

***Modified Servo, NOT included in this kit.
For this product, see separate manual "Modifying a servo"**

Construction kit "Heading Indicator"

Your kit contains all the necessary components (except for a servomotor) for building a "Heading Indicator".

Fine-tuning

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

Difficulty level

This product can be constructed without technical expertise. Knowledge of electronics soldering is required. Care and accuracy are of utmost importance.

What else do you need?

A modified servomotor, type HS300, HS311 or equivalent, is required to make the instrument fully functional (for modifying a servomotor, see the separate manual). 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 small hammer, a 1/16" (4 mm) drill, a 0.26" (6.5 mm) drill, a soldering iron (suitable for fine electronics), tin solder, insulating adhesive tape, superglue and glue suitable for plastic model kits.

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 prior to 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 - Metal button (2 x)
AA - Inbus key
B - Bolt (inbus)
C - Strain relief
D - Printed Circuit Board
E - Heading bug ring
F - Compass card
G - Heading bug disc
H - Compass lower disc
I - Plate
J - Shaft with arms

K - Upper cap for adjusting heading bug
L - Lower cap for adjusting heading bug
M - Upper cap rotary encoder
N - Cap for rotary encoder assembly shaft
O - Hollow gearwheel 1
P - Gearwheel with shaft, short
Q - Hollow gearwheel 2
R - Gearwheel with shaft, long
S - Fastening cap 1
T - Fastening cap 2
U - Servo cap
V - Tilted gearwheel
W - Straight gearwheel
X - Shaft for right gearwheel
Y - Shaft for cap M
Z - Shaft for adjusting heading bug
Z1 - Spring for adjusting heading bug
A1 - Front ring
A2 - Front optical
A3 - Upper casing
A4 - Lower casing
A5 - Light
A6 - 2-Vein cord
A7 - Sleeve
A8 - Rotary encoder assembly of R1, R2, R3
A9 - Self-tapping screw for mounting PCB
R1 - Rotary encoder
R2 - Rotary encoder fitting
R3 - Rotary encoder wire

Carefully tap shaft Y into cap N until it blocks.

Y

N

1

Solder the wires onto the rotary encoder R1, as indicated in drawing 5 and 6.

R1

Red

Black

Yellow

5

Y

N

2

6

If you find a rotary encoder assembly A8 inside this construction kit, you can continue with drawing 7. Insert the wires of R3 into the openings of component R2 as indicated in drawing 4, respecting the colour indications.

R2

R3

3

Place component Y/N as assembled in drawing 1 onto the rotary encoder shaft. There is a small indentation in the rotary encoder shaft. The opening of component N contains a small ridge, which fits exactly into this indentation. Make sure ridge and indentation fit completely.

A8

N

Y

M

glue

7

R2

R3

4

Connect component M to component A8, making sure no glue comes into contact with the rotary encoder, with the rotary encoder shaft or with component Y/N.

8

0.26" (6.5 mm.)

Use a drill to give the two small holes in front ring **A1**, which already come with indications on enlargement, a diameter of 0.26" / 6.5 mm.

9

13

Place optical **A2** into front ring **A1**. Mind the positioning notch!

10

Mount shaft **X** to component **L**. Make sure shaft **X** protrudes exactly 0.16" (4 mm).

14

Apply some minimal amounts of glue to the inside of the front ring.

11

Place gearwheel **W** over shaft **X**.

15

Carefully mount gearwheel **V** to shaft **Z**. Use component **K** as an aid. See also drawing 13.

12

Use a file to smoothen the sharp edges of spring **Z1**, allowing it to turn freely inside component **L**.

16

Insert spring Z1 into component L.

17

Component O is made of nylon. This means that superglue must be used for assembling and cementing components O and U.

21

18

22

Now place component K and shaft Z (with gearwheel V mounted) onto component L. Press components K and L together.

19

Component Q is made of nylon. This means that superglue must be used for assembling and cementing components Q and J.

23

Now glue part K and part L together. Be careful with the glue, avoid contact of the axis and gearwheels with glue.

Keep parts K and L pressed together for a bout 5 minutes.

20

24

Insert component **H** into component **J/Q**. Do not use glue. Component **H** and **J/Q** need to twist together freely.

25

Turn components **G/H/J/Q** around and press them together firmly. While pressing them down, use the side of the soldering iron to flatten the pins and secure component **G**.

29

26

Press component **F** firmly down onto component **G/H/J/Q** until it can't be pressed down further.

30

Mount component **G** onto component **H/J/Q** as indicated. Make sure the pins on component **G** fall exactly into the holes in component **J/Q**.

27

31

28

Cement ring **E** to the edge of component **G**. Make sure no glue touches the moving parts. See also drawing 33.

32

Apply a minimal amount of glue to the edge of component **G**. Make sure component **F** can continue to twist freely.

33

Turn over combined components **E/F/G/H/J/Q/U** and fix them onto front ring **A1**, in order to facilitate the fine-tuning of component **Y/K/L/X/Z1/V/W**.

37

E/F/G/H/J/Q

34

Y/K/L/X/Z1/V/W

38

Press component **O/U** onto the shaft of component **E/F/G/H/J/Q** until it blocks.

E/F/G/H/J/Q

O/U

35

A1/A2 + E/F/G/H/J/Q/O/U (Backside)

Mount the component as indicated in the drawing, but without using glue! Then carefully twist the component with the small gearwheel against the large gearwheel.

39

E/F/G/H/J/Q/O/U

36

Allow enough space between the gearwheels to allow them to twist smoothly.

40

Once you've made sure the gearwheel can twist smoothly, you can cement the component.

41

Fix the servo connector to the circuit board. For this, you need to use connection **S1**. Connection **S2** is kept open. Take note of the cable's colour in order to decide its position. See also drawing 46

45

Solder the wires **A6** to lightbulb **A5** using a soldering iron for electronics. Use the shrink tube to isolate the connection as shown, but leave the wires for the lightbulb approx. 0.3" (8mm.) free. The shrink tube shrinks by heat from a soldering iron or heat gun.

42

Connect to **S1**

46

Connect the wires to the circuit board. Polarities are not important.

43

Check if the PIHER position sensors, present on both sides of the circuit board, are in proper arrangement, as indicated in drawings 47 and 48.

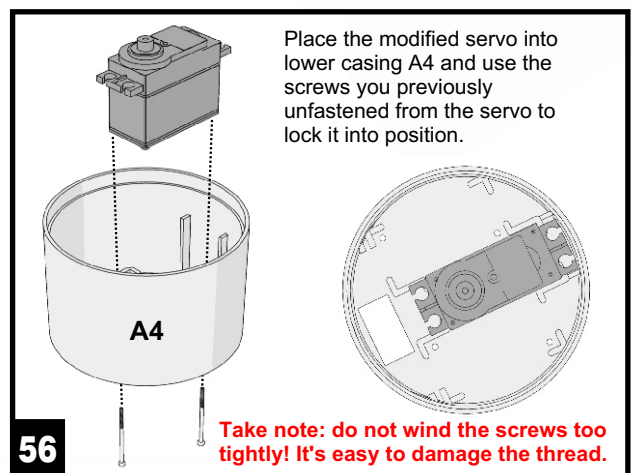
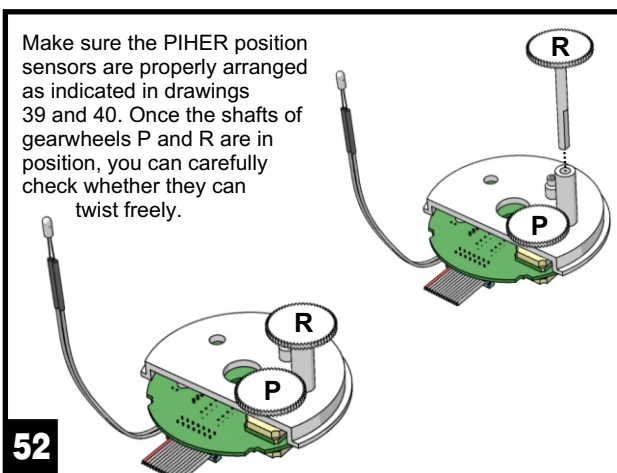
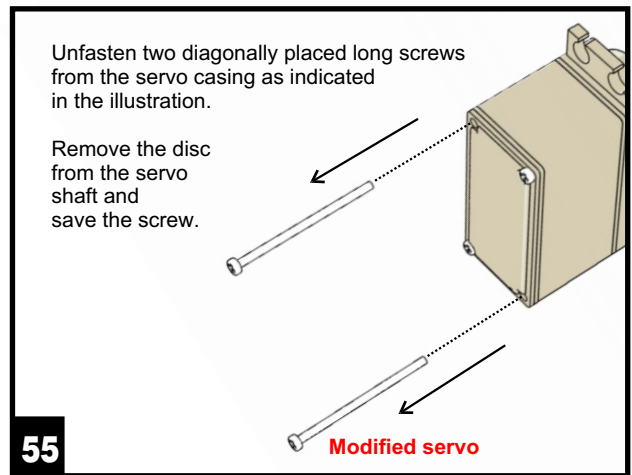
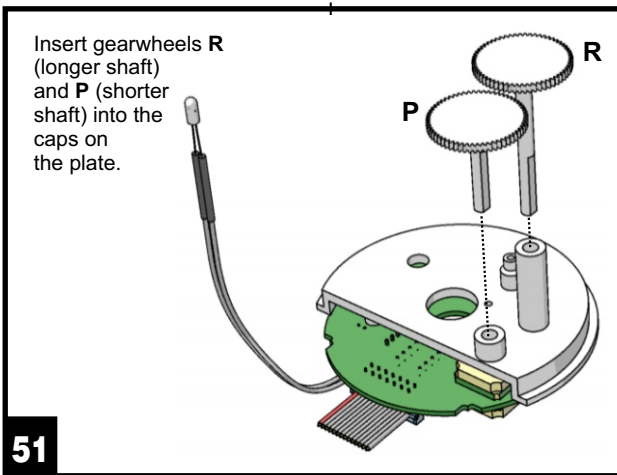
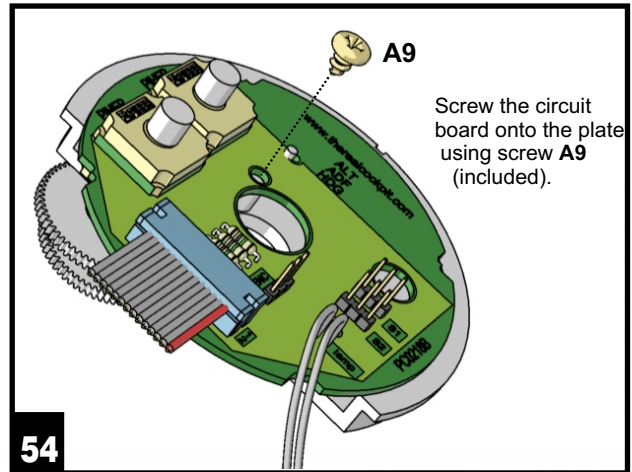
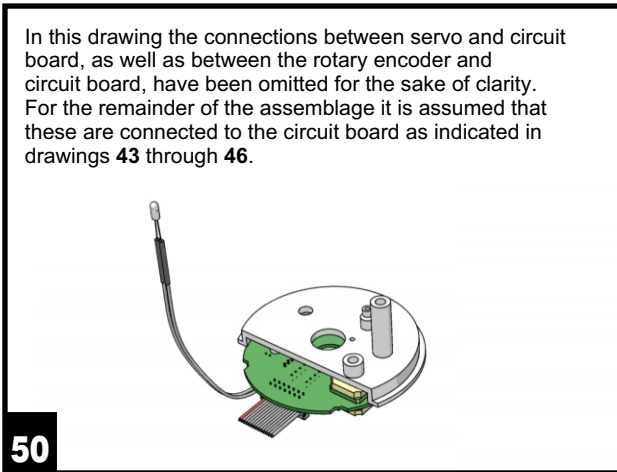
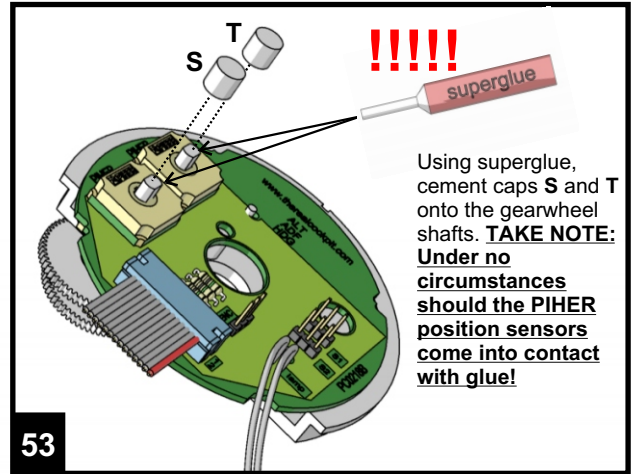
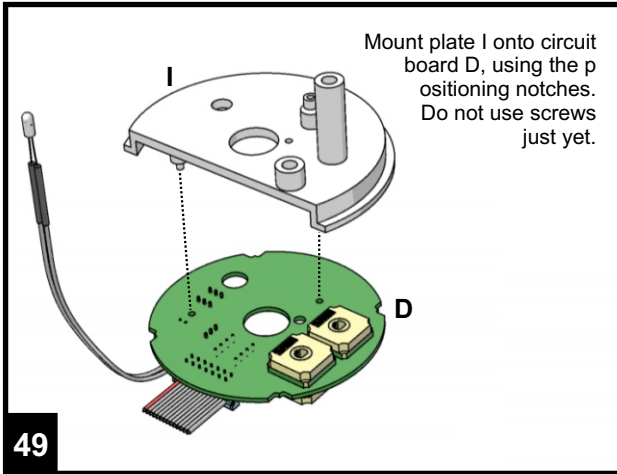
47

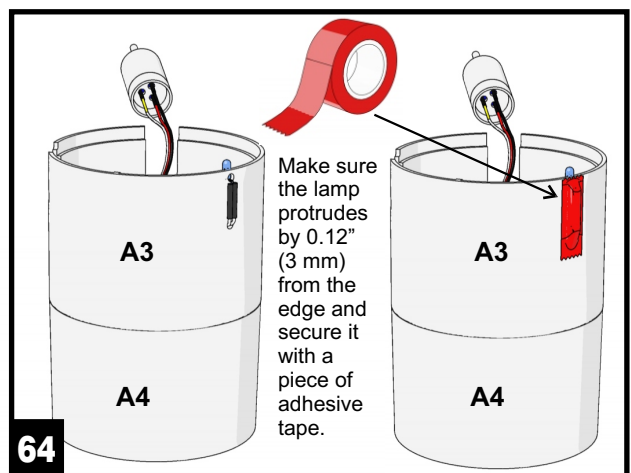
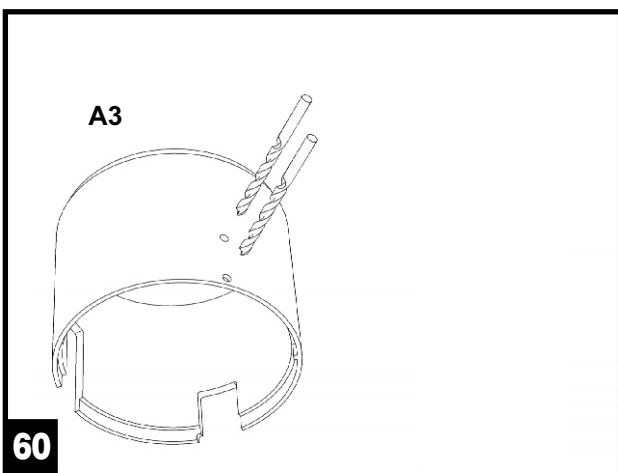
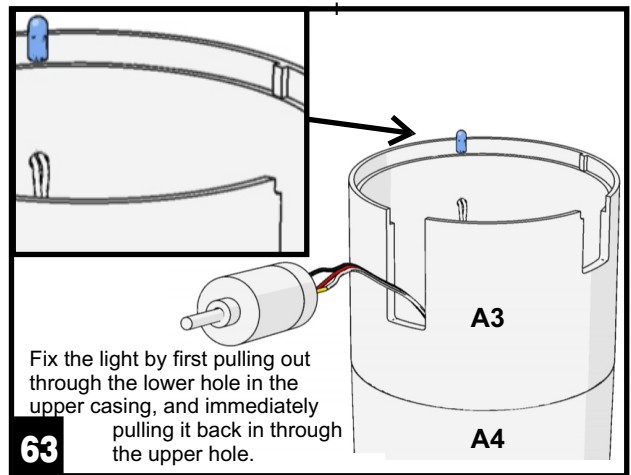
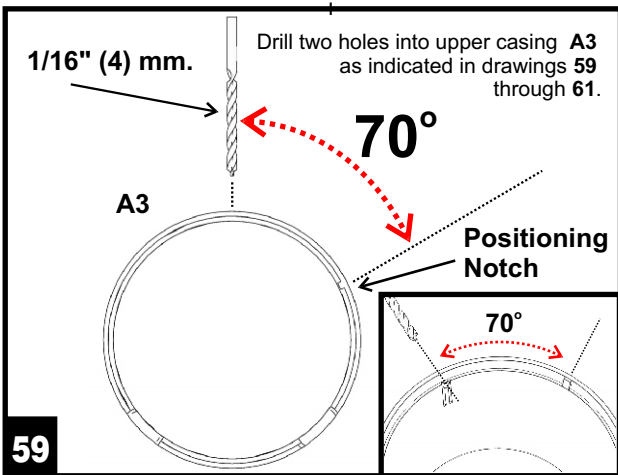
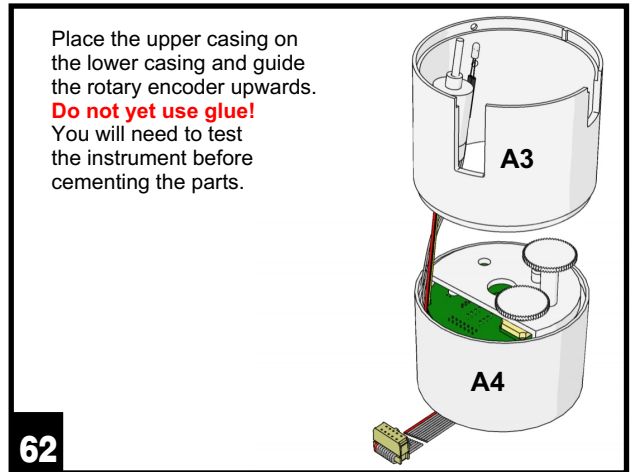
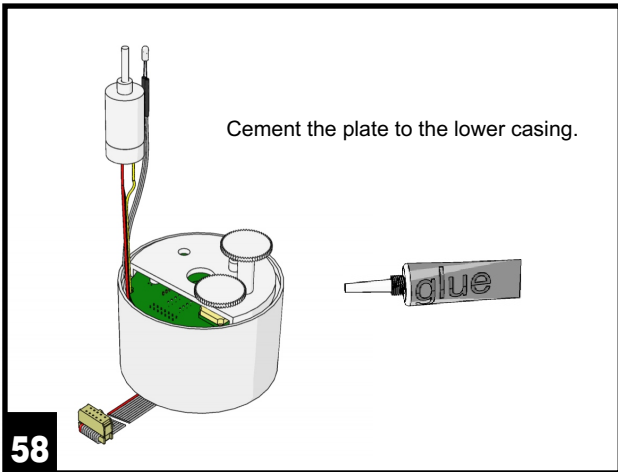
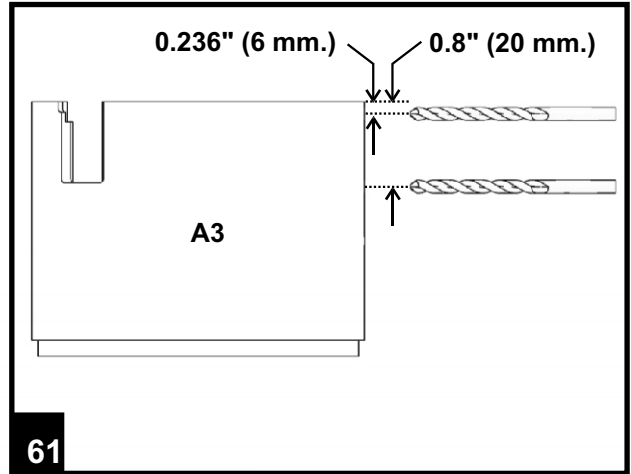
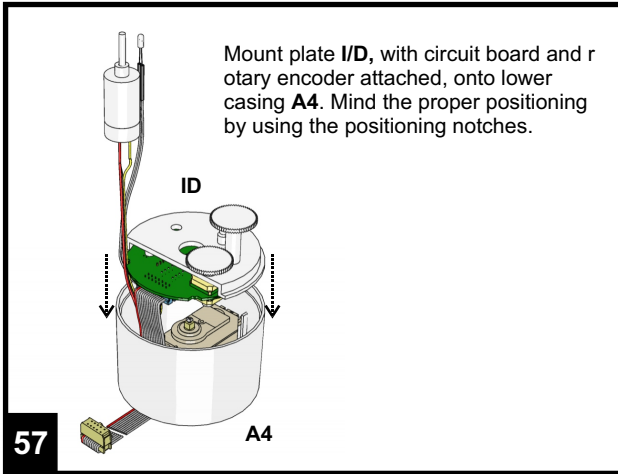
Place the rotary encoder assembly's connector onto the circuit board as indicated.

44

Mind the proper arrangement of the PIHER position sensors.

48





Servo screw

Place assembly **A1/A2 + E/F/G/H/J/Q/O/U** over the servo shaft and use the screw you previously removed from the servo to lock it into place.

65

Mount the knobs.

69

Make sure the gearwheel disc doesn't touch the wires or the light.

66

The right shaft is slightly longer than the left shaft. The right knob will only be functional when pressed down.

70

Now glue the rotary encoder assembly into the front ring. Make sure no glue comes into contact with the rotary encoder shaft!

67

The strain relief needs to be filed down somewhat to facilitate the 14-pin flatcable.

71

Place the front ring onto the casing. Make sure the small gearwheel connects properly with the gearwheel disc.

68

Fix the flatcable into its proper position in the lower casing by using strain relief **C**.

72