

# SILVA 520/525

DIGITAL KOMPASS • DIGITAL COMPASS  
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## SILVA 520 electronic compass

### 1. General Description:

The SILVA 520 Electronic Compass is a precision instrument using modern micro-processor technology to obtain the highest quality and accuracy.

The SILVA 520 gives digital indication of actual heading and steering error from a pre-selected course. The desired course can be selected using a pushbutton on the front of the instrument.

The SILVA 520 may be dampened from 1 to 120 seconds thus providing stable readings in all sea conditions.

The SILVA 520 features electronic deviation compensation accurate to within 1 degree. These correction values are stored permanently in a non-volatile memory, and cannot be lost when the power is shut off. Compensation for the 520 is achieved with the pushbutton on the front of the instrument.

The high-contrast LCD display is red-illuminated for optimal readability and night vision enhancement.

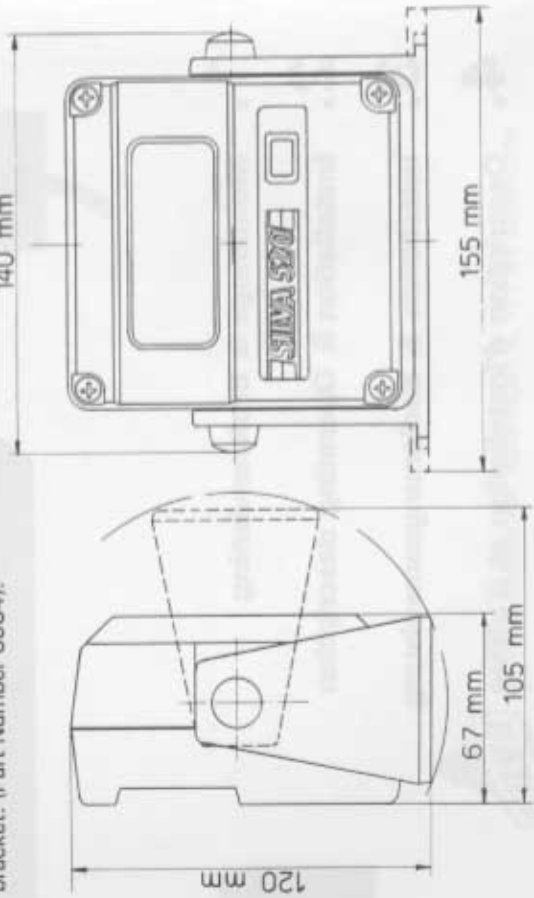
The span and accuracy of the SILVA 520's deviation correction makes the instrument ideal for installations on steel boats.

A serial output type NMEA 0183 suitable for connection to a computer, datalogger or repeating instrument is provided.

The SILVA 525 is a flush-mount version of the electronic compass for installation in a dash-board.

### 2. Optional accessories

The SILVA 520 Electronic Compass may be ordered with an optional dash-mount bracket. (Part Number 8934).



### 3. Contents list for the SILVA 520 electronic compass

The SILVA 520 comes complete with all necessary fittings and attachments for almost all installations. Included in this box are the following items. Check now to become familiar with each part prior to installation.

- 1 instrument
- 1 gasket
- 4 stainless steel screws
- 1 transducer
- 1 transducer cable with plug connector, 12 m

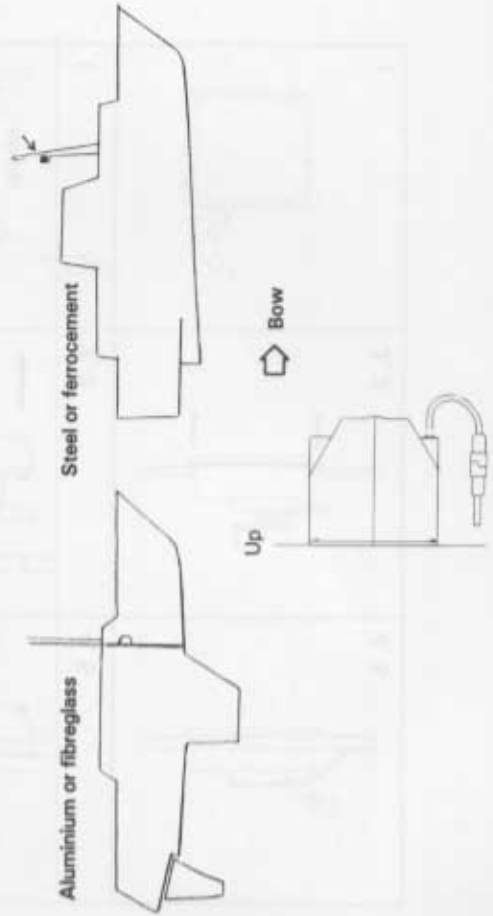
In addition to this a two-wire cable from the fuse box is also required.

### 4. Installation of the compass transducer

The compass transducer must be positioned away from magnetic disturbance. Observe that some disturbances vary. These are generated by e.g. windshield wipers, loudspeakers, transmitting antennas and the like. Keep the transducer well away from them.

The following general guidelines apply:

- a) The transducer must be as near to the boat's centre of gravity as possible. On fibreglass or aluminium boats, a position on the main bulkhead is usually satisfactory.
- b) The reading error (prior to calibration) must not exceed 15 degrees. That is to say, if the boat is pointing due west, the compass reading must be within 255° and 285° before any adjustments.
- c) The transducer must be mounted such that the arrow on the transducer base is pointing forward and parallel to the boat's centreline.
- d) The cable exit must always be on the bottom.
- e) If the transducer is mounted on the mast, strong support and protection must be given against shocks and vibrations of the rig. On steel boats, a transducer location on the mast is usually the best.



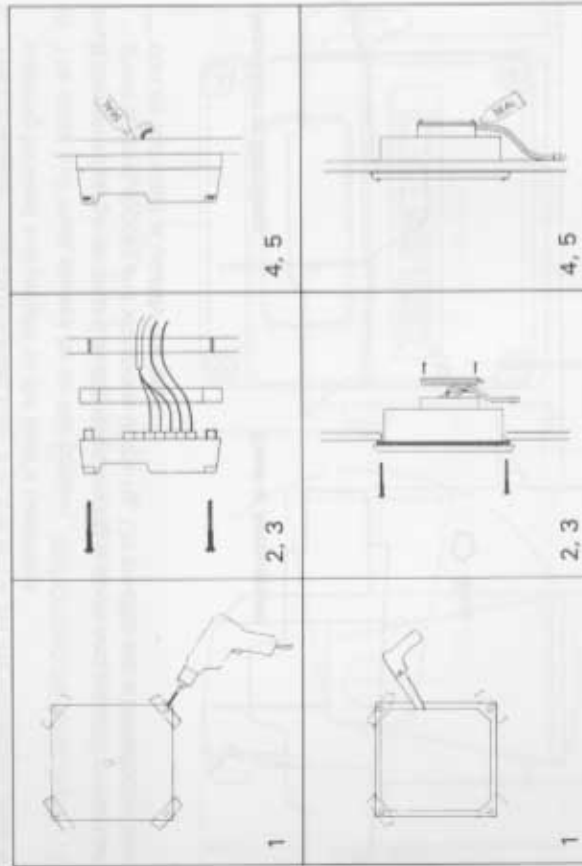
## 5. Installing the instrument display

### Bulkhead mount:

1. Locate the position of the display using the template supplied with this handbook. Drill the holes as indicated, one in each corner, and one for the instrument cables to pass through the bulkhead.
2. Pass the instrument cables through the hole and through the rubber gasket. Attach the cable wires to the terminals as indicated in Section 8.
3. Calibrate or adjust the instrument in accordance to Section 7.
4. Use the screws supplied to attach the instrument and gasket onto the bulkhead.
5. Seal the hole where the instrument cables pass through the inside of the bulkhead. This will prevent warm cabin air from escaping into the instrument case where it may condense on the display glass.

### Flush mount:

1. Locate the position of the display using the template supplied with this handbook. Drill the holes as indicated, one in each corner and use a hacksaw to take up the hole for the instrument box.
2. Attach the cable wires to the terminal as indicated in Section 8.
3. Calibrate or adjust the instrument in accordance to Section 7.
4. Use the screws supplied to attach the instrument and gasket onto the bulkhead.
5. Seal the hole where the cables pass into the instrument. This will prevent warm cabin air from escaping into the instrument case where it may condense on the display glass.



## 6. Operating instructions for the SILVA 520 electronic compass

The SILVA 520 electronic compass is activated by turning on the power from your circuit panel. It will then indicate your heading with a dampening factor of 1 second.

### Adjusting the dampening factor

In various sea conditions, a greater or lesser dampening factor may be desirable in order that the SILVA 520 gives you stable and readable heading indications.

You select from a choice of seven dampening factors: 1, 2, 4, 10, 30, 60 and 120 seconds.

Your heading indication is always updated every 1 second, however, the displayed value is averaged over one of the above selected time periods.

1. Press and hold the pushbutton until the display indicates "SEA".
2. Continue holding the pushbutton until the desired dampening factor appears on the display. The sequence of choices will appear as described above, and will repeat automatically if you go past the factor you had wanted.



### Setting the "required course"

You may input a required steering course into the SILVA 520. The display will then indicate not only your actual heading but at the same time a visual indication of steering error from the desired course.

1. Steer the course you have chosen as your required course.



Push 1 x to set



2. When on that required course, press and release the pushbutton. Two small arrows on either side of the actual course heading will appear. This indicates that you have chosen a required course. It is now stored in the instrument's memory.



Small arrows appear

3. To erase the required course from the instrument's memory, press and release the pushbutton again. The arrows will disappear.



Push 1 x to erase



### Using the required course indication

1. When two small arrows appear on the display on each side of the actual course heading, it means you are within 2 degrees of your required course.



ON COURSE +/- 2°

2. If a small arrow appears only on one side of the actual course display, you are steering to that side by more than 2 degrees.

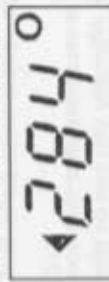


PORT 2° +



STARBOARD 2° +

3. If two arrows appear on one side of the actual course display, you are steering to that side by more than 4 degrees.



PORT 4° +



STARBOARD 4° +

4. If three arrows appear on one side of the actual course display, you are steering to that side by more than 8 degrees.

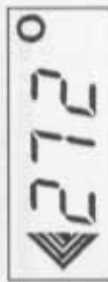


PORT 8° +

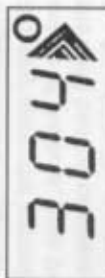


STARBOARD 8° +

5. If four arrows appear on one side of the actual course display, you are steering to that side by more than 16 degrees.



PORT 16° +

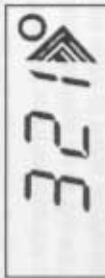


STARBOARD 16° +

6. If four blinking arrows appear on one side of the actual course display, you are steering to that side by more than 32 degrees.



PORT 32° +



STARBOARD 32° +

### Switching on the instrument light

The instrument's display illumination can be switched on with an external switch. Alternatively it may be connected for permanent illumination. See the connection diagram, section 8.

## 7. Calibration of the SILVA 520 electronic compass

### Part One: Explanation of Deviation

All recreational compasses will indicate headings that will not be totally consistent with the actual magnetic bearings on your chart. This is caused by magnetic disturbances on each individual boat. This disturbance is called "deviation".

Correct location of the compass or the compass transducer can reduce the amount of deviation effect (see section 4), however, there will always be influences that can not be corrected completely with transducer location. Electrical devices such as windshield wipers, motors, moving coil instruments and gauges, transmitting antennas all have an influence on the compass readings, as do various metal parts used in the construction and rigging of the boat..

For truly accurate readings and improved navigation, it is recommended that you take the time to make a "Deviation Table" for your boat. Normally you can do this yourself, with the help of a good quality hand bearing compass. In more difficult instances, it may be prudent to call on the services of a professional compass adjuster in your area.

### Part Two: Making your own Deviation Correction Table

The concept of this method is to compare the readings of a hand bearing compass and that of the SILVA 520. It is important that the hand bearing compass be held in a location free of magnetic and electrical disturbances, and that readings be precise. Sighting along the centreline from the transom, ideally from a dock immediately astern of the boat, note the readings of the hand bearing compass and those of the SILVA 520. The mast and stay can assist you in correctly lining up the boat to the bearings you wish to measure.

Use a table such as the one shown here to list the deviation amounts.

You will want to note the deviation from true bearings on all the 45° steps. There are eight of these as shown on the table.

If no correction table is made the calibration values given in the transducer's calibration certificate should be entered.



\* Previous value:  
On delivery, preset to 000, 045 etc. If adjustment for deviation has been made earlier, set values are valid. These are displayed as per the description below.

True Bearing	SILVA 520	Correction = SILVA - true bearing	Adjust value = Previous value* + deviation
000		-000 =	+
045		-045 =	+
090		-090 =	+
135		-135 =	+
180		-180 =	+
225		-225 =	+
270		-270 =	+
315		-315 =	+



Example:

045	044	044 - 045 = -1	043 + (-1) = 042
090	093	093 - 090 = +3	091 + (+3) = 094


Calibration certificate





### Part Three: Entering the Deviation Table into the SILVA 520

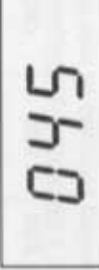
The SILVA 520 will accept the deviation corrections you have just noted, on the eight points and will compute all other points in between.


- Switch the power to the 520 'off'.
- Switch the power to the 520 'on', and at the same time, press and hold the pushbutton. Keep the button pushed until the display reads 'CAL'. Then release the pushbutton.
 

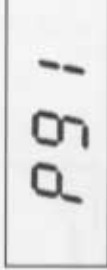
	Release when 'CAL' appears
Switch power 'on' and push & hold button	
- The figure '000' is then displayed, representing North.
 


	'000' (North) appears
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- Use the pushbutton to advance the reading on the display from '000' to the desired deviation factor, from +20 to -20 degrees. Push and hold button until desired correction indicated, then release.
 

	The numbers will at first advance towards +20 degrees. After reaching +20, they will then go to -20 degrees and advance towards '000'.
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- Seven seconds after you release the pushbutton, the compass display will automatically go to the next point for deviation adjustment.
 

	7 seconds after release, next point appears. Adjust with push button
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- The steps that the compass will make will be the following:  
000, 045, 090, 135, 180, 225, 270, 315.  
You have the option of adjusting each one of these, or of moving on to the next.
 

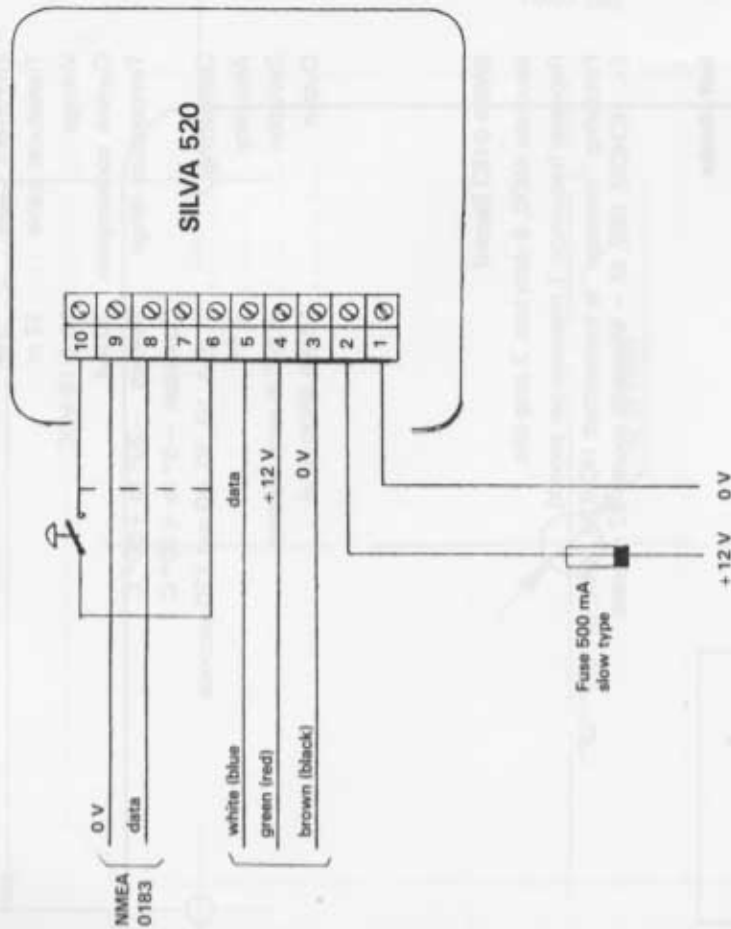
	After all 8 points have appeared/adjusted 'P00' displayed
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- When all the points have been displayed and/or adjusted, the display will read 'P00'.
 

	Use the pushbutton to advance the display to 'P91'. This value 'P91' is the key that permanently locks and stores your deviation into the instrument's memory. Push & hold until 'P91' displayed; then release
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- After reaching 'P91', the instrument will begin normal course indication.
 

	Normal indication begins
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### 8. Connection diagram

Instrument illumination connect according to dotted line for constant illumination.



## 9. Technical data

### Dimensions:

Transducer	125 x 140 x 120 mm
Instrument	125 x 125 x 35 mm
Instrument cable	3 m
Transducer cable	12 m
Voltage	10.5-18 VDC
Current consumption	70 mA
Temperature range	Storage -20° to +80° C Operation -5° to +70° C
Dampening	1, 2, 4, 10, 30, 60 and 120 seconds
Accuracy	±1°
Deviation	±20° in each 45 step
Output	NMEA 4800 baud

### NMEA-0183 Record

Baudrate 4800, 8 data bits, 2 stop bits.

Repeater frequency: 1 message per second.

Following "message" is transmitted: HCHDM, XXX, M "CR" "LF".

Ex.: HCHDM, 092, M = Magnetic course 92 degrees.

### Self checks

Indication "Lo" Warning low voltage of battery 10.5 V (flashing).

Lo

Indication "Ert" (steady) caused by iron objects near the transducer or faulty transducer.

Ert

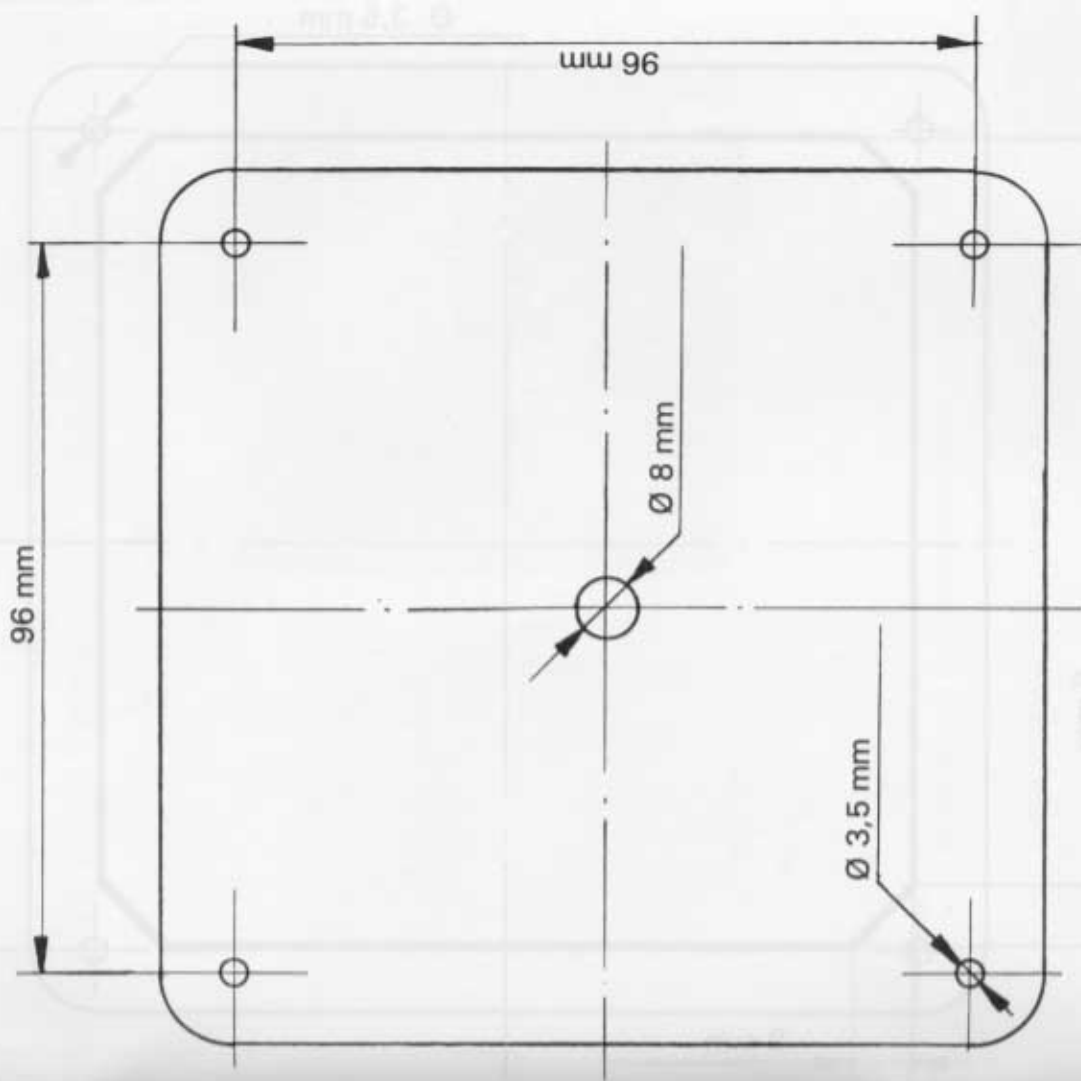
Indication "Erd" caused by fault in transducer or cable between transducer and instrument.

Erd

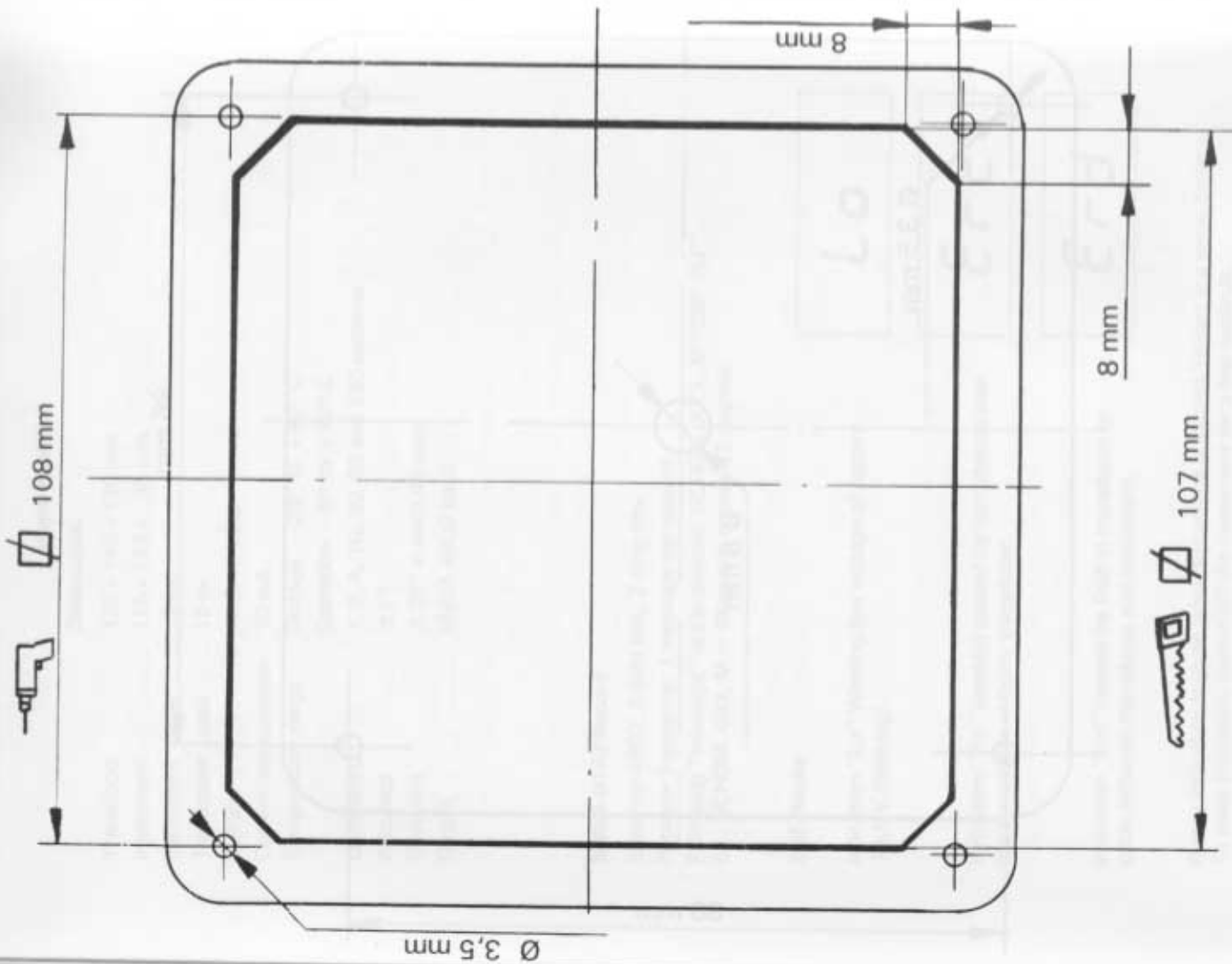
If error indication is given when the engine is started, reason is a weak battery. To reset indication, switch off the instrument for a few seconds.

## TEMPLATE

Bulkhead mount



TEMPLATE Flush mount



SUMMA 5710/5715

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1. Montieren & Nachjustieren
2. Installation & Dynamische Kalibrierung
3. Installation & Statistische Auswertung



Angewandte Messtechnik & Fertigungstechnik