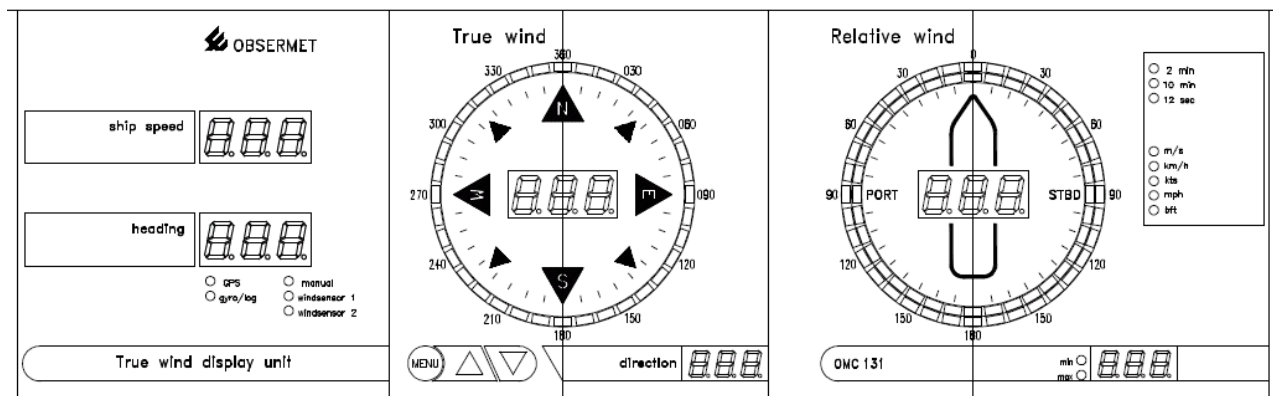


# OMC-131 True wind display

## Meteorological Applications

### Installation & technical users' manual



## Index

<b>INDEX .....</b>	<b>2</b>
<b>1. GENERAL .....</b>	<b>4</b>
<b>2. INSTALLATION .....</b>	<b>6</b>
2.1. MECHANICAL.....	6
2.2. ELECTRICAL.....	6
2.2.1 General system layout.....	6
2.2.2 Power supply settings.....	7
2.2.3 Connections .....	8
2.2.4 I/O Ports .....	9
2.2.5 Input jumper settings Port 1 .....	9
2.2.6 Output jumper settings.....	9
2.2.7 Jumper settings port 2 – 4.....	10
2.2.8 Serial input Port 1: Wind sensor (Portside) input .....	11
2.2.9 Serial input Port 2: Wind sensor (Starboard) or speed log (VHW) input .....	11
2.2.10 Serial input Port 3: Gyro (HDT) or combined heading & speed (VHW).....	11
2.2.11 Serial input Port 4: GPS (GGA & VTG).....	12
2.2.12 Serial input output Port 5.....	13
2.2.13 Analogue input output Port 6.....	14
<b>3. COMMISSIONING .....</b>	<b>16</b>
3.1 WIND SENSORS RELATIVE WIND INFORMATION .....	16
3.2 TRUE WIND INFORMATION.....	17
3.3 COMMUNICATION AND PORTS .....	18
3.3.7 Message format .....	19
3.4 FUNCTIONS VIA FRONT PANEL.....	20
3.4.1 Units and averaging settings .....	20
3.4.2 Lamp test.....	20
3.4.3 Gust reset.....	20
3.4.4 Vessel Heading & Speed information.....	20
3.4.5 Status led's GPS & Gyro .....	20
<b>4. MAINTENANCE .....</b>	<b>21</b>
<b>5. SETTING UP PROCEDURE.....</b>	<b>22</b>
5.1 INPUT DEVICE .....	23
5.2 SET OUTPUT DEVICE .....	26
5.3 SET AVERAGE OF CHANNELS .....	27
5.4 SET OPTIONS .....	27
5.5 ALL SETTINGS .....	28

**Version history**

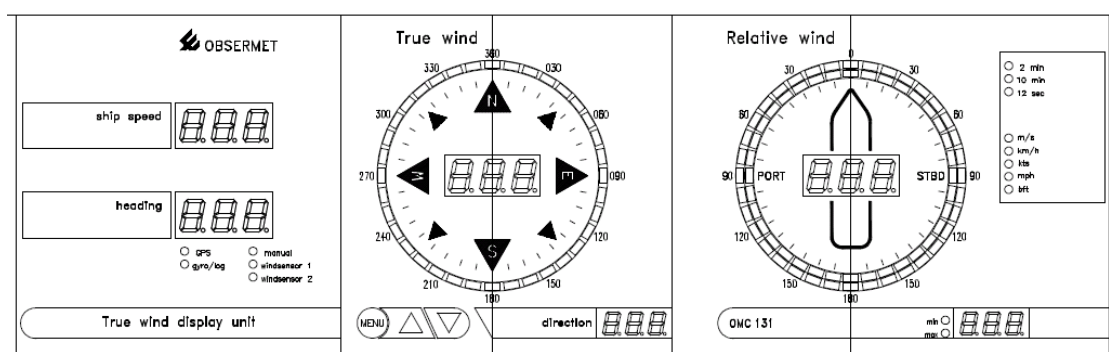
- 1.13**      ***Correction in text on page 16: Starboard and Portside where exchanged.***  
**1.14**      ***Added comment page 4 concerning gust display & Gust reset description page 20.***

## 1. General

The Observator Instruments OMC-131 True wind display unit is specially designed for easily read out of true and relative wind information on board sea going vessels. Once again the use of the latest Observator Instruments standards in combination with a distinguished front panel, known from earlier released wind displays like OMC-139, the unit will be a breakthrough in the marine navigation market.

The unit is suitable for panel mounting as well for mounting into a standard 19" rack, on request a table top version is also available. Any inclination is allowed and no additional control units are required.

For proper use, this unit requires, besides a wind speed and direction signal, a GPS, Gyro and speed log signals. These are necessary for calculating true wind and direction for normal situations as well as situations such as turning at low speeds.



Relative wind direction and variation is indicated within a circle relative to the longitudinal axis of the vessel, while the true wind information is displayed within a wind circle with the four wind directions. Inside these circles which consist of 36 LEDs, numeric displays indicates the corresponding relative and true wind speed. This information can be displayed in m/s, knots, mph, km/h or Beaufort. Selection of these units can easily be made using the MENU option within the integrated membrane keys. Another MENU option is the choice of the averaging interval, which can be set at 2 minutes, 10 minutes or every other user-programmed interval. When not in the MENU mode the arrow keys are used for brightness control or gust reset.

A gust display is located in the lower right of the relative wind circle. It will display the maximum gust over the selected interval time or - when the interval is set to 'user' - the maximum since last reset. The minimum gust is not selectable since it is not implemented in this firmware.

On the lower right of the true wind circle a 3 digit display is available for indication of the numeric wind direction.

The true wind display unit was specially developed for integration within meteorological systems used for nautical applications. Therefore many in- and output connections belong to the possibilities, either as standard or as option. The unit was primarily intended to use with the Observator Instruments OMC-160 wind sensors, but other, most common sensors can be connected to the system.

Of course the connection with all other Observator Instruments equipment like meteorological data monitoring software, data printers and 'slave' display units belong to the possibilities using the Observator Instruments standard output.

#### Mechanical

Case type	: 19 inch front plate 3HU
Material	: Aluminum
Max. dimensions	: 493x143x90mm
Panel out cut	: 432x132 mm
Weight	: 2.5 kg

#### Electrical

Power Supply	: 230 VAC/50-60Hz (+/-10%) (Optional 115 VAC & 24VDC)
Power Consumption	: 50 VA
E.M.C.	: EN-50081-1 (emission) and EN-50082-2 (immunity)
Fuses:	: Glass fuses 5x20 mm (all Slow Type) <ul style="list-style-type: none"> <li>- 250mA for 230 Vac</li> <li>- 500mA for 115 Vac,</li> <li>- 630mA for 24 Vdc</li> </ul>

#### Input

Sensor Supply	: 15 VDC, max. 100 mA
Signal	: NMEA (RS422) or TTY, (300 - 9600Bd)
Compatibility	: All Observator Instruments equipment, wind sensors, displays etc. GPS
GYRO	: RS422 NMEA-0183 (HDT)
LOG	: RS422 NMEA-0183 (VHW) or 200 pulses per nautical mile
Combined Heading - Speed:	: RS422 NMEA-0183 (VHW)

#### Output

Daisy chain	: TTY, (passive) to other Observator Instruments display units or RS422
	: NMEA MWV (T, R & M)

#### RS-232 Communication & programming

Connector	: DB9-M
User interval	: 1 ... 600 sec.
Gust reset	: automatic or manual

#### Display

Averaging interval	: 2 min, 10 min, or any user-programmed interval, selectable from front panel. The selected interval is valid for direction, variation, speed, and gust.
User interval	: programming via RS-232 communications port
Readout units	: m/s, km/h, kts, mph, bft, selectable from front panel
Selection GPS, Gyro/Log	: Automatic or manual, on front panel LED indication what selection is made
Front panel control	: 3 keys, marked MENU, ▽ and Δ
Brightness control	: from front panel with ▽ and Δ keys (16 steps)
Lamp test	: from front panel by simultaneously pressing ▽ and Δ keys
Manual gust reset	: from front panel by simultaneously pressing MENU and ▽ key

#### Available Options

: 115VAC Power Supply
: 24 VDC Power Supply
: RS-232 signal output (Observator Instruments data format)
: RS-232 or RS-422/RS485 signal output (NMEA-0183 data format)
: Analog outputs 0-1 V or 4-20 mA
: Signal input RS-232 (Observator Instruments data format, modem connection)
: Signal Input for non-Observator Instruments Sensors: contact factory
: Remote brightness control

## 2. Installation

### 2.1. Mechanical

Panel mounting of the OMC-131 display requires a panel cut-out of 435mm x 130mm. Maximum panel thickness 5 mm. Rear access must be provided, for fixing of the tightening clamps and connecting the electric cabling. The depth of the unit is 63 mm and an additional clearance of 8 mm should be allowed for the cable connections.

### 2.2. Electrical

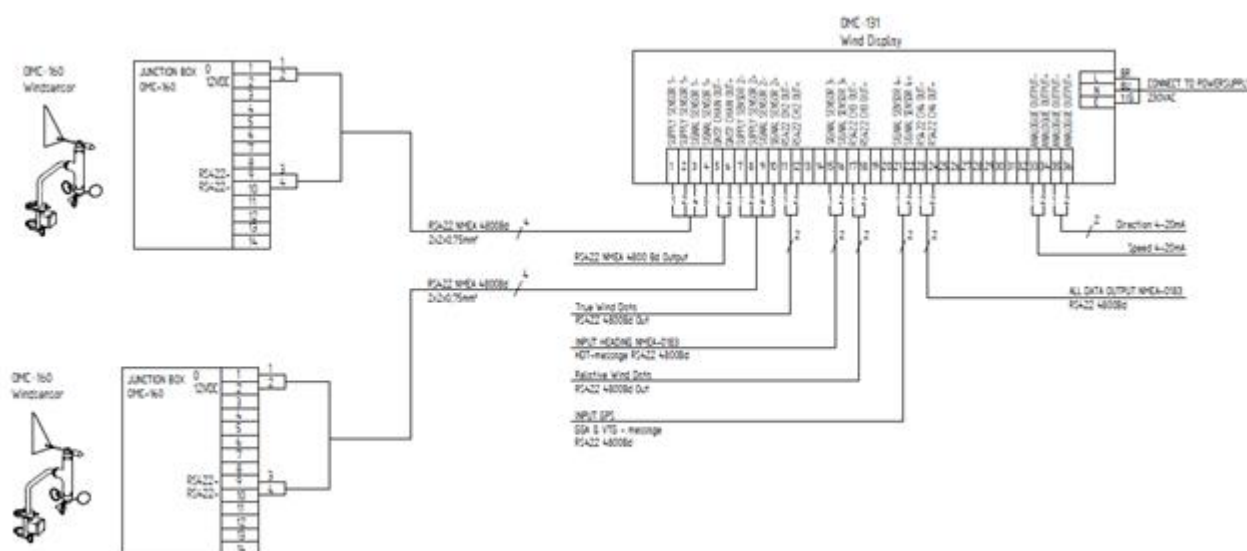
All Observator Instruments displays utilize a common terminal strip for the connections to the wind sensors and the ancillary displays and/or recorders. The signal cable between the wind sensor and the display is a 4-core cable with 2 cores for power to the sensor and 2 cores for signal transmission. To reduce interference the cable must have a common screen. This screen should be grounded to earth in the junction box of the wind sensor. In this way the cable may run distances up to 1 kilometer.

Recommended cable: 2 (or 3) twisted pairs with common screen, core size 0.75 mm<sup>2</sup>.

In the case that the wind sensor is provided with a heater. 2 extra cores are required for power supply to the heater. The size of the heater cable depends on the cable length. (For more details see manual wind sensor)

The OMC-131 display unit provides the 15 Volts DC. power supply to the microprocessor transmitter in the wind sensor. The power consumption of the sensor transmitter electronics is approx. 65 mA. This power supply should not be used for the optional heaters in the sensor. These sensor-heaters must be powered independently from the display unit.

#### 2.2.1 General system layout



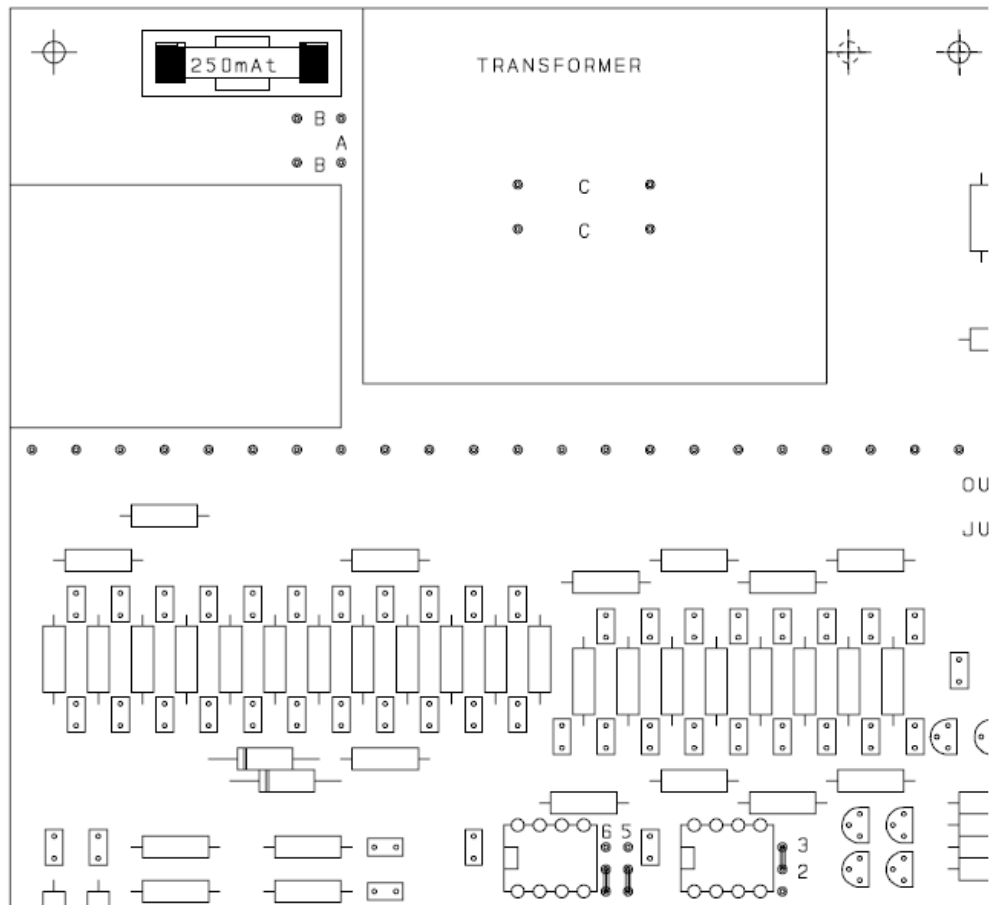
Cable layout depends strongly on the customer requirements.

### 2.2.2 Power supply settings

The OMC-131 will be delivered with the power supply set as required by the customer. If no power supply is mentioned in the official ordering papers the OMC-131 power supply will be set for 230 Vac.

If during installation is found that the supply setting is wrong two things can be done, the unit can be returned to the factory for modification or the user will modify the unit himself.

To modify the display unit for a different power supply proceed as follows,

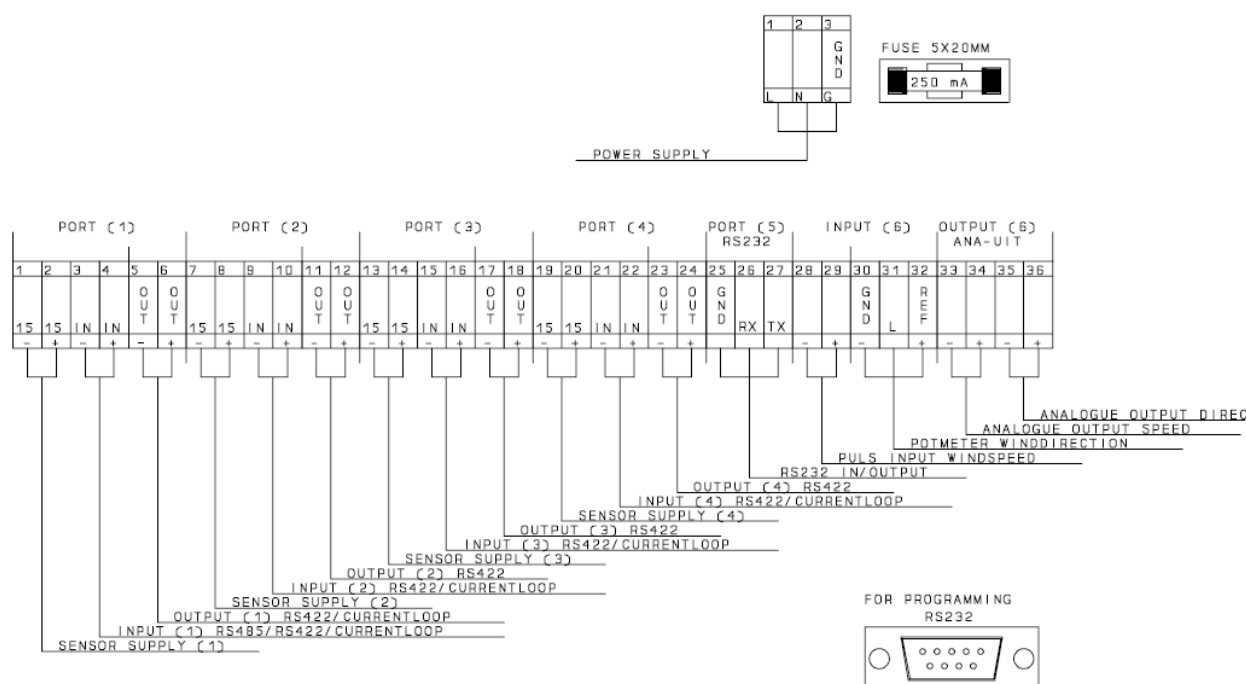


On the power supply board, the PCB with the terminal connection on the rear side, there is installed a transformer. The transformer offers the possibility of 115 or 230 Vac. The supply depends on the jumper settings between the filter transformer and the supply transformer. (See PCB layout) If the wired marked "B" are installed the unit is set for 115 Vac, If the wire "A" is installed the unit is set for 230 Vac.

For 24 Vdc power supply the transformer TR1 has to be removed from the printed circuit board. When the transformer has been removed two wire connection can be made (marked with "C")

### 2.2.3 Connections

All connections to the OMC-131 display are made to the rear of the display as shown on the drawing below.



If the Observator Instruments wind sensors are used, the terminals 1, 2, 3, and 4 are used for sensor 1 and the numbers 7, 8, 9 and 10 for sensor number 2.

- 1, 7, 13, 19 = -15 Vdc sensor supply
- 2, 8, 14, 20 = +15 Vdc sensor supply
- 3, 9, 15, 21 = - serial currentloop input, or RS422 input\*
- 4, 10, 16, 22 = + serial currentloop input, or RS422 input\*
- 5 = - output currentloop or RS422\*
- 6 = + output currentloop or RS422\*
- 11, 17, 23 = - output RS422
- 12, 18, 24 = + output RS422
- 28, 29 = remote brightness control or 200 ppm log or manual selection wind sensor
- 30 = not used
- 31 = not used
- 32 = not used
- 33 = - analogue speed output 4..20 or 0..1(0) Volt\*\*
- 34 = + analogue speed output 4..20 or 0..1(0) Volt\*\*
- 35 = - analogue direction output 4..20 mA or 0..1(0) Volt\*\*
- 36 = + analogue direction output 4..20 mA or 0..1(0) Volt\*\*

\* Default = RS422

\*\* Optional (requires OMC-127 analogue output kit), default is 4-20mA



## 2.2.4 I/O Ports

The OMC-131 has 5 serial I/O ports & 2 analogue outputs available:

Port	RS422	CL	RS232	Function
1	input	x	x	Wind sensor 1 ( Portside) / Combined NMEA (Slave mode)*
	output	x	x	Wind: OMC-160 / OMC-2900 / NMEA MWV T,R,M / NMEA MWV R
2	input	x	x	Wind sensor 2 (Starboard) / Log NMEA VHW
	output	x		NMEA MWV T,R, M
3	input	x	x	Gyro: NMEA HDT / Combined heading speed: NMEA VHW
	output	x		NMEA MWV T,R, M
4	input	x	x	GPS: NMEA GGA & VTG
	output	x		NMEA MWV T,R, M / All relevant NMEA (Master)*
5	input		x	N/A
	output		x	NMEA MWV T,R, M / All relevant NMEA

Port	4-20mA	0 .. 1 V	0 .. 10 V	Function
6	output 1	x	x	Wind speed: True / Relative
	output 2	x	x	Win direction: True / Relative

\* All relevant NMEA messages is all the data required for a slave OMC-131 to work (Input port 1 of a slave OMC-131 will be connected to output port 4 of another OMC-131).

## 2.2.5 Input jumper settings Port 1

Port number 1 has jumper settings on the connection board as well as on the processor board. On the connection board jumper field J1 is used to select Currentloop or RS422.

J1 jumper position 1-3 and 2-4 = Currentloop input  
J1 jumper position 3-5 and 4-6 = RS422 input

On the processor board (right) the following jumper field is used,

J1 jumper position 1-2 = Currentloop input  
J1 jumper position 2-3 = RS422 input  
J1 jumper position 4-5 = RS485 input (n/a)

The default settings for port 2 are RS422 input 4800 baud.

Input Port is always used for input of wind speed and direction information. Information can be accepted from several different sensors depending of settings in hardware and software.



## 2.2.6 Output jumper settings

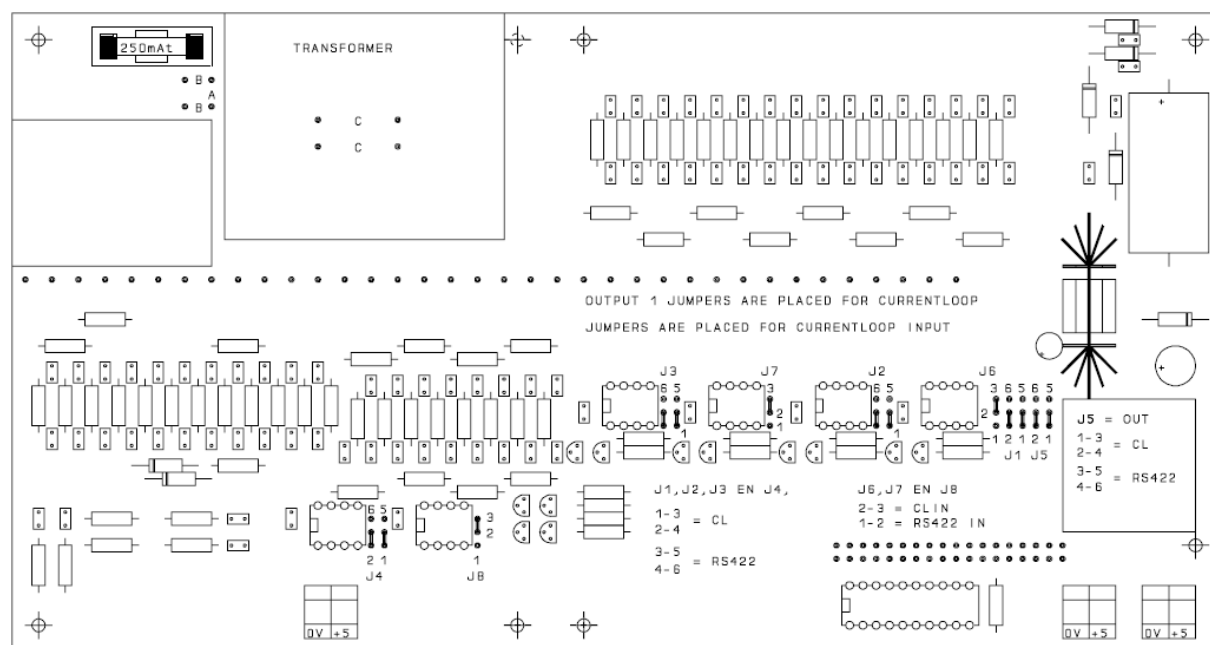
Port number 1 has only jumper settings on the connection board:

J5 jumper position 1-3 and 2-4 = Currentloop output  
J5 jumper position 3-5 and 4-6 = RS422 output

### 2.2.7 Jumper settings port 2 – 4

Port	Jumper set 1	Jumper 2
2	J2	J6
3	J3	J7
4	J4	J8
<b>RS422</b>	<b>3-5 &amp; 4-6</b>	<b>1-2</b>
Current Loop	1-3 & 2-4	2-3

Output 2-4 is RS422, no jumper settings.





### 2.2.8 Serial input Port 1: Wind sensor (Portside) input

Default the system expects a NMEA MWV message at 4800 baud:

**\$IIMWV,xxx,R,x.x,M,A\*cscs**

"M" means meters per second

"A" means message valid "V" means message invalid

Other options are:

- OMC-160
- Gill format
- Combined NMEA
- Etc.

If you have 2 sensors, connect the Portside sensor to port 1.

Select Combined NMEA if you connect this display as slave to another OMC-131. Use Output 4 of the Master OMC-131 (and set it to output all NMEA).

### 2.2.9 Serial input Port 2: Wind sensor (Starboard) or speed log (VHW) input

**\$GPVHW,xxx.x,T,xxx.x,M,xx.x,N,xx.x,K,\*hh**

(T = Heading in degrees true)

(M = Heading in degrees magnetic)

N = Speed knots

K = Speed km/h

**Only speed data will be used on port 2, for combined heading & speed use port 3 !**

### 2.2.10 Serial input Port 3: Gyro (HDT) or combined heading & speed (VHW)

Default this port is set to Gyro input (NMEA 4800 baud) and expects the following message:

**\$GPHDT,xxx.x,T\*hh<CR><LF>**

T = Heading degrees true

Alternatively Combined heading & speed can be chosen, the system the expects the following message:

**\$GPVHW,xxx.x,T,xxx.x,M,xx.x,N,xx.x,K,\*hh**

T = Heading in degrees true

M = Heading in degrees magnetic

N = Speed knots

K = Speed km/h



### 2.2.11 Serial input Port 4: GPS (GGA & VTG)

Input port is always used for input of GPS information. This can be information of ships speed and heading calculated by the GPS (true speed and heading) and position of ship (longitude and latitude)

Expected messages are , VTG (Course and ground speed) and the GGA message. (see page 9)

**\$GPVTG,xxx.x,T,xxx.x,M,xx.x,N,xx.x,K\*hh <CR><LF>**

T = Course degrees true  
M = Course degrees magnetic  
N = Speed over ground in knots  
K = Speed over ground in km/h  
hh = checksum

**\$GPGGA,hhmmss,llll.ll,a,yyyy.yy,a,b,cc,dd.d,xx.x,M,xx.x,M,gg.g,kkkk\*hh<CR><LF>**

llll.ll = GPS latitude North or South a = N/S  
yyyy.yy = GPS longitude East or West a = E/W  
b = GPS quality indicator 0 = GPS invalid, 1 = GPS fix, 2 = DGPS fix  
cc = Number of GPS satellites being use  
dd.d = Horizontal dilution of precision  
M = Antenna height relative to main sea level  
M = Geoidal separation units in meters  
gg.g = Age of differential GPS data  
kkkk = Differential reference station ID  
hh = Checksum

"b" is used to select at which speed the OMC-131 starts to use the gyro and log information to calculate the true wind speed and direction.

When the quality indicator gives "0" unit switches immediately to gyro and log.

When the quality indicator gives "1" unit goes below 3 knot speed to gyro and log.

When the quality indicator gives "2" unit goes below 1 knot speed to gyro and log.

Output port is used to transmit true and relative wind information in the NMEA-183 format.

Output message,

**\$IIMWV,xxx,T,x.x,M,A\*cscs Theoretical wind message**

**\$IIMWV,xxx,R,x.x,M,A\*cscs Relative wind message**

**\$IIMWV,xxx,M,x.x,M,A\*cscs True wind message (used for True wind displays, like OMC-138)**

"M" means meters per second

"A" means message valid "V" means message invalid

### 2.2.12 Serial input output Port 5

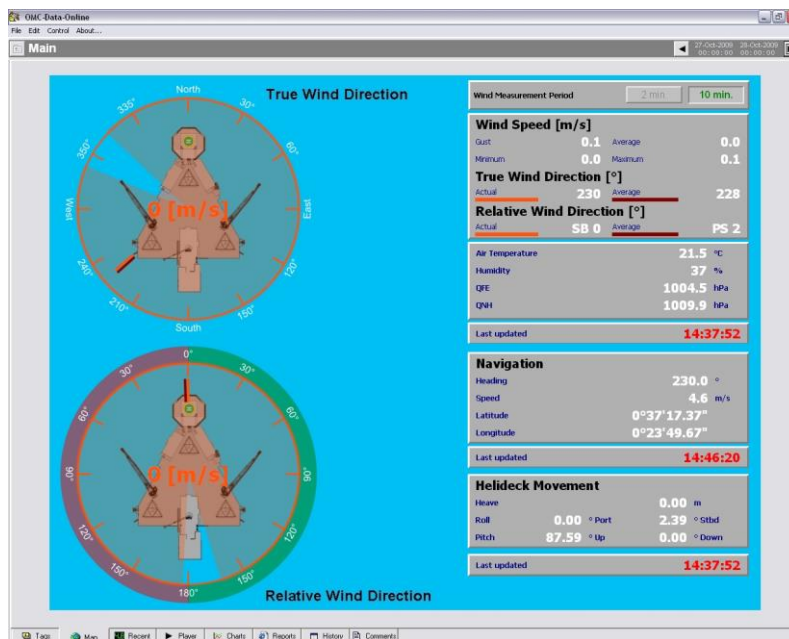
Port 5 uses the connections on the rear of the instrument numbered 25 to 27 in the following way,

- 25 = Ground signal
- 26 = Receive data
- 27 = Transmit data

Within the menu driven software, input or output can be set to transmit or receive data on this port. There are no jumper settings available for input or output port number 5. The default settings for port 5 are RS232 input and output communication speed 9600 bps.

Port 5 can be used for output all the received information to a computer running the OMC-data-online software for capturing the information and showing trend information as well as numeric information. Program stores received information in day files on hard disk. With the correct GPS signals transmitted to the OMC-131, a weather report can be stored on hard disk labeled with the position of the ship at that time.

If position information is to be received from the GPS, the following message from the GPS is expected, GGA Gb al positioning system fix data



### 2.2.13 Analogue input output Port 6

Port 6 is completely different used as the ports 1 to 5.  
The pulse input can be used for either:

1. Dim on distance
2. Puls input speed log (200 ppm)
3. Remote selection between windsensor 1 & 2

The output port 6 are two analogue signals coupled to one of the input and providing 0...1(0) Volt or 4...20 mA over a set range.

The output is non isolated. Use of an external isolator is recommended.

### 2.2.13 Port 6 input

Port 6 uses the connections on the rear of the instrument numbered 28 to 32 in the following way,

28	= - input pulse
29	= + input pulse
30	N/A
31	N/A
32	N/A

As analogue input is optional the IC's needed are standard not installed in the sockets. If analogue is needed the IC's 14 and 15 must be placed in the sockets.

**The pulse input can be used for ships speed input. A signal of 200 pulses per nautical mile is expected.**

### 2.2.14 Port 6 output

The OMC-131 provides an analogue output signal for wind speed and wind direction. This is optional and not as standard available.

On the processor board (middle board) there are some jumper settings to select a current or voltage output signal. There are three jumpers that have to be set in the correct position. In the drawing the selection for a voltage output is set. In jumper field J2 de position 2-3 is selected and in jumper field J3 the jumper settings 1-3 and 2-4 are selected.

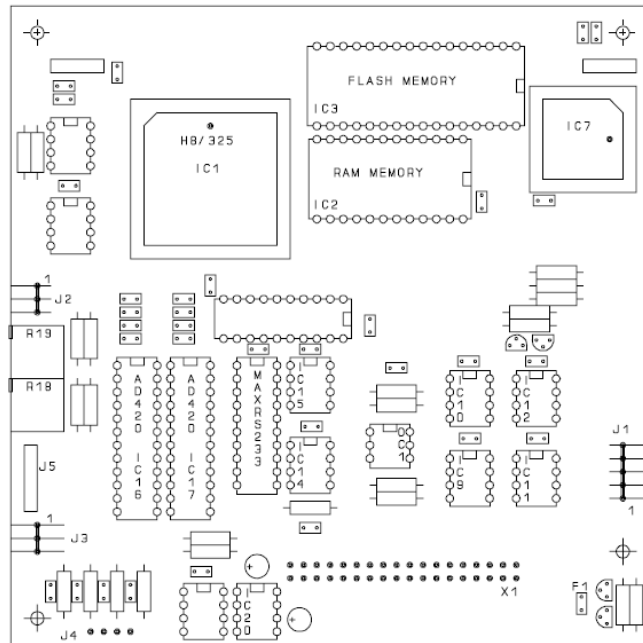
To get a 4...20 mA output the jumpers must be set as follows,

Jumper field J2 set 1-2

Jumper field J3 set 3-5 and 4-6

The potentiometers R18 and R19 are used to set the range of the analogue output signals.

Because the analogue output is optional the IC,s needed for this output are not installed originally. If the analogue output is added after the display has left the factory some IC,s needs to be installed in the correct sockets. For the analogue output the following IC,s have to be installed, IC16, IC17, IC18 and IC20. To select the correct output signal see above for the correct jumper settings.



### 3. Commissioning

Before switching ON the mains, check that the power supply is correct as indicated on the identification label on the rear of the equipment.

With no signal cable connected, switch on the display and observe the front panel LED.s. The system will perform a led test all led are switched on and off one by one. When the test is finished the display shows on the led circle no information and on both speed displays only "---" is shown. This is because no sensor information is received by the display.

#### 3.1 wind sensors relative wind information

Check the voltage at terminals [1] and [2] on the rear panel this should be 15 Volts DC. With all cabling correctly connected, the display will show the relative wind speed and wind direction directly as transmitted by the wind sensor. Sensor should be aligned with respect to the bow of the ship.

Adjustment cannot be made as the sensor-signal is digitally transmitted.

When there is no serial information received from the wind sensor the watchdog circuit in the display unit starts to switch the 15 Volt supply voltage to the sensor ON and OFF. The supply voltage is 10 seconds ON and if none information is received from the wind sensor the supply voltage is switched OFF for 5 seconds. If this is happening during the commissioning check the wiring to the wind sensor.

If two wind sensor are used the same procedure should be followed for the second wind sensor. Which sensor is used can be seen from the indication leds on the front panel. The switching between the sensors is done automatically or if selected by hand via the menu key and the arrow up/down keys. If on automatic, the sensor selected depends on the wind direction. If the wind direction is between 345 and 195 degrees Portside sensor is used, if the wind is blowing from 015 and 165 degrees Starboard sensor is used.

When the display is fully operational and the wind sensor information is not received for more than 5 seconds the display starts flashing indicating that the sensor information is not longer received by the display unit.

If from the speed display inside the led circle the decimal point between the hundred and the ten display is ON the Eeprom has been damaged. Settings for proper operation are most probably lost. The display must be returned to the factory.

**If in doubt about the information shown on the displays, note the following information,**

Relative wind speed  
Relative wind direction  
Ships heading as shown on the OMC-131  
Ships speed as shown on the OMC-131  
Calculate true wind speed  
Calculate true wind direction

Contact Observator Instruments with the above information at hand.



### 3.2 True wind information

To calculate and display the true wind information ships speed and heading is needed. When this information is not received the true display part shows "----" because calculation is not possible.

There are several ways for the OMC-131 to receive the ships speed and heading,

- 1 Heading and speed message from GPS (VTG) and (GGA)
- 2 Heading information from ships instrumentation (HDT)
- 3 Speed information from serial speed log (VHW)
- 4 NMEA-message with **speed and heading** information from ships instrumentation (VHW)
- 5 Speed information via the pulse input (6)
- 6 Heading and speed message from the stepper conversion box (obsolete).

Which message and on which port the information is to be received must be set in the setup menu via the serial port (9 pin D-connector).

When no information is received from the gyro compass, the OMC-131 can not calculate the true wind speed and direction. The true wind part of the display starts to flash or if no information has been received from start-up the true wind display part shown "-----".

If there is no speed information the unit will still calculate the true wind speed and direction but this information will not be correct.

When a valid speed and heading is received from the GPS the display will use this information instead of the gyro heading and the log speed. As soon as the speed in the GPS message becomes more then 3 knots the GPS information will be used. This is shown on the indication leds on the front panel of the display.

When a valid speed and heading is received from the DGPS the display will use this information instead of the gyro heading and the log speed. As soon as the speed in the GPS message becomes more than 1 knots the DGPS information will be used.

**\$GPGGA,hhmmss,IIII.II,a,yyyy.yy,a,b,cc,dd.d,xx.x,M,xx.x,M,gg.g,kkkk\*hh<CR><LF>**

IIII.II	= GPS latitude North or South a = N/S
yyyy.yy	= GPS longitude East or West a = E/W
b	= GPS quality indicator 0 = GPS invalid, 1 = GPS fix, 2 = DGPS fix
cc	= Number of GPS satellites being used
dd.d	= Horizontal dilution of precision
M	= Antenna height relative to main sea level
M	= Geoidal separation (Diff. between WGS-84 earth ellipsoid and mean sea level. -=geoid is below WGS-84 ellipsoid)
gg.g	= Age of differential GPS data
kkkk	= Differential reference station ID
hh	= Checksum

The information GPS or DGPS is taken from the message as shown above. If this message is not available the speed and heading information received from the GPS will be used as GPS information and not as DGPS, meaning fewer than 3 knots ships speed the system switches back to gyro compass and ships log for its information.

Because the commissioning is almost always done along side the key, meaning no ships speed above 1 or 3 knots, the information used to calculate true wind is coming from the gyro compass and the ships log. Indication on front panel should show this.



### 3.3 Communication and ports

Starting from firmware v3.1 the speed information in the VHW message can be read on this port. The heading information on this port is ignored, HDT from gyro is expected on port 3.

If you would like to use the VHW speed AND heading data, you must use port 3. This will replace the gyro (HDT) input.

Expected input message, VHW Water speed and direction.

**\$GPVHW,xxx.x,T,xxx.x,M,xx.x,N,xx.x,K,\*hh**

T = Heading in degrees true  
M = Heading in degrees magnetic  
N = Speed knots  
K = Speed km/h

**\$GPHDT,xxx.x,T\*hh<CR><LF>**

T = Heading degrees true

When only ships heading is available via NMEA-183 protocol the pulse input of input 6 can be used for ships speed input



### Output jumper settings

There are no jumper settings available. The output on port 3 is RS422.

### 3.3.7 Message format

#### Currentloop output OMC-160 message format

The currentloop output is normally used to transport the collected data from the currentloop input. Using the system in this way it is not necessary anymore to output the data as analogue signals which upgrade the performance and the accuracy. The data is transmitted with the same speed as data is received from the wind sensor. 300 baud 8N1.

If the currentloop output signal from the OMC-160 is repeated by the OMC-138 the message looks as follows,

**<LF>D125<sp>V234<sp>>cscs<CR>**

In the above message the transmitted wind direction is the number shown after the indent "D" 125 degrees. the wind speed in the message is shown after the indent "V" 234 is 23.4 m/s. The wind speed is transmitted without decimal point and must therefore be divided by 10 to get the correct wind speed.

The checksum is all information in the string added, the least significant byte is divided into high and low nibble and both nibbles are incremented by hexadecimal 30. This information is sent out as a checksum.

#### OMC-2900 message format

Sometimes the data is transmitted in the OMC-2900 format. This format is used when more parameters are transmitted.

The wind data transported in the OMC-2900 format looks as following,

**<STX><LF>V21.2<SP>CSCS< CR>  
<LF>D156<SP>CSCS<CR><EOT>**

Every message starts with a start of text character after this the messages are transmitted. All messages start with a line feed followed with the identifier for the data, then the data and then a checksum for protection reasons, the message end with a carriage return.

All input channels can be transmitted in this way every second to any receiving station.

#### RS232/RS422 in/output channel

The OMC-2900 and the OMC-160 format on the RS232/RS422 looks the same as the format used in the currentloop output.

There are two possibilities to transmit data in the NMEA output, wind speed can be transmitted in m/s or in knots, both messages are shown below.

**SIIMWV.123.R.5.8.N.A\*24 Wind speed in knots**

**SIIMWV.123.R.5.8.M.A\*27 Wind speed in meters per seconds**

### 3.4 Functions via front panel

On the front panel of the display there are three pushbuttons. The buttons are marked "MENU", arrow up and arrow down. Under normal conditions the buttons marked arrow up and down are used to adjust the brightness of the display.

#### 3.4.1 Units and averaging settings

When the menu button is pressed the led in the average time window starts flashing indicating that the select option is on. It becomes possible now to make a selection using the arrow up and down button. If the menu button is pressed again the led in the unit window starts flashing indicating that the select option is on. With the arrow up and down button it is possible now to select different units for the wind speed.

Menu structure:

**Wind sensor selection → Average interval → Wind speed unit → Menu off**

When the buttons are not touched for 5 seconds the display will return to the normal operation mode (Menu off).

#### 3.4.2 Lamp test

With both arrow buttons pressed all the displays and led's start flashing (lamp test) When the interval time for gust is set to 0 seconds the Gust must be reset manually. this has to be done by pressing the menu and the arrow down button at the same time.

#### 3.4.3 Gust reset

When the average interval 'user' is selected (which is default a 3s average), the maximum gust displayed is the maximum since last reset.

Pressing the buttons 'Menu' & 'Arrow Down' simultaneously will reset the maximum gust value. Minimum gust is not available in this firmware.

#### 3.4.4 Vessel Heading & Speed information

Vessel heading and speed are displayed on the 2 left displays.

Ship speed will be SOG (gps) if available otherwise this will be the speed through water (speed log). Heading is the gyro (HDT) information if available otherwise this will be COG (gps).

#### 3.4.5 Status led's GPS & Gyro

From firmware V3.1 and up

led	GPS	Gyro/log
off	No data received No data expected	No data received No data expected
on	Valid data	Valid data
blinking	Invalid data No GPS data while expected	Invalid data no data while expected

Pre firmware 3.1

Led	ON	OFF
GPS	GPS used for True wind calculation	Input not used
Gyro/log	Gyro / log used for True wind calculation	Input not used

## 4. Maintenance

The Observator Instruments OMC-131 digital display unit has no moving parts, and requires no routine maintenance. If required, the display front can be cleaned with a cloth, slightly moistened with a soft detergent. Care must be taken that no liquid enters the display unit. Solvents should not be used, and scratches should be avoided.

Fuses: Glass fuses 5x20 mm, slow

250mA for 230 Vac

500 mA for 115 Vac

630 mA for 24 Vdc

The fuse can be reached as follows,

Switch of the main supply and disconnect all the wiring on the rear of the display.

Remove the 8 2.5 mm screws and the 4 nuts on the rear of the display.

With holding the front down, the whole case can be removed now.

The fuse can be reached now. The fuse is placed on the PCB where all the wires are connected to.



Select one of the items with the numbers in front of the option.

### 5.1 Input device

With the given options the OMC-131 can be set to customer needs.

If "Select input device" is selected the menu on the right will appear on the screen. The menu shows the actual situation with the words placed in brackets. This actual situation can be changed by selecting a number.

The OMC-131 can handle the information from two wind sensors. If only one wind sensor is used the second wind sensor is disabled as shown.

**"in use" indicates the option is not selectable since it is in use by another function!**

**If you want to enable this function you will need to disable the other function first.**

If number "1" or "2" has been selected a new menu will appear as shown on the right.

With this menu it is possible to select the type of wind sensor used with the system and the transmission speed the sensor is transmitting its information to the rack.

The selected items are marked with an asterisks between the number and the texts.

In the menu the Observator Instruments OMC-160 NMEA wind sensor has been selected with a communication speed of 4800 bps.

The second wind sensor has been disabled.

If the settings have been made press "0" to return to the previous menu.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

1 - Set input device.
2 - Set output device.
3 - Set averaging of channels.
4 - Set options.
5 - Show all settings.
6 - Test instrument.
```

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Instrument input device.

0 - menu back.
1 - windsensor 1 (PortSide)
2 - windsensor 2 (StarBoard) [enabled].
3 - GPS heading / speed [enabled].
4 - Combined NMEA heading / speed [in use].
5 - NMEA Heading [disabled].
6 - NMEA Speed (not implemented) [in use].
7 - Step conversion box [in use].
8 - Speed pulse input 200/nm [on].
9 - Combined NMEA input [off].
Select option : 1
```

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Input windsensor 1 settings.

0 - menu back.
1 - 300 baud.
2 - 1200 baud.
3 - 2400 baud.
4 * 4800 baud.
5 - 9600 baud.
6 - Obsermet sensor.
7 - Gill sensor.
8 - Irdam sensor.
9 * NMEA sensor.
Select option : 4
```



When number "3" is selected the menu as shown on the right will appear.

To get a better accuracy it is possible to use the ships speed and heading calculated by a GPS system if such a system is available and has the correct output signals.

In the menu shown it is possible to select a GPS when the correct information is received from the GPS system. If switched on the correct communication speed must be set. With NMEA-183 this will be 4800 bps.

When number "4" is selected the menu as shown on the right will appear.

On board of some ships it is possible to obtain ships speed and direction from the ships computer. The message is in the NMEA-183 format.

When it is possible to obtain the information, the combined NMEA heading/speed information must be set ON.

Secondly the correct transmission speed should be selected.

If there is no combined message available a separate message, if available can be used.

If switched ON a free input port must be selected where the information is coming in.

Input "2" can be used if no second wind sensor is used.

Input "4" can be used if no GPS has been connected.

If both ports are used port "5" can be used. This port is an RS232 port.

"in use" means hardware input already used.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Input GPS information 2 settings.

0 - menu back.
1 - 300 baud.
2 - 1200 baud.
3 - 2400 baud.
4 * 4800 baud.
5 - 9600 baud.
6 - GPS information off.
7 * GPS information on.
8 - GPS Talker identifier [none].
Select option : █
```

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Input Combined NMEA heading / speed settings.

0 - menu back.
1 - 300 baud.
2 - 1200 baud.
3 - 2400 baud.
4 * 4800 baud.
5 - 9600 baud.
6 - Combined NMEA heading / speed information off.
7 * Combined NMEA heading / speed information on.
8 - NMEA heading / speed Talker identifier [none].
Select option : █
```

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Input NMEA speed settings (not implemented).

0 - menu back.
1 - 300 baud.
2 - 1200 baud.
3 - 2400 baud.
4 - 4800 baud.
5 - 9600 baud.
6 * NMEA speed information off.
7 - NMEA speed information on input 2 [free].
8 - NMEA speed information on input 4 [in use].
9 - NMEA speed information on input 5.
A - NMEA speed Talker identifier [none].
Select option : █
```



If there is no combined message available a separate message if available can be used.

If switched ON a free input port must be selected where the information is coming in.

The information is expected on port "3" and the correct communication speed must be set.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Input NMEA heading settings.

0 - menu back.
1 - 300 baud.
2 - 1200 baud.
3 - 2400 baud.
4 * 4800 baud.
5 - 9600 baud.
6 * NMEA heading information off.
7 - NMEA heading information on.
8 - NMEA heading Talker identifier [none].
Select option : █
```

Some early displays were equipped with a stepper conversion box (which is currently obsolete).

In the menu window shown right the step unit can be switched on or off and if on the correct transmission speed must be set. This is always 1200 bps.

When it is not possible to get ships speed information in NMEA format, the pulse input, normally used for wind speed or remote brightness control, can be used for speed input.

If the ships log provides a potential free relay contact providing 200 pulses per nautical mile, the relay contacts can be connected to the pulse input (terminals 28 and 29). In the menu window on the right option "8" must be selected for this option.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Instrument input device.

0 - menu back.
1 - windsensor 1 (PortSide).
2 - windsensor 2 (StarBoard) [enabled].
3 - GPS heading / speed [enabled].
4 - Combined NMEA heading / speed [in use].
5 - NMEA Heading [disabled].
6 - NMEA Speed (not implemented) [in use].
7 - Step conversion box [in use].
8 - Speed pulse input 200/nm [on].
9 - Combined NMEA input [off].
Select option : █
```

**This input is also used for the remote brightness control or sensor select.  
It can only be used for 1 option!**

## 5.2 Set output device

The main menu is shown again. Select "Set output device" to adjust the communication speed for all the possible outputs.

Select "2" from the menu shown.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

1 - Set input device.
2 - Set output device.
3 - Set averaging of channels.
4 - Set options.
5 - Slow all settings.
6 - Test instrument.
```

The new window shows what can be expected on the different output ports.

The output is fixed, the only thing that can be changed here is the transmission speed for the different output ports.

Select the number in front of the option, if done a new menu window will open as shown below.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Instrument output device.

0 - menu back.
1 - output 1 c1/rs422 All info OMC160/OMC2900 format [9600 baud].
2 - output 2 rs422 NMEA wind output [4800 baud].
3 - output 3 rs422 NMEA wind output [4800 baud].
4 - output 4 rs422 NMEA Wind/All info output [4800 baud].
5 - output 5 rs232 NMEA All info output [4800 baud].
6 - output analog [true].
7 - toggle OMC160/OMC2900 on port 1 [2900].
8 - toggle wind/all info on port 4 [wind].
Select option : █
```

If the analogue output is available, with number "6" of the menu true or relative can be selected for the analogue signal.

Select the correct communication speed the selected port and select "0" to return to previous menu.

If all port are set to the correct communication speed select "0" again to go back to the main menu window.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Output 1 settings.

0 - menu back.
1 - 300 baud.
2 - 1200 baud.
3 - 2400 baud.
4 - 4800 baud.
5 * 9600 baud.
Select option : █
```

for  
the

### 5.3 Set average of channels

The main menu is shown again. Select "Set average of channels" to adjust the time settings for the wind parameters and the analogue output

Select number "3" from the menu shown.

The new window shows what can be set,

The wind speed display part has 3 different average times, 2 are fixed times and set for 2 and 10 minutes.

The third one is called "users" which means that the user can set an average time by him self.

This is done with the menu shown on the right. The first 3 are for the wind direction, the average wind direction and the average wind speed.

The numbers "4" and "5" are the average times used for the analogue output signals.

Number "6" has to do with the gust display reset time. If this average time is set to zero the gust display has to be reset manually. Otherwise it will be reset when the set time here has elapsed.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

1 - Set input device.
2 - Set output device.
3 - Set averaging of channels.
4 - Set options.
5 - Slow all settings.
6 - Test instrument.
```

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Averaging of channels.

0 - menu back.
1 - Direction [3].
2 - Variation direction [3].
3 - Speed [3].
4 - Analog output direction[3].
5 - Analog output speed[3].
6 - Max windspeed reset time[0].
Select option : █
```

### 5.4 Set options

#### 1 - Dim on Distance

Uses the pulse input for brightness Control.

#### 2 - Deviation

Sets wind sensor direction offset

#### 3 - Obsermet Style True wind data

Sets NMEA MWV output to output True to North with T indicator. (for use with old OMC-138 slave displays. **Not recommended!**)

#### 4 - NMEA style Theoretical and Magnetic Wind

Sets NMEA MWV output to Theoretical wind with T indicator. For OMC-138 slave displays the True to North data is send with M (Magnetic) indicator.

#### 5 - Remote sensor select

Sets pulse input to status input for manual wind sensor selection.

#### 6 - Boat rotation

Option to set an offset for the Relative wind direction display only. Should be 0 for standard OMC-131 (use Deviation for sensor offset corrections). For OMC-138 D (boat upside down on display) set to 180 deg.

```
OMC 131 Obsermet True Wind display unit
Software version 3.5

Serial nr : 00000000

Device Options.

0 - menu back.
1 - Dim on distance [off].
2 - Deviation [0 deg].
3 * Obsermet style True Wind data.
4 - NMEA style Theoretical and Magnetic Wind data.
5 - Remote Sensor Select [off]
6 - Boat rotation [180 deg]
Select option : █
```

## 5.5 All settings

When the OMC-131 has been setup or settings have been changed, it is possible to get an overview what settings have been made.

Select number "5" of the menu, the window as shown right will appear.

From both wind sensors the type of sensor as well as the communication speed is shown.

The window shows which input is used for ships speed and heading with the used communication speed.

```
OMC 131 Obsermet True Wind display unit
Software version 3.0

Serial nr : 00000000

Input device : Windsensor 1      NMEA sensor      4800 baud
               Windsensor 2      NMEA sensor      4800 baud
               GPS information    Off
               NMEA combined speed / heading Off
               NMEA heading      Off
               NMEA speed        Off
               Step conversion unit On              4800 baud
               Speed pulse input Off

Output device : 1 9600 baud
               2 4800 baud
               3 4800 baud
               4 4800 baud
               5 4800 baud

Press a key. ■
```

From the output ports the baud rate settings are shown.

For more information press a key.

if a key has been pressed the window on the right appears.

In this window the set range for the analogue outputs is shown with the average times in seconds.

For the wind parameters the "Users" time set are shown in seconds.

Dim on distance is disabled and there is no deviation set for the wind direction.