

# SILVA Direction

VINDINSTRUMENT • WIND INSTRUMENT  
WINDMESSANLAGE • GIROUETTE-ANEMOMETRE



Monterings & Bruksanvisning  
Installation & Operating description  
Installation & Bedienungsanweisung  
Description d'installation et d'utilisé



SILVA SWEDEN AB, Kuskvägen 4, S-191 62 Sollentuna, SWEDEN

# SILVA 40 DIRECTION DIGITAL WIND VANE

## General description

SILVA 40 Direction is a high quality precision instrument designed to meet the demands from cruisers and yachts. The instrument is very easy to read and to operate.

**NOTE:** The instrument must be calibrated to your boat. Read the instruction in section 6.3 carefully and calibrate accordingly.

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## Contents list for the SILVA 40 digital windmeter

SILVA 40 comes complete with all necessary fittings and attachments for almost all installations. Included in this are the following items. Check now to become familiar with each part prior to installation.

- instrument
- gasket
- cable cover plate
- stainless screws, 4 rubber screwcaps
- ribbon plug cable 5 m
- junction box with connection circuit board
- masthead unit
- mast cable 22m
- connection cable to log
- 1-wire cable from the battery supply is also required.

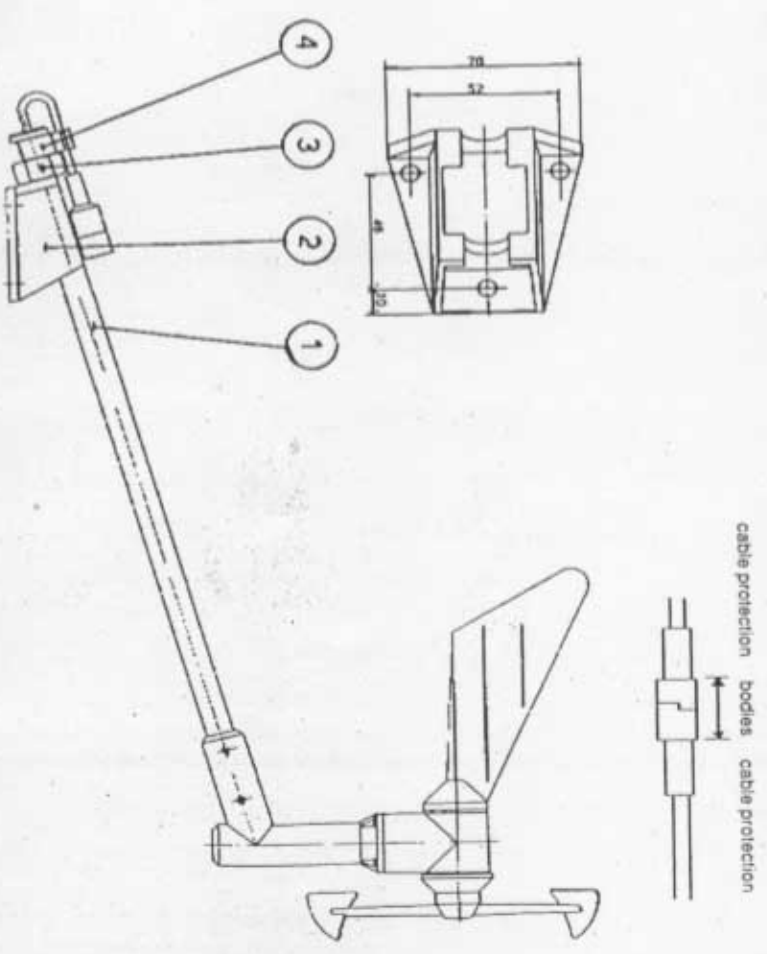
## Optional accessories

Following items can be supplied as optional extras:  
Optional junction box including ribbon cable (part no. 9812). This box is necessary for connection of some optional extras. See further description in section 7.  
External audible alarm (part no. 8147). An audible alarm is included inside the instrument housing.  
Log transducer (part no. 4001). Necessary to obtain true wind values and VMG/TRIM-function in case a SILVA log is not fitted together with the windmeter.  
SILVA log is not fitted together with the windmeter.  
Compass transducer (part no. 8526). Necessary to obtain magnetic wind direction in case a SILVA digital compass is not fitted together with the windmeter.  
Remote control (part no. 9369).  
Cable for connection to SILVA 1000 Compact Series (part no. 9771).

## 4. Installation of the masthead unit

The masthead unit must be mounted so that the propeller is vertical when the boat's backstay is fully tensioned. Make a wedge shaped piece if necessary to fit the mast fitting. Secure the screws with Loctite or a similar substance. Mount the unit to the mast fitting by directing the pipe (1) downwards/backwards into the bracket (2). Secure the nut (3) against the attachment by hand. Attach the security clamp (4) behind the nut. Secure the cable in the clamp. When engaging and disengaging the two plug connectors, always pull at the plug bodies and not at the cables or the cable protections.

**Note:** Check that the mast is connected to the battery minus terminal. This minimizes the risk of damage to the electronic circuits in the masthead unit in the event of thunderstorms.



# Installing the instrument

Locate the position of the instrument using the template supplied with this handbook. Drill the holes as indicated, one in each corner and one for the instrument cable to pass through the bulkhead.

Pass the instrument cable through the bulkhead and gasket and connect it to the instrument as illustrated. Mount the cable cover.

Use the 4 larger screws supplied to attach the instrument and gasket onto the bulkhead.

Alternatively, machine type screws and nuts can be used if it is preferred to screw the instrument from the inside (anti-thaft reason). Cover the screws with the screwcaps.

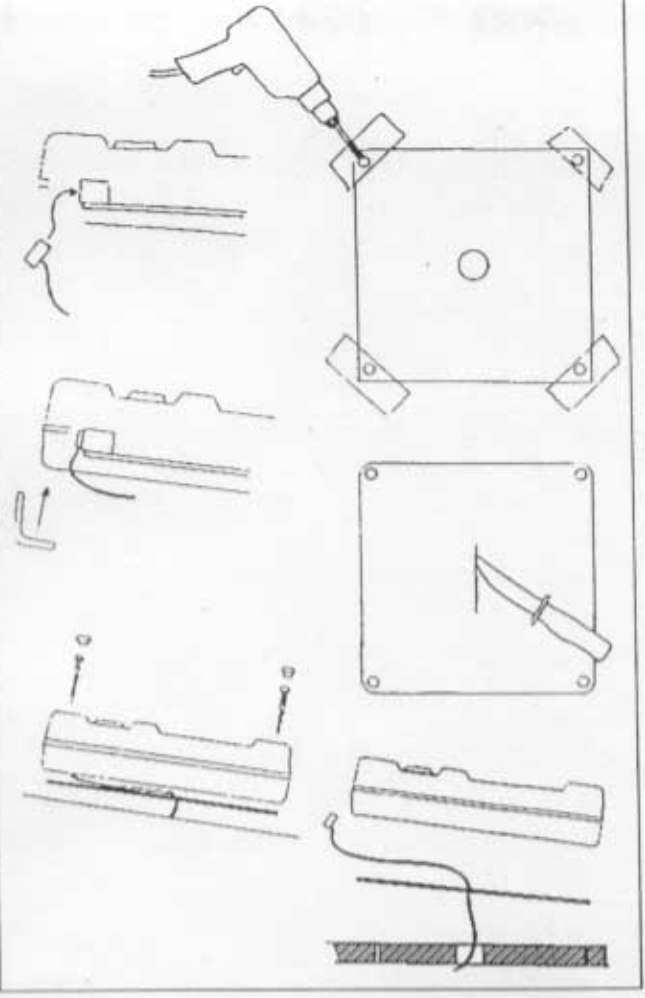
Locate the junction box and fasten it with the 4 smaller screws supplied.

Attach the cables to the junction box. Pull the cables through the cover plate's opening. Plug in the wires, insert the circuit board up-side-down in the slot and snap on the cover plate.

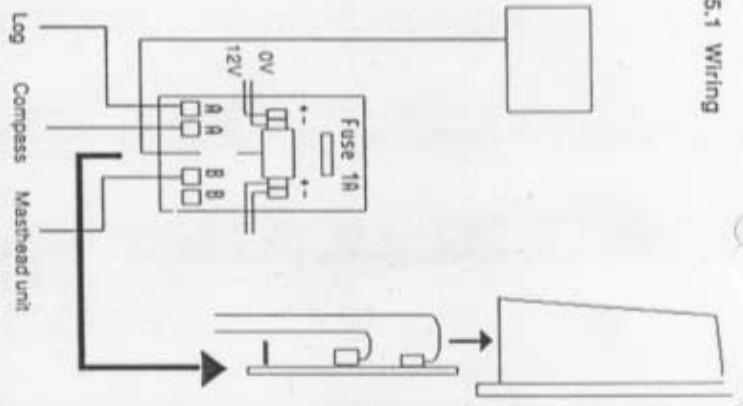
When several SILVA Direction units are installed, a marking of the junction boxes and the cables is recommended.



Secure the cables properly outside the junction box.

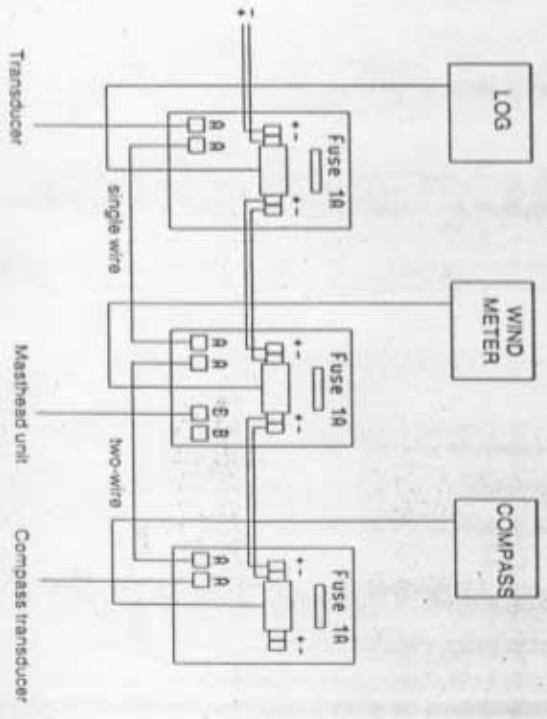


# 5.1 Wiring



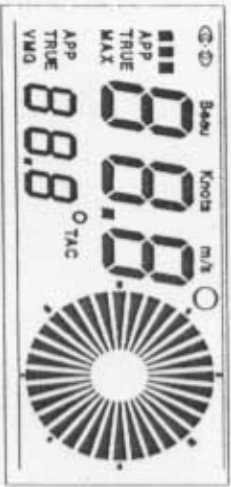
Note: Insert the circuitboard up-side-down into the junctionbox.

# Interfacing of log, windmeter and compass



# Operation instruction for the SILVA 40

## Functional description



Upper part always indicates wind angle

Wind angle

Wind direction

Lower part indicates:

Wind speed

Wind speed

Scale indicates:

True and true wind angle

Directions



Upper case is used to SELECT the functions to be indicated on the display.

Lower case is used to CONTROL the functions indicated on the display.

Pushbutton is used to CHANGE between the upper and lower case of the pushbuttons.

Pushbutton can be connected to a remote control.

When a SILVA Log is connected, When a SILVA digital compass is connected

## 6.2 Operation

### TRIM

Press TRIM until TAC appears



Upper display indicates apparent wind angle. Lower display indicates last selected mode. Analogue scale indicates close hauled rel. line and relative VMG. Each step equals 2 degr. and 2 % change in VMG resp.

NOTE: The TRIM function operates independently on both tacking courses. See further section 6.4.

### TRUE WIND SPEED

Press SPEED until TRUE appears



Lower display indicates true wind speed in metres per second, knots or Beaufort.

### APPARENT WIND SPEED

Press SPEED until APP appears



Apparent windspeed is indicated in the same way as above.

### TRUE WIND ANGLE

Press ANGLE until TRUE appears



Upper display indicates true wind angle. If a SILVA digital compass is connected, magnetic wind direction is indicated.

### APPARENT WIND ANGLE

Press ANGLE until APP appears



Upper display indicates apparent wind angle.



True and apparent wind angle are also shown on the analogue scale. APP TRUE

NOTE: Up to 99 degrees, port wind angle is indicated by a minus sign in order to differentiate between wind angles close to zero degrees.

MC:

VMG until VMG appears



Lower display indicates VMG in knots.

### MAXIMUM WINDSPEED / ALARM

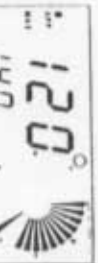
SPEED until MAX appears



Lower display indicates maximum windspeed since the instrument was switched on.

et alarm

SET SET



The windspeed alarm value is displayed. Set or disengage as desired. The alarm is always to be set in m/s.

Knowledge alarm

SPEED



Audible alarm is switched off.

LIGHT

LIGHT and hold until light goes on/off



Instrument light is switched from OFF to medium to strong. The instrument consumes only 45 mA when the light is switched off.

### 6.3 Start up procedure

Your instrument must be set up with certain values to operate with the best possible accuracy. The following routine need only be done once. Once inserted, the values are stored permanently even when the power is shut off.

Press **TRIM** and **SET** simultaneously until a code is indicated on the upper display. The lower display indicates the value to be altered.

- C0:** selection of measuring unit for windspeed
- Press **C SET** new unit is indicated as **C** is stepped (m/s, knots or Beaufort).

The next code is automatically brought up when **SET** is pressed.

**C1** and **C2** select the modes you normally want your instrument to be in when it is switched on.

- C1:** selection of start mode for wind speed
- Press **C SET** new start mode is indicated as **C** is stepped (apparent, true, max or VMG).

- C2:** selection of start mode for wind angle
- Press **C SET** new start mode is indicated as **C** is stepped (apparent or true).

- C3:** selection of damping
- Press **C SET** damping is changed as **C** is stepped

no damping  
 \* low  
 \*\* medium  
 \*\*\* high

- C4:** log calibration (0-99%)
- Press **C SET**

- A)** A SILVA Direction or 2200 log is fitted. Adjust to the same calibration value as for the log.
- B)** Another log or only a paddlewheel transducer is fitted. Set **C4** = 0. Disconnect the masthead unit by unplugging the mast cable in the junction box. Set the instrument to VMG. The VMG reading should be equal to boat speed. The adjustment is made in %.

Example: True boatspeed 5 knots, VMG reading 4 knots.  $5/4 = 1.25$  **C4** is set to 25.

- C5:** wind speed calibration (0-99)

Press **C SET** set to 50

C6: wind angle calibration

SET set according to the calibration certificate.  
Note: 8 values are to be set.

C7: alignment of masthead unit (0-359)

SET set the instrument to app. wind angle. Motor in total calm and note the app. wind angle. If a starboard app. wind angle is indicated, set C7 to this value. If a port wind angle is indicated, set C7 to (360 - indicated value).

C8: compass selection

C SET 00 and 01 appear as C is stepped 00 = compass not connected  
01 = compass connected

C9: compass deviation\*

SET set to the same values as for your SILVA digital compass.  
If only a compass transducer is fitted, disconnect the masthead unit by unplugging the mastable in the junction box and calibrate according to section 8 in the SILVA 50 Direction Digital Compass manual.

C10: local variation (\*±.99 degrees)\*

SET set to agree with the local magnetic variation.

The values are now stored permanently and the instrument reverts to normal operation.

\* C9 and C10 need to be set only if a compass is connected

## 6.4 Description..

The SILVA 40 windmeter can display the following values:

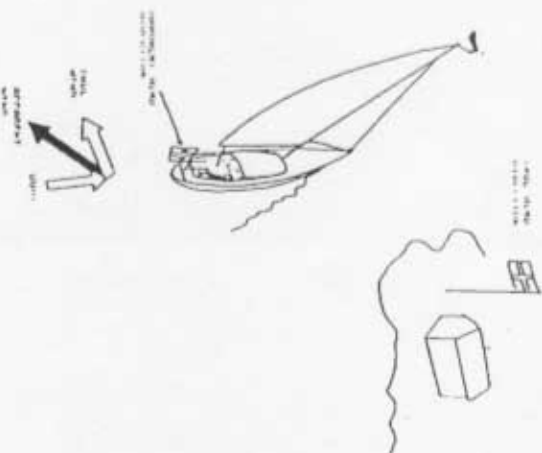
- true and apparent wind angle
- true and apparent wind speed
- VMG (Velocity Made Good)
- TRIM function (close hauled reference line / graphic VMG)

A short explanation to these values is given below.

### True and apparent wind

A stationary windmeter measures the true wind speed and wind angle. On a moving boat the wind is affected by the boat's speed and direction and hence the boat's instrument feels another wind speed and direction, as shown in the figure.

The SILVA 40 windmeter measures the apparent wind and, by adding the boatspeed, calculates the true wind. When a SILVA digital compass is connected, the true wind angle is calculated versus north, giving magnetic wind direction.



### VMG (Velocity Made Good)

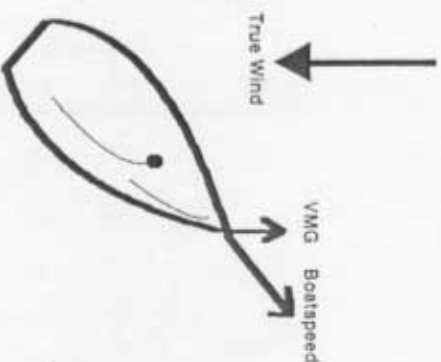
VMG refers to the boat's speed directly towards the wind when sailing close hauled or directly away from the wind when reaching.

If a boat is steered too close to the wind, distance is gained but speed is lost. Contrary, if the boat is steered too far off close hauled, speed is gained but distance is lost.

The SILVA 40 calculates the VMG, which tells you the optimal course.

Similar conditions apply when running with the wind and the VMG is particularly useful when reaching with a spinnaker.

Note that lifting up beyond close hauled can give a deceptively high VMG for a moment because the momentum of the boat keeps up the speed while the angle is reduced. VMG readings should therefore always be taken while making small rudder adjustments and for reasonable periods of time, so that true values are obtained.



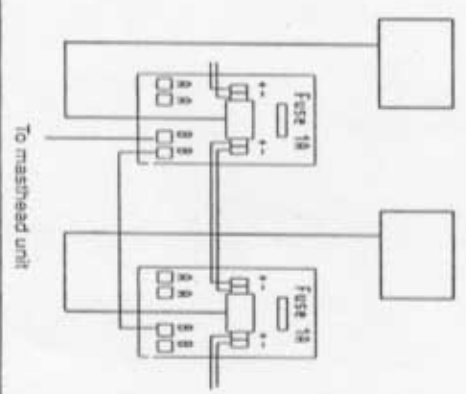


## 7. Connections

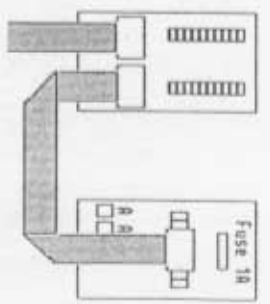
When installed according to section 5 the instrument operates without any further precautions.

Note that the windmeter should be connected to the log by means of the plug cable supplied. The connection is shown in 5.1

### 7.1 Connection of additional Direction windmeters as repeaters



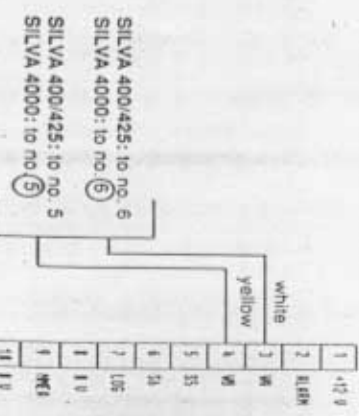
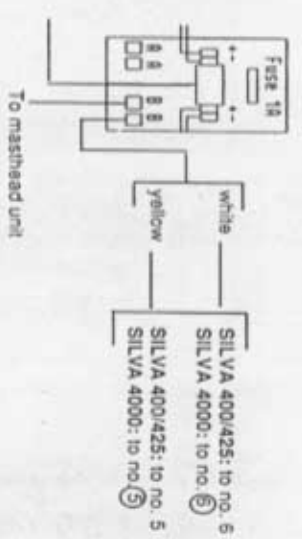
If optional extras are required, an option junctionbox (part no. 9612) is required. The connection is shown below.



Note: The circuitboards should be inserted up-side-down into the boxes as shown in 5.1

### 7.2 Connection of other SILVA windmeters as repeaters

A: If an B-plug in your junctionbox is free, connect to this plug (cable no. 9771).

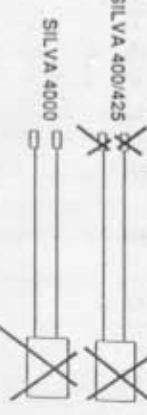


1	12	9
2	11	8
3	10	7
4	9	6
5	8	5
6	7	4
7	6	3
8	5	2
9	4	1
10	3	0
11	2	11
12	1	10

Adaptation of cable 9771



Adaptation of cable 9771



arily important VMG feature is the TRIM function

s function is engaged the most vital information for efficient sailing is present on the display

arent wind angle

arent or true wind speed or VMG as selected

VG in graphic form

se hauled reference line

e TRIM function operates independently on both tacks

sailing close hauled wanting to improve your performance.

TRIM pushbutton. Now the apparent wind angle is stored

as a close hauled reference line. The VMG is also stored

reference. The analogue scale shows the close hauled reference

the VMG as two horizontal lines. The reference line is always

ndward side and the VMG is always on the leeward side of

degrees closer to the wind. The close hauled reference

one step for every two degrees. The VMG result is positive,

led by the sector growing upwards. A decreasing VMG is

by the sector growing downwards. Each new segment

2% change in VMG

ther two degrees closer to the wind. Now the VMG

is and accordingly the optimum apparent wind angle in

is 34 degrees. That is, at this wind speed, state of sea

eting.

the most efficient course going downwind, i.e. how much to deviate from the flat run.

the TRIM-function is equally useful in

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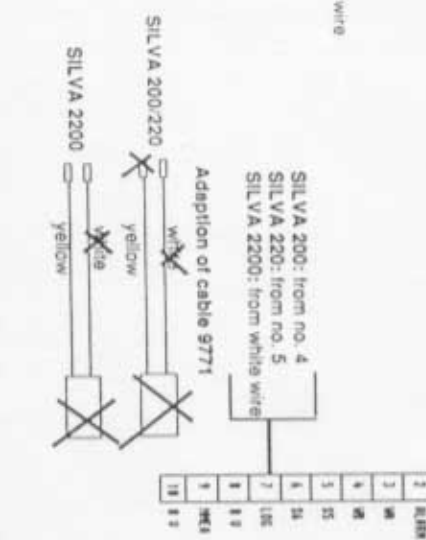
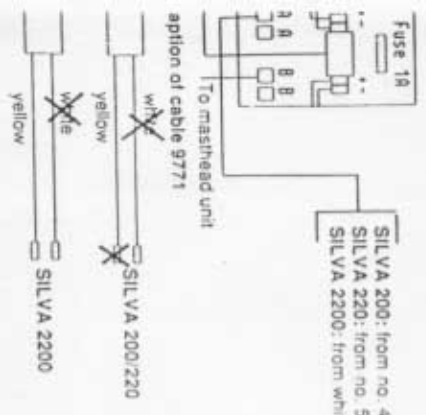
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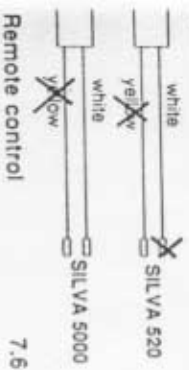
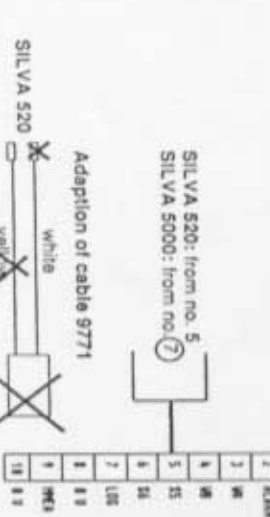
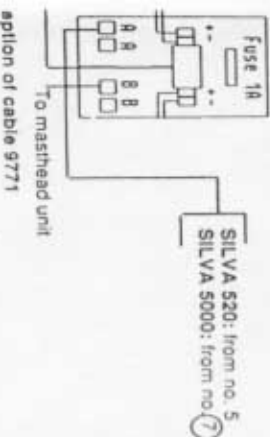
**Connection of log-signal from other SILVA logs**  
 If an A-plug in your junctionbox is free, connect to this plug (cable no. 9771).

**B:** If no A-plug is available, connect to option junctionbox (cable no. 9771).

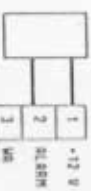


**Connection of compass-signal from other SILVA digital compasses**  
 If an A-plug in your junctionbox is free, connect to this plug (cable no. 9771).

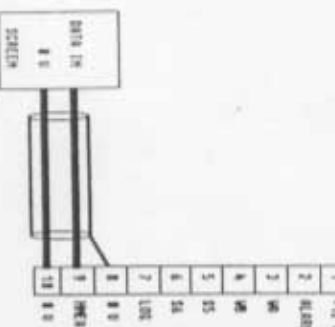
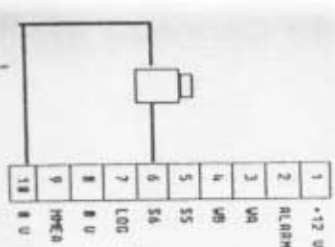
**B:** If no A-plug is available, connect to option junctionbox (cable no. 9771).



**7.6 External alarm**



**7.7 NMEA dataline**



**8. Fault finding**

Most faults on electronic equipment can be found in the outer wiring and this should always be checked first if a fault arises.

**Check that:**  
 no cables are squashed or worn,  
 the screw terminals are tight,  
 the connection is made properly as per the wiring diagram.

**9. Data**

**Dimensions:**  
 instrument: 125 x 125 x 30 mm  
 junctionbox: 140 x 68 x 42 mm  
 instrument cable: 5m  
 masthead unit: 450 x 300 mm, 325 g  
 mast cable: 22m

**Power supply:** 12V DC (10-18V)  
**Current consumption:** 45mA (65mA with illumination)

**Output:** external alarm: open collector transistor, max 250 mA

**Accuracy:** wind angle: +/- 2 degrees  
 windspeed: +/- 4 % up to 20 degrees heeling

**Temperature range:** storage: -30 to +85C  
 operation: -10 to +70C

**NMEA 0183 data output:** data format: 8 data bits (D7=0), no parity, 2 stopbits  
 repetition: 1/second  
 output: 0 - 10 V DC, sink/source 25 mA  
 message: apparent wind angle, apparent windspeed (knots), apparent windspeed (m/s), left or right side (L/R): \$XXVWR,000,L/R,00,0,N,00,0,M,(CR,L,F)

true wind angle, true windspeed (knots), true windspeed (m/s), left or right side (L/R): \$XXVWT,000,L/R,00,0,N,00,0,M,(CR,L,F)  
 VMG in knots: \$XXVPW,00,00,N,(CR,L,F)

**10. Warranty**

SILVA gives a two year warranty against manufacturing faults or faulty components. A purchasing receipt must be shown if a warranty claim is made.



