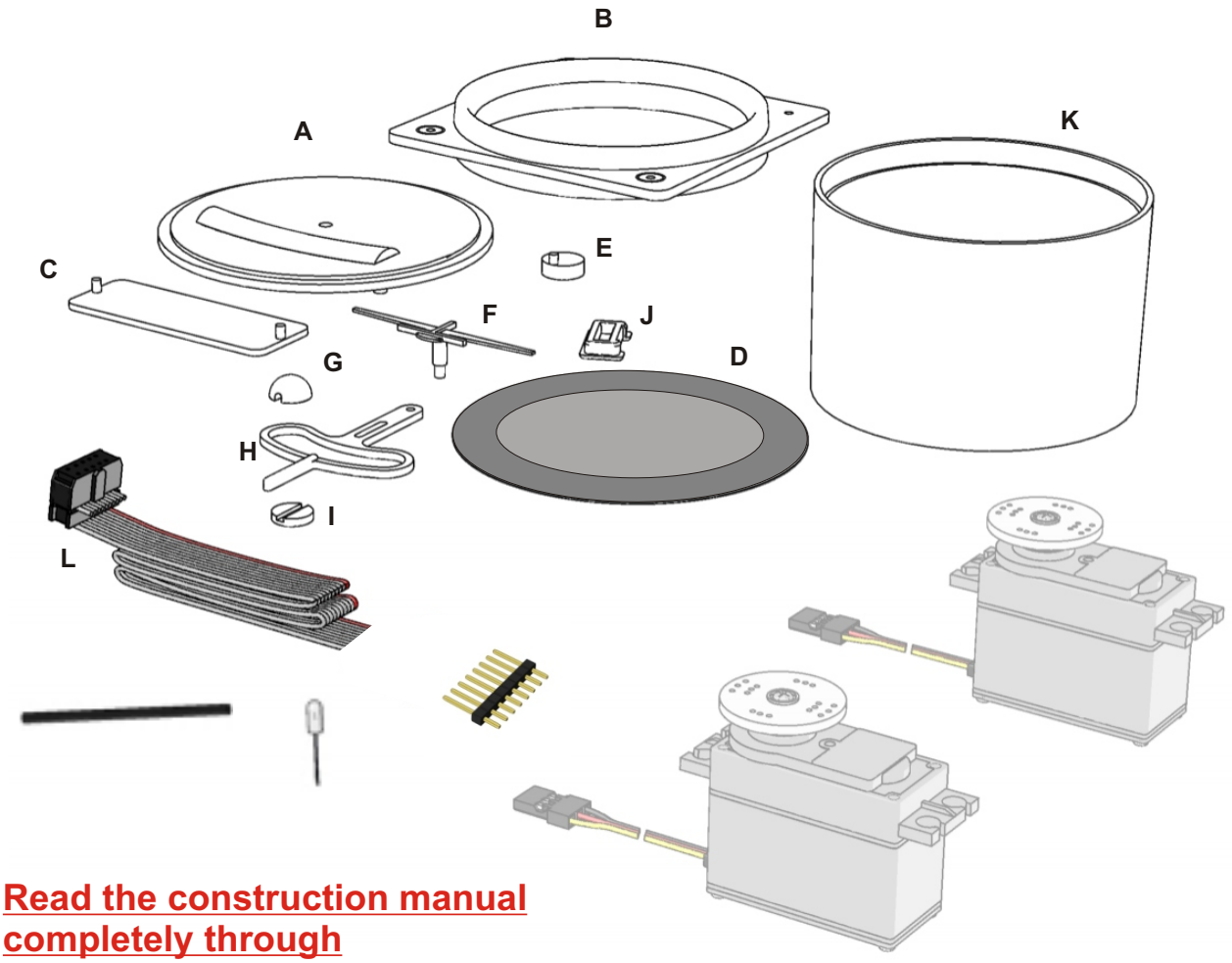
CONSTRUCTION MANUAL
TURN COORDINATOR

Read this manual first, prior to cunstructing



Read the construction manual completely through prior to constructing!

(SERVOS, Not included in Kit)

Construction kit "Turn Coordinator"
Your kit contains all the necessary components (except for a servomotor) for building a “Turn Coordinator Gauge”.

Fine-tuning
The calibration software allows you to accurately adjust the instrument (once connected to the Central Control Unit) to the movement of the indicators of the chosen instrument.

Difficulty level
This product can be constructed without technical expertise. Care and accuracy are of utmost importance.

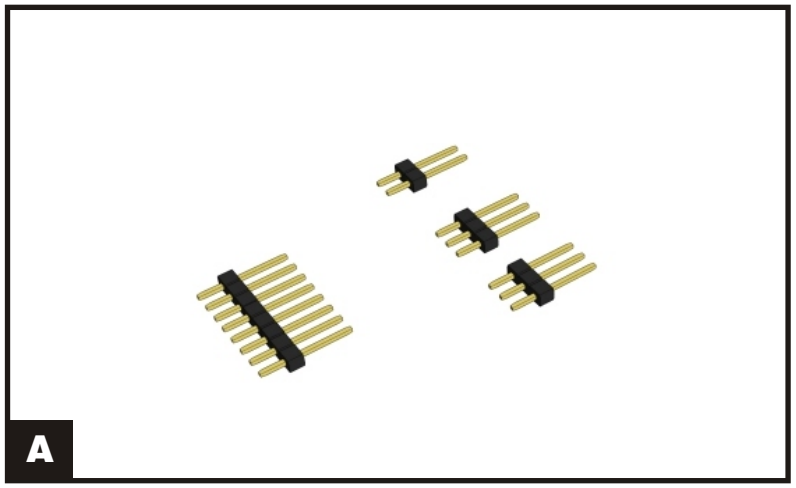
What else do you need?
2 Servo motors of type HS300, HS311 or equivalent is required to make the instrument fully functional. This product can be ordered separately or bought from any retailer of model kits. Additionally you will need some simple tools, such as a small star-shaped screwdriver, a hobby knife, some pliers, a soldering iron, insulating adhesive tape and glue suitable for plastic model kits and a soldering iron.

General hints
Be very careful when using the hobby knife! You can easily hurt yourself when handling sharp objects! Take good care of the amount of glue you apply and to which areas you apply it. Glue for plastics is essentially a solvent. Excessive use can damage the exterior of the instrument.

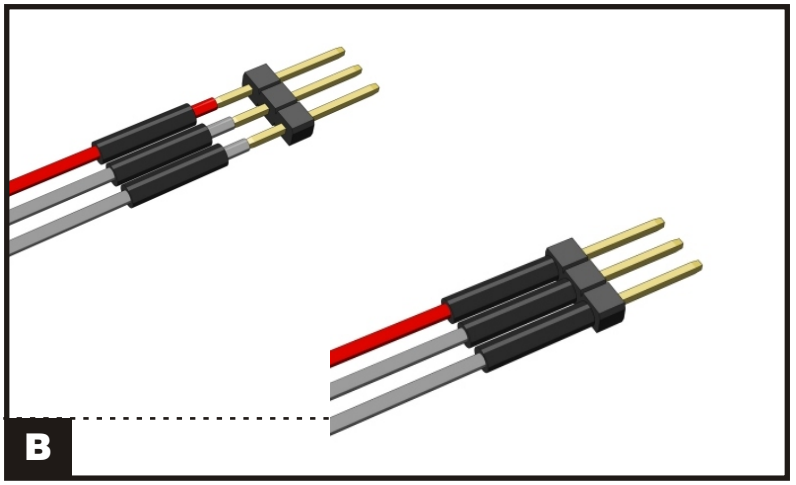
Preparations before beginning construction
Check if all components are included. During packing, the contents of the construction kit have been inspected several times. Nothing should be missing.
Use the hobby knife to remove any irregularities. Be careful when using the sharp hobby knife!

Warranty
Construction kits come without a warranty!

List of components
A - Frontplate
B - Front ring
C - Backplate
D - Optical (plastic, material PET) with imprinted edge and text
E - Excentric
F - Indicator
G - Top of ball indicator
H - Pendulum
I - Bottom of ball indicator
J - Strain relief
K - Instrument casing
L - Flatcable with connector
M - 8-pin header
N - Heat Shrink sleeve
O - Filament Lamp



A: The pin header comes as an 8-pin version. Separate 2 times a set of 3-pins, which results in 2 pieces of 3-pin header and one piece of 2-pin header.

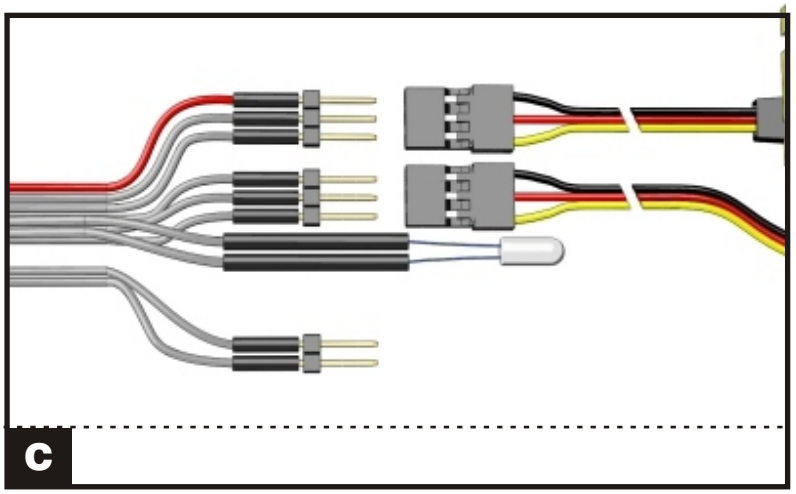


B: Separate on one end of the ribbon cable the leads for approx. 3 cm. (approx. 1.2”) from each other. Remove the insulation from the end of the ribbon cable for approx. 5 mm. (approx. 0.5”).
Now cut the heat shrink in 10 pieces of approx. 1.5 cm. and first move each piece of the heat shrink on the wires of the flat cable, before you start to solder.

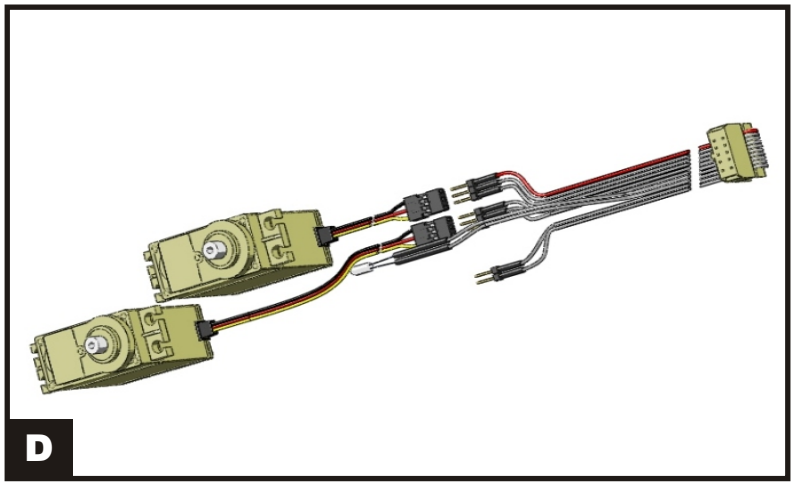
Now solder the 2 3-pin headers and the 2-pin header on the flatcable, to begin at the red indicated wire.

Solder the filament lamp on wires 7 and 8. The polarity is not important here.

Move the heat shrink isolation forward towards and over the blank soldering to prevent short circuit later. Use the soldering iron to shrink the heat shrink isolation over the blank leads

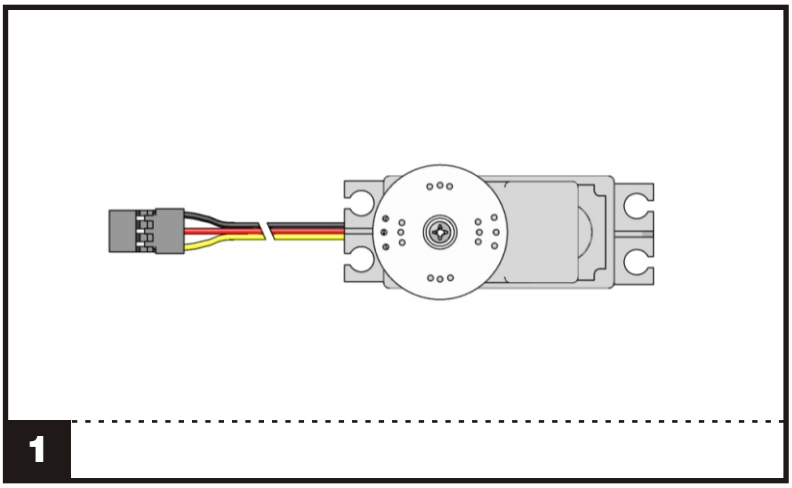


C: Finally your cable assembly should look as in illustration **C**.



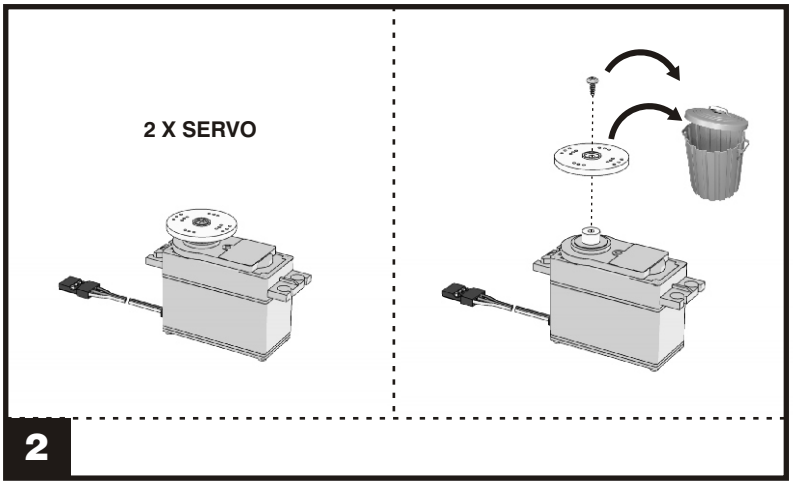
D: This illustration shows 2 servo connections.

Since this page describes the ribbon cable connection for instruments with 1 and 2 servo’s, just use - when your instrument has only one servo - the outer 3-pin connector for the first (or solitair) servo and the second 3-pins for an instrument with 2 servos.
The outer 2-pin header connector is not used for this instrument and can eventually be omitted.



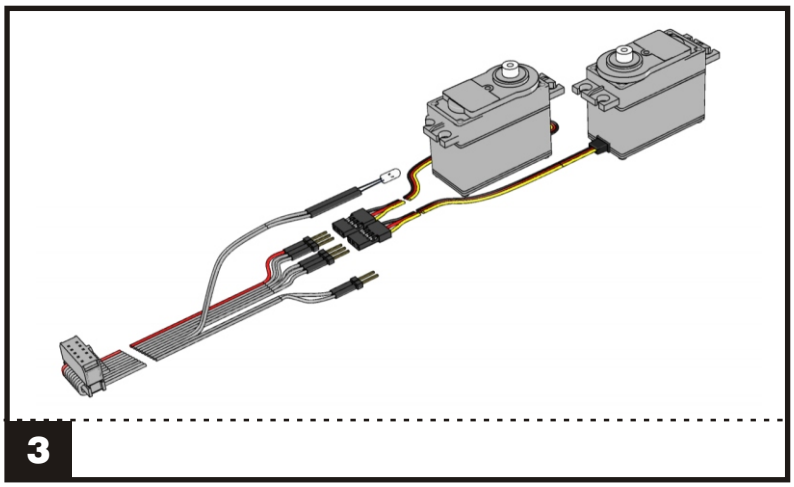
1

1. The shafts of the servos must be in the middle position. Turn the shaft of the servo by hand clockwise or anti clockwise until the shaft is exactly in the middle position.
The outgoing servo shaft can be turned over 190 degrees.
Take care that the shaft is not turned into another position during the assembly of the Turn Coordinator.



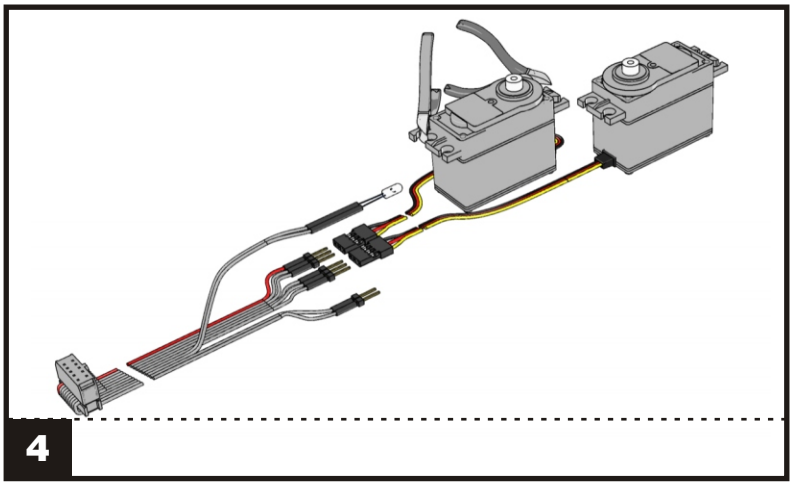
2

2. Remove the discs from the servo (if they where mounted).
Be careful not to turn the servo shaft!



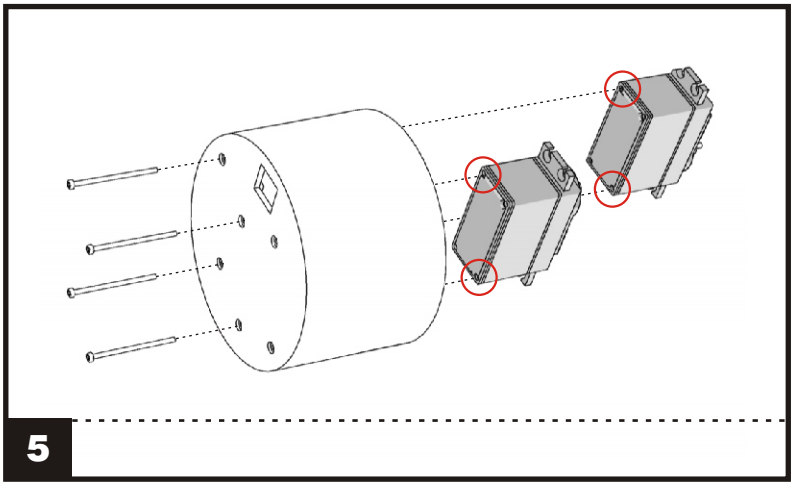
3

3. Connect both servos to the ribbon cable as in the picture. Be sure of the correct polarity. The black wire of the servos must go to the first (red) wire of the ribbon cable and the 4th wire of the ribbon cable.
The 2-pin connector on the ribbon cable will not be used.

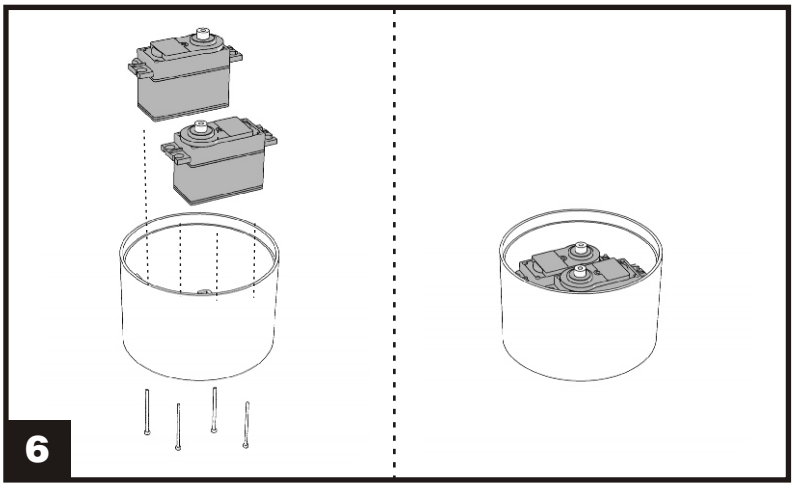


4

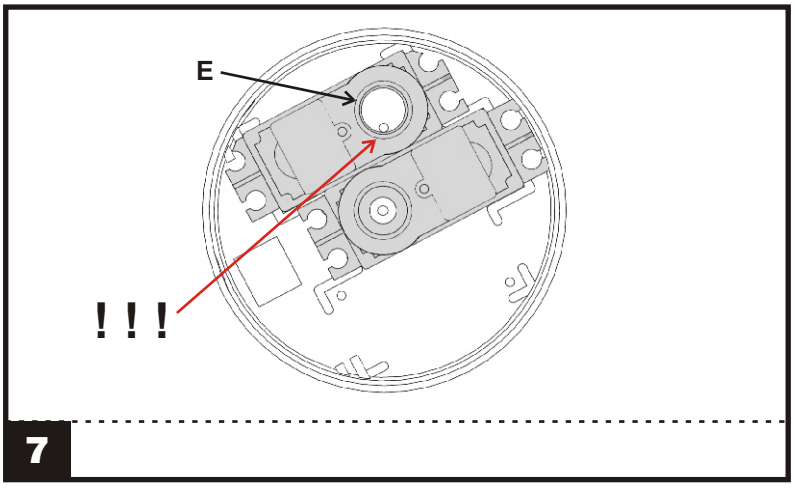
4. Now cut mounting the ears from the servo as shown in the illustration.



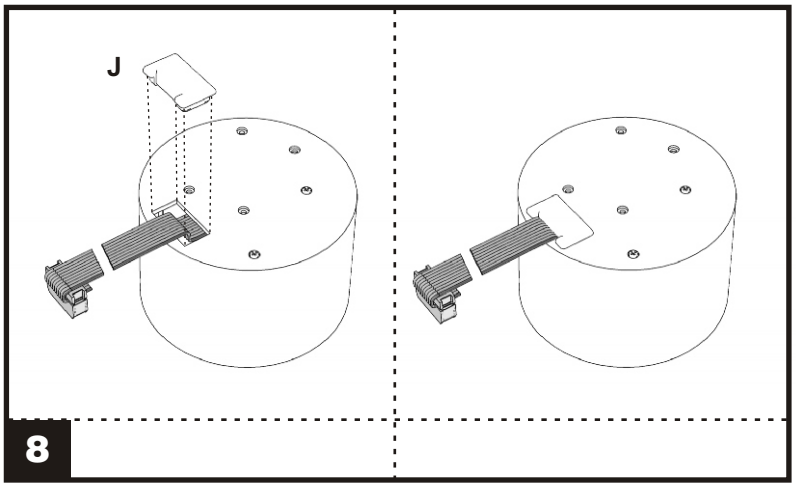
5. Remove 2 screws of each servo as shown in the illustration.
Position the servos inside the lower part of the housing as shown and mount the servos carefully with the loosened screw.



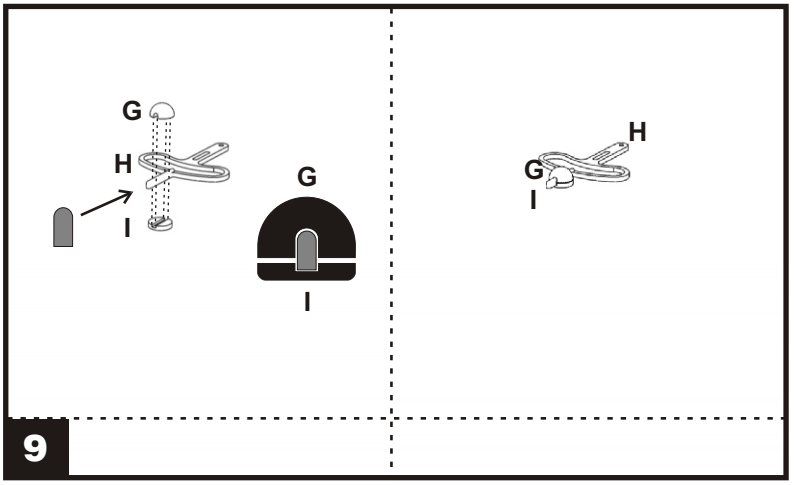
6. Take care: do not screw them too tight!!! The can easily be turned too far and will not be able to fix the servo in its place.



7. Check for the proper position of the servo in the housing. The servo with the cut off ears must be mounted to the side of the housing.
Now position excentric E on the shaft of the upper servo.**Take care not to change the position of the outgoing servo shaft!!**
Push the excentric onto the shaft but be careful not to damage the little pin.

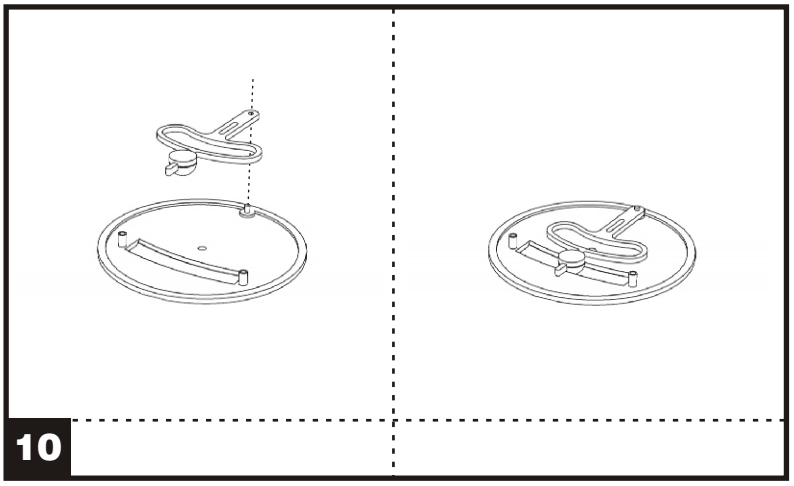


8. Move the ribbon cable through the hole in the housing and place the strain relief such a way that the ribbon cable is mounted properly between the space of the strain relief and the housing.
Leaf enough length on the ribbon cable to be able to mount the lamp later.



9

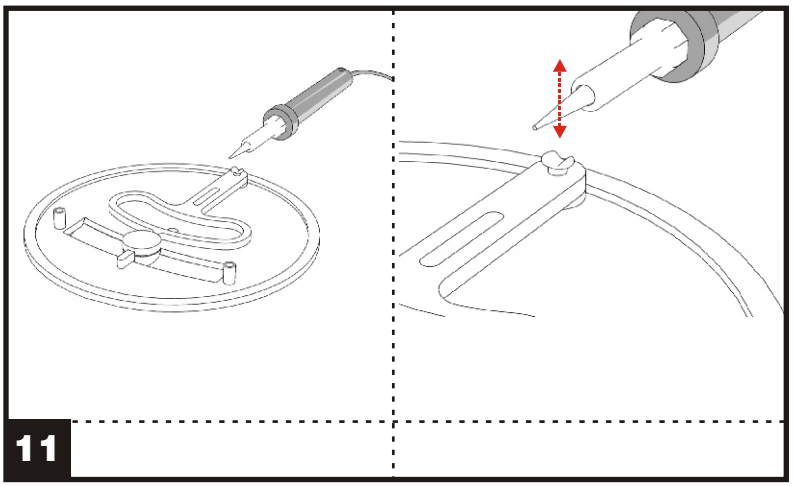
9. Construct the pendulum by combining both black halves **G** and **I** together as shown in the illustration.
Note: The thin part of the pendulum **H** has rounded off edges.
The opening in part **G** also has rounded off edges. They should fit together!
The ball will now easily move over the thin shaft of the pendulum and will not get off easily.



10

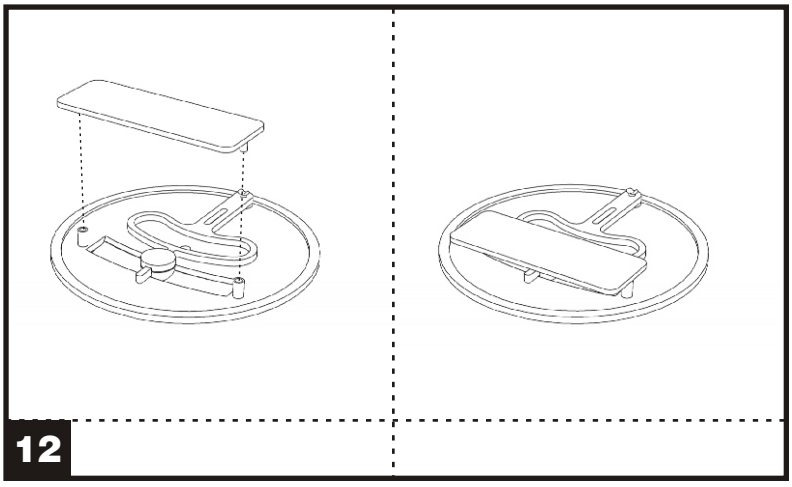
10. Position the pendulum on the little plastic shaft on the back side of the front plate as show.
During the positioning of the pendulum the round side of the ball must face onto the hollow part of the front plate.

Now check if the pendulum can move freely within the hollow part of the front plate.
During this movement, you will notice that the black ball moves a little up and down over the small part of the pendulum.



11

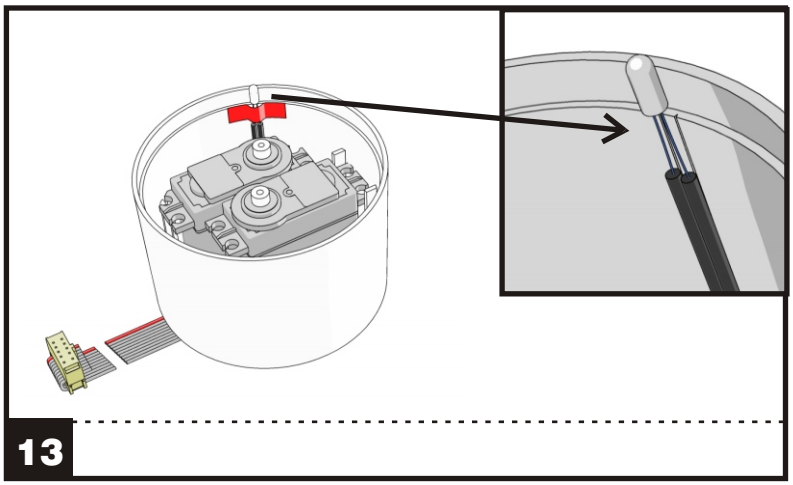
11. Now take a soldering iron and push (very shortly) with the side of the soldering iron onto the little shaft which holds the pendulum.
J**ust a little pressing will do, as the pendulum must still be able to move freely on this shaft, but will not come off anymore.**



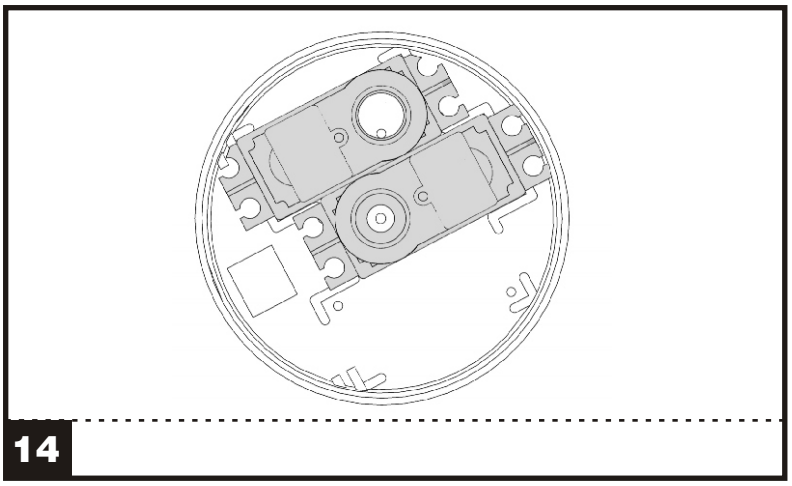
12

12. Now position the small square plate with the two pins on the bushes of the front plate.
Press the pins into the bushes slowly until they cannot go any further.

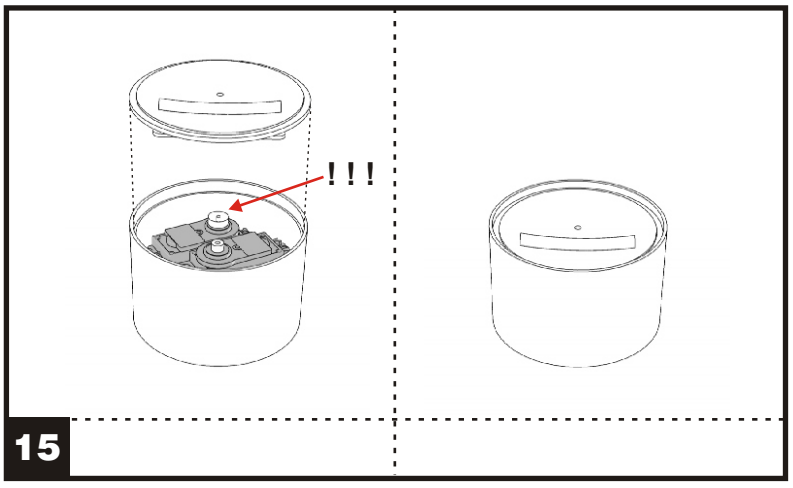
Again check if the pendulum can still move freely.



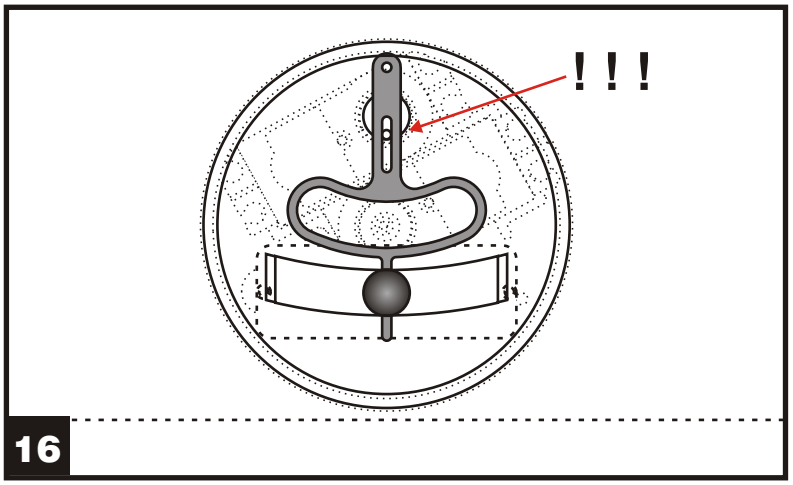
13. Cut a little piece of isolation tape and mount the lamp as shown in the picture on the inside of the housing where you see 2 small little stripes. Be careful, the lamp must be positioned such a way that the top of the lamp is just at the edge of the housing.
Note: the wires of the lamp can easily be short circuit. Check it and separate the wires more if necessary.
Also check that the wires and ribbon cable is free from the moving parts of the mechanism. Fix loose wires with tape inside the housing.



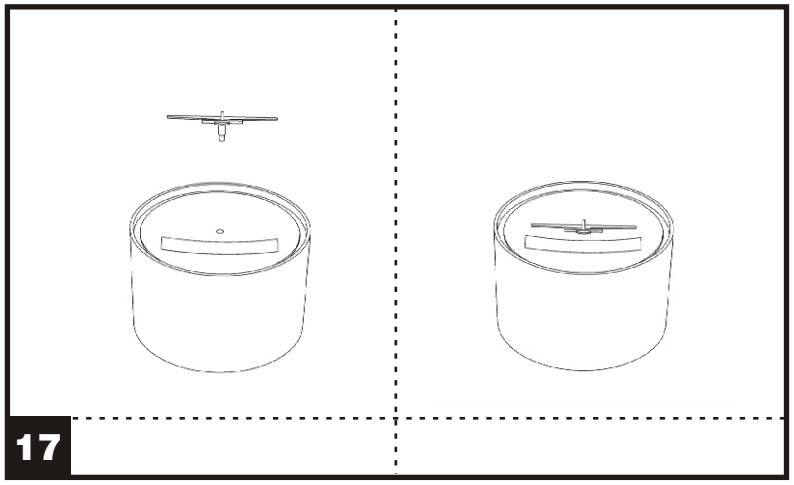
14. Now position the housing with servos in front of you as shown in the picture.



15. Mount carefully the front plate with pendulum in such a way on the housing that the small pin of the excentric is positioned exactly.
The front plate can only be positioned on the housing one way due to positioning pins.



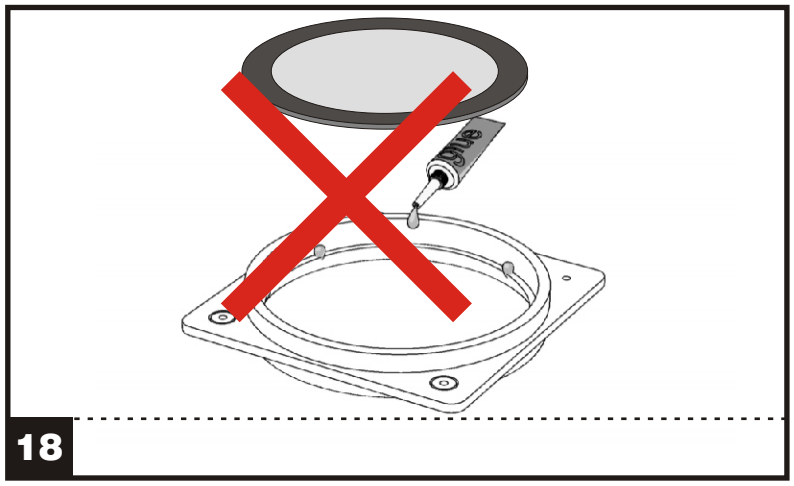
16. This drawing shows exactly how the pendulum must be positioned during the construction.



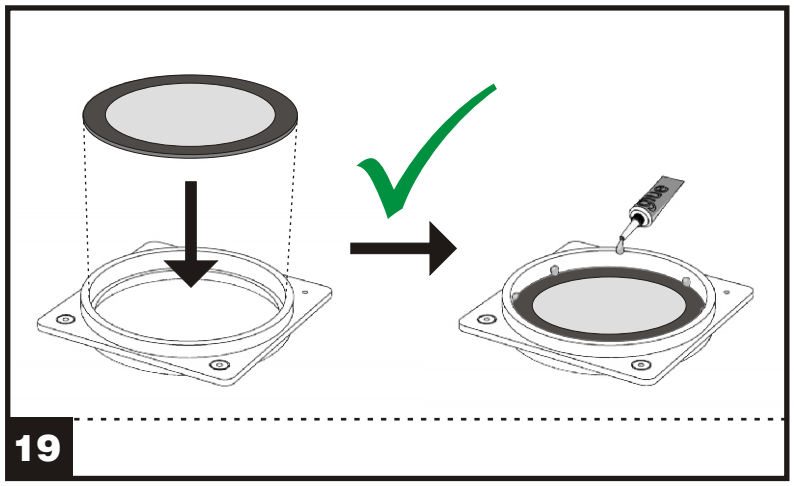
17. Position the small aircraft in the middle of the front plate and push it onto the servo with the little pin.

Check that when the optic is placed, the aircraft can still move freely and does not touch the front plate.

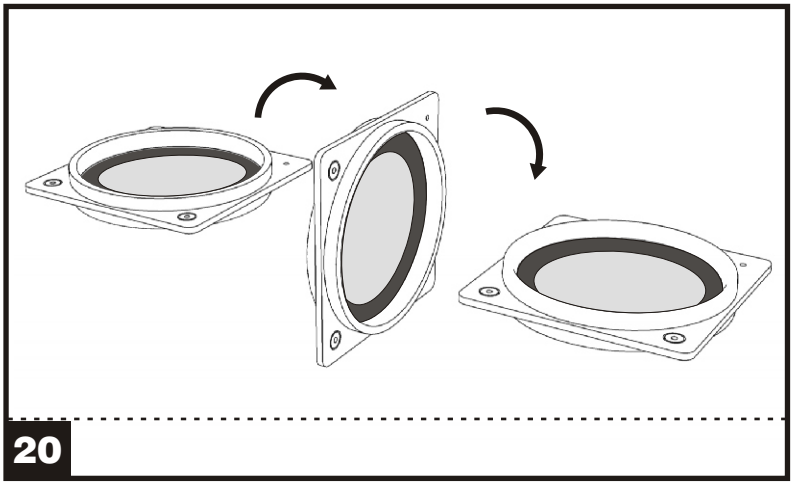
The aircraft does not have to be glued onto the servo shaft.



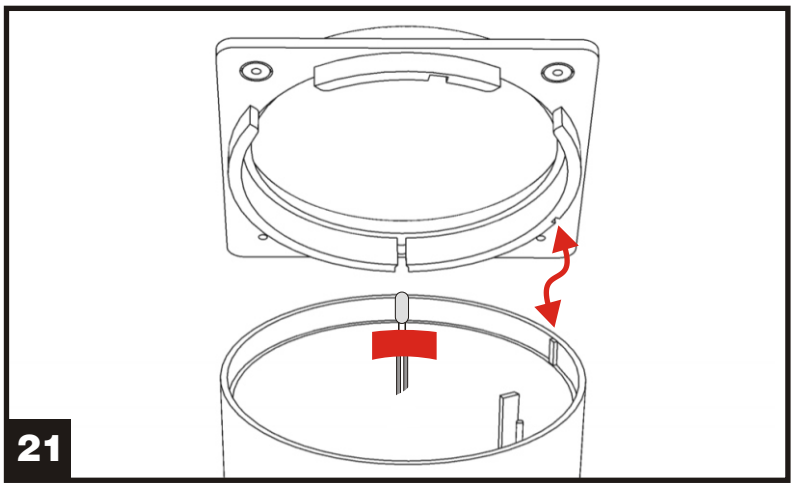
18/19. Positioning and gluing the optics on its place has to be done very careful.
First you must place the optics into the front ring (check for the positioning pin) and thereafter glue the optics in its place by using tiny drops of glue in the inside.
Note: the optics can easily be damaged by using too much glue or spilling glue on it!



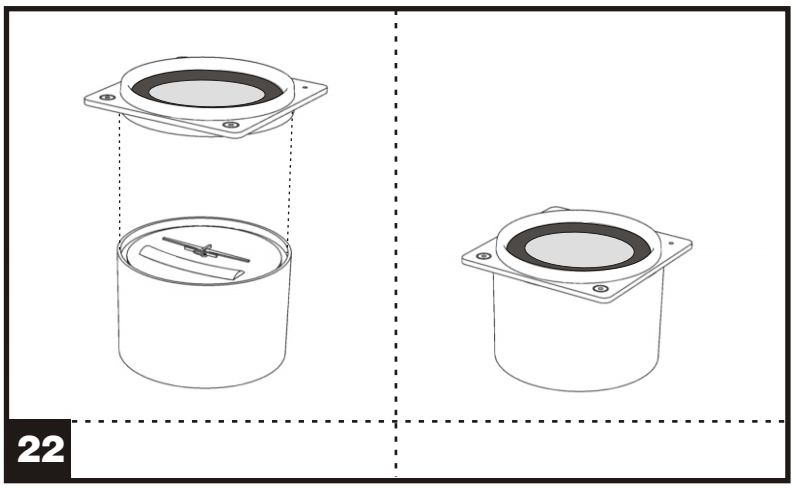
It is recommended to use approx. 16 tiny drops along the inside of the front ring and the optics.
When you use a glue which is less viscose, less glue may be necessary.
Let the glue dry fully before you continue.



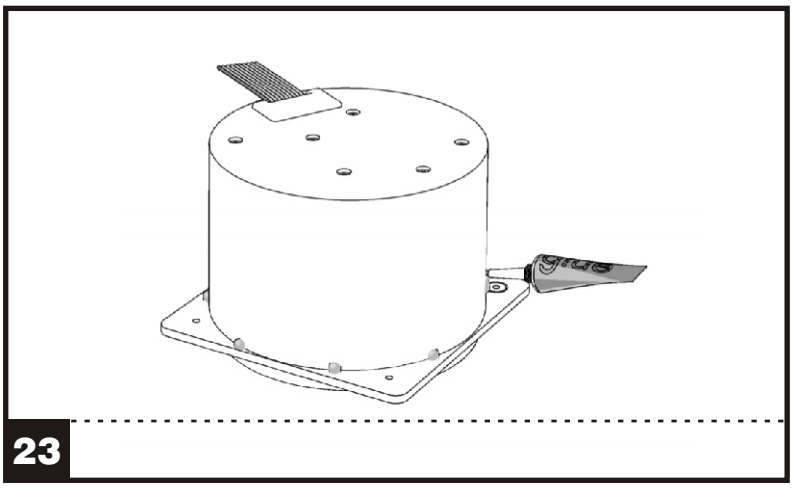
20. Now turn the front ring facing up.



21. Mount the front ring onto the housing. Check for the positioning pins and be careful during this mounting not to move the lamp in a wrong position.
Do not glue the front ring onto the housing!!



22. Now check the instrument by connecting it to the Central Control Unit or S.I.C. (depending on what controller board you have) by using the calibration software.
The instrument must work perfectly before you continue.



23. Finally mount the front ring onto the housing using tiny drops of glue. It is recommended to use about 8 drops around the housing.