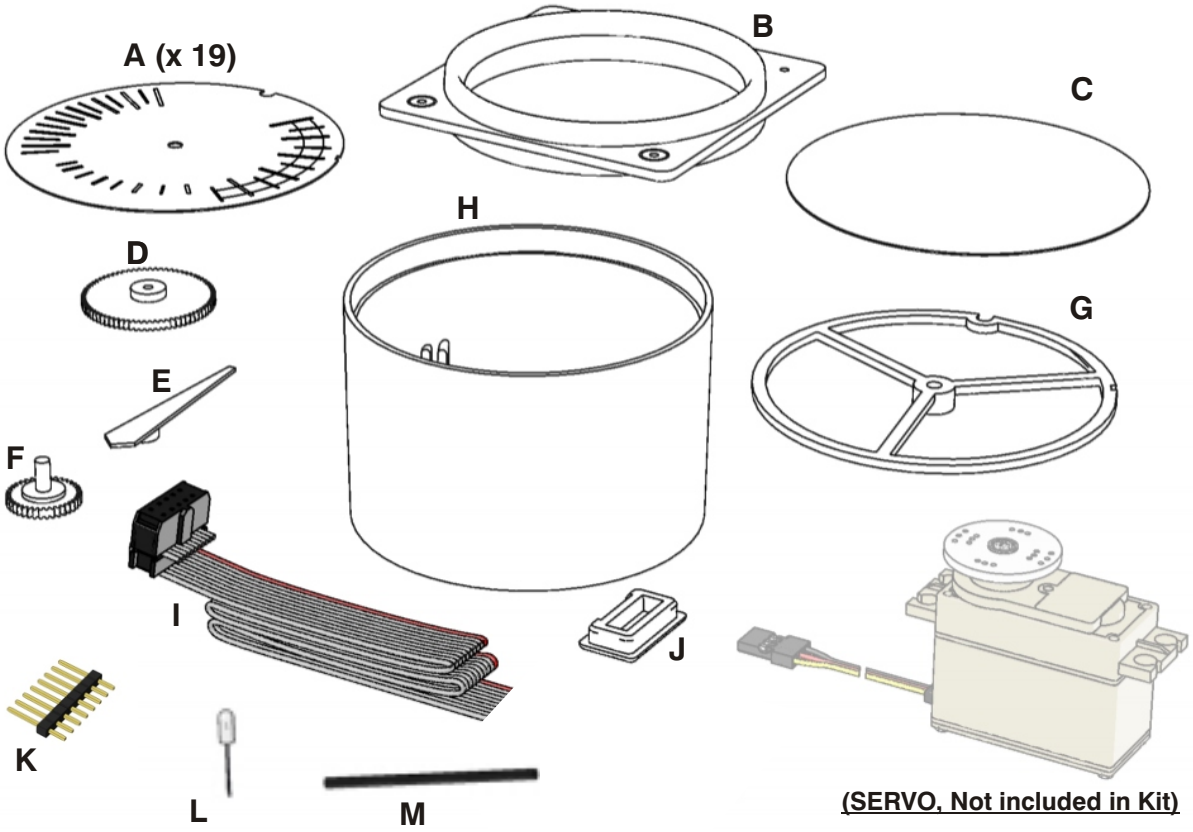
# CONSTRUCTION MANUAL GENERAL INSTRUMENT

**Carefully read the instructions first prior to start building the kit!**

## Can be used to build 19 different instruments:

## Airspeed Indicator - Tachometer - Vertical Speed Indicator




(SERVO, Not included in Kit)

**Construction kit "General Instrument"**
Your kit contains all the necessary components (except for a servomotor) for building a “General Instrument”. Included are 19 faceplates that will allow you to construct any of the following products:

**Airspeed Indicator for:**
- Bell 206B Jet Ranger
- Beechcraft Baron 58
- Cessna 172 Skyhawk
- Cessna 182 Skylane
- Cessna Caravan Amph. & Grand Caravan
- Extra 300S
- Mooney Bravo
- Sopwith Camel
- Schweizer Sailplane
- Vaught Corsair
- Airliner 450 knots
- F-16

**Vertical Speed Indicator for:**
- Beechcraft Baron
- Bell 206B Jet Ranger
- Cessna 172 Skyhawk
- Cessna Caravan Amph. & Grand Caravan
- Vaught Corsair

**Tachometer for:**
- Cessna 172 Skyhawk
- Cessna 182 Skylane
- Vaught Corsair
- Sopwith Camel

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

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

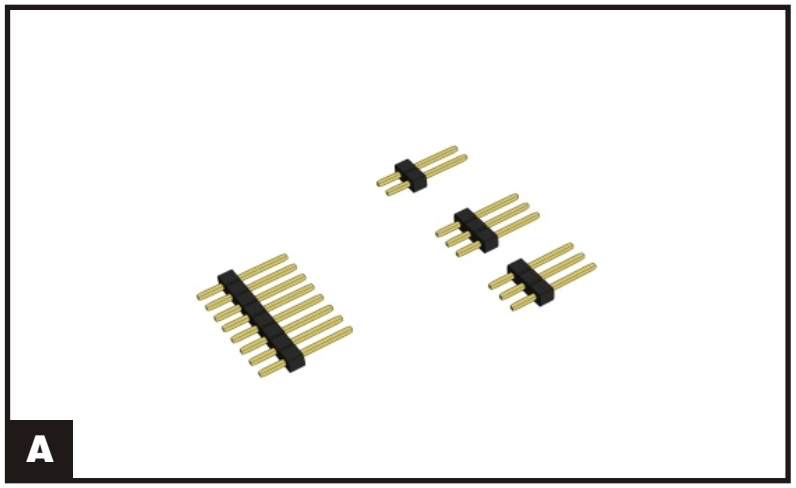
**What else do you need?**
A type HS300, HS311 or equivalent servomotor is required to make the instrument fully functional. This product can be ordered separately or bought from any retailer of model kits. Additionally you will need some simple tools, such as a small star-shaped screwdriver, a hobby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

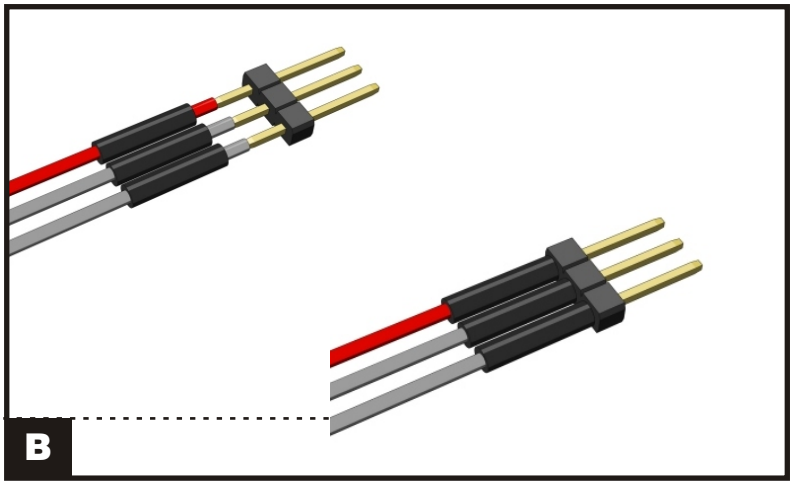
**Preparations before beginning construction**
Check if all components are included. During packing, the contents of the construction kit have been inspected several times. Nothing should be missing.
Use the hobby knife to remove any irregularities. Be careful when using the sharp hobby knife!

**Warranty**
Construction kits come without a warranty!

**List of components**
A - Faceplate, 19 pcs. (see list above)
B - Front ring
C - Optical (plastic, material PET)
D - Large gearwheel for connection with servo
E - Indicator
F - Small gearwheel for connection with indicator
G - Frame for faceplate
H - Instrument casing
I - Flatcable with connector mounted
J - Strain relief
K - 8-pin header
L - Filament lamp
M - Heat shrink



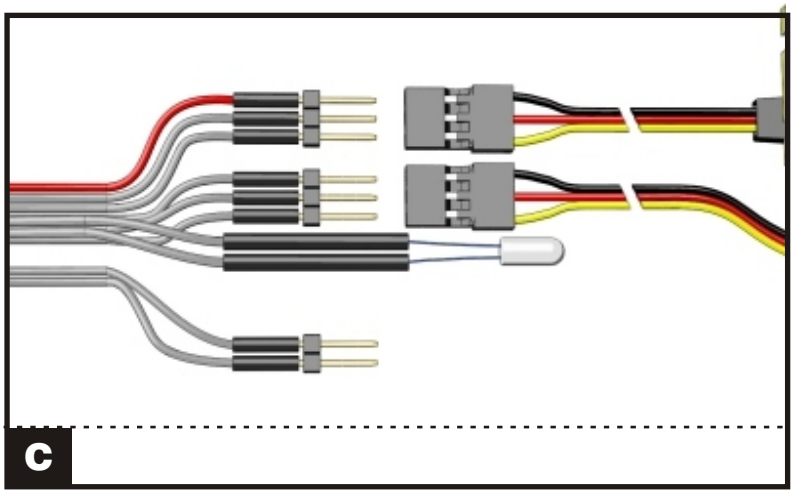

**A:** The pin header comes as an 8-pin version. Separate 2 times a set of 3-pins, which results in 2 pieces of 3-pin header and one piece of 2-pin header.




**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.

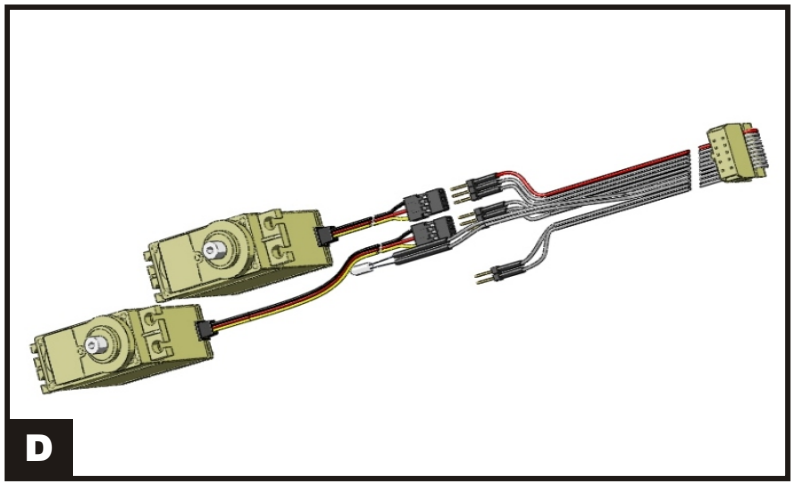
Now solder the 2 3-pin headers and the 2-pin header on the flatcable, to begin at the red indicated wire.

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



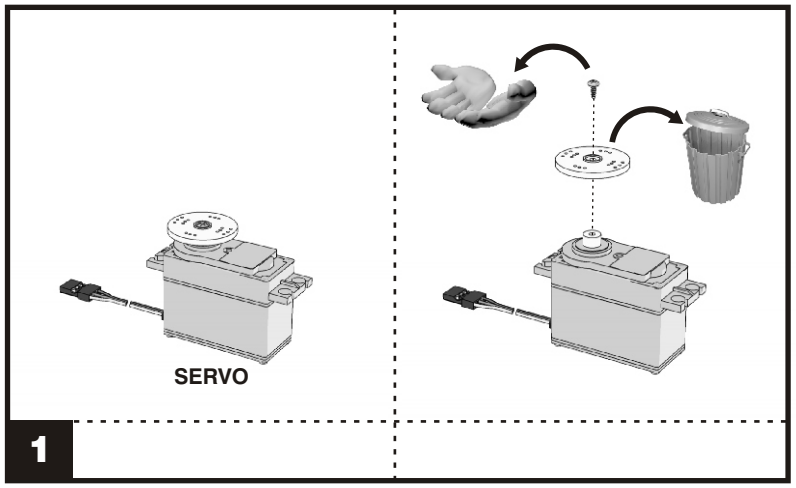

Move the heat shrink isolation forward towards and over the blank soldering to prevent short circuit later. Use the soldering iron to shrink the heat shrink isolation over the blank leads

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

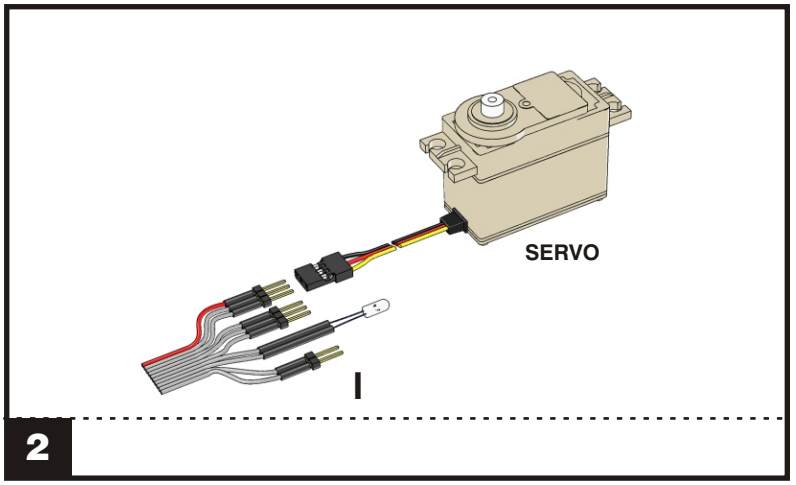



**D:** This illustration shows 2 servo connections.

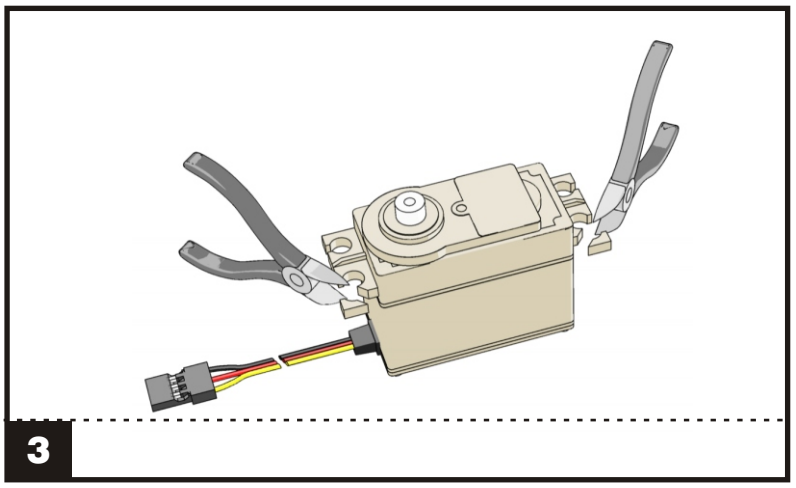
Since this page describes the ribbon cable connection for instruments with 1 and 2 servo’s, just use - when your instrument has only one servo - the outer 3-pin connector for the first (or solitair) servo and the second 3-pins for an instrument with 2 servos.
The outer 2-pin header connector is not used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



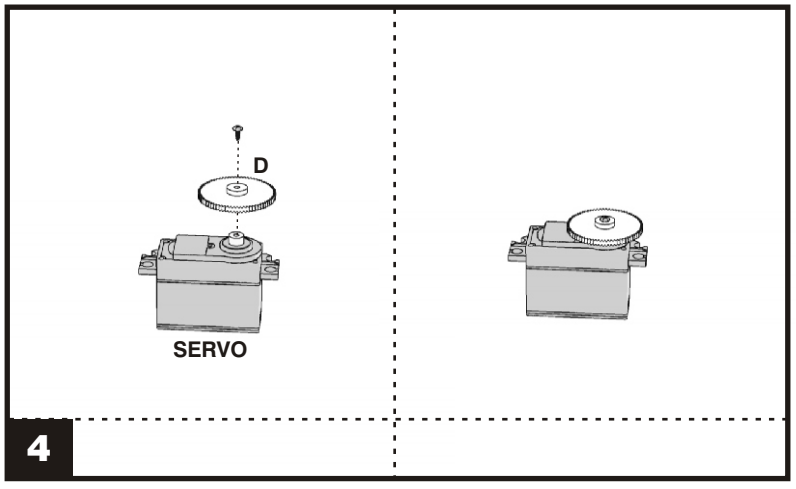

**1:** The servomotor HS300 or HS311 is not included in this construction kit! Detach the servo's original disc and save the screw.



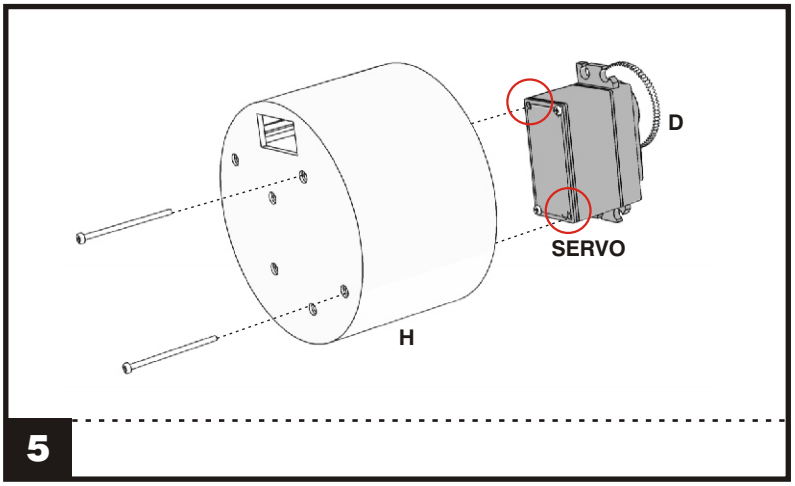

**2:** Remove the cable binder from the flatcable and unwind the cable. One end of the flatcable is a 10-pole header connector, while the other end has two 3-pin connectors, a light and one 2-pin connector. The cable can be used with several different instruments. Only the first 3-pin connector is used here. Connect the first 3-pin connector to the connector on the servo in such a way that the flatcable's red wire and the black wire on the servo connector are joined. This also properly connects all the other wires on the servo connector to those of the flatcable.



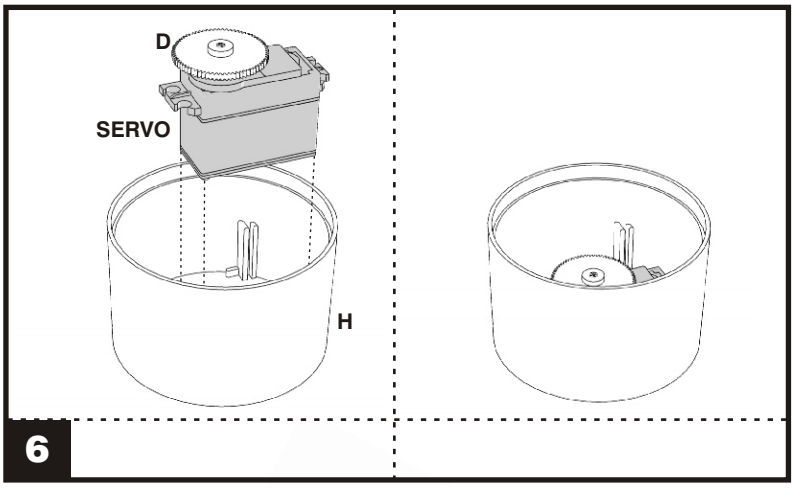

**3:** Use the pliers to cut the corners off the servo as shown in the illustration.



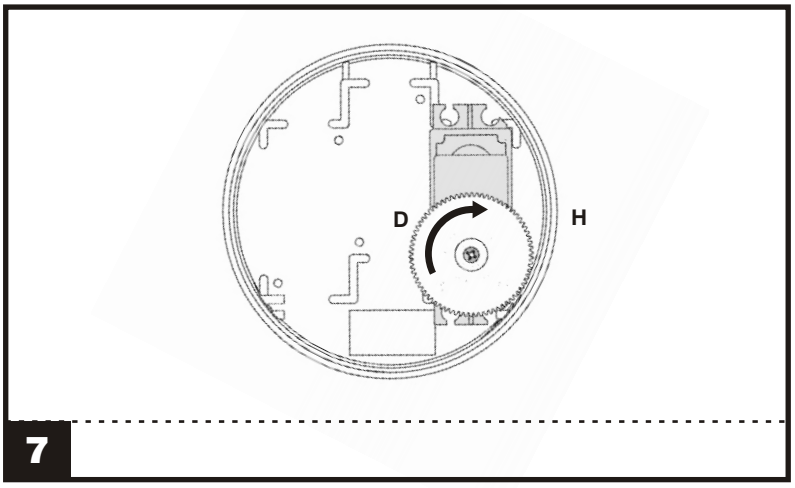

**4:** Now fix gearwheel D to the servo, using the screw you saved earlier.



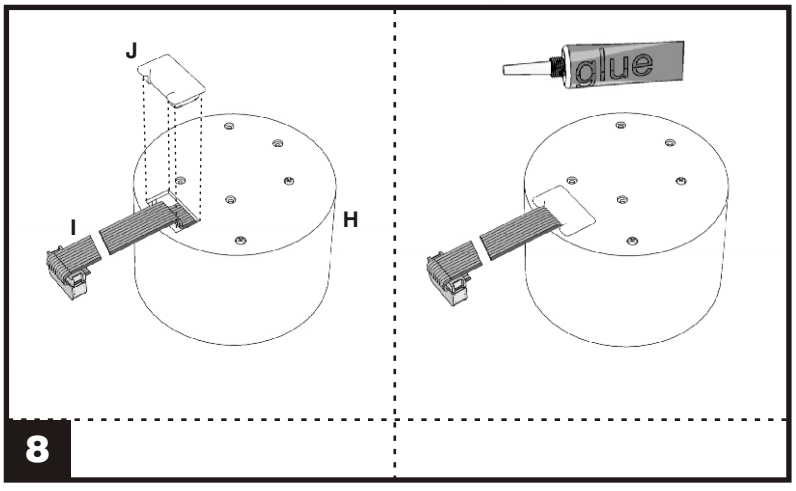

**5, 6 and 7**: Take off two of the large screws that hold together the servo. Place the servo inside the instrument casing in the location indicated in the illustration and carefully fix the servo using its own screws.



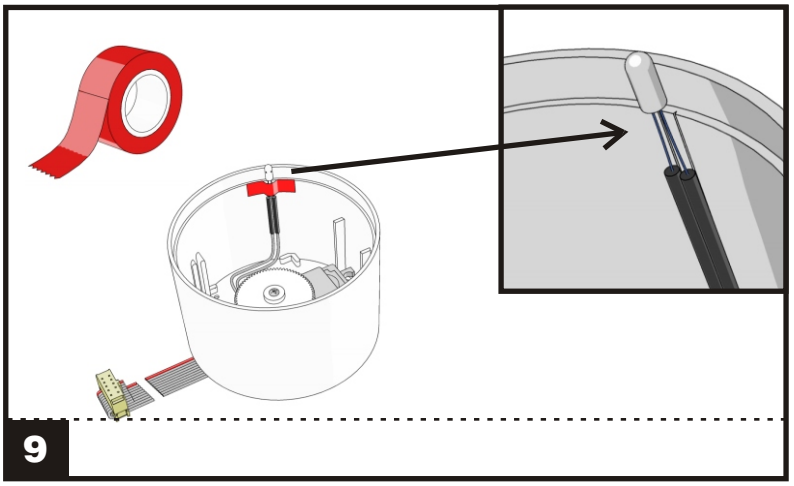

Be careful not to wind the screws too tightly. It's easy to damage the thread. Pay attention to properly position the servo inside the casing!



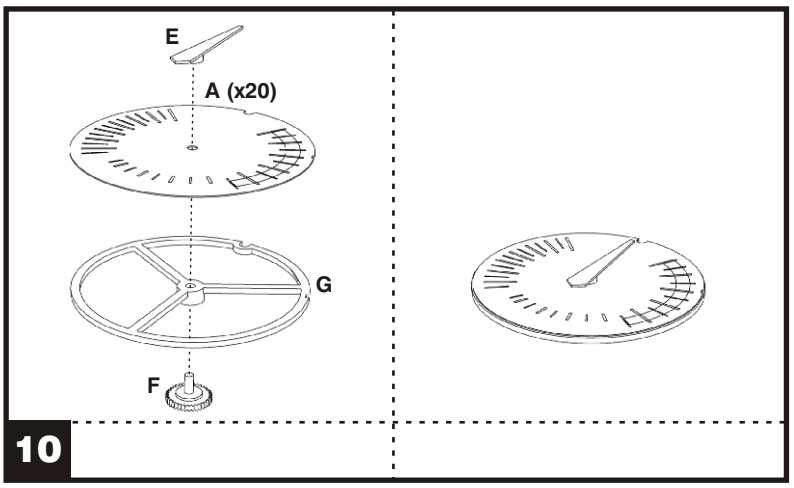

**7:** Carefully turn the servo's axis clockwise until it blocks. Make sure the servo remains in this position.



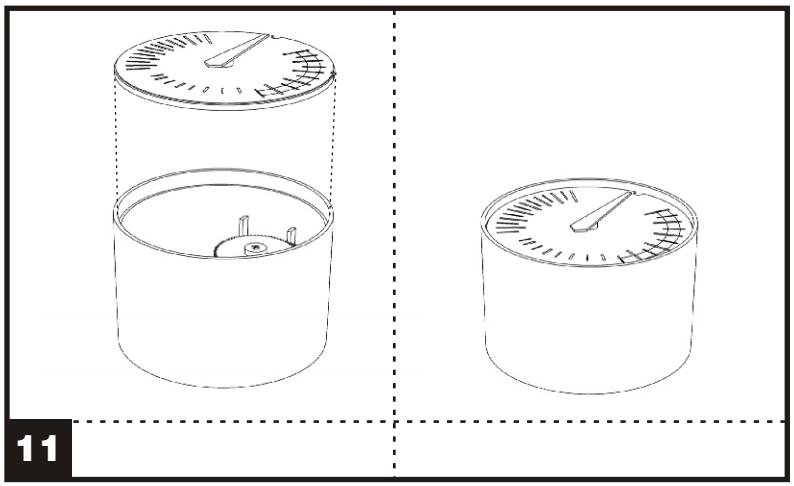

**8:** Pull the flatcable through the square hole in the bottom of the casing and press the Strain relief (J) into the opening, in such a way that the flatcable is placed between the side of the casing's opening and the nook in the Strain relief.



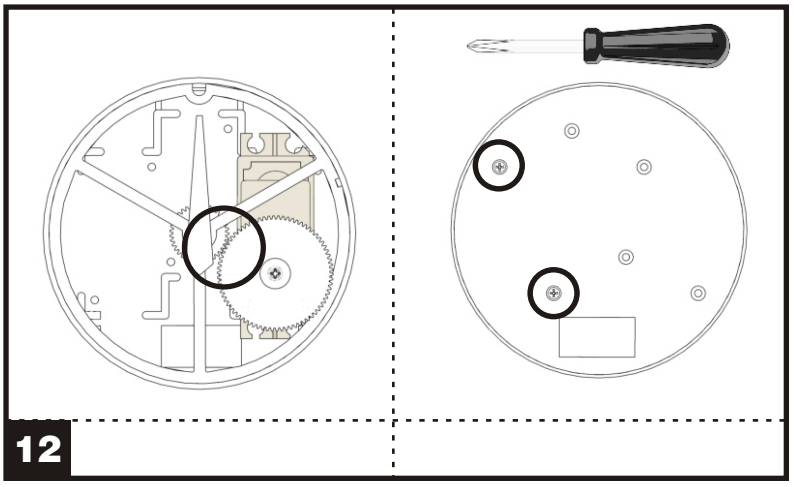

**9:** Cut a small piece of insulating tape and place the light on the inside of the casing where you find two small grooves. Make sure the light doesn't protrude above the edge of the casing. A small piece of insulating tape will take care of any stray wires by sticking them to the inside of the casing bottom. It's important to avoid entangling the wires in the gearwheels and/or the servomotor. ***Beware for short circuiting the wires!!***



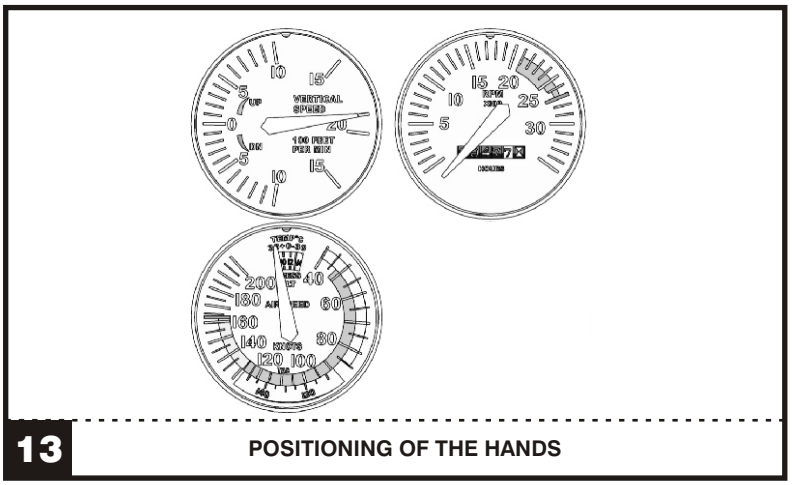

**10:** Now assemble indicator E, faceplate A, faceplate frame G and gearwheel. Do not use glue to connect indicator E to gearwheel F! Firmly pressing one onto the other will be enough.




**11:** Now place the faceplate with the frame, indicator and gearwheel carefully on the instrument casing. Mind the ridge as well as the notch for the light.

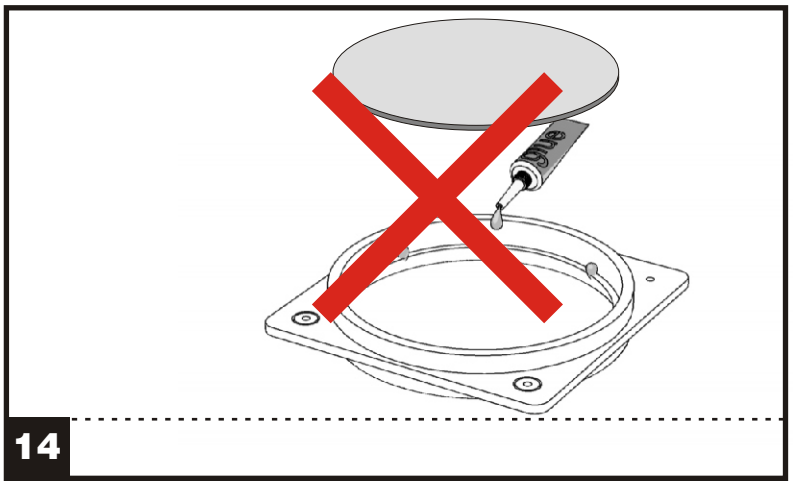



**12:** If necessary, tweak the margin between gearwheel F and gearwheel D by tightening or loosening the screws that attach the servo to the casing. Be careful not to wind the screws too tightly. It's easy to damage the thread. A proper situation is achieved when both gearwheels show a minimal margin. Positioning them too closely together will create friction and damage! Keeping them too loose creates an unruly and inaccurate indication.



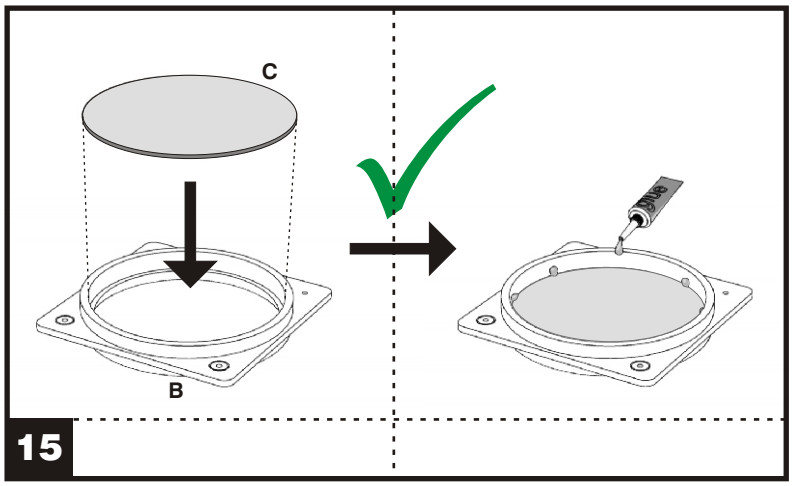
13 POSITIONING OF THE HANDS

**13:** Now place the indicator approximately in the same position indicated in the illustration of your preferred instrument, but only twist the indicator after slightly lifting the faceplate with indicator and gearwheels in order to avoid friction with the gearwheels. Check once more the margin of the indicator (by way of the gearwheels) with the servo, and repeat if necessary the action described with illustration 12.

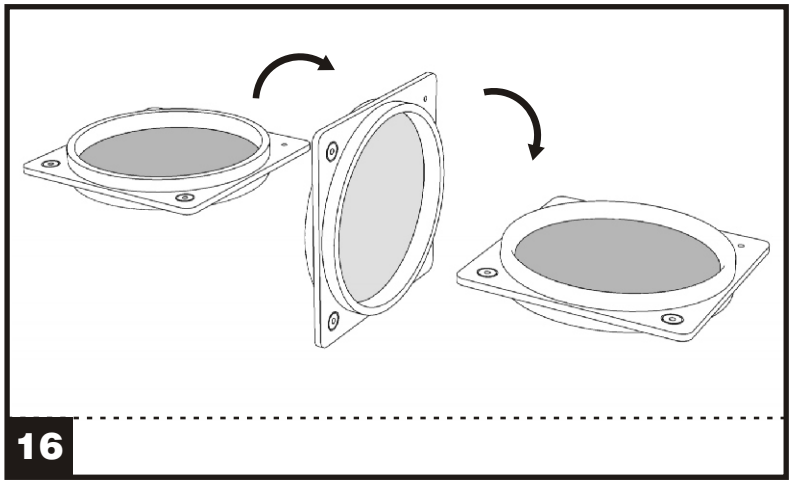



14

**14:** Placing and cementing the optical (made of PET material plastic) needs to be done with great care. First place the optical into the front ring as in illustration **15** (mind the nudge!) and only then cement the optical by carefully applying small drops of glue evenly along the inner edge between optical and front ring. Be careful, excessive use of glue can badly damage the optical. We recommend applying around 16 small drops when using a viscose glue (thick glue). Thinner, more fluid glues will spread out and therefore require fewer drops. **Give the glue sufficient time (1 hour at least) to harden before continuing construction.**

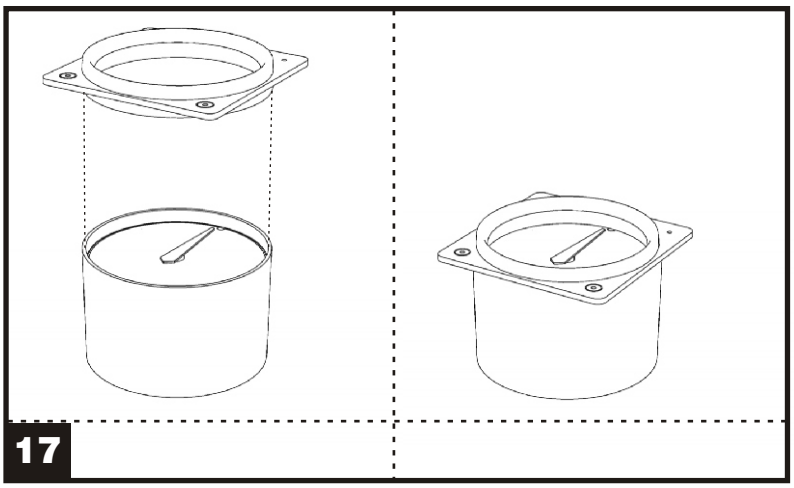



15



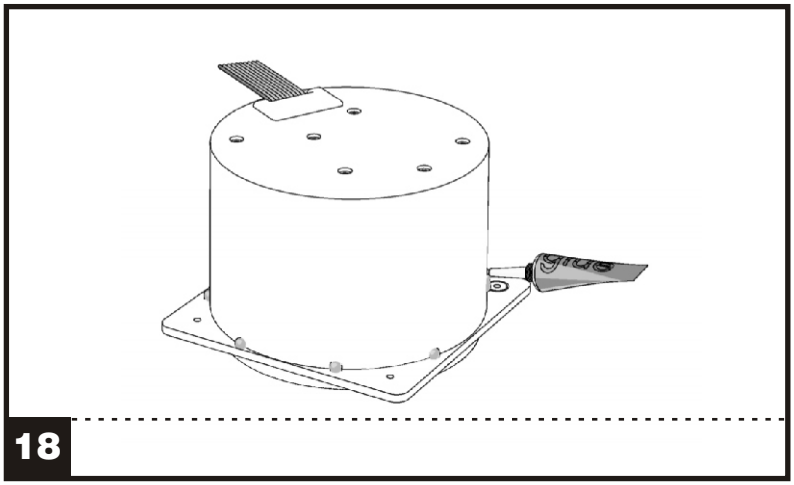
16

**16:** Turn around the optical and connect it to the instrument casing in accordance with illustration **17**. **Do not yet glue the front ring to the casing!**



17

**17**. Make sure the nudges and light are placed in the nooks of the front ring. **Do not yet glue the front ring to the casing!** First test the instrument by connecting it to the Central Control Unit and using the calibration software. Only when the instrument functions properly should you glue the front ring as shown in illustration



18

**18**. The connection made with the glue will be invisible from the outside, which means you can make sure the instrument casing and front ring are attached firmly. We recommend applying glue in at least 8 spots around the front ring.

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