

The Artificial Horizon (207.KHZ)

This kit contains: 1 printed cardboard sheet, 1 steel mirror, 1 spirit level

Assembly instructions (please read before you start):

Step 1: Push the large parts out of the cardboard panel and remove the punched slot from section K1 (front). Place the front and back sections (part K2) together with their unprinted sides facing each other so that right-angled corners are flush. Draw around the inside of the contours of the slot and then colour it in black on the unprinted side of the back section. Glue both sections together.

Step 2: Glue section K3 (slot-in support) to the corresponding blank white edge of the back section so that the outer edge of the slot-in support and the edge of the front section are flush. Check if glueing is exact as follows: mount the whole section on the white ridge which projects from the base plate above the viewing chamber of your sextant. The front section of the artificial horizon must now be flush with the front edge of the base plate and touch the top cover of the viewing chamber.

Step 3: Remove the protective film from the mirror and clean it with methylated spirit if necessary to remove any film residue.

Step 4: Push out the 4 K4 sections (mirror support) from the cardboard panel and glue the two white sections together. Then glue a printed section onto either side. The edges must all match exactly.

Step 5: Glue the mirror and the support into the slot. When doing so, press the support against the back of the mirror until it touches the edge of its slot. The support is glued to the unpolished side of the mirror.

Step 6: Glue sections K5 and K6 (bottom and top cover) into the corner between the mirror and support so that the open slot behind the mirror is covered.

Step 7: Mount the cardboard section with the mirror on the ridge above the viewing chamber of your sextant and place the spirit-level on the top cover of the viewing chamber. If you now want to fix a point, you will see the spirit level in the bottom part of the horizon mirror. This allows you to check that you are holding the sextant horizontally. If you want to use your Artificial Horizon with maximum accuracy, do not glue the spirit level in place yet and proceed to Step 8 to calibrate it. For normal accuracy, the spirit level may now be glued by its long edge to the blank white area below the mirror. This completes the Artificial Horizon. It may be mounted on and removed from the sextant as required.

Calibrating the Artificial Horizon:

To achieve maximum precision with your artificial horizon, the spirit-level display must be calibrated. This is performed as follows:

Step 8: Place the spirit level fully on the bearing casing, do not glue it on yet. Find a point as far away as possible that is on exactly the same elevation above sea level as your position. If you happen to be by the sea, this may be the actual horizon. On a detailed map you may however also seek out a site that is far enough away and on the same elevation as your position.

Step 9: Set the alidade (sight rule) to exactly 0° and fix the point discussed in Step 8 so that it appears on the marking line of the horizon mirror. Ideally you should now see that the spirit level air bubble is located exactly between its two black marking lines. If this is the case, the artificial horizon of your sextant is already precise and requires no further calibration. You may now glue the spirit level in place as described in Step 7.

Otherwise tilt the sextant a little until the spirit level air bubble is exactly between the marking lines. Move the alidade until the mirror image is level with the fixed point and the marking line. Now read off the result in the alidade window and note whether the value is positive or negative.

This value is the calibration correction. If you glue the spirit level in this position, you must deduct this value from all measuring results performed with the artificial horizon. If the value of the calibration correction is positive, the result arrived at with the artificial horizon must be reduced by this amount. If it is negative, the measuring result should be increased by this amount.

You can place small pieces of paper etc. between the spirit level and the viewing chamber until the calibration correction value is zero and then glue the spirit level in this position. This requires a little more patience, which is rewarded however with an especially precise instrument.

Using the Artificial Horizon:

In order to determine the height of a point (star, mountain top, etc.) above the mathematical horizon, during measurement you must constantly check that the sextant is held horizontally by looking at the spirit-level. You no longer need to regard the un-mirrored image, instead fetch the mirrored image of the point to the level of the marking line on the horizon mirror by swivelling the alidade. Then recheck that the sextant is horizontal and read off the result.

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