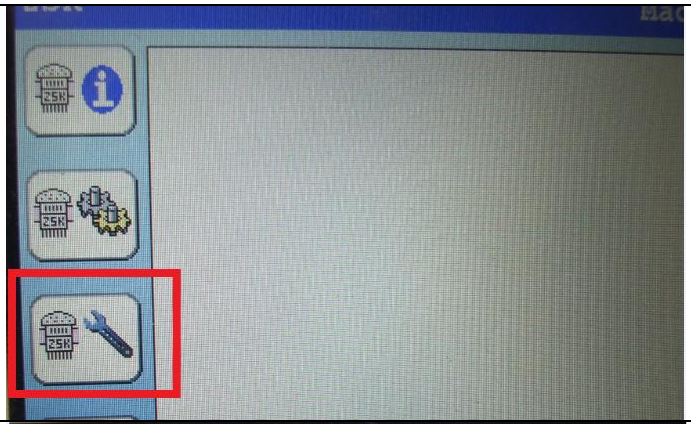
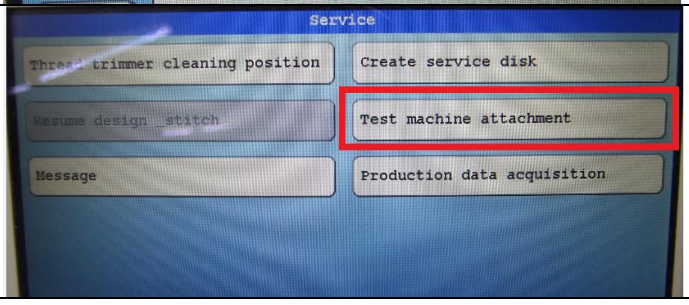
If the beads are immobile or absent on the string, then **blinking does not** occur.

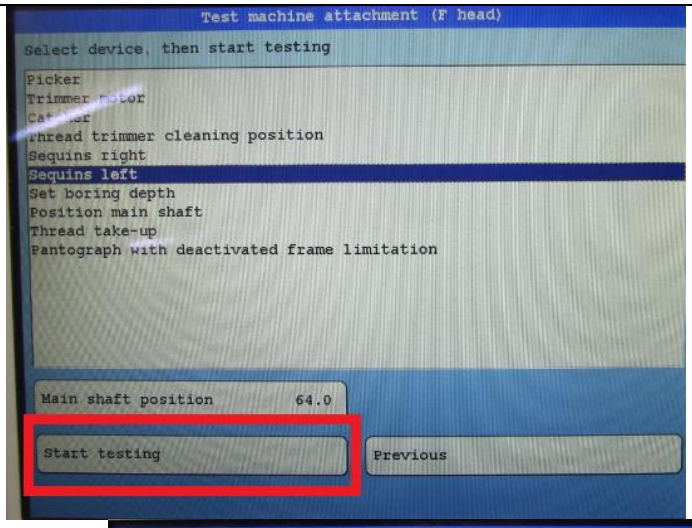
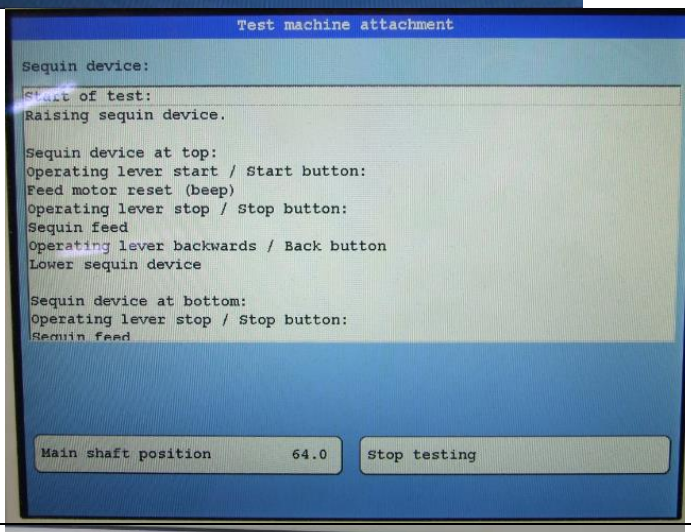
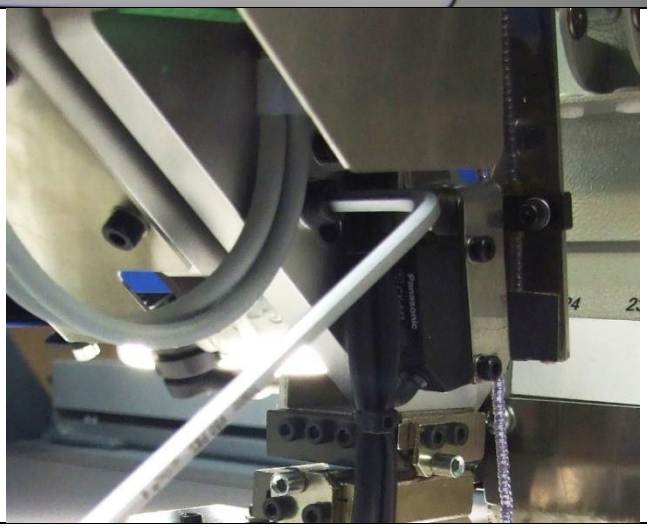


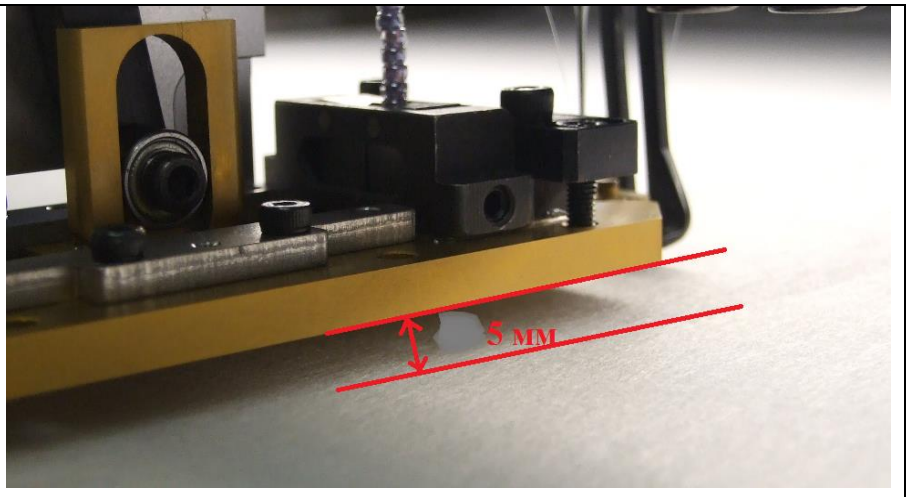
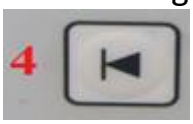
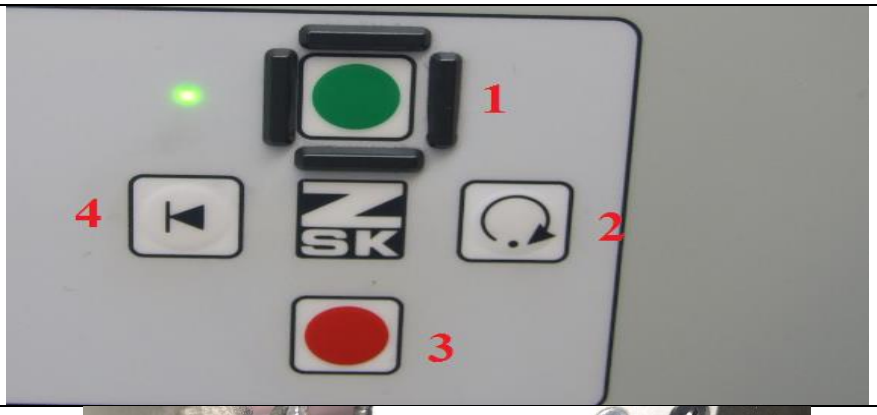
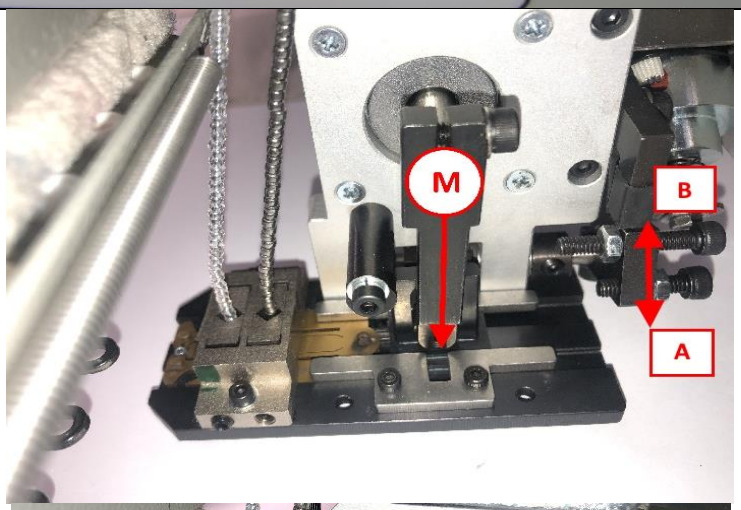
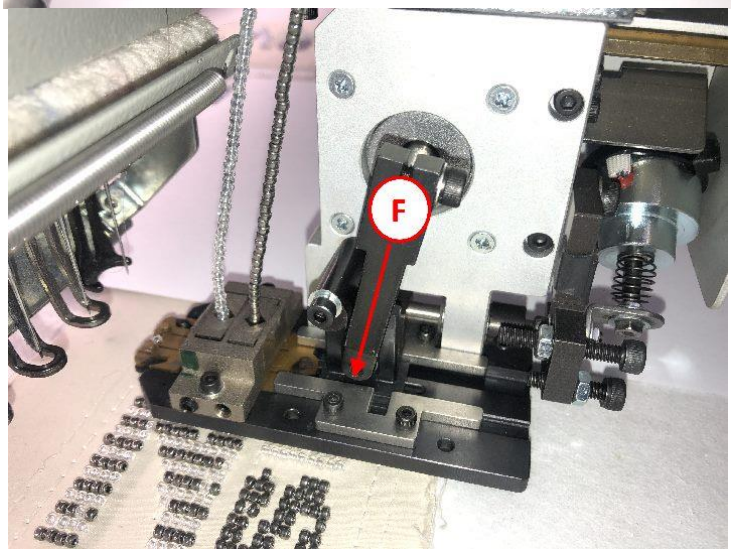
5. MOUNTING BEAD DEVICE ON THE EMBROIDERY HEAD.

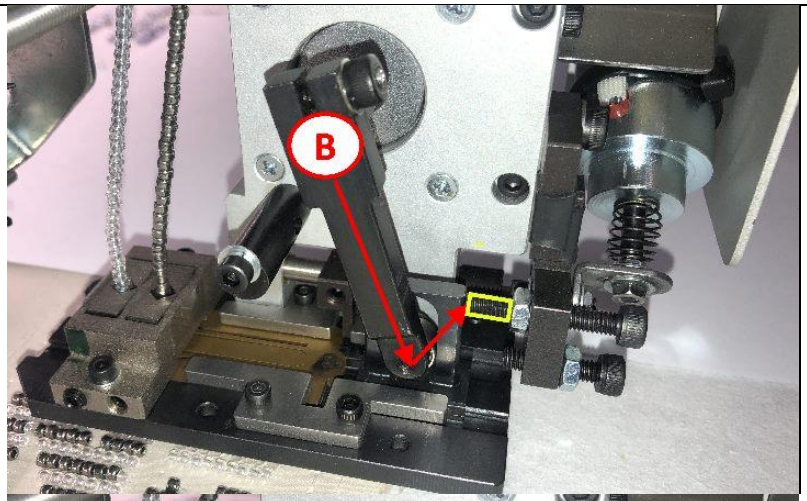
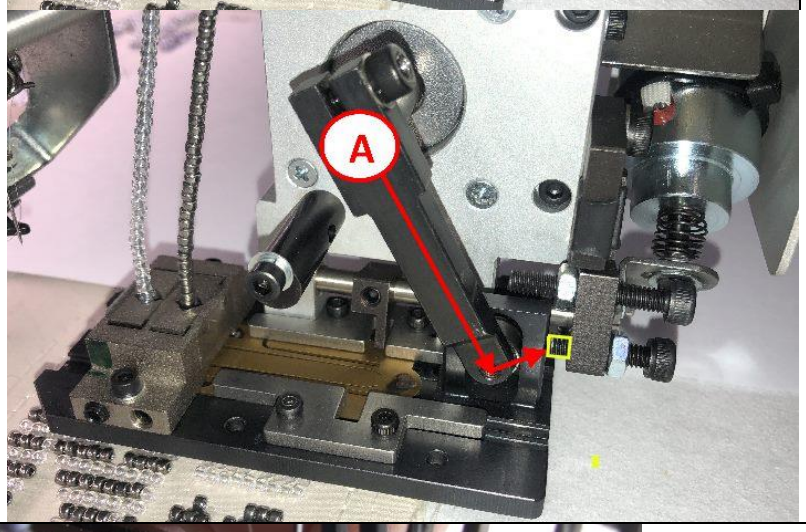
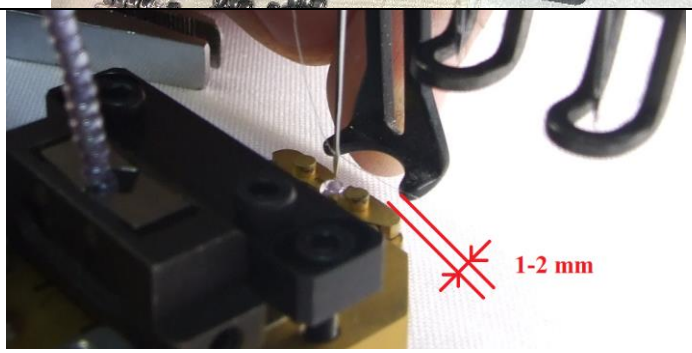
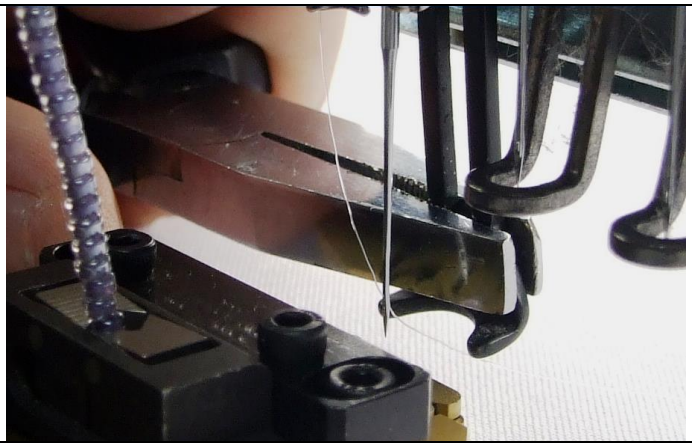
ATTENTION! PERFORM WORK ONLY WHEN THE EMBROIDERY MACHINE IS POWERED OFF.		
5.1	The embroidery machine must be is turned off.	
5.2	Connect the cable (supplied) to the KSP - 10 board. Secure the cable with a bracket on the front of the embroidery head - photo.	 

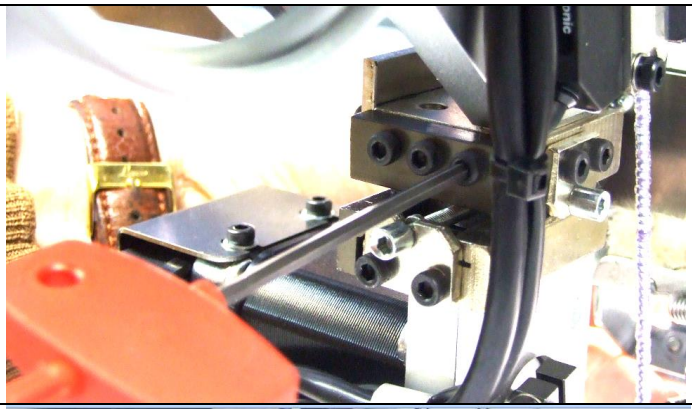
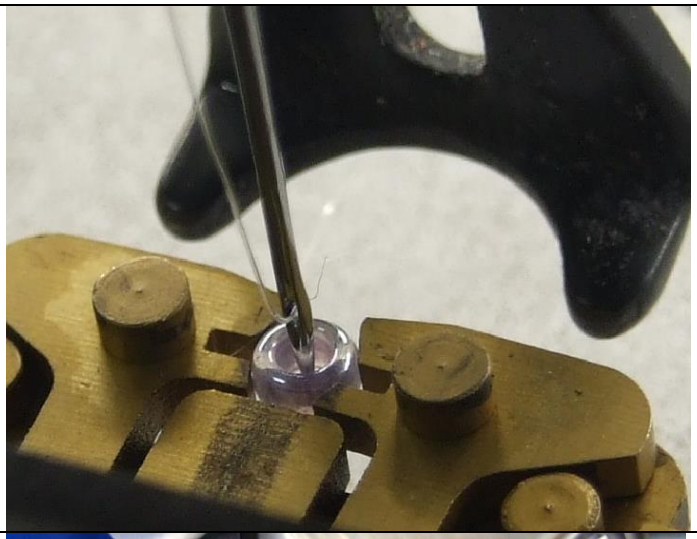
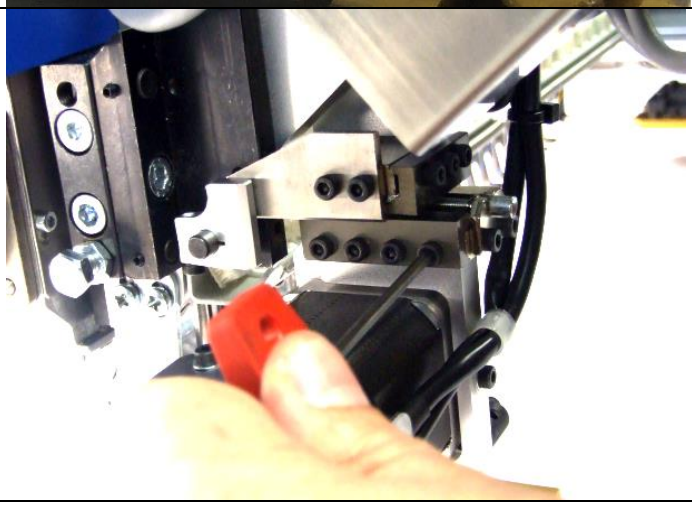
5.3	Before mounting the device on the embroidery head, create a gap between beads **B** and the spring lock of threads **12**. To do this move the spring mount **12** in the direction of the arrows (**see photo**).	 
5.4	Preparing the embroidery head for installing the Bead Device is the same as for the Sequins device (foot, mount). Install the device on the pins in the mount.	
5.5	Connect the cable and tighten the mounting screw	
Turn on the embroidery machine!		

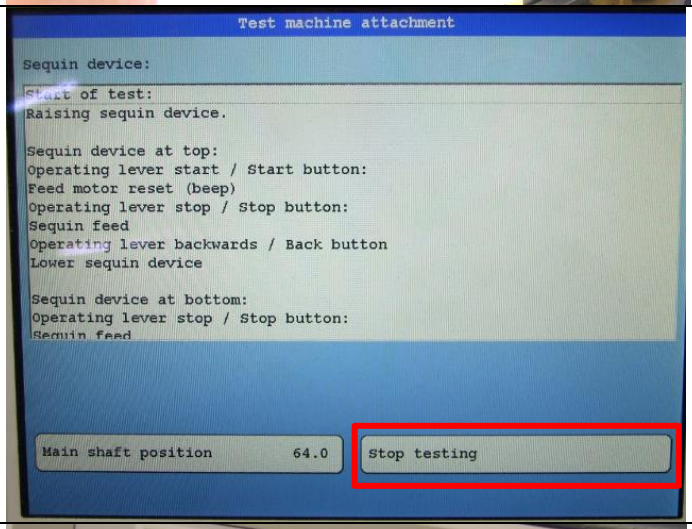
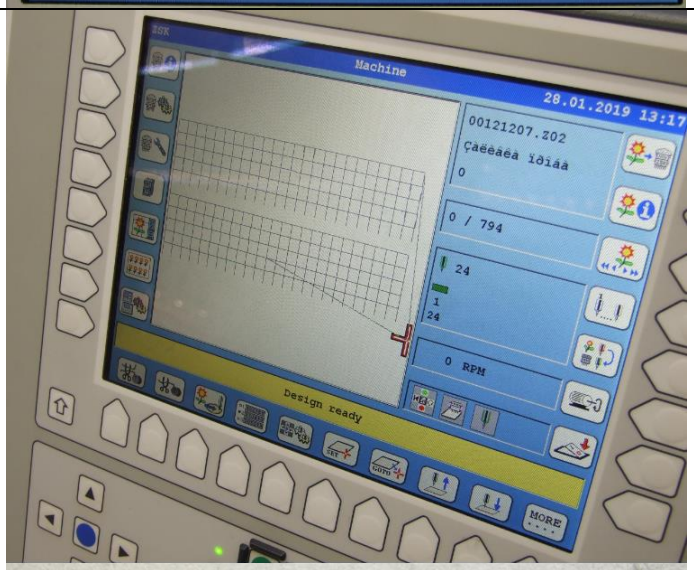
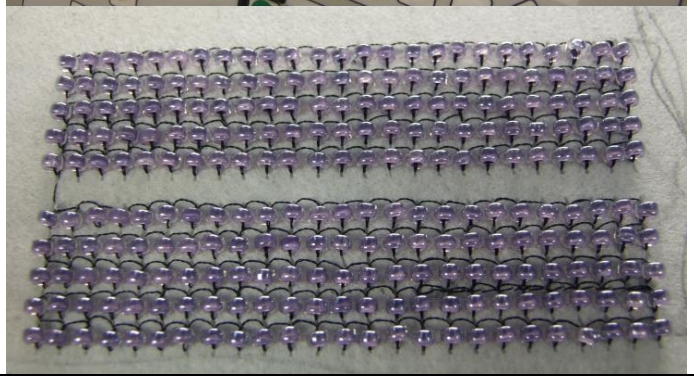
5.6	And on the device indicator the point will flash (2 times per second).	
5.7	Installing tweezers with beads under the needle: The level of beads in the loading drum. **MIN** – more than 5 mm. **MAX** beads volume 60 ml. To fill the string, switch the toggle switch (10) to the “10.3” position and briefly press the control button (9) **Attention!** When the drum is loaded for the first time, it is recommended to use measuring containers <= 60 ml to determine the volume of beads loaded.	
5.8	To test the operation of the device, you must: On the embroidery machine terminal go to **Service**.	
5.9	Select the item **Test machine attachment**	

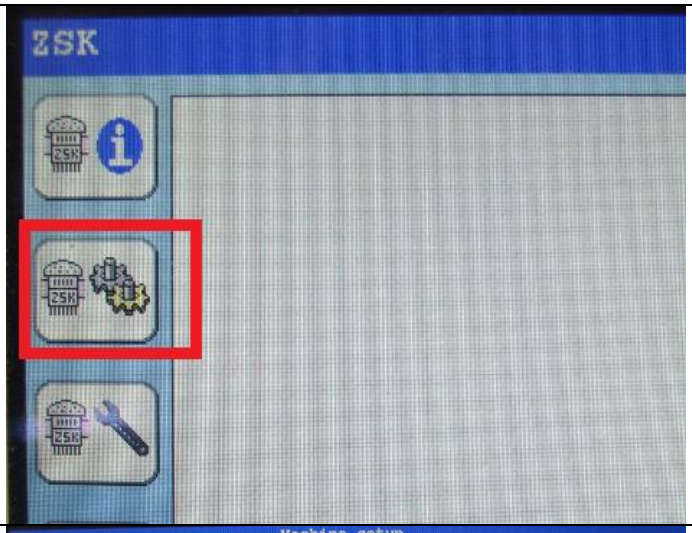
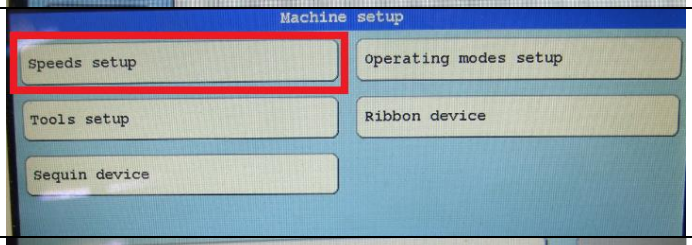
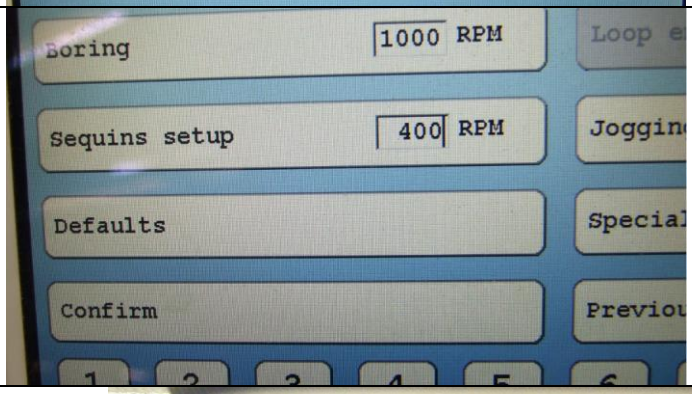
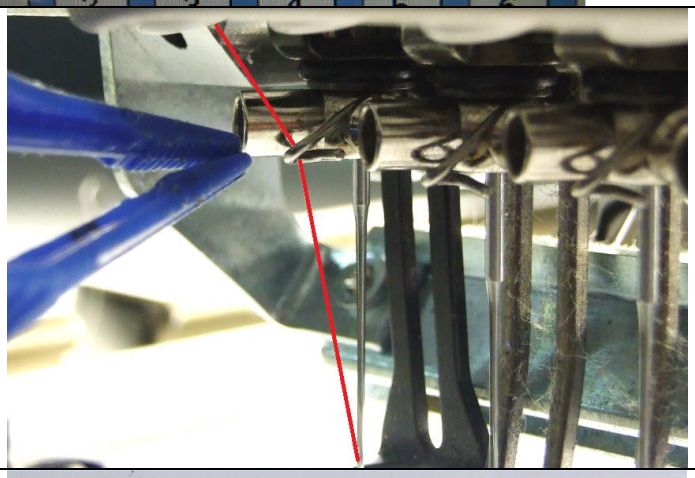
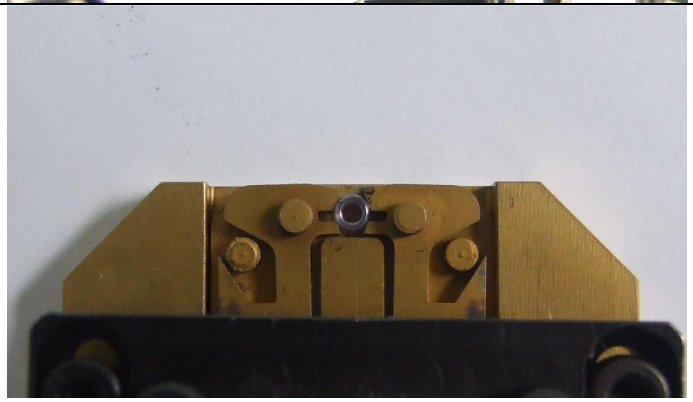
5.10	Select for which device the test mode will be conducted (left/right). After selecting, click **Start testing**.	 
5.11	Device actions: Press button 4 twice - the device will go down.	
5.12	Loosen the fastening screw	

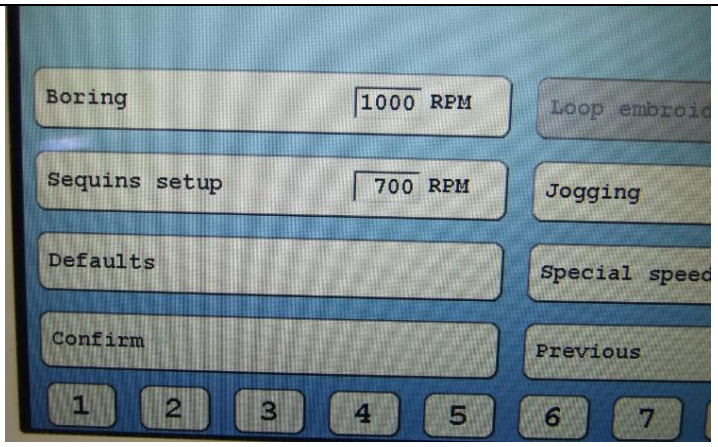
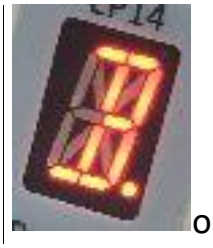
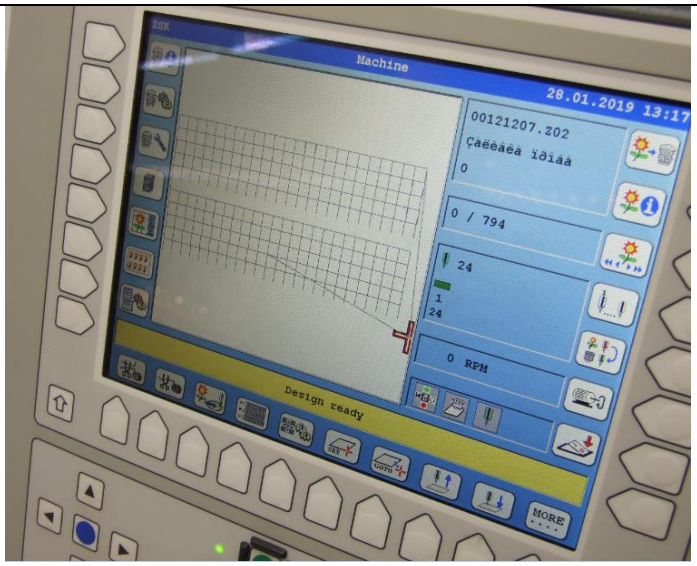
5.13	It is necessary to establish the distance between the needle platform and the base of the bead feeder 5 mm. **Note!** You can use the plate of the desired size (as shown in the photo). Fix the fixing screw.	
5.14	Press button 4 once - the device will go up.  Next, double-click on the button 4 - the device goes down, check the distance.	
5.15	**Device downstairs.** **1 press**  – tweezers (lever) in **M**iddle position =>  **presses** switching the color change mechanism **A** and **B** **2 press**  - tweezers in the **F**ront position (beads under the needle)	 

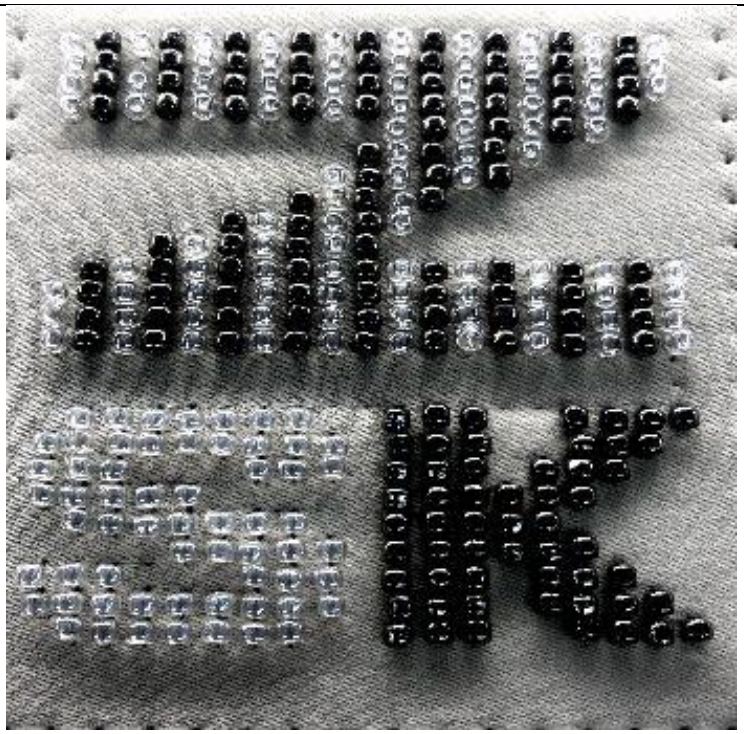
	3 press  - tweezers in the position of loading beads **A** or **B**	 
5.16	Check the gap between the presser foot and the tweezers. If distance = 1-2 mm, then go to p.5.18 If not, then to p. 5.17	
5.17	Bend the foot with pliers.	

5.18	Expose the position of the needle with calipers. Loosen the screws - photo 1.	
5.19	Rotate the screw: - **Clockwise to move the tweezers** - right. - **Counterclockwise** - left. After selecting the position, fix the screws from p. 5.18.	
5.20	**Attention!!! The correct position of the bead hole under the needle**	
5.21	Similar actions for moving forward / back tweezers. **Clockwise** - Forward **Counterclockwise** - backward Conduct a check of p.5.20(PHOTO)	

			
5.22	Fix the needle bar. We finish testing - **Stop testing**		
5.23	**Perform and check the settings** Choose a test program(121212.Z00 on ZSK site) Set the mode **A**  on the device (Section 4.2)	 	

5.24	Speed setting On the embroidery machine terminal go to **Machine Setup**	
5.25	Select item **Speeds setup**	
5.26	Speed setting is performed in the Sequins setup field. For the test, choose a speed of 400	
5.27	Attention!!! Need to thread the thread in the hook, as shown in the photo.	
5.28	When embroidering the test sample, we check the positions of the beads in the tweezers (hole up). Correctly: hole up!	

	If the beads in the tweezers are missing or clamped sideways, additional settings must be made. You also need to pay attention to the number of absences of beads while embroidering .	
5.29	If errors do not occur, you can increase the speed. Maximum speed 700	
5.30	**Repeat the test for a position in the** Set the mode **B**  on the device (Section 4.2)	

5.30	Choose a test program (00000020. Z01 on ZSK site) **Repeat the test for A+B position** Set the mode **W**  on the device (Section 4.2)	

6. BEAD FEEDER SETTINGS. COLOR CHANGE MECHANISM

6.1 **TABLE of settings for the bead feed unit according to indicator 8**

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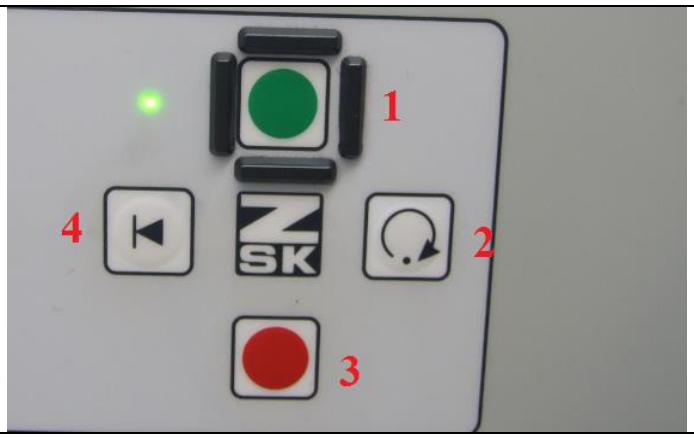
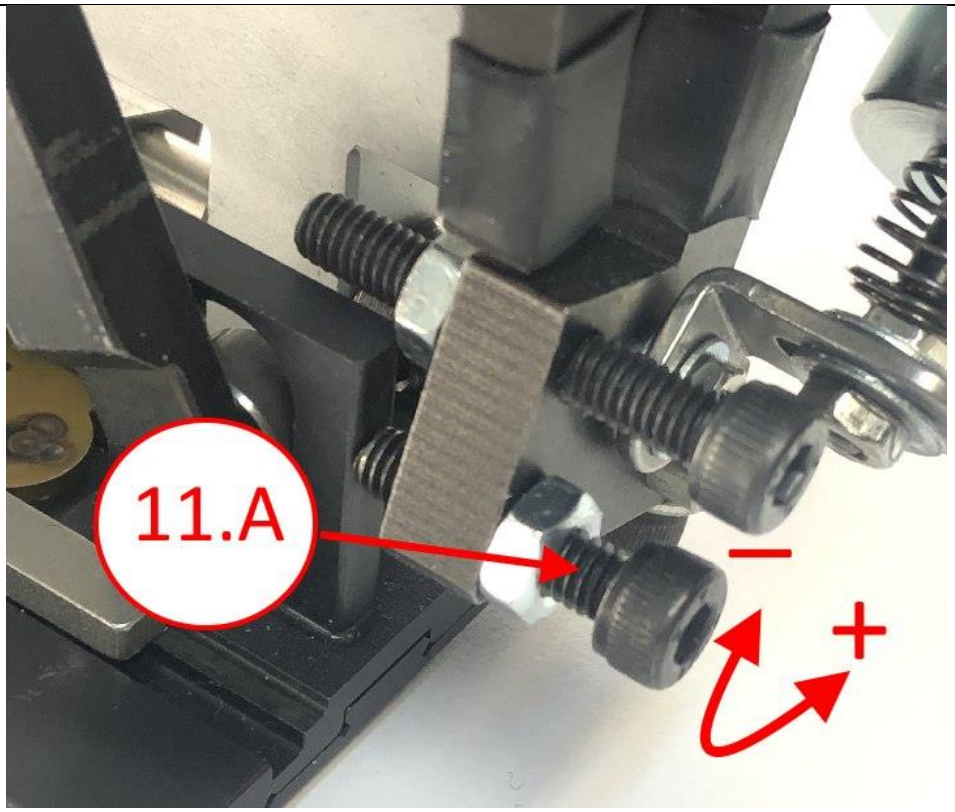
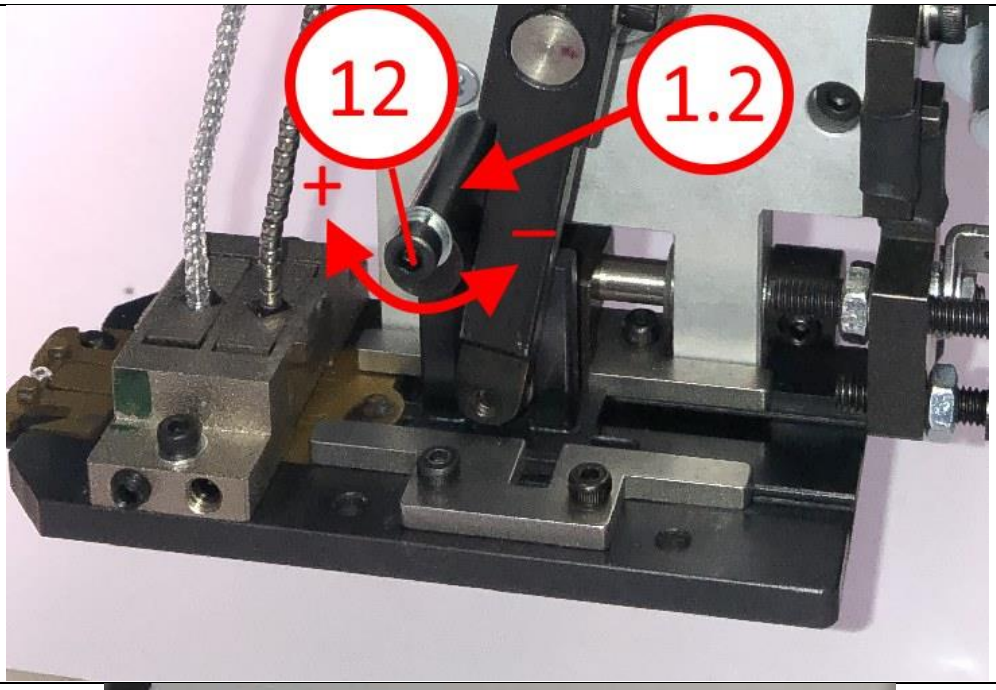
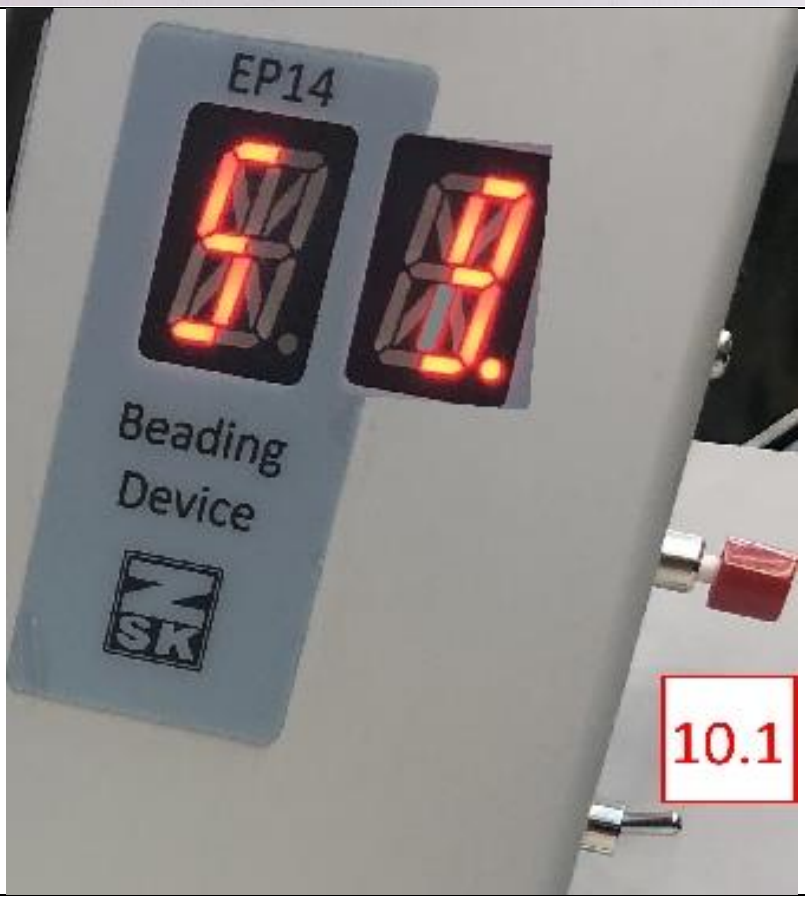
Bead Diameter (D)		Front eccentric **1.2**	**11A**	**11B**
1	Bead 2.0 мм – 2.1 мм	5.9	2.0 -2.3	manual setting
2	Bead 2.5 мм – 2.6 мм		2.5-2.7	manual setting
3	Bead 2.7 мм – 2.8 мм		2.7-2.9	manual setting

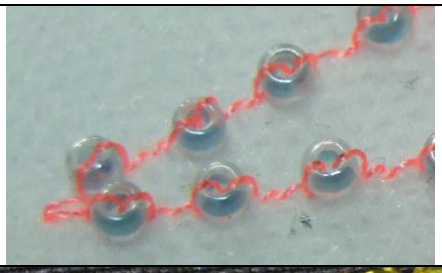
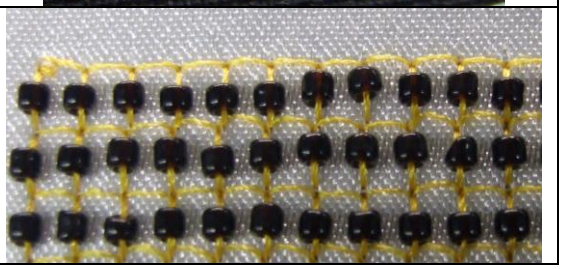
6.2	**Setting the position A** Press button 4 twice - the device will go down.	

	Device downstairs. **1 press**  – tweezers (lever) in **M**iddle position => **presses**  switching the color change mechanism on **A** **3 press**  **-** tweezers in the position of loading beads **A.** To reduce the size of the beads, turn the screw **11.A** in the direction "-", to increase in the direction of "+".	
	Set the toggle switch **10** up (**10.1**) Press the lever (**1.1)** to the screw (**11.A**) and check indicator reading (**8**). If the readings correspond to the table, then the setting is completed.	
6.3	**Setting the position**	

	Front eccentric **The front eccentric adjusts:** - the force of compression of the beads with tweezers under the needle; - mobility of tweezers with beads (0.1-0.2 mm) under the needle.	
	Loosen screw 12. Insert a No. 2.5 socket wrench into the cam hole. Turn in the “+” or “-” direction to reach 5.9. Lock in position with screw 12. **Improper adjustment of the front eccentric breaks the needles.**	

7 GUIDE FOR DESIGNING BEAD PATTERNS

Options for placing beads in the pattern:

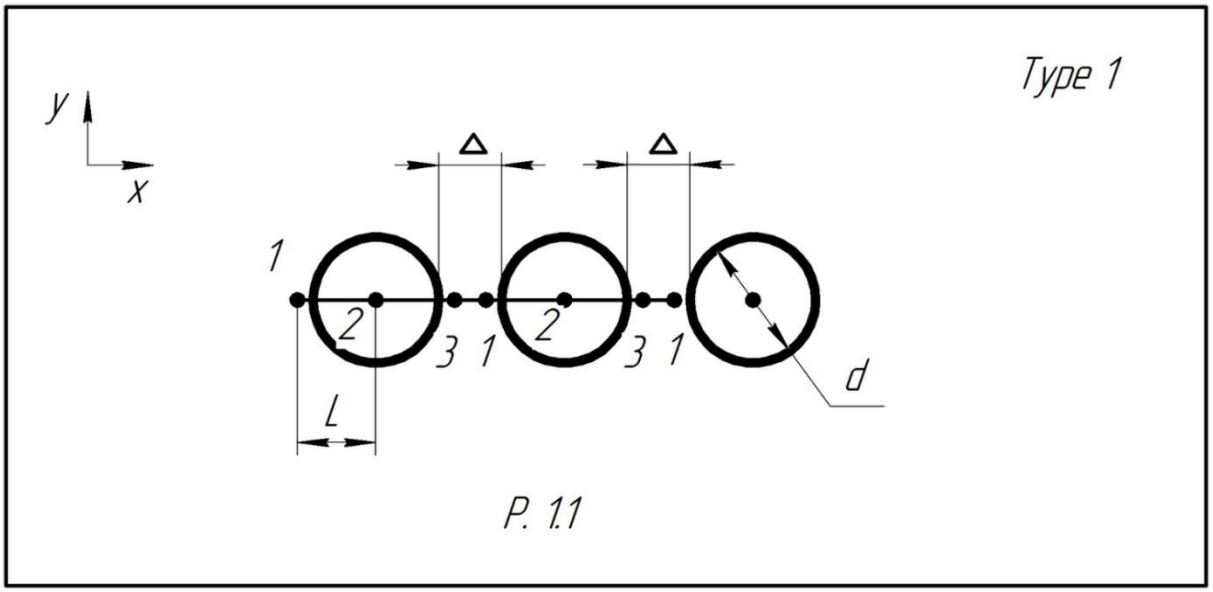
Type 1		
Type 2		
Type 3		

Type 1) When using this method of drawing pattern, it is necessary to take into account the **diameter** of the beads.

Type 2) When using this method of drawing a pattern, it is necessary to consider the **height** of the beads.

Type 3) When using this method of drawing pattern, it is necessary to take into account the **diameter** of the beads.

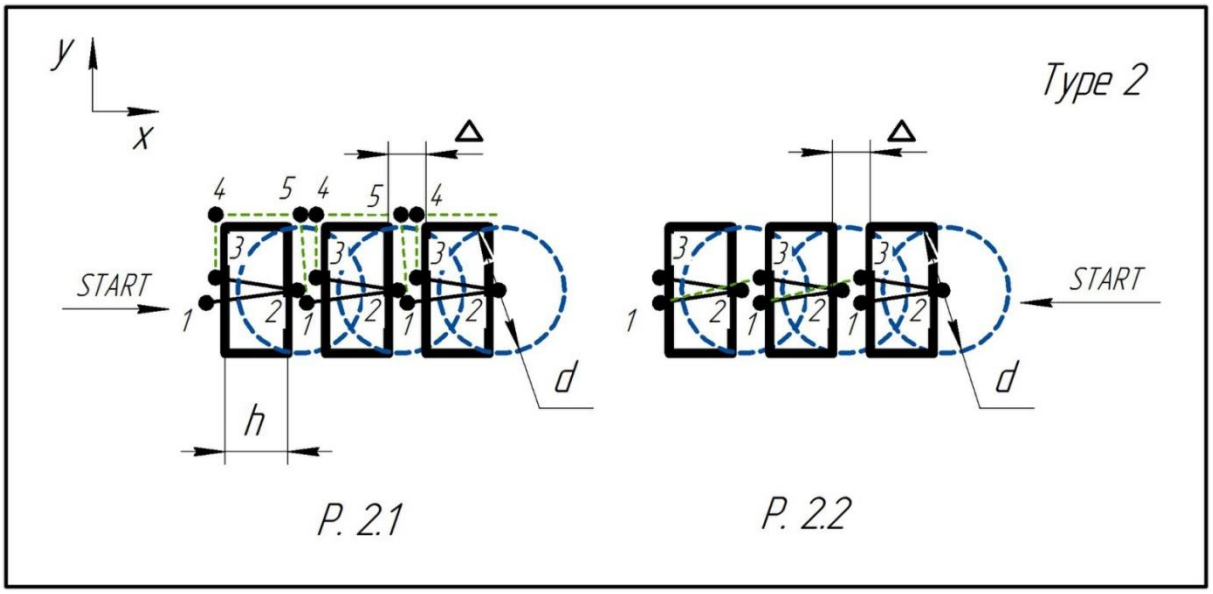
Indents in patterns:



P. 1.1

d - bead diameter, mm
L - stitch length, mm
Δ - indent between the beads, mm
1, 2, 3 - needle pricks

Recommendations:
$L_{1-2} = L_{2-3} = d/2$ mm
$\Delta = L_{3-1} + 0.2$ mm

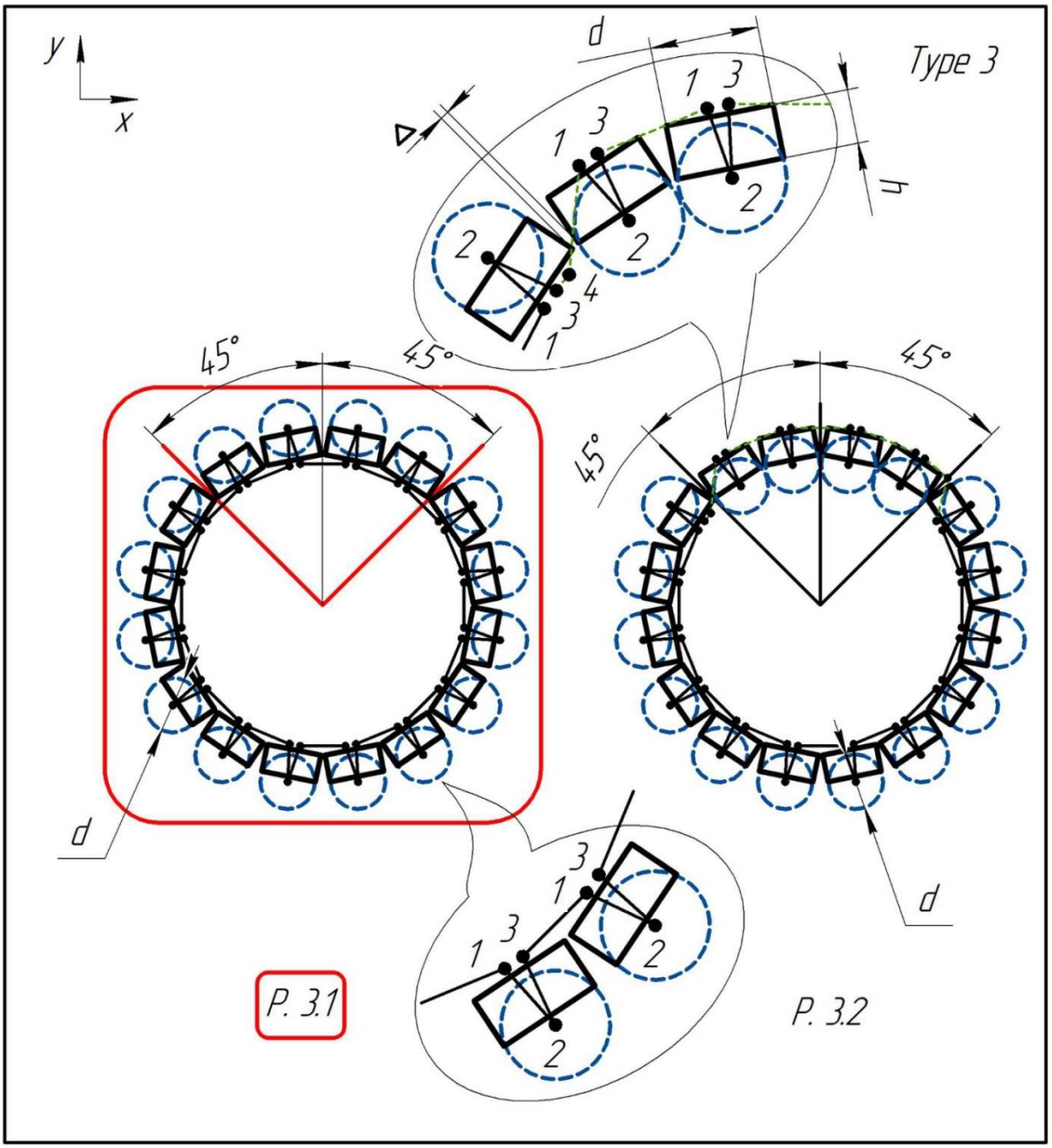


d - bead diameter, mm
h - bead height, mm
Δ - indent between the beads, mm
1, 2, 3, 4, 5 - needle pricks

P. 2.1:
1-2-3 - bead stitching
3-4-5-1 - transitional stitches

P. 2.2:
1-2-3 - bead stitching
3-1 - transitional stitches

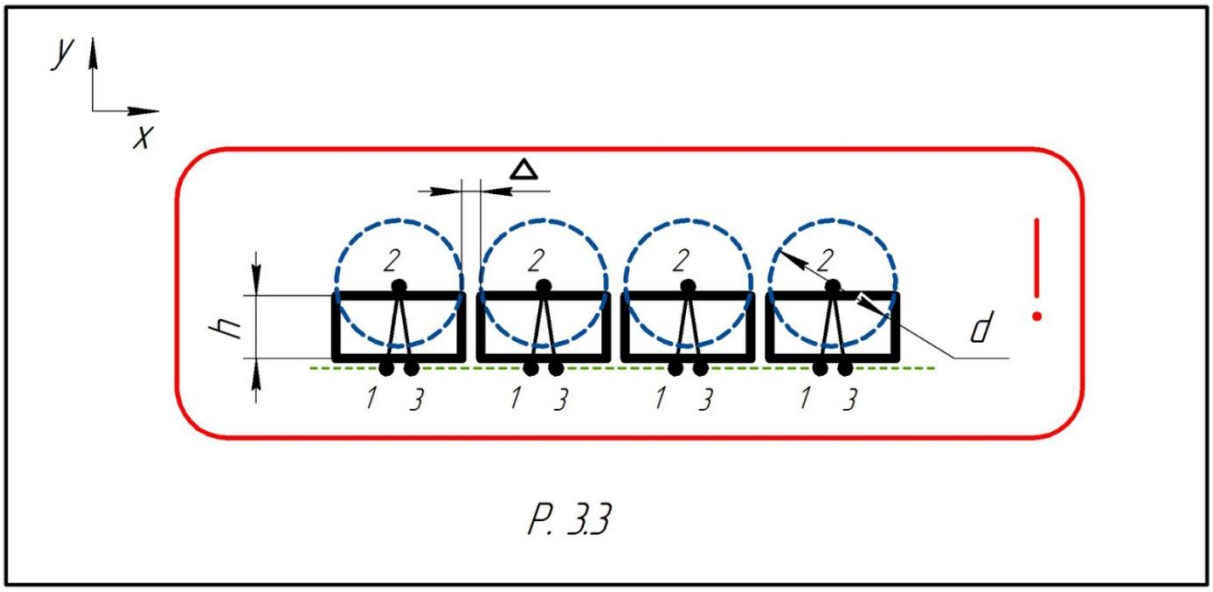
Recommendations:
$L_{1-2} = L_{2-3} = L_{4-5} = h + 0.2$ mm
$L_{3-4} = L_{5-1} = d/2$ mm
$\Delta = D_{5-4} + 0.2$ mm (D_{5-4} - distance between the 5th prick of the current transitional stitches and the 4th prick of the next ones)



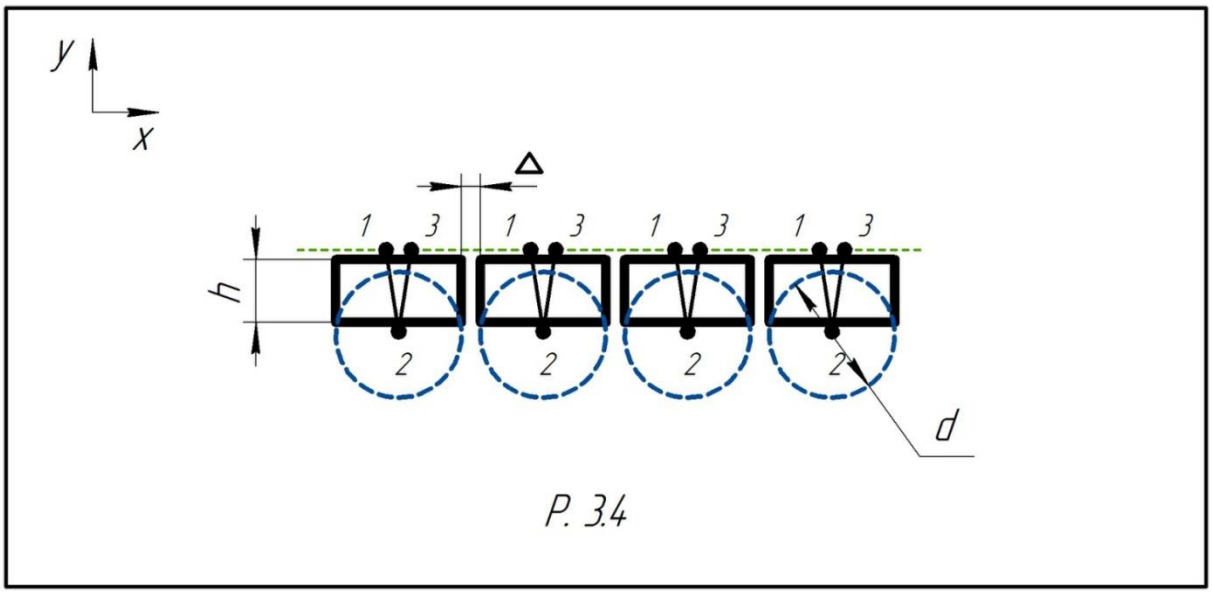
d - bead diameter, mm
h - bead height, mm

1-2-3 - bead stitching
3-4-1 - bypass stitches
3-1 - transitional stitches

Δ - indent between the beads, mm
1, 2, 3, 4 - needle pricks



P. 3.3



P. 3.4

Recommendations:

$L_{1-2} = L_{2-3} = h + 0.2$ mm

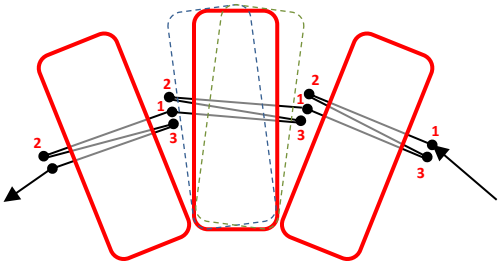
$L_{3-1} = d + \Delta$ mm

$L_{3-4} = d/2 + \Delta$ mm

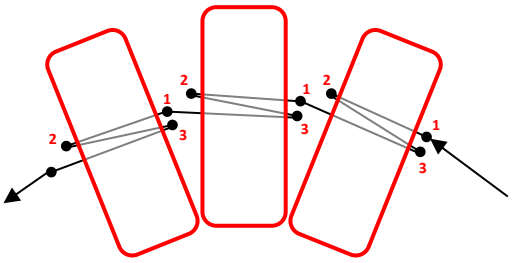
$L_{4-1} = 0.7 \cdot d$ mm

Due to the peculiarities of the mutual arrangement of the bead feeding unit and the sewing thread, it is recommended that stitch 2-3 be performed mainly in the up direction (from the unit) as shown on P.3.2, P.3.4. Otherwise, the thread may fall between the tweezers sponge and the bead, preventing it from normal feeding or even pulling it out of the tweezers. So the designs on P.3.1, P.3.3 are highly not recommended.

In addition, punching software lengthens all stitches of the macro when laying beads in an arc, for example, to preserve the condition that beads fit to each other along the inner radius (P.4.1). Because of this lengthening, the beads have the ability to move freely, i.e. may hang out or warp, which degrades the quality of embroidery. It is recommended to lengthen only transitional stitches 3-1 (P.4.2), leaving sewing stitches 1-2 and 2-3 of length L, calculated according to the recommended formulas depending on the type of laying.



P. 4.1



P. 4.2

Not optimize and not modify a pattern when loading it on an embroidery machine.

To fix the beads securely, **apply 5-stitch start and end bartackings**.

8. ERRORS, FAULTS AND SOLUTIONS

(1) Error: E6 – Positioning tweezers error

Description 1: Beads or a foreign object got in the mechanism of tweezers

Solution: Check feed mechanism. Remove the jammed beads.

Description 2: Low string lowered

Solution: Adjust string settings by adjusting the height of the loading drum. (See Photo 1- Photo 2)

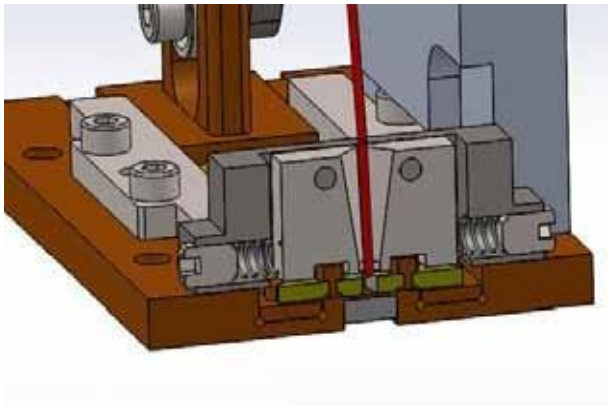


Photo 1- The correct position of the string

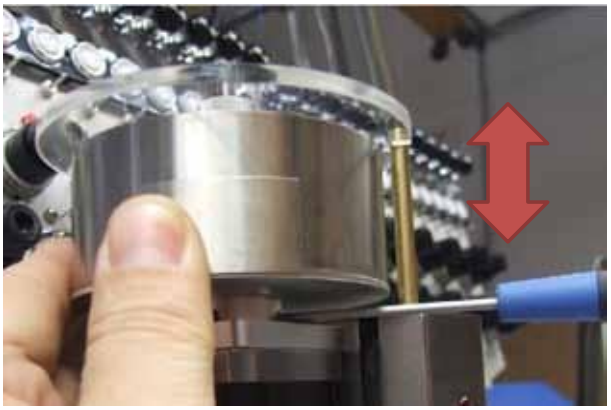


Photo 2

(2) Error: Beads in tweezers turned on edgewise

Description: Beads getting into tweezers has a wrong position **Solution 1:** Invalid string position (check item 2 settings) **Solution 2:** Change the position of the rear eccentric:

1. increase by 0.1- 0.2 (p. 6.1). Sew a test sample.

2. decrease by 0.1- 0.2 (p. 6.1). Sew a test sample. (values are displayed on the device indicator

(3) Error: Bead misses the string in the drum

Description 1: Not enough beads in the drum

Solution: Fill the beads

Description 2: In the drum there are beads with an inner diameter (d) less than the required or dirty hole in the beads.

Solution: We recommend using calibrated beads, keep the beads and drum clean.

Attention! It is recommend to store beads in a closed container.

(4) Error: Does not fix beads - holes in embroidery

Description 1: Missing beads in tweezers

Solution: Find out the cause and solve, following the points above.

Description 2: The position of the tweezers under the needle is not precisely adjusted.

Solution: Check position, see section 5 (p.5.19- p.5.23).

Description 3: Check whether needle bar embroiders all stitches.

Solution: If not, you need to make adjustments (change the needle, adjust the mechanical grab)

Description 4: If at a speed of 400 st./min the beads sews well, but at a high speed there are skips..

Solution: Need to adjust the tension of the thread. Recommendations! Beads should be sewn to the fabric firmly.

Description 5: If beads fly out from under the needle.

Solution: It is necessary to check the pattern set (section 7).

(5) Error: Bad bead loading on the string

Description: String is dirty

Solution:
1. Wipe the strings with alcohol.
2. Clean the guides
3. Check guides for damage
4. Wipe the inner surfaces of the guides.

(6) Error: E9 – Lack of Bead

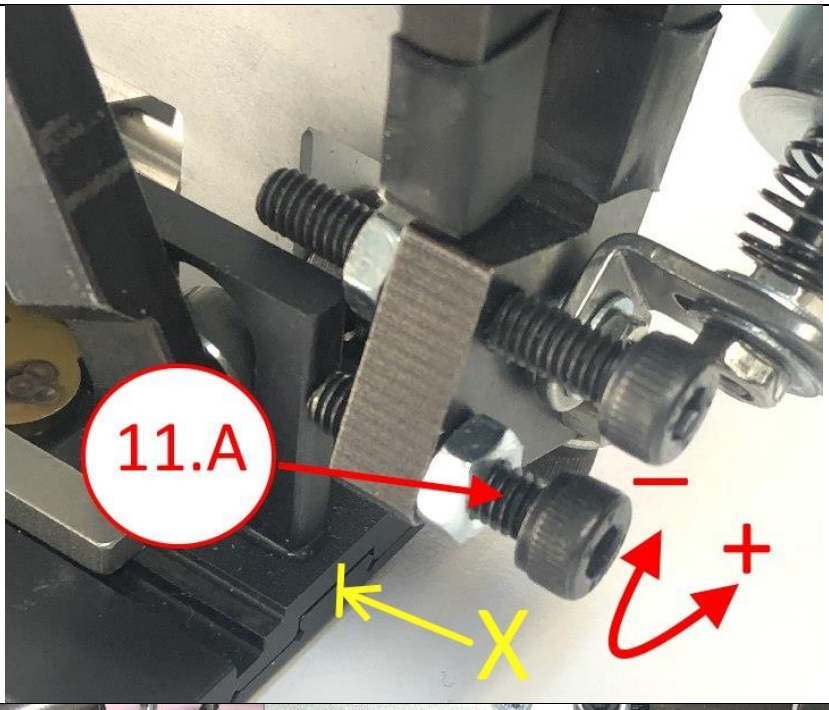
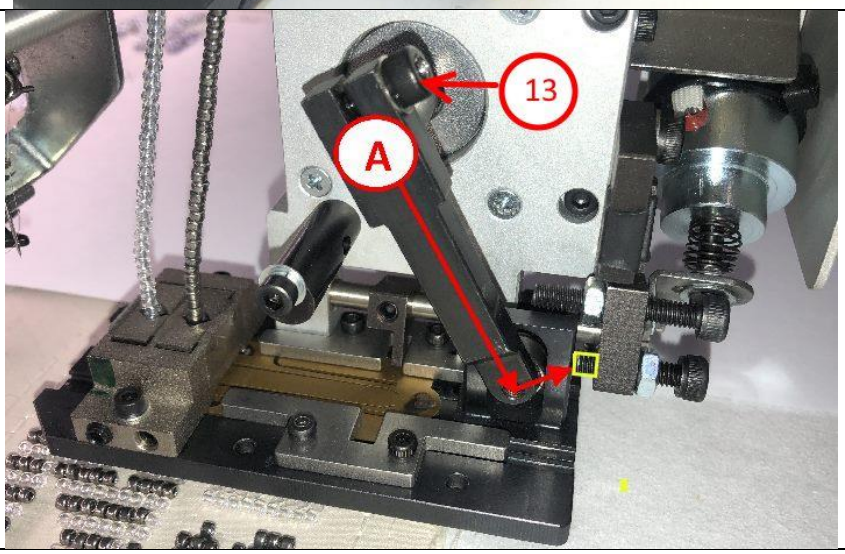
Description : If there is beads, but the E9 has occurred, you need to adjust the

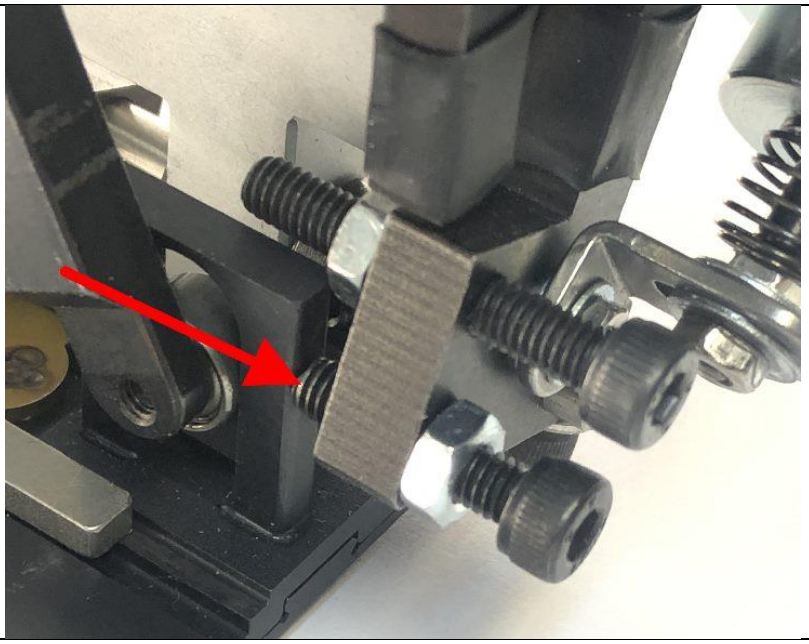
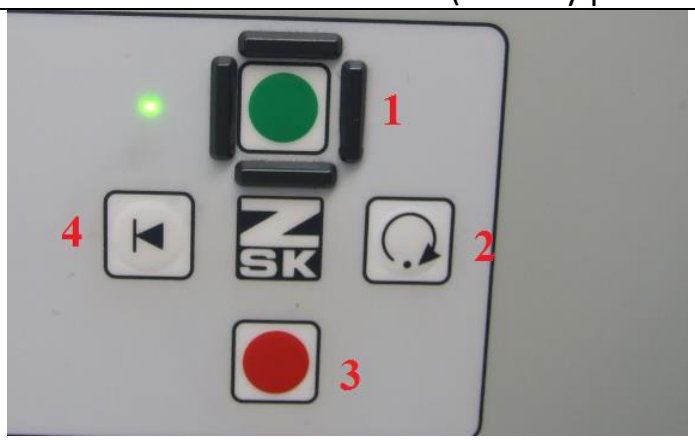
position of the string with beads relative to the sensor!.

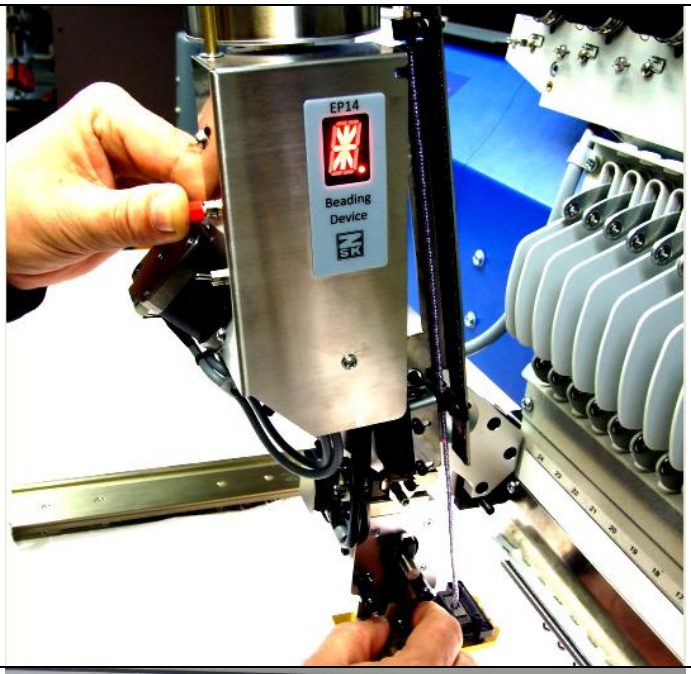
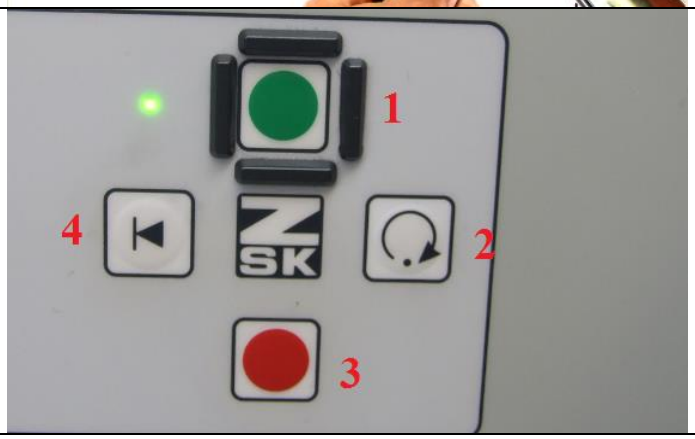
Solution: Fill the beads. To correct the position of the string, it is necessary to adjust its position with the help of guides (6)! When the beads move (during operation), the sensor should blink.
With error **E9**, the device rises. Refill the beads (**paragraph 5.7**). If there are non-sewn beads, then go back press (**4**). If necessary, the device will automatically change the color of the beads. Continue to work press (**1**) (Foto 5.11).

9. Adjusting the zero position of the lever (for engineers only)

If you need to disassemble the bead feeder, follow the instructions for setting the zero position.

9.2.1	Enter the test mode section 5 (p. 5.9- p.5.11)	
9.2.2	Set the lever to position **A** (paragraph 6.2) Turn screw **11.A** in the **"+"** direction until the parts are installed in the same **X** plane (see photo).	
9.2.3	Loosen the screw 13 so that the engine can rotate freely.	
9.2.4	Turn the toggle switch **(10)** to position **10.2** and press the button **(9)** once. The	

	engine rotates and stops herewith.	
9.2.5	Press lever **1.1** onto screw **11.A** and tighten screw **13**	
9.2.6	Switch the toggle switch (10) to position 10.2. The values on the indicator (8) should be **2.7-2.8**	
9.2.7	Adjusting the middle position of the bead feed lever (standby positions)	
9.2.8	1. Double tap on 4 - the device is lowered down. 2. Double tap on 4 - the device has gone up. 3. 1 pressing the button 1 - pressing the lever to the rear eccentric. 4. After 2-3 seconds, press button 1 once - turn off the motor power supply, the bead feed lever (**1.1**) will move freely.	
8.2.9	Switch the toggle switch (**10**) to position (**10.1**) and set the position of the tweezers as shown in the photo.	

9.2.10	After setting the position of the tweezers (9.2.9), it is necessary to press the button (9) and wait on the indicator (8) - *.	
9.2.11	After the appearance of *, you need to press button 1 once.	

General recommendations

After changing the settings, each time you need to sew a test sample! Check the correct installation of the needle.

For monofil it is recommended to install the needle with a hole on yourself or turned 5 degrees to the left!

For polyester, needle placement remains standard!