



OBSERVATOR

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OMC-140 Multifunctional NMEA display

Installation Manual

Version 1.18 2019

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Disclaimer:

Observator Instruments reserves the right to improve their products and therefore specifications might change without prior notice.

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1 Introduction

This manual contains required information for installation, commissioning and integrating the OMC-140 display. For operating the display we kindly refer to the Operators' Guide and Operators' Manual.

Some information will be available in both manuals for your convenience. We do advise to keep the Operators manual at hand as well during installation.

After installation this manual should be kept by the system administrator of the system. It contains information and passwords which could affect the working of the display if used without the proper care.

Observator Instruments products are under continuous development and improvement.
Functionality described in this manual

2 Safety



**Do not open display.
Potential lethal voltages inside.
No user exchangeable parts inside.**



**Indoor use only.
For outdoor use an IP66 or better housing is required.**



For correct functioning of this display the display and connected sensors must be installed according installation instructions.



**Remember: instruments are tools.
They do NOT replace your own observations!**







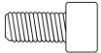
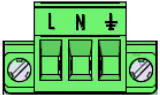
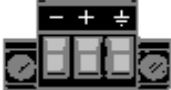


**Note the correct power supply voltage:
Do not connect AC power to DC version of display!**



**After end of life dispose this product according local regulations
or return to manufacturer.**

3 Identification

3.1 Standard Items in the box

Item	pce	Description
	1	Display
	1	Seal for IP22 Panel mounting
	4	Panel mounting screw Nylon
	1	Panel mounting plate
	4	M4 -12mm hex screw
	1*	Green AC power connector (mounted on the display)
	1*	Black 24VDC power connector (mounted on Display)
	2	4 Terminal connector input (mounted on the display)
	1	3 Terminal connector output (mounted on the display)

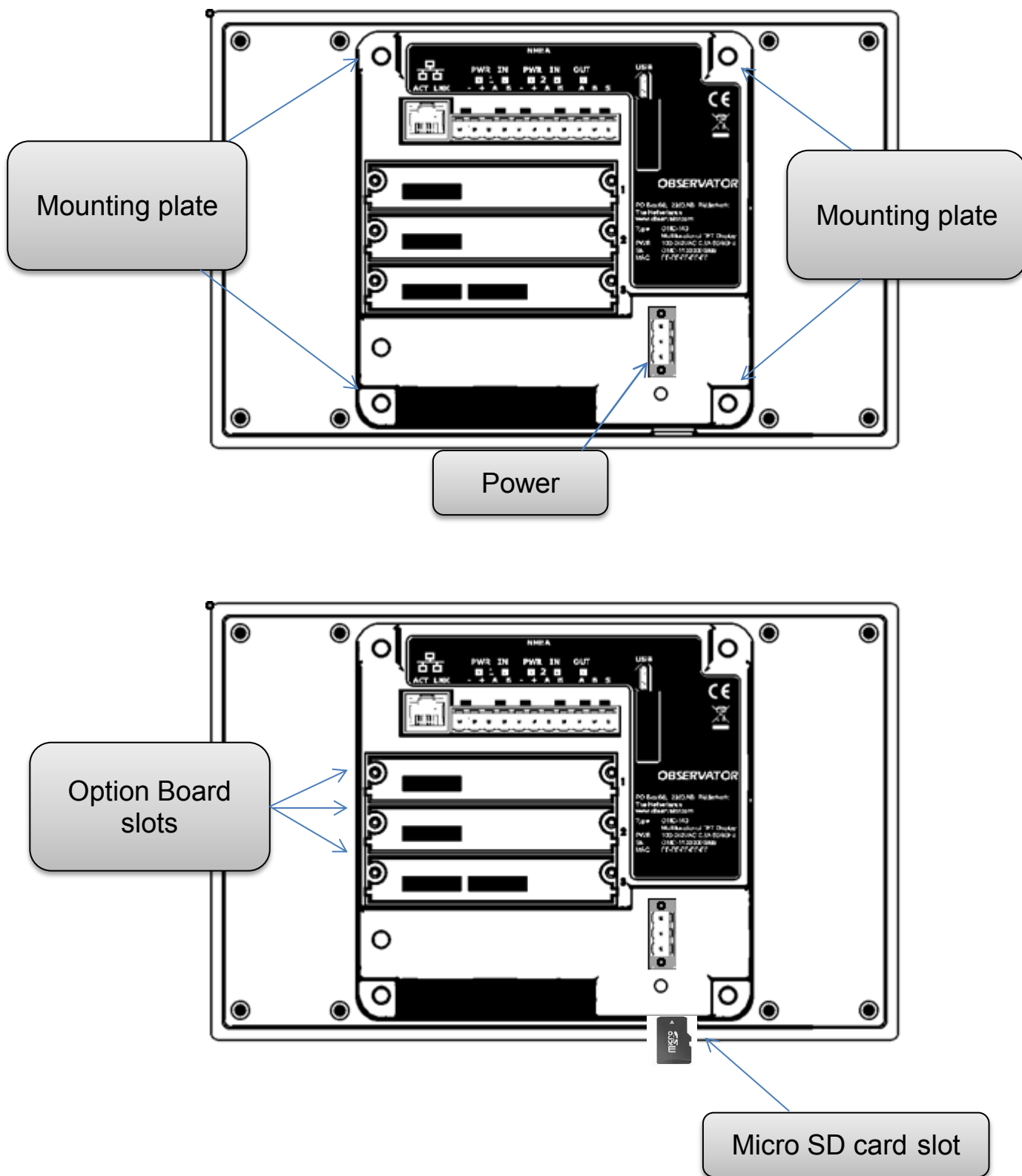
*Either the green (AC) or black (DC) power connector is included.

3.2 Optional items

1. Spacer for 144x144 (retrofit) mounting.
2. Bracket
3. Micro USB cable
4. Cleaning kit
5. 12-24 VDC PSU module
6. Remote control panel
7. Micro SD card max 32GB
8. Power connector cable housing

3.3 Display

Connections are described in [chapter 5 Terminals](#)



3.4 Option modules

If any option modules are included, install them before mounting.

The modules can be installed in any of the 3 slots, but we do recommend to place the DC power module in slot one, which is on top.

3.4.1 Installation Option Modules

Beware of ESD when installing the option modules, wear an antistatic wrist belt, avoid touching any electronics on the module.

1. Remove the protection plate of the slot to be used, save the screws for locking the module later.
2. Remove package of option module
3. Position the module with the connector facing the display on the left side and carefully slide the module in the module slot.
4. Secure the module with the screws from the protection plate.

4 Mounting

4.1 Mounting location

Choosing the right location is important for correct functioning of the display. Please mind the following recommendations:

- Although the display has an antiglare filter it is recommended to choose a position where the display doesn't reflect direct light.
- If the operator will need to operate the display it must be in reach or the optional remote panel should be installed.
- Dimming can also be remotely controlled using the NMEA DCC message.
- Allow enough space for cabling.
- Allow enough space for service.
- Mind the viewing distance according IEC 62288:2014 paragraph 4.3:
 - For the wind speed indication in the center, the character height is 10 mm which corresponds to a nominal viewing distance of 2.85 meters
 - For the other numeric fields the character height is 7 mm which corresponds to a nominal viewing distance of 2 meters

4.2 Mounting position

The display can be mounted either in Landscape (default) or Portrait position. Landscape is preferable since it allows maximum use of the display area. Portrait mode has 2 data positions less.

The display can be panel mounted, desktop or ceiling mounted. For ceiling or desktop mounting an optional bracket is available.

4.3 Panel cut-out

For new installations we recommend to use the large cut-out of 228x142mm. Optional the display can be fitted in the 144x144 position (cut-out 138x138mm) and optional spacer is available. This can be useful for refits (replacement of the OMC-138, 139 or 934 or any other 144 display).

Cut-out drawings can be found in chapter *17 Panel cut-outs*.

IP 22 rating only for 228x142mm panel mount with use of included seal!

4.4 Mounting plate

For panel mount, the display must be fitted first.

Attach the square mounting plate from the back on the position as marked in chapter **Error! Reference source not found.** and tighten the 4 M4 screws without any force.

Secure the display using the 4 Nylon screws, tighten them carefully by hand. If hard to reach a Phillips screwdriver can be used, but do not use any force.

No force should be used to tighten the Mounting clamps and Nylon screws!

5 Terminals

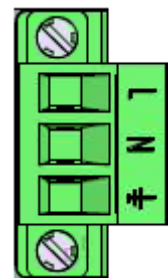
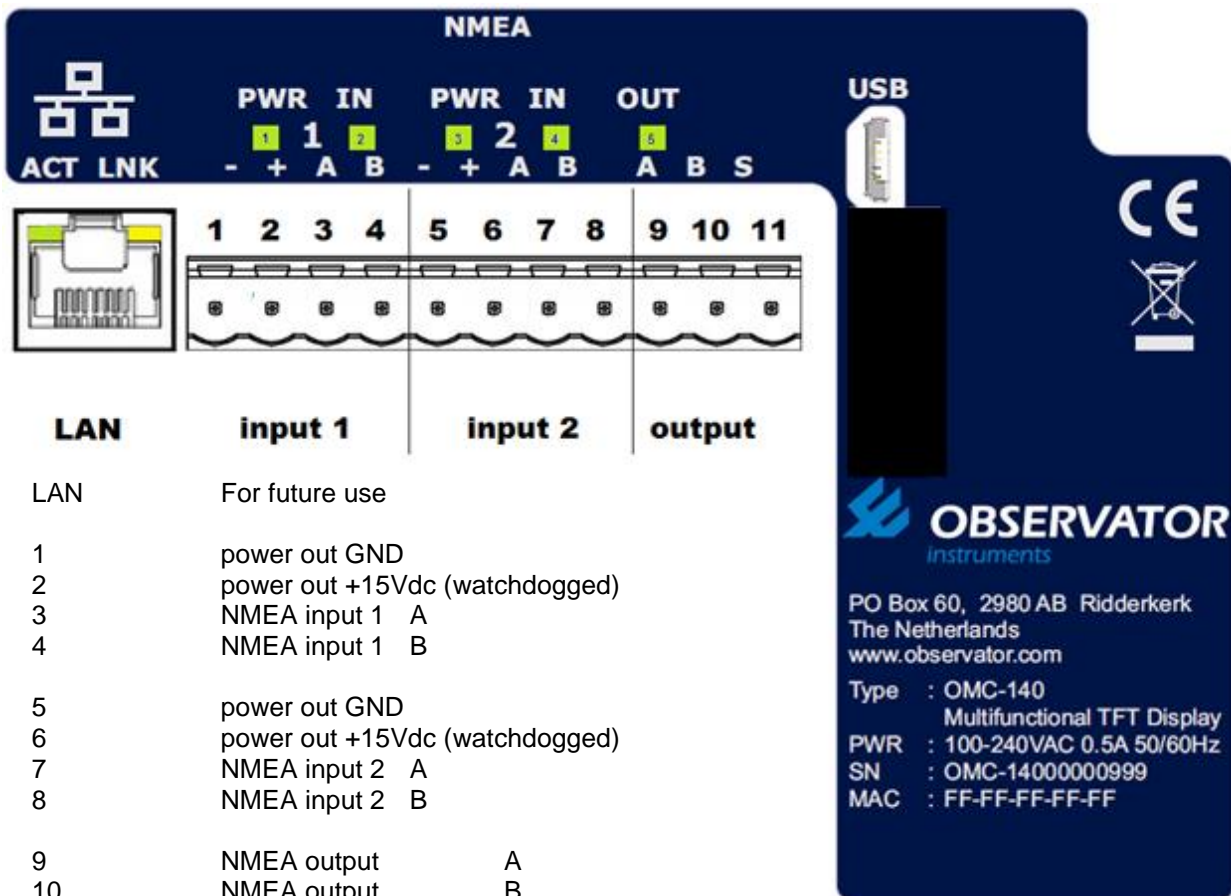
5.1 Sensor connection

The OMC-140 display has 2 isolated NMEA inputs, both with power output available. The power outputs have a configurable watchdog option, whenever no valid signal is received for 10s (default setting), the power will be interrupted to reset the attached sensor.

Use a NMEA multiplexer like Observator MeteoLink whenever you require more NMEA inputs. The display has 1 NMEA output.

All NMEA and Mains terminals are suitable for wires up to 2.5mm².

5.2 Main connections



100 .. 240 VAC
Power
(Green connector)

Optional 24VDC
(Black connector)
see chapter 5.4

*Shield connection is for output only, input shield should never be connected to the display!

5.3 AC Power Connection



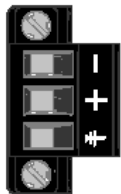
The standard OMC-140 Display accepts AC voltages in the range of 100 .. 240VAC @ 45 .. 65 Hz.

The connection is meant for panel mount installations.

For AC power a green connector is used.

Note: For installations where the AC Mains connection is accessible the optional connector cover must be installed!

5.4 DC power connection



Optional the display can be delivered suitable for 24VDC.

It has a different power supply not suitable for AC power!

The DC power connector is black.

The display is marked to be suitable for DC power (18 .. 32VDC)

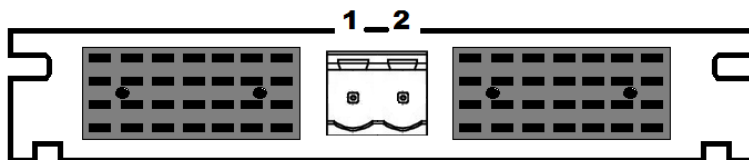


5.5 DC power module connections (optional)

Optional the AC version of the OMC-140 display can be supplied with a DC power module. This enables the display to be powered by both AC and DC power.

Useful if backup power is required.

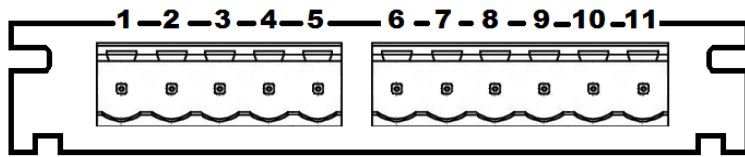
Due to the wide range of the DC input it also allows the display to run on 12VDC.



DC power

- | | |
|---|-------------------|
| 1 | GND |
| 2 | Power +9...+30VDC |

5.6 Remote keypad and relay module (optional)



Left Connector

1 .. 5 Remote Keypad

Right connector: Relay outputs

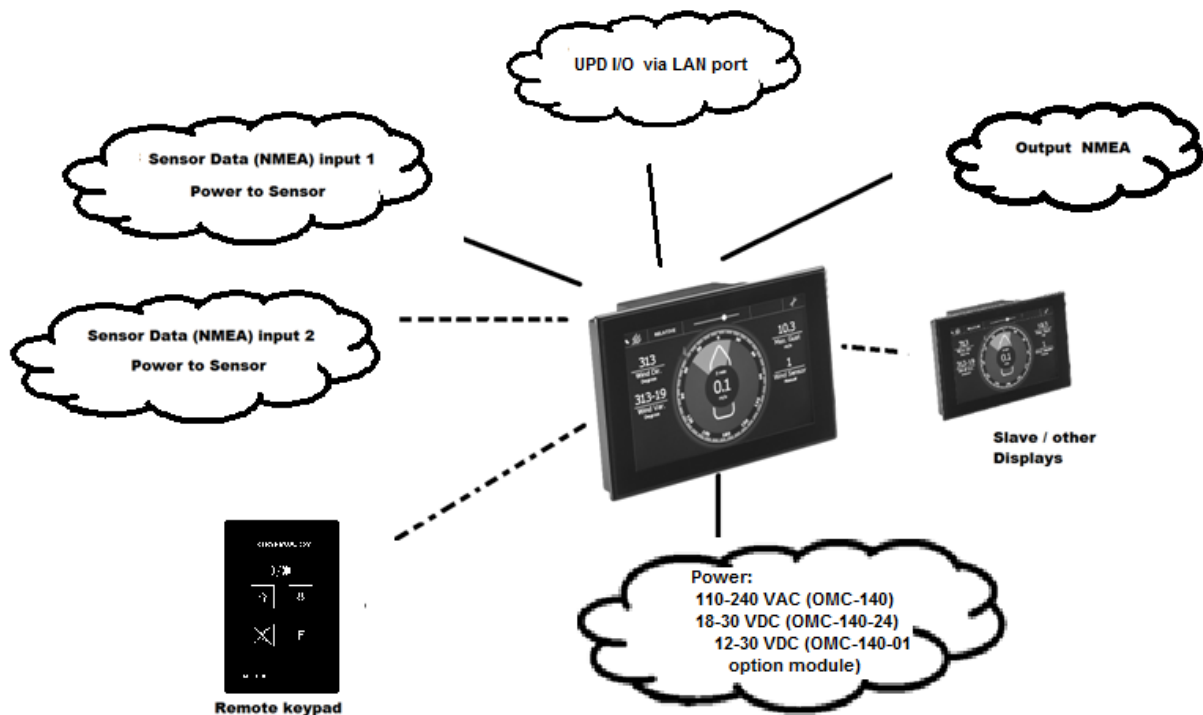
6	Relay 1 NO contact
7	Relay 1 Common
8	Relay 1 NC contact
9	Relay 2 NO contact
10	Relay 2 Common
11	Relay 2 NC contact

5.7 Connections

Connect the data cable(s) for input and output if required.
 Connect the keypad (if applicable).

Finally connect the power cable.
 If the AC connector is used

Details of the terminal connection can be found in the next chapter.



Connection overview

6 Commissioning

6.1 Preparations

Normal configuration can be done via the touch screen, alternatively this can be done via terminal or by loading a configuration from a micro SD card*

The display has an auto configuring function: it will makes functions available based on recognized NMEA 0183 messages.

To fully use the auto configure function all inputs should be connected and operational.

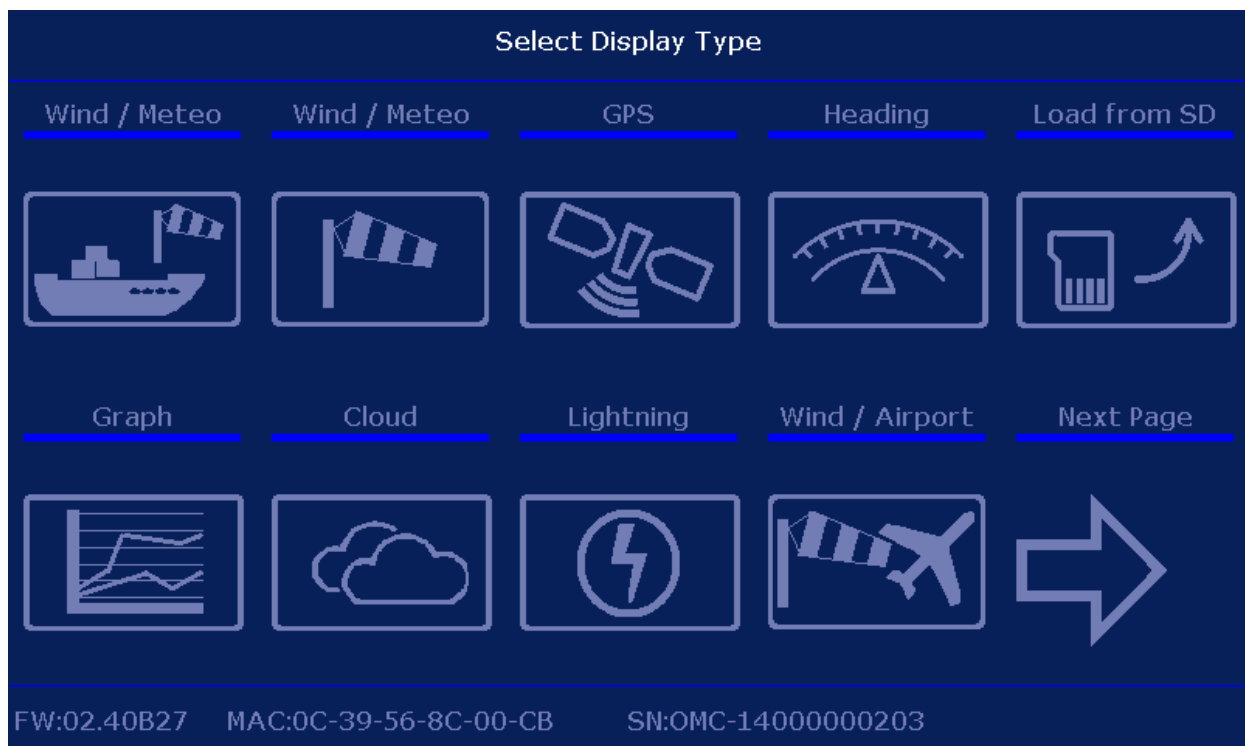
** the SD card is optional, if fitted the configuration will be stored every 24h or whenever the configuration has been changed. The configuration file name is config.dat.*

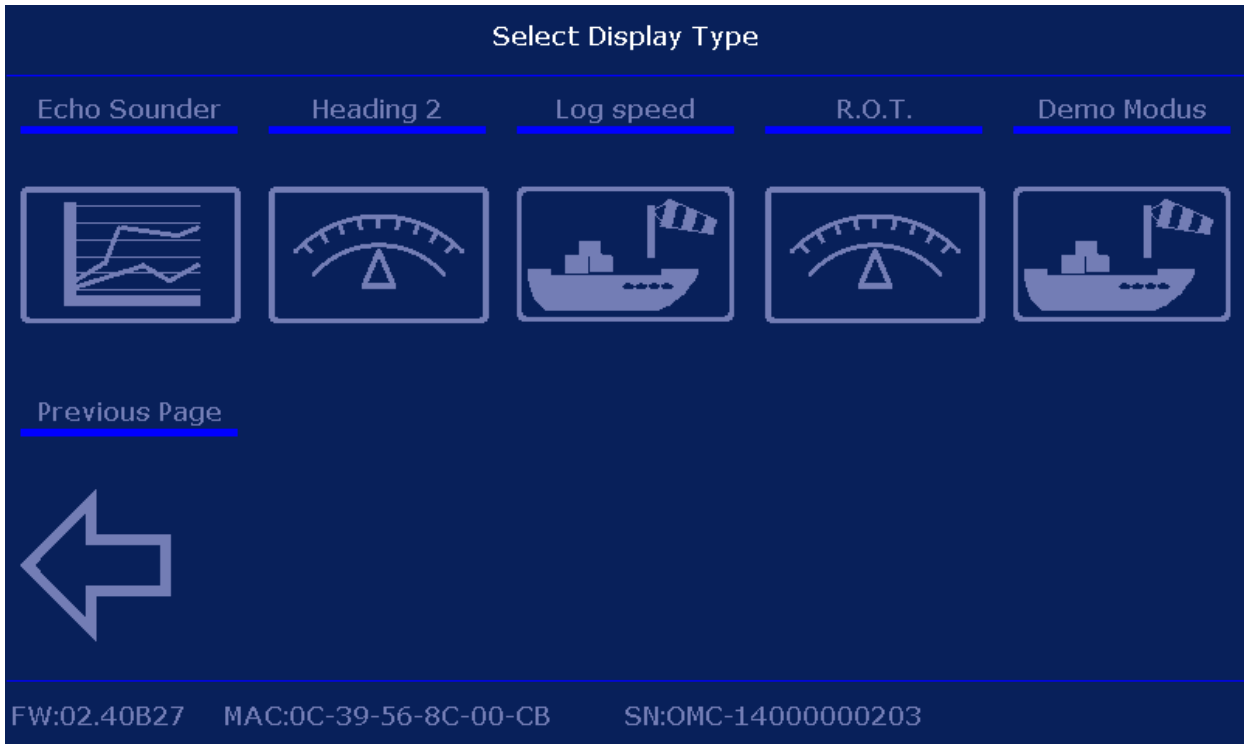
6.2 Display Type Selection

The first time the display is started it will give you the option to select the type.







Perform a Factory Reset if the display has been configured before and you want to select a different type.




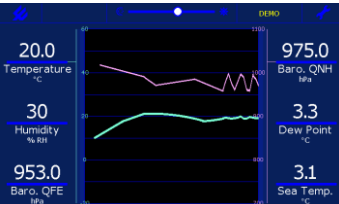

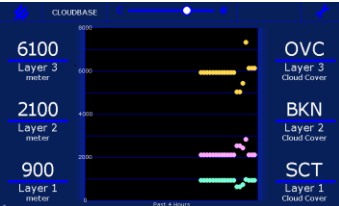

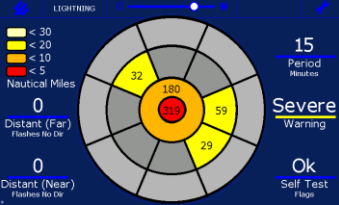



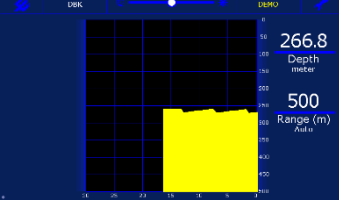



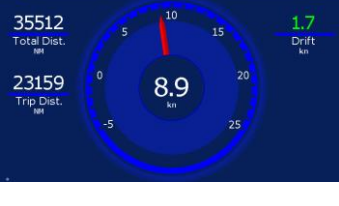
The Factory Reset is described in paragraph 6.4 Advanced.


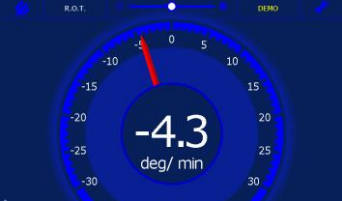






All types can display all accepted NMEA data in decimal format, but each has specific graphics or layout for its purpose:

Symbol	Display type	Specific Features	Front tab
	Marine Wind	Vessel graphic for Relative & Theoretical wind display Wind rose graphic for True wind display	
	Land Wind	Wind rose graphic	
	GPS repeater	Large position field Arrow drift display	

	Heading	Heading and /or Course graphic presentation.	
	Graph	Display up to 6 parameters of which 2 graphical.	
	Cloud	Cloud height and coverage up to 3 layers.	
	Lighting	Lightning display for use with BT3xx sensor	
	Airport	Airborne wind display with runway graphic.	
	Echo Sounder	Graphical water depth + max 6 parameters.	
	Heading 2	Heading display full circle	
	Log speed	Log speed gauge	

	<p>Rate Of Turn</p>	<p>R.O.T. gauge</p>	
	<p>Demo Modus</p>	<p>Demonstration mode, toggle between all available display types.</p>	
	<p>Loads a configuration from the SD card</p>	<p>Filename should be: config.dat</p>	

6.3 Configuration via Touch screen

Once the display type selection has been made and confirmed, the display will start up in the selected type mode.

The display will monitor the inputs and display the data once received.

Default the inputs are set at 4800 baud. If you require 9600 or 19k2 baud, this can be changed via the terminal window accessible via the 'Advanced' menu. This menu has a baud rate scan button and once an input is found the display will auto configure the input for the correct baud rate.

6.4 Advanced

The tab 'Advanced' opens with a code panel.

The following default codes are available:

1382	Advanced setting mode (for System Administrator) This password can be changed via advanced menu.
085	Displays the Operator available codes
0851	Opens terminal window input 1
0852	Opens terminal window input 2
0853	Opens terminal window UDP
0852984	Factory Reset
0851234	Demo mode (for demonstration purposes, enables internal NMEA simulator)

Each code should be followed by [ENTER]

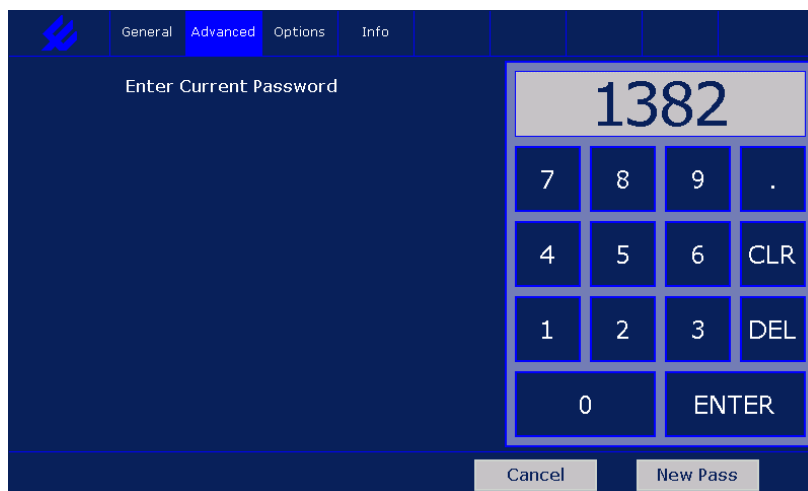
Note: The first 0 will not be displayed on screen whenever typing a code!

6.4.1 Advanced password (default 1382)


The 'Advanced' password is default 1382. This can be changed via the advanced tab. This can be useful when you don't want the operator to be able to edit the advanced settings.

Tap 'New Pass'

You will be asked to type the current password.



Enter the new password




Enter Current Password...Accepted
Enter New Password (4 digit minimum)

12345

7 8 9 .
4 5 6 CLR
1 2 3 DEL
0 ENTER

Cancel New Pass

Confirm password



Enter Current Password...Accepted
Enter New Password...Accepted
Confirm New Password...Accepted
New Password confirmed...
Enter Password to proceed

0

7 8 9 .
4 5 6 CLR
1 2 3 DEL
0 ENTER

Cancel New Pass

New password confirmed.

Cancel will bring you back to the main screen, for advanced options you will have to enter the new password again.

Please note: The password can only be reset to default by a Factory Reset if you lose it!

We will assume your password is 1382 in this manual, if you change it replace 1382 with your own password whenever you follow an example.

6.4.2 Advanced settings

Code 1382 opens settings for the System Administrator on the 'Advanced' page, the 'Front' tab and the 'Sensors' tab. After editing use the Save & Exit button to save any changes or Cancel to discard them.

a. Advanced - Offset sensor 1 & 2 (Wind only)

This function sets an offset to the wind direction of the wind sensor. Use this function for lining up the wind sensor to North or Bow without changing the physical wind sensor position.

b. Advanced - Display Mode

Toggles the screen between Landscape (Default) and Portrait mode. The menu will always be in landscape.

Portrait mode has 2 parameter less available on screen compared to Landscape.

c. Advanced - Marked Discontinuity

With Marked Discontinuity set to 'On' the wind data will also be monitored in 2 minute interval whenever 10 minutes is selected. Under the following conditions the display will automatically switch to 2 minute average interval:

1. The difference in wind speed between 2 minute & 10 minute average is equal to or exceeds 10 kn.

OR

2. The average wind speed is (either 10 minute or 2 minute interval) is equal to or exceeds 10 kn AND the difference in wind direction between 2 minute & 10 minute average interval is equal to or exceeds 30 degrees.

OR

3. The difference in wind direction between 2 minute & 10 minute average is equal to or exceeds 60 degrees.

To indicate a Marked Discontinuity has occurred, the 10 minute average will be shown as <10 minute. The < symbol will disappear when there hasn't been a Marked Discontinuity for the next 8 minutes.

d. Advanced- Wind Alarm

Enable or disables Wind Alarm settings.

Wind Alarm settings can be altered when the Wind Alarm is set to On, otherwise it will be grayed out.

The following parameters can be set:

1. Wind Alarm level
2. Pre Alarm (value may not exceed Wind Alarm value)
3. Hysteresis
4. Alarm Delay

The alarm is triggered by the actual value of the wind speed!

Operator averaging display settings will not have any influence on the trigger value of this alarm.

The alarm function works as follows:

1. The actual wind speed will be used for triggering the alarm (which is basically the gust).
2. You can set a wind speed end- and pre-alarm value.
3. You can set a hysteresis and delay, both will be set identical for pre and end alarm.
4. Delay is set in seconds. The wind speed will need to be above the set alarm value for the set delay time before it is triggered.
5. Hysteresis is set in wind speed and work when the wind speed goes below the set value.

6. The interval setting (instant /user / 2 & 10 minute average) will not influence the alarm behavior.
7. When an alarm situation is reached:

- The beeper will be activated and the display will show (pre) alarm.
- The beeper will sound until it is accepted (by touching the alarm message or pressing the accept button on the optional remote controller).*
- The alarm message will remain until the wind speed is below the set alarm value (minus hysteresis).

** Except when the relay output is set to option 3 Enabled (without user input), see 8.*

8. The optional relay output can be set in 3 modes (only accessible via micro USB terminal menu):

- 1 (default) It follows the display beeper.
Once accepted it will be deactivated.
Useful when an alarm horn is directly connected.
- 2 (enabled) Relay follows alarm status during alarm.
Relay will be deactivated when User has accepted AND alarm situation has been resolved.
- 3 (enabled
(no User acceptance)) Relay and Display follow the actual alarm status
Relay will be deactivated ONLY when alarm situation has been resolved.
Acceptance on the display does not influence the relay status.
Display alarm & beeper will also deactivate once the alarm situation has been resolved.

Example:

*Alarm level: 20 m/s
Pre Alarm: 15 m/s
Hysteresis: 1 m/s
Delay: 10s*

The Pre Alarm will be high when the actual wind speed is over 15m/s for at least 10s.

The Alarm will be high when the actual wind speed is over 20 m/s for at least 10s.

The Alarm will be low when the actual wind speed is below 19 m/s.

The Pre Alarm will be low when the actual wins speed is below 14 m/s.

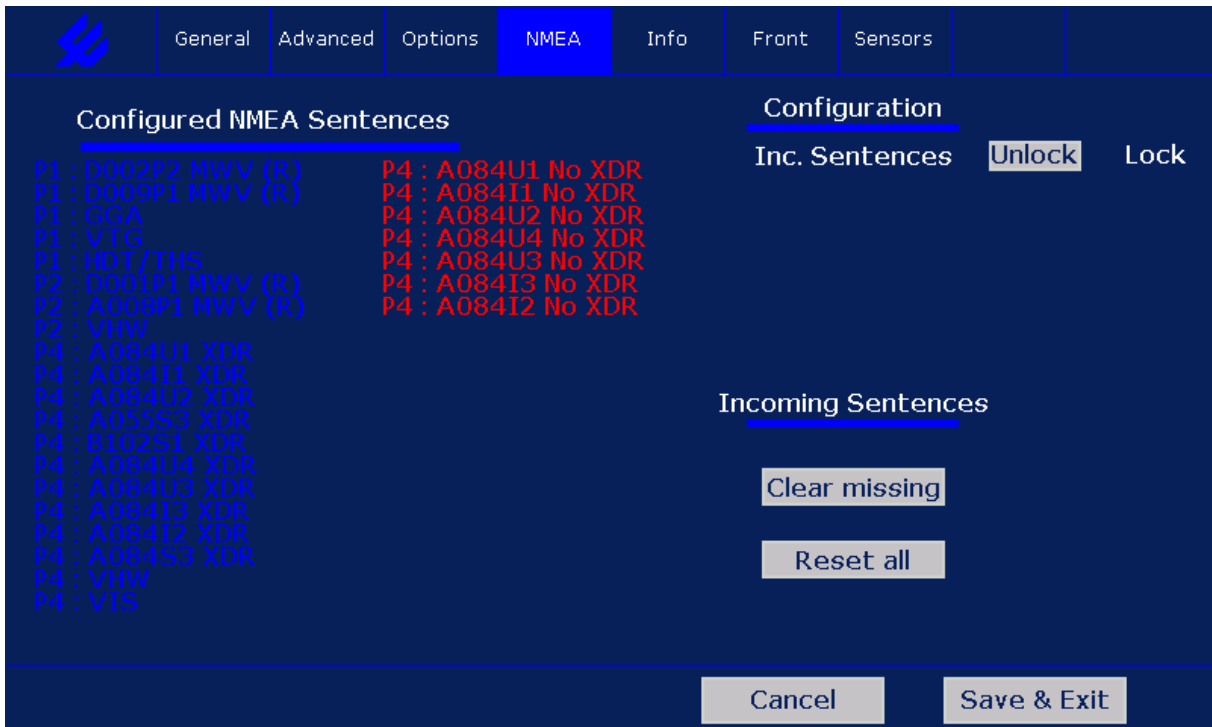
Note: *Alarm levels can be set in any unit (set default unit first in General – Wind Speed). Knots are used as whole Knots (no decimals). Therefore alarms are (de)activated when the wind speed reaches a whole Knot higher or lower than the set value! The other units do use decimals; m/s will result in the highest resolution.*

6.4.1 NMEA

The OMC-140 detects incoming sentences and will add them automatic to the selection list. It will also warn you whenever the sentence is missing (Yellow sensor warning on Front, missing sentences in red op NMEA tab).

This is a very useful function when you are configuring the display, but under some conditions you might want to disable it. Or you have changed your configuration and wish to remove some earlier configured messages, without resetting the display.

For these options some extra functionality has been implemented in the NMEA tab, only available when you are logged in as admin (via advanced menu);



The screenshot shows the NMEA configuration interface. At the top, there are tabs: General, Advanced, Options, **NMEA**, Info, Front, and Sensors. The main area is divided into sections:

- Configured NMEA Sentences:** A list of sentences, some in blue (configured) and some in red (missing).

P1 : D002P2 MWV (R)	P4 : A084U1 No XDR
P1 : D009P1 MWV (R)	P4 : A084I1 No XDR
P1 : GGA	P4 : A084U2 No XDR
P1 : VTG	P4 : A084U4 No XDR
P1 : HDT/THS	P4 : A084U3 No XDR
P2 : D001P1 MWV (R)	P4 : A084I3 No XDR
P2 : A008P1 MWV (R)	P4 : A084I2 No XDR
P2 : VHW	
P4 : A084U1 XDR	
P4 : A084I1 XDR	
P4 : A084U2 XDR	
P4 : A055S3 XDR	
P4 : B102S1 XDR	
P4 : A084U4 XDR	
P4 : A084U3 XDR	
P4 : A084I3 XDR	
P4 : A084I2 XDR	
P4 : A084S3 XDR	
P4 : VHW	
P4 : VIS	
- Configuration:** Includes 'Inc. Sentences' and 'Unlock' (highlighted) and 'Lock' buttons.
- Incoming Sentences:** Includes 'Clear missing' and 'Reset all' buttons.

At the bottom, there are 'Cancel' and 'Save & Exit' buttons.

Configuration (Incoming sentences): Unlock / Lock
 When locked the display will ignore any new sentences.
 Use when your configuration is correct.

We recommend you lock the Incoming Sentences detection once you are satisfied with your configuration.

For the following functions the Configuration needs to be Unlocked:

Clear Missing: Deletes all current missing (the ones in RED) from the list.

Reset all: Empties the complete XDR list.

Use Save & Exit to confirm your actions!

Note: parameters using any of the cleared sentences will be removed from the Front screen!

6.4.2 Front (Screen layout)

Within certain limits it is possible to customize the screen layout.

In Wind mode 6 data fields - 3 left and 3 right of the wind circle – can be altered (in portrait mode this is limited to 4).

In GPS mode 4 lower data fields can be edited.
 In Heading mode only the 2 upper fields can be edited.

The fields can be chosen from the available data.



Tap on a parameter location to toggle through the available parameter options.

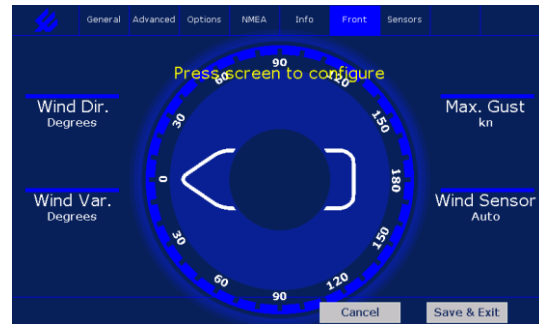
Due to the long list of possible options, the display will default only show available parameters based on received data!

6.4.3 Rotated wind circle & boat symbol



The wind circle & boat can be rotated in steps of 90°. This useful in case the display is mounted sideways or on the aft.

Tap in the middle of the circle to rotate 90° clockwise until the desired position.



6.4.4 Enabling parameters without the actual data

If you do want to preconfigure the screen layout without any sensor data, you can enable data messages via the USB terminal mode:

[how to connect and enter the menu \(see 8 Terminal Mode Configuration\).](#)

Navigate to:

1. Device settings
 1. Display intensity
 2. Sensor 1
 3. Sensor 2

If you already know to which port you will connect select the corresponding sensor port. Otherwise simply open sensor 1. Change the status of the required data from 'Auto' to 'On'

Installation Settings Sensor 1:

1	Baudrate	(4800)
2	Watchdog	(OFF)
3	MWV Relative	(AUTO)
4	MWV Theoretical	(AUTO)
5	MWD True	(AUTO)
6	GGA GPS Quality	(AUTO)
7	VTG GPS Ship Heading	(AUTO)
8	HDT/THS Gyro Heading	(AUTO)
9	VHW Log Speed	(AUTO)
A	XDR Data	(AUTO)
B	GMP GPS Data	(AUTO)
C	GST GPS Data	(AUTO)
D	MHU Humidity Data	(AUTO)
E	MMB Baro Data	(AUTO)
F	MTA Air Temp. Data	(AUTO)
G	MDA Combined Data	(AUTO)
H	MTW Water Temp. Data	(AUTO)
I	VIS Visibility Data	(AUTO)
J	CME Cloud Data	(AUTO)
K	BTD Lightning Data	(AUTO)
L	DBK Depth Data	(AUTO)
M	DPT Depth Data	(AUTO)
N	VLW Water Distance	(AUTO)
O	VBW Water Speed	(AUTO)
P	ROT Rate Of Turn	(AUTO)

Watchdog Time

Q Baro Status (AUTO)
Z NMEA Allow No Checksum (OFF) Port 1 & 2

Once finished leave the menu and save the changes (type 0 until you are asked to save / discard settings, then choose 1 to save).

If you open the 'Front' tab now you should be able to toggle through the parameters corresponding the enabled data.

Once finished use 'Save & Exit' to store your layout.

If you enabled the correct data messages for the correct Sensor ports you are done. But if you are not sure to which Sensor port the data will be sent you will have to change all Data messages set to 'On' back to 'Auto' to be save. The display monitors for the expected data and will give a Sensor 1 or 2 warning whenever expected data (=data set to 'On') is missing.

6.4.5 MeteoLink and OMC-140

With the introduction of MeteoLink, Observator Instruments introduced the option to identify the origin of a sentence in the system by adding a (NMEA compliant) tag in front of the sentence. This way multiple wind sensors all transmitting MWV messages can be identified in one stream, so up to 4 wind sensors can be connected to the display via 1 NMEA cable (or UDP). It will also allow this for other sentences. There is only a selection button available for wind sensors. But you could display multiple temperature sensors for example.

It does make some things a little more complex. The OMC-140 is default set to auto configure and will recognize incoming sentences, add them to the input list including the tag id. The display will monitor the input and warn if messages are missing.

The list for MWV & XDR id's is limited to 15, if the list is full, no sensors will be added!
This is more than enough for any system, but could lead to issues if you make changes to a system.

You should realize identical sentences with different tag id, are not identical sentences for the display. For example: if you would replace an OIC-406 temperature Humidity sensor without any changes to the display configuration, you will have 2 temperature and humidity parameters in your system.

You will notice no temperature & humidity will be displayed, since the OMC-140 display expects data with the 'old' tag id!

To solve this there are several options:

1. Factory reset and (re)configure the display completely
2. Remove unused NMEA sentences (Advanced user login, then Tab NMEA)
Reconfigure temperature & humidity in 'Front'

Option 1:

This is easy: via Touchscreen go to advanced and use code 0852984.

Downside is you will have to do the complete configuration again (but usually it doesn't take much time)

Option 2:

Via Touchscreen go to advanced and login in with 1382

Go to the NMEA tab and check Inc. Sentences under Configuration is set to 'unlock'

Tap on 'Clear missing' (under Incoming Sentences) and again when it pops up large.

Save & exit

Log in again with 1382 and configure the 'new' temperature & humidity

It is recommended to start with an empty list before you make a new configuration!

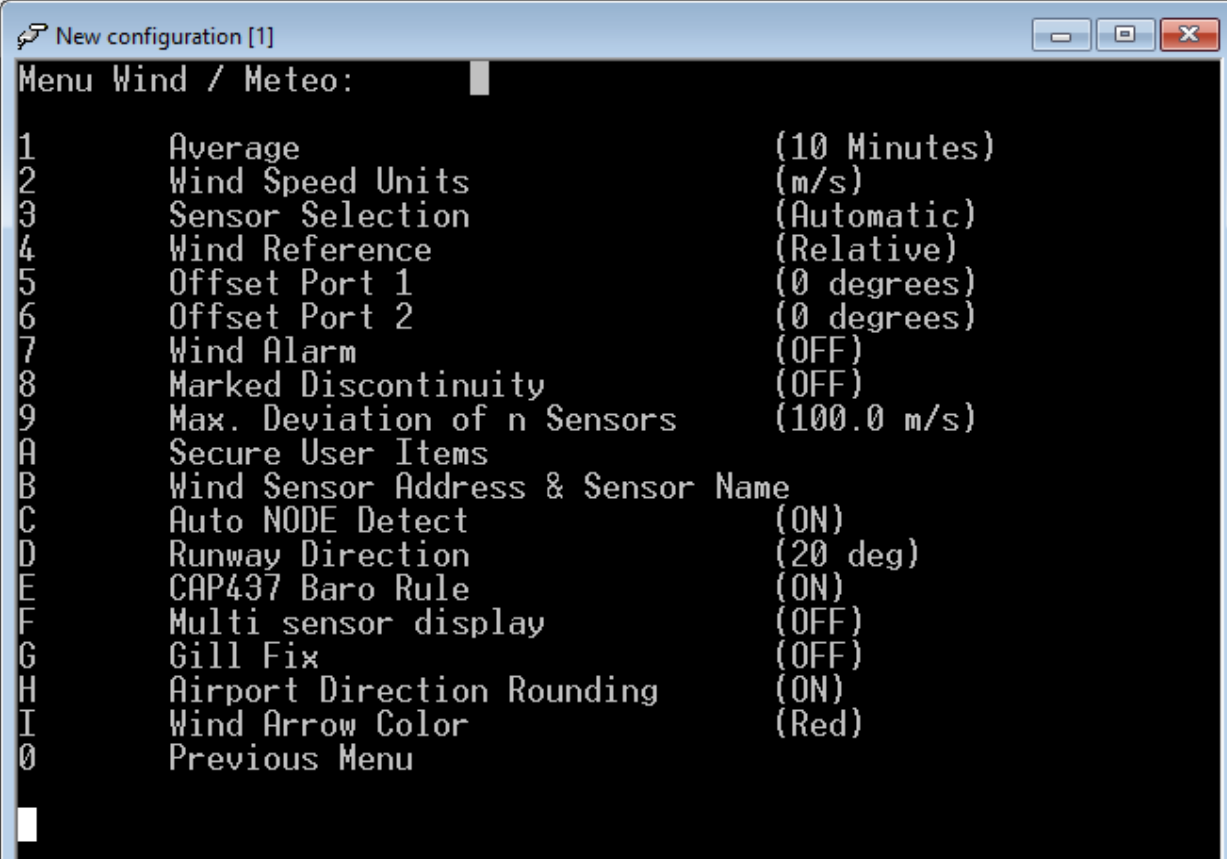
6.4.6 Setting up Airport display

When the Airport mode is selected, some settings will be default changed for Aeronautical use. Other settings will need to be manual configured via the USB menu.

First connect to the display via USB

[how to connect and enter the menu \(see 8 Terminal Mode Configuration\).](#)

In the menu select 2 Wind / Meteo and the following menu should be visible:



```

New configuration [1]
Menu Wind / Meteo:
1      Average                (10 Minutes)
2      Wind Speed Units       (m/s)
3      Sensor Selection       (Automatic)
4      Wind Reference         (Relative)
5      Offset Port 1          (0 degrees)
6      Offset Port 2          (0 degrees)
7      Wind Alarm              (OFF)
8      Marked Discontinuity   (OFF)
9      Max. Deviation of n Sensors (100.0 m/s)
A      Secure User Items
B      Wind Sensor Address & Sensor Name
C      Auto NODE Detect       (ON)
D      Runway Direction       (20 deg)
E      CAP437 Baro Rule       (ON)
F      Multi sensor display   (OFF)
G      Gill Fix               (OFF)
H      Airport Direction Rounding (ON)
I      Wind Arrow Color       (Red)
0      Previous Menu
  
```

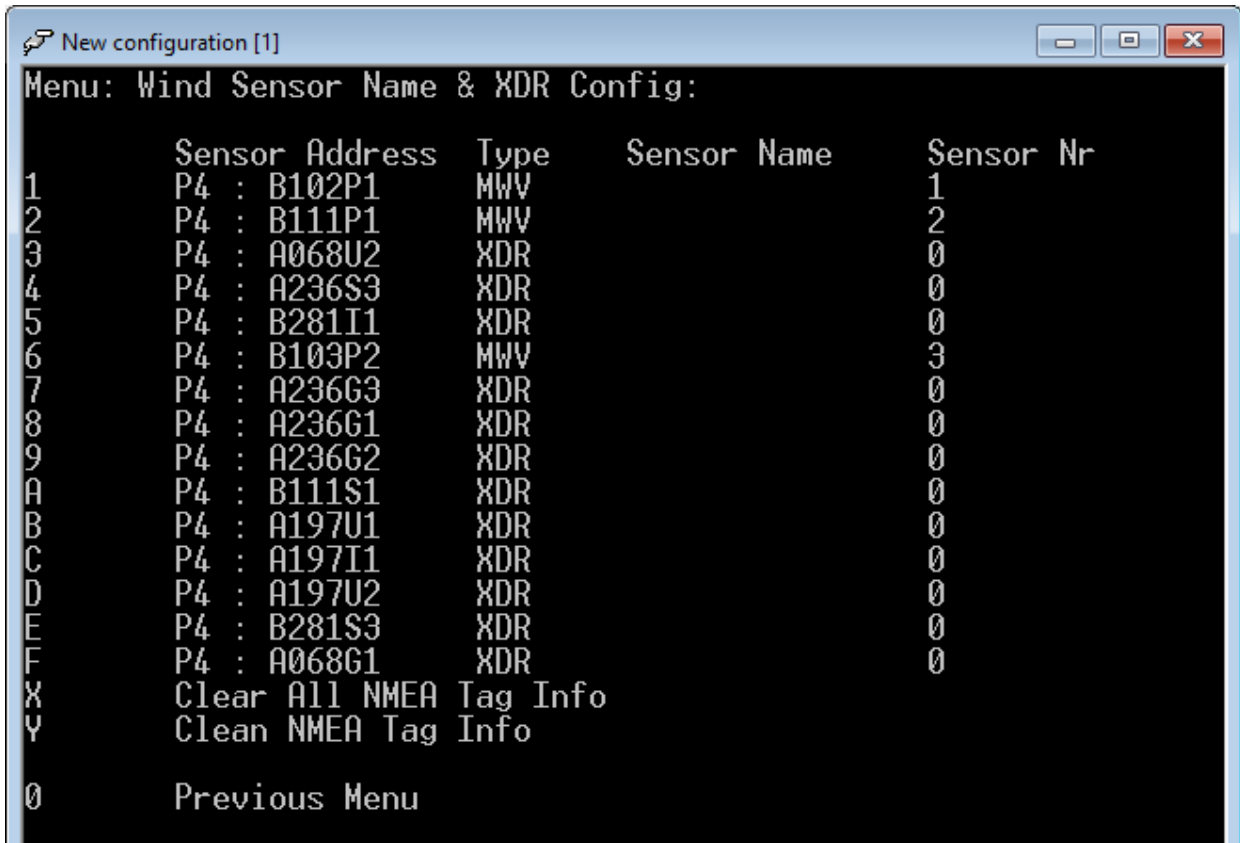
Default the 'Airport Direction Rounding' will be ON (selection 'H').

You will need to set manually the direction of the Runway via 'D'

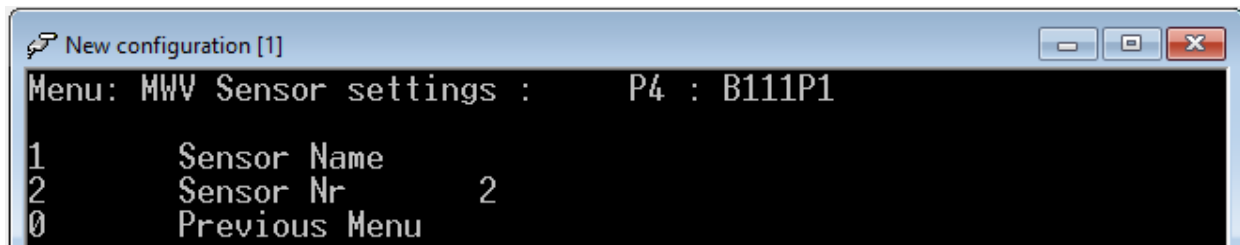
It is also possible to name the connected wind sensors.

The sensor data must have been received by the display in order to change the name!

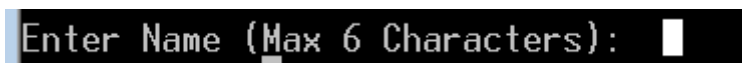
Type 'B' to go to the Wind sensor Address & Sensor Name menu:



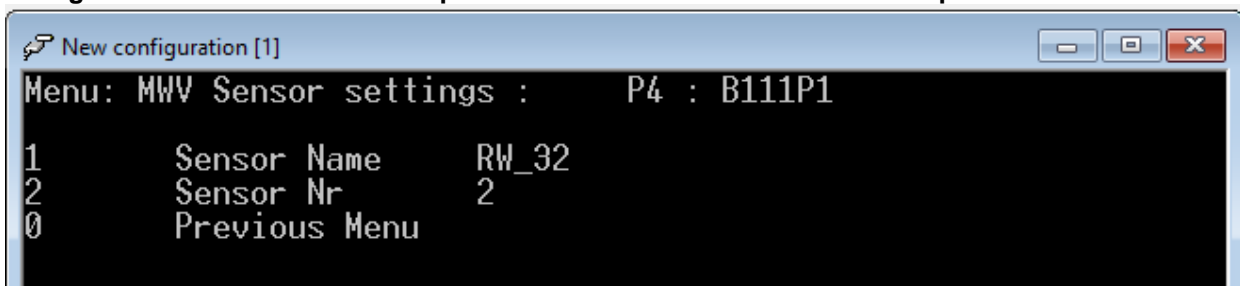
Find the sensor you want to name (Type should be MWV and it will have a Sensor Nr).



Select 1 to change the Name (max 6 characters)



Please note: the 2 middle parameter positions have only space for 5 characters. So if you use 6 change the wind sensor selection parameter / button to one of the corner positions!



Repeat this for the other sensors (if any).

6.4.7 Setting up RAIN (tipping bucket)

In combination with MeteoLink the OMC-140 can calculate Rain per day and Rain intensity. It will also keep track on the total Rain (since reset of the MeteoLink module).

You will need to enable Rain output via the web interface of MeteoLink (see the Meteolink manual). This will result in an update message once every 10s, so the display knows a Rain gauge is connected. MeteoLink will immediate send an update message once a pulse has been received (it won't wait for the 10s interval).

For using the Rain / day parameter the time must be set correct in the OMC-140. If a GPS is connected, it will be corrected automatically, otherwise set the correct time via the USB port in the SD menu (see chapter 7).

Also the mm/pulse must be set (default is 0.2mm) in the USB menu

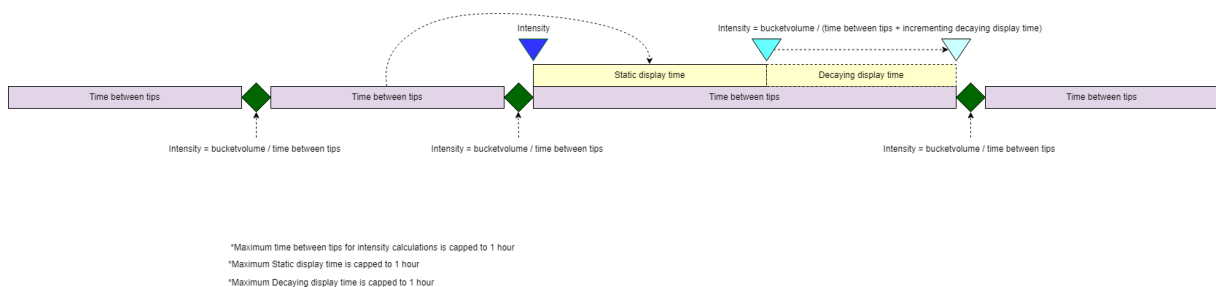
The output of Meteolink is a counter. It runs from 0 to 65000. At 65000 it will be reset to 0. Also depowering MeteoLink will reset the counter. Since the counter value will be send every 10s (or sooner if a pulse has been received), the display will get the correct data even if a message is missed.

The OMC-140 monitors the counter and if a change is detected the Rain counter is added with difference multiplied by the mm/pulse.

The Rain / day will be updated and the Rain intensity will be recalculated.

Rain intensity is somehow limited with use of a tipping bucket rain gauge. It will be calculated in the OMC-140 as follows:

Once an increment in the pulse counter has been detected, the increment will be divided by the measured time between the last and previous increment.



Formula:

$$\text{Rain intensity} = \frac{\text{Last received updated counter value} - \text{previous received updated counter value}}{\text{Time between values}}$$

If no pulses are received the time will go up and the displayed intensity will go down.

When the MeteoLink resets – the counter goes back to 0 – nothing will change until a new pulse (increment) has been received.

The rain intensity will not be correct until at least 2 pulses have been received!

6.4.8 Changing Rain gauge bucket size

Default the bucket size is set to 0.2mm per pulse. The size can be changed via the USB menu.

From the main menu choose: **2 Wind / Meteo**

```
Menu Wind / Meteo:
1 Average (10 Minutes)
2 Wind Speed Units (kn)
3 Sensor Selection (Automatic)
4 Wind Reference (Relative)
5 Offset Port 1 (0 degrees)
6 Offset Port 2 (0 degrees)
7 Wind Alarm (OFF)
8 Marked Discontinuity (OFF)
9 Max. Deviation of n Sensors (100.0 m/s)
A Secure User Items
B Wind Sensor Address & Sensor Name
C Auto NODE Detect (ON)
D Runway Direction (0 deg)
E CAP437 Baro Rule (ON)
F Multi sensor display (OFF)
G Gill Fix (OFF)
H Airport Direction Rounding (ON)
I Wind Arrow Color (Red)
0 Previous Menu
```

Choose: **B Wind Sensor Address & Sensor Name**

```
Menu: Wind Sensor Name & XDR Config:
Sensor Address Type Sensor Name Sensor Nr
1 P1 : B227S1 XDR 0
2 P1 : A157S3 XDR 0
3 Not Used
4 Not Used
5 P1 : B227P1 MWV 1
6 P1 : A157R1 XDR 0
7 Not Used
8 P1 : B227I1 XDR 0
9 Not Used
A Not Used
B Not Used
C Not Used
D Not Used
E Not Used
F Not Used
X Clear All NMEA Tag Info
Y Clean NMEA Tag Info
0 Previous Menu
```

Find the pulse input, which will be a sensor address ending on **R1** and type **XDR** (number 6 in this example).

```
Menu: XDR Node : P1 : A157R1
/*****\
| XDR | Display |
|-----|-----|
| Type Unit Trans.ID | Name Unit Dec. Factor Offset |
|-----|-----|
1 G RP Rain mm 1 0.200000 0.000000
2 Empty
3 Empty
```

Choose **1** to open the Rain settings:

```
Menu: XDR Node setting: P1 : A157R1
1      Type                G
2      Unit                 None
3      Transducer ID       RP
4      Display Sensor       Rain
5      Display Unit         mm
6      Display Decimals     1
7      Display Factor       0.200000
8      Display Offset       0.000000
0      Previous Menu
```

Choose **7** to change the bucket size and enter a Factor (0.1 in this example)

```
Menu: XDR Node setting: P1 : A157R1
1      Type                G
2      Unit                 None
3      Transducer ID       RP
4      Display Sensor       Rain
5      Display Unit         mm
6      Display Decimals     1
7      Display Factor       0.200000
8      Display Offset       0.000000
0      Previous Menu

Enter a Factor : 0.1
```

Confirm with **[Enter]**

```
Menu: XDR Node setting: P1 : A157R1
1      Type                G
2      Unit                 None
3      Transducer ID       RP
4      Display Sensor       Rain
5      Display Unit         mm
6      Display Decimals     1
7      Display Factor       0.100000
8      Display Offset       0.000000
0      Previous Menu
```

Return to main menu by pressing '0' until you are asked to exit.
 Choose **save settings** otherwise all changes will be lost.

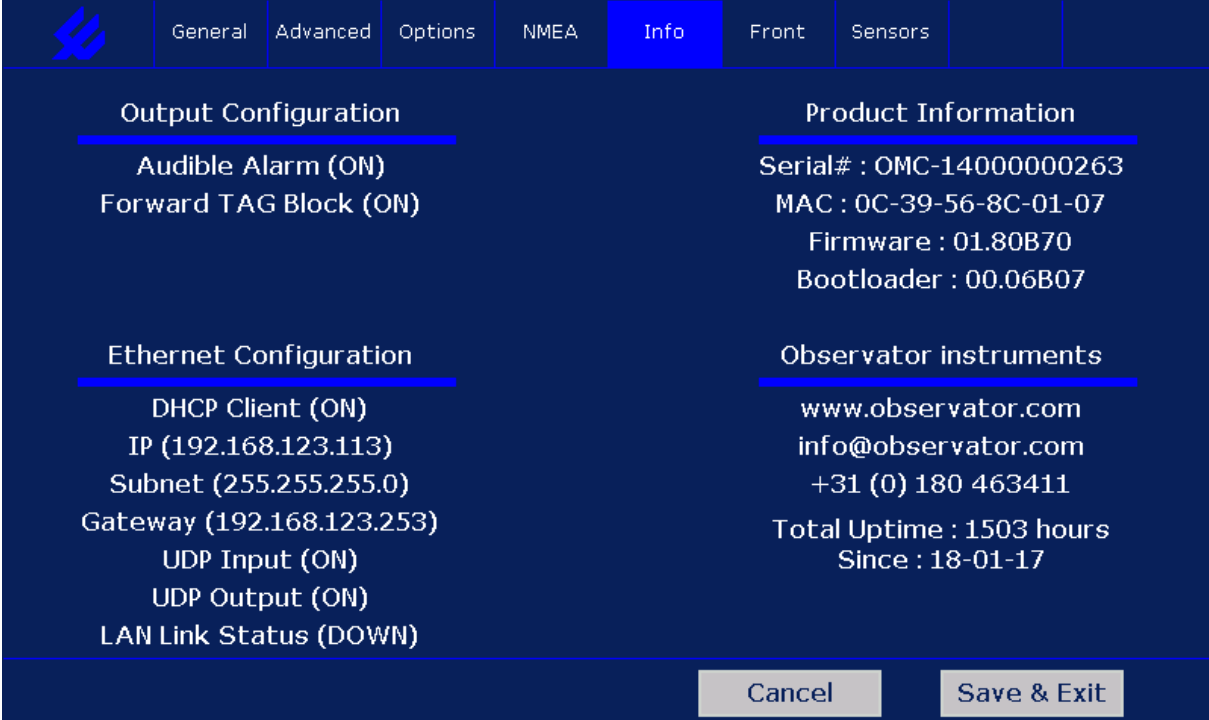
6.4.9 Sensors

This tab shows the VER data of connected sensors.

6.5 I/O UDP LAN (NMEA over Ethernet)

This function will give you great flexibility
 IEC 61162-450 compliant.

It will work in combination with the MeteoLink SMART-node, but also with other OMC-140 displays.
 On the Info tab the Ethernet status can be found:

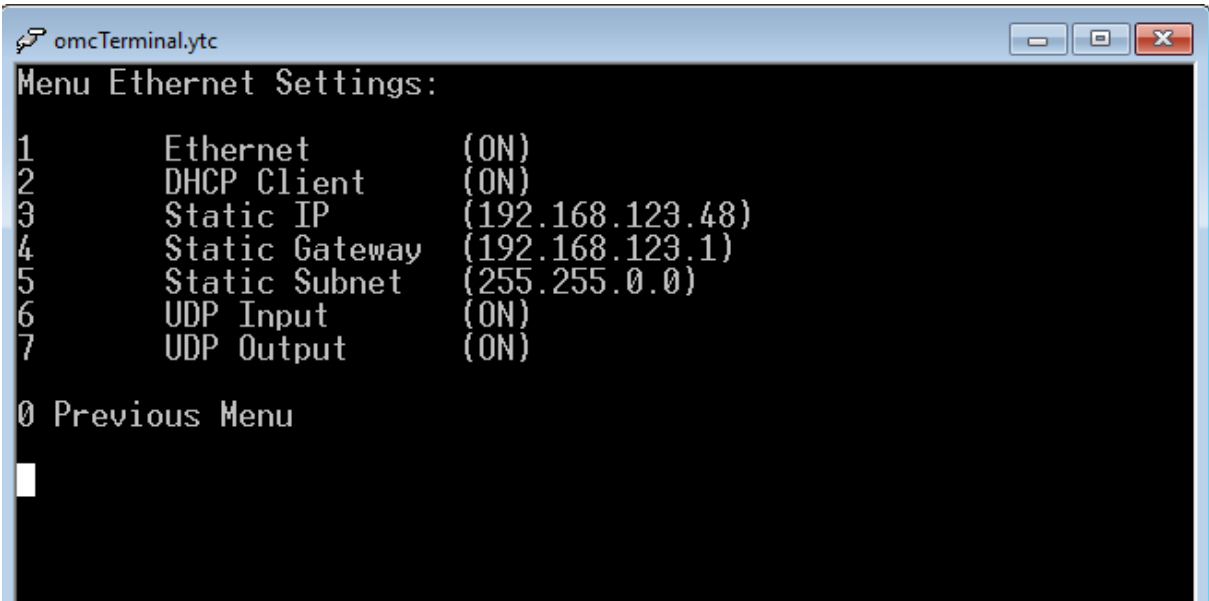


Output Configuration	Product Information
Audible Alarm (ON)	Serial# : OMC-14000000263
Forward TAG Block (ON)	MAC : 0C-39-56-8C-01-07
	Firmware : 01.80B70
	Bootloader : 00.06B07
Ethernet Configuration	Observator instruments
DHCP Client (ON)	www.observator.com
IP (192.168.123.113)	info@observator.com
Subnet (255.255.255.0)	+31 (0) 180 463411
Gateway (192.168.123.253)	Total Uptime : 1503 hours
UDP Input (ON)	Since : 18-01-17
UDP Output (ON)	
LAN Link Status (DOWN)	

Settings can be done via USB menu:

Main Menu:

7. Ethernet Settings



```

omcTerminal.ytc
Menu Ethernet Settings:
1 Ethernet (ON)
2 DHCP Client (ON)
3 Static IP (192.168.123.48)
4 Static Gateway (192.168.123.1)
5 Static Subnet (255.255.0.0)
6 UDP Input (ON)
7 UDP Output (ON)
0 Previous Menu
  
```

6.5.1 Connections via UDP

UDP offers several options for high speed connections between OMC-140 displays and MeteoLink.

The system uses port 60004, so make sure this port is open in your network.

Via a router:

The easiest way is using a router. Default the OMC-140 has UDP in- & output enabled and the DHCP client is on. Wind data will be transferred via UDP between all OMC-140 displays if a MeteoLink Smart node is in the network its data will also be available.

You only need to enable additional sentences in the display for output if for instance you have gps and/or gyro connected to 1 display and you want to share with other OMC-140 displays in the network.

1 on 1 connection between 2 OMC-140 displays:

It is possible to connect 2 OMC-140 displays via UDP without a router, but it will require some manual configuration.

Ethernet settings

1 Ethernet	(ON)	
2 DHCP Client	(OFF)	
3 Static IP	(192.168.0.1)	(192.168.0.2) for 2 nd display
4 Static Gateway	(192.168.0.10)	(not used for 1 on 1 connection, doesn't really matter)
5 Static Subnet	(255.255.255.0)	
5 UDP Input	(ON)	
6 UDP Output	(ON)	

If you want to share other data `than wind they check USB menu:

1. Device Settings:/ 4 Serial Output/ 4 NMEA Sentences

And set the required sentences ON for output (NMEA out and UDP out are set simultaneously)

1 on 1 connection with MeteoLink SMART node:

Leave default settings (DHCP client ON).

The SMART node runs a DHCP server when it doesn't get an IP address and will assign an IP address to the OMC-140.

The SMART node has only output on UDP, so no data from the OMC-140 will be read via UDP.

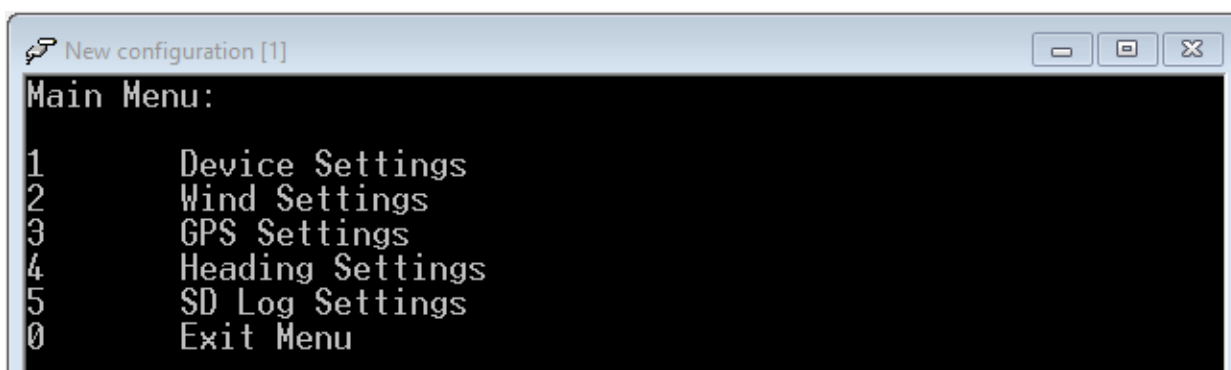
7 Data log function

7.1 Introduction

In firmware version 2.4B27 the improved data log function has been added. From this version and up all relevant data can be logged on a Micro SD card and will be stored per day in .txt files.

7.2 Data log function settings

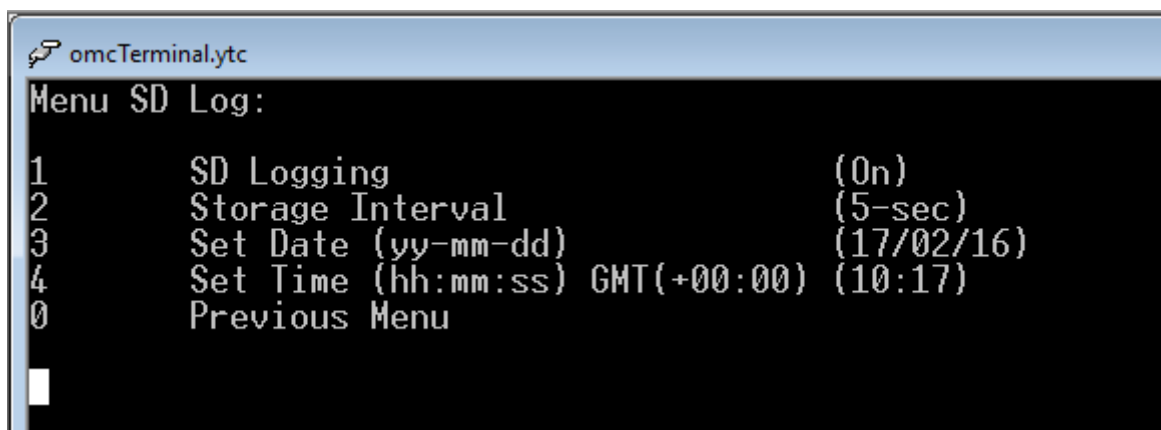
The data log function can be enabled using the USB menu, for USB menu connection details see chapter 8 Terminal Mode Configuration.



```

New configuration [1]
Main Menu:
1      Device Settings
2      Wind Settings
3      GPS Settings
4      Heading Settings
5      SD Log Settings
0      Exit Menu
  
```

All log related functions are in the menu **5 SD Log Settings**.



```

omcTerminal.ytc
Menu SD Log:
1      SD Logging                (On)
2      Storage Interval          (5-sec)
3      Set Date (yy-mm-dd)       (17/02/16)
4      Set Time (hh:mm:ss) GMT(+00:00) (10:17)
0      Previous Menu
  
```

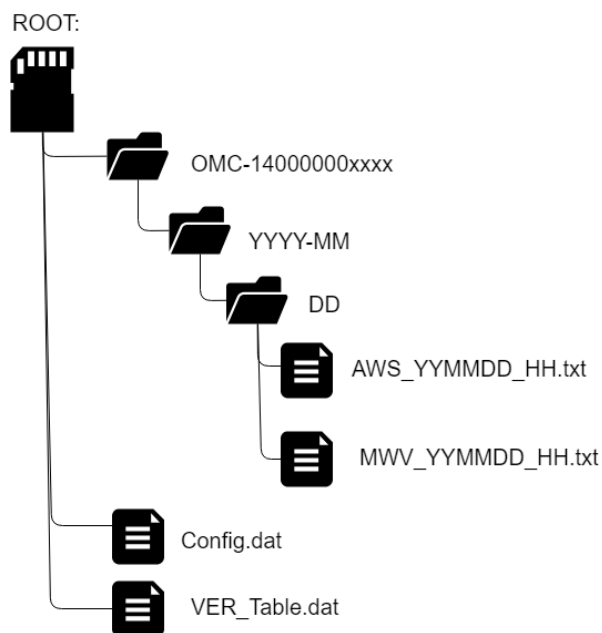
- | | |
|---------------------|--|
| 1. SD logging | <i>On or Off</i> |
| 2. Storage interval | 10 minute, 2 minute or 5 second interval |
| 3. Set Date | Option to correct the date
Format: =yy/mm/dd (the '=' must be included!) |
| 4. Set Time GMT | Option to correct the time:
Format: =hh:mm:ss (the '=' must be included!)
* GPS message at noon (if available) |

* Once SD logging is selected *On* GGA message is available; time will be daily synchronized with the UTC time. Since date is not in the GGA message this will not be synchronized like the time!

7.3 Storage

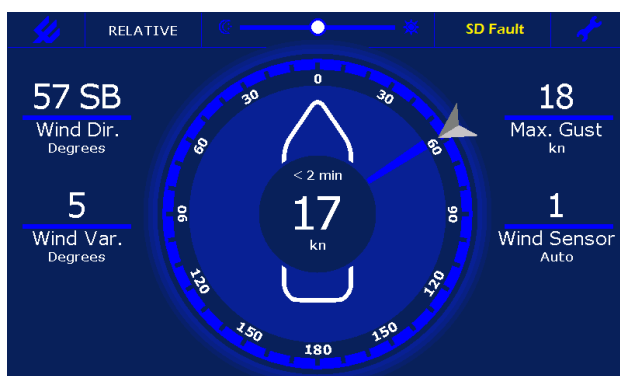
Starting from firmware 2.5 the SD log functionality has been improved. The data format has changed from the OMC-data logger protocol to NMEA style. You will have the option to log wind data in MWV format once a second and / or all relevant Meteorological data in an AWS data string once a minute. The AWS string is compatible with TurboWin (developed by KNMI the Dutch Meteorological authority and used by most Meteorological authorities worldwide to collect data).

7.4 Structure



7.5 Functional information

In case the display is not able to write to the SD card, the user is notified with the following message in the main screen: 'SD fault'.



On the *NMEA tab* page the following information is available in the bottom line:

SD card status:	SD-Card OK Insert SD-Card	SD-card missing, not accessible or full Please insert or replace an SD-card
-----------------	-------------------------------------	--

Available space in GB It will take one Storage interval before the correct value is displayed (after card-insertion or power cycle).

Storage Interval 1 seconds for MWV, 1 minutes for AWS



7.6 Parameters

The following parameters will be logged if they are available:

Parameter	Value	source	Average
NMEA identifier	\$PEUMB	n.a.	n.a.
Date	15 of July, 2012	RTC	n.a.
Time (UTC)	09:02:27	RTC	n.a.
Latitude, 10min average	52,405 ° N	GGA	Median 1 min
Longitude, 10min average	5,338 ° W	GGA	Median 1 min
Course over ground, 10min average	192.0 °	VTG	10 min Avg
Speed over ground, 10min average	5.2 m/s	VTG	10 min Avg
True Heading, 10min average	184.0 °	HDT, THS	10 min Avg
barometric pressure at sensor level, 1min median	997.4 hPa	XDR	Median 1 min
barometric pressure at sea level	998.6 hPa	XDR	Median 1 min
pressure tendency over three hours	+ 2.3 hPa	Calculated	Delta 3 Hours
tendency characteristic	2	Calculated	n.a.
air temperature, 1min median	16.0 °C	XDR	Median 1 min
Relative humidity, 1min median	87.5 %	XDR	Median 1 min
water temperature (SST), 1min median	Missing value	XDR	Median 1 min
relative wind speed, 10min average	9.4 m/s	MWV	10 min Avg
relative wind direction, 10min average	98.5 °	MWV	10 min Avg
true wind speed, 10min average	12.5 m/s	MWV	10 min Avg
true wind direction, 10min average	55.2 °	MWV	10 min Avg
maximum true wind gust speed from 10min	15.2 m/s	MWV	10 min Avg
maximum true wind gust direction from 10min	44.0 °	n.a.	10 min Avg
supply voltage	24.2 V	n.a.	n.a.

internal temperature	18.8 °C	n.a.	n.a.
VOT : visual observation acquisition trigger	n.a.	n.a.	n.a.

Example NMEA AWS sentence:

*\$PEUMB,20120715,090227,52.405,-5.338,192.0,5.2,184.0,997.4,998.6
,2.3,2,16.0,87.5,,9.4,98.5,12.4,55.2,15.2,44.0,24.2,18.8,
-38,,, <CR><LF>*

8 Terminal Mode Configuration

More advanced settings can be done in terminal mode via the micro USB port.

You will need to install the correct USB driver first. This can be downloaded from our website:

<http://www.observatormeteohydro.com / support / software>

You will need a terminal program like **OMC-terminal** which can also be downloaded from above page, but you are free to use any other terminal program.

Unzip and install the driver.

After installation connect the USB cable to the display and your pc.

Start the terminal program, settings:

Select right com port

9600 baud

8 bits

No parity

1 stop bit

No Flow control

Once connected type: **menu [Enter]**

The following menu should appear:

Main Menu:

- 1 **Device Settings**
- 2 **Wind / Meteo Settings**
- 3 **GPS Settings**
- 4 **Heading Settings**
- 5 **SD Log Settings**
- 6 **Graph Settings**
- 7 **Ethernet Settings**
- 0 **Exit Menu**

You can find the full menu structure in [chapter 15.Menu Structure Terminal Mode](#)

9 Terms, Abbreviations & Symbols list

9.1 Terms & Abbreviations

Advanced	Advanced menu protected by password
Average	Interval over which the average wind speed & direction is calculated
Dimming Control	Selected means of regulation of the backlight
Options	Option slot information
QFE	Barometric Pressure at Runway Level
QNH	Barometric Pressure at Sea level
Relative	Wind direction & speed as measured.
Sensor 1	Sensor connected to port 1 of the display
Sensor 2	Sensor connected to port 2 of the display
True	True wind direction & speed related to True North
Theoretical	Wind direction & speed as if the vessel would not move, related to the bow of the vessel.
Wind Variation	The variation in wind direction over the selected Average interval.

9.2 Symbols



Select between Day or Night mode.
In Night mode a darker color palette reduces the emitted light intensity.



Brightness slider bar.
In Automatic or NMEA control mode; use this to set an offset.



Settings menu

10 Digital interface

10.1 NMEA software

10.1.1 Inputs:

The Display accepts the following NMEA input messages with a maximum rate of 4 per second:

\$xxDBK	Depth Data
\$xxDDC	Dimming control of backlight
\$xxDPT	Depth Data
\$xxGGA	GPS Lon Lat position
\$xxGMP	GNSS Map Projection Fix Data
\$xxGST	GNSS Pseudo range Error Statistics
\$xxHDT	Heading from Gyro (replaced by \$xxTHS, display accepts both)
\$xxMWD	True Wind
\$xxMWV	Relative or Theoretical Wind
\$xxROT	Rate Of Turn
\$xxTHS	Heading from Gyro
\$xxVBW	Water Speed
\$xxVER	Version info
\$xxVHW	Speed through water (direction is not used)
\$xxVLW	Water Distance
\$xxVTG	Speed and direction over ground
\$xxXDR	Air Temperature, Sea Temperature, Humidity, Dew point, Barometric Pressure (measured), Barometric Pressure QNH (Sea level), Barometric Pressure QFE (Runway level)

Observator Proprietary Messages (From MeteoLink):

\$xxPOBSVIS	Visibility Data
\$xxPOBSCME	Cloud Data
\$xxPOBSBTD	Lightning Data

Retired sentences (sentences not recommended for new designs since 2008):

\$xxMDA	Meteorological Composite
\$xxMHU	Humidity
\$xxMMB	Barometer
\$xxMTA	Air Temperature

10.1.2 Outputs:

All recognized input messages (except the retired NMEA sentences) can be copied to the output

Calculated messages

\$xxMWV	Relative or Theoretical Wind
\$xxMWD	True Wind

Other functions

\$xxDDC	Dimming control of backlight
---------	------------------------------

\$xxVER Version info

10.1.3 TAG notes

Observator MeteoLink and the Observator OMC-140 make use of (NMEA) Tags, which are placed in front of the basic NMEA sentence to identify the source of the sentence. This enables the use of multiple similar sensors with identical NMEA sentence ID.

For example multiple wind sensors all transmitting \$WIMWV sentences multiplexed in one stream can still be identified, while without a tag the display would process them as data from 1 sensor.

The TAG “\s:string*hh\” can contains source information of the string.

‘string’ starts with a letter (A= SMART node, B= Basic node & D=OMC-140 Display), followed by the last three digits of its serial number, followed by the input port.

Examples:

A sensor connected to NMEA 1 port of a SMART node with serial number: OICA-000123 shall result in:

\s:A123P1*hh

A sensor connected to NMEA 2 port of a Basic node with serial number: OICA-000223 shall result in:

\s:B223P2*hh

A sensor connected to NMEA 1 port of an OMC-140 with serial number: 1400001203 shall result in:

\s:D203P1*hh

3rd party equipment designed according the NMEA 0183 standard, will ignore the TAG data if it has no use for it.

For non compliant equipment the tag data can be disabled via the USB menu:

1. Device settings / 4. Output / 8. Node Info Pass Through

Starting from FW version 2.6 the tag data of the OMC-140 is default disabled on the NMEA output port (enable via the same USB menu).

Port specific information:

MeteoLink:

Port information as given below:

- Generated by device, VER \s: A123**G0***hh\
- Generated by device, QFE \s: A123**G1***hh\
- Generated by device, QNH \s: A123**G2***hh\
- Generated by device, DP \s: A123**G3***hh\
- Generated by device, Baro Avg \s: A123**G4***hh\

- NMEA IN 1 \s: A123**P1***hh\
- NMEA IN 2 \s: A123**P2***hh\
- NMEA IN 3** \s: A123**P3***hh\
- NMEA IN 4* * \s: A123**P4***hh\
- NMEA IN 5* * \s: A123**P5***hh\
- NMEA IN 6* * \s: A123**P6***hh\

- ADC V IN 1 (voltage) \s: A123**U1***hh\
- ADC V IN 2 (voltage)* \s: A123**U2***hh\
- ADC V IN 3 (voltage)*** \s: A123**U3***hh\
- ADC V IN 4 (voltage)*** \s: A123**U4***hh\

- ADC I IN 1 (current) \s: A123**I1***hh\
- ADC I IN 2 (current)*** \s: A123**I2***hh\
- ADC I IN 3 (current)*** \s: A123**I3***hh\

- RAIN IN 1* \s: A123**R1***hh\

- SERIAL IN 1 (CMOS) \s: A123**S1***hh\
- SERIAL IN 2 (RS232) \s: A123**S2***hh\
- SERIAL IN 3 (RS422/RS485) \s: A123**S3***hh\

- * smart node only ports.
- ** 4x NMEA IN extension board ports.
- *** 2x Current, 2x Voltage IN extension board ports.
- ***** New port indicators may be added in the future.

OMC-140:

Port information as given below:

- NMEA IN 1 \s: D321**P1***hh\
- NMEA IN 2 \s: D321**P2***hh\
- Generated by device \s: D321**G1***hh\

10.2 NMEA UDP protocol

Since the introduction of ML and the OMC-140 version 2.0 the Ethernet UDP stack is functional. Due to regulations (IEC 61162-450) the TAG block implementation is slightly different from the previous described “Meteolink TAGs”.

Because the NMEA regulations allow multiple tags to be transmitted by using “,” (comma) as separation we decided to implement both “Tag addresses” in case of transmission over NMEA UDP. This way the “Meteolink TAGs” are used for data source identifications while the second tag can be used by third party devices following the NMEA UDP protocol.

For future reference the names “ML-tag” and “UDP-tag” shall be used.

10.3 UDP-tag calculation

A UDP-tag is derived from the ML-tag and added to the NMEA sentence in case it is transmitted over UDP. In case a UDP-tag is rerouted to be transmitted over serial NMEA, the UDP-tag is removed from the tag-sentence!

A UDP-tag is identical to a ML-tag using start/stop characters and checksum calculations:

"\s: WIxxxx*hh\"

The WI stands for weather instrument and is static since our instruments only transmit weather related data.

xxxx can only contain decimal characters (0-9) which are directly derived from the ML-tag of the given NMEA sentence.

The first x refers to the device type it was sent from:

1	"A"	Meteolink Smart node
2	"B"	Meteolink Basic node
4	"D"	OMC-140 Display

The remaining xxx is a direct copy of the device serial number (last three digits)

For example:

\s: A123P5*hh\ (Smart node 123, NMEA port 5)

A becomes "1"

123 is copied "123"

P5 is ignored for UDP-tag

This makes the UDP-tag: "\s: WI1123*hh\"

10.3.1 UDP-tag combination

The UDP-tag is always added to the existing ML-tag using comma separation (see NMEA tag standard), creating:

\s: A123P5, s:WI1123*hh\

**it is not possible to transmit a NMEA message over UDP without the ML + UDP-tag information!*

10.4 NMEA Message description

\$--DDC,a,xx,a,a*hh<CR><LF>
 1 2 3 4

1. Display dimming preset
2. Brightness percentage 00 to 99
3. Color palette
4. Sentence Status Flag

\$--GGA,hhmmss.ss,llll,ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10

1. UTC of position

2. Latitude - N/S
3. Longitude - E/W
4. GPS Quality indicator₁
5. Number of satellites in use, 00-12, may be different from the number in view
6. Horizontal dilution of precision
7. Altitude re: mean-sea-level (geoid), meters
8. Geoidal separation, meters
9. Age of Differential GPS data
10. Differential reference station ID, 0000-1023

\$--GMP,hhmmss.ss,c--c,c--c,x.x,x.x,c--c,xx,x.x,x.x,x.x,x.x,x.x,a*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position
2. Map projection identification
3. Map zone
4. X (Northern) component of grid (or local) coordinates
5. Y (Eastern) component of grid (or local) coordinates
6. Mode indicator
7. Total number of satellites in use, 00-99
8. HDOP
9. Antenna altitude, meters, re: mean-sea-level (geoid)
10. Geoidal separation, meters
11. Age of differential data
12. Differential reference station ID
13. Navigational Status Indicator

\$--GST,hhmmss.ss,x.x,x.x,x.x,x.x,x.x,x.x,x.x*hh<CR><LF>
 1 2 3 4 5 6 7 8

1. UTC time of the GGA or GNS fix associated with this sentence.
2. RMS value of the standard deviation of the range inputs to the navigation process. Range inputs include pseudoranges & DGNSS corrections.
3. Standard deviation of semi-major axis of error ellipse (meters)
4. Standard deviation of semi-minor axis of error ellipse (meters)
5. Orientation of semi-major axis of error ellipse (degrees from true north)
6. Standard deviation of latitude error (meters)
7. Standard deviation of longitude error (meters)
8. Standard deviation of altitude error (meters)

\$--HDT,x,x,T*hh<CR><LF>
 1 2

1. Heading
2. degrees True (fixed)

\$--MWD,x,x,T,x,x,M,x,x,N,x,x,M*hh<CR><LF>
 1 2 3 4

1. Wind direction, 0 to 359 degrees True
2. Wind direction, 0 to 359 degrees Magnetic
3. Wind speed, knots
4. Wind speed, meters/second

\$--MWV,x,x,a,x,x,a,A*hh<CR><LF>
 1 2 3 4 5

1. Wind angle, 0 to 359 degrees
2. Reference:
 R = Relative
 T = Theoretical
3. Wind speed
4. Wind speed units: K/M/N/S
5. Status, A = Data Valid, V = Data invalid

\$--THS,x,x,a*hh<CR><LF>
 1 2

1. Heading, degrees True
2. Mode indicator:
 A = Autonomous
 E = Estimated (dead reckoning)
 M = Manual input
 S = Simulator
 V = Data not valid (including standby)
 This field shall not be null.

\$--VER,x,x,aa,c--c,c--c,c--c,c--c,c--c,c--c,x*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10

1. Total number of sentences needed, 1 to 9
2. Sentence number, 1 to 9
3. Device type
4. Vendor ID
5. Unique Identifier
6. Manufacturer serial number
7. Model code (product code)
8. Software revision
9. Hardware revision
10. Sequential message identifier

\$--VHW,x,x,T,x,x,M,x,x,N,x,x,K*hh<CR><LF>
 1 2 3 4

1. Heading, degrees True
2. Heading, degrees Magnetic
3. Speed, knots
4. Speed, km/hr

\$--VTG,x,x,T,x,x,M,x,x,N,x,x,K,a*hh<CR><LF>
 1 2 3 4 5

1. Course over ground, degrees True
 2. Course over ground, degrees Magnetic
 3. Speed over ground, knots
 4. Speed over ground, km/hr
 5. Mode Indicator:
 - A = Autonomous mode
 - D = Differential mode Corrections from ground stations or Satellite Based Augmentation System (SBAS).
 - E = Estimated (dead reckoning) mode
 - M = Manual input mode
 - N = Data not valid
 - P = Precise. Satellite system used in precision mode. Precision mode is defined as no deliberate degradation (such as selective availability) and higher resolution code (P-code) is used to compute position fix. P is also used for satellite system used in multi-frequency, or Precise Point Positioning (PPP) mode
 - S = Simulator mode
- This Mode Indicator field shall not be a null field.

\$--XDR,a,x,x,a,c--c,.....a,x,x,a,c--c*hh<CR><LF>
 1 2 3 4 5 6

1. Transducer type, Transducer #1
2. Measurement data, Transducer #1
3. Units of measure, Transducer #1
4. Transducer #1 ID
5. Data for variable # of transducers
6. Transducer 'n'1

Recognized XDR messages:

Parameter	1	2	3	4	remarks
Temperature (Celsius)	C	xx.x	C	AT	4 <> WATER or DP 4 = empty also recognized
Humidity (Relative in %)	H	xx	P	RH	4 = ignored 4 = empty also recognized
Dewpoint (Celsius)	C	xx.x	C	DP	
Barometric pressure (Bar)	P	xx.x	B		4 <> QNH or QFE
Barometric pressure QNH (Bar)	P	xx.x	B	QNH	
Barometric pressure QFE (Bar)	P	xx.x	B	QFE	
Water temperature (Celsius)	C	xx.x	C	WT	1 = W (4 empty) is also recognized

The OMC-140 multifunctional display will also accept the following retired sentences:

Note: These messages will only be used for display and not forwarded to the output!

\$--MDA,x.x,I,x.x,B,x.x,C,x.x,C,x.x,x.x,x.x,C,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11

1. Barometric pressure, inches of mercury *
2. Barometric pressure, bars *
3. Air temperature, degrees C
4. Water temperature, degrees C
5. Relative humidity, percent
6. Absolute humidity, percent
7. Dew point, degrees C
8. Wind direction, degrees True
9. *Wind direction, degrees Magnetic ----will not be used!*
10. Wind speed, knots **
11. Wind speed, meters/second **

** Barometric Pressure in 'mercury' will only be read when in 'Bar' is not available and will be displayed in the equivalent value in hPa.*

*** Wind speed in knots will only be read when Wind speed in m/s is not available.*

\$--MHU,x.x,x.x,x.x,x.x,C*hh<CR><LF>
 1 2 3

1. Relative humidity, percent
2. Absolute humidity, percent
3. Dew point, degrees C

\$--MMB,x.x,I,x.x,B*hh<CR><LF>

1. Barometric pressure, inches of mercury
2. Barometric pressure, bars

\$--MTA,x.x,C*hh<CR><LF>

1. Temperature, degrees C

Observator Proprietary Messages

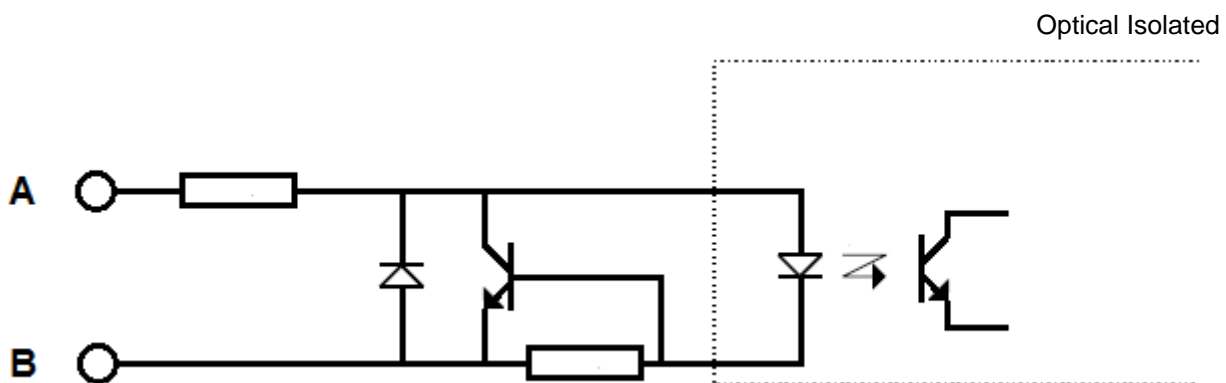
\$POBSBTD

\$POBSCBE

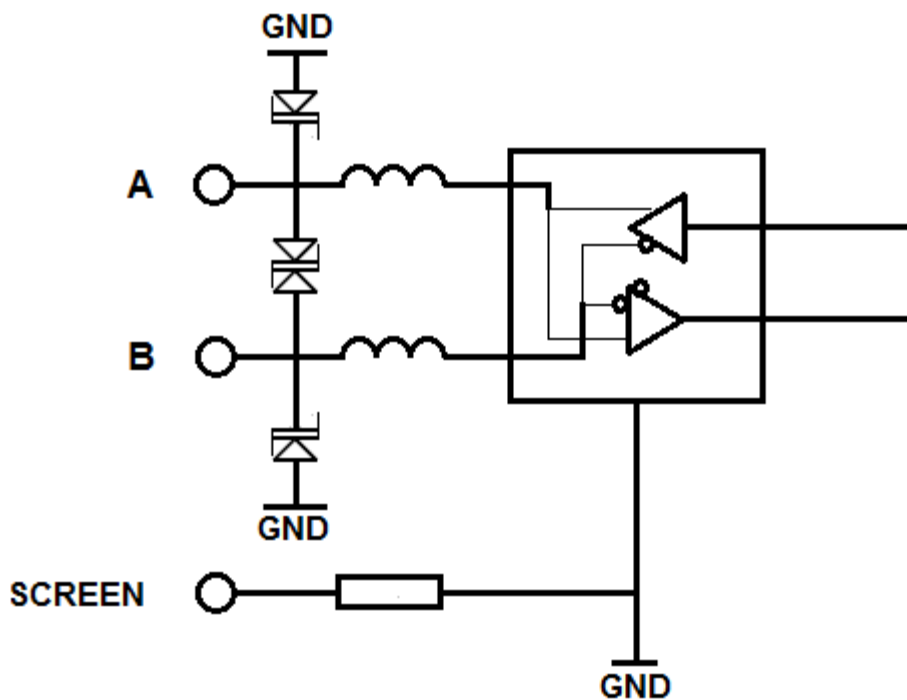
\$POBSVIS

11 NMEA Hardware:

Input circuit (simplified)



Output circuit (simplified)



13 Specifications

13.1 Inputs/Outputs

- 2 NMEA0183 inputs
- 1 NMEA0183 output
- Micro USB (programming purposes)
- RJ45 LAN connector (Future use)
- Display interconnection bus

More I/O possible through the option boards

13.2 TFT touch screen

- 8,5" Super Wide Viewing Angle 170° LCD with long life and low power LED backlight
- Active display area: 184.8 x 110.9 mm
- Resolution: WVGA 800x480
- The used font (Verdana) is non-italic, sans-serif, optimized for TFT readability
- For the wind speed indication in the center, the character height is 10 mm which corresponds to a nominal viewing distance of 2.85 meters
- For the other numeric fields the character height is 7 mm which corresponds to a nominal viewing distance of 2 meters

13.3 Electrical

- 100..240 VAC, 50/60 Hz, max 50 VA
- 9-30V Vdc via Optional DC Power Module
- Sensor 1 and 2 power output 15..16.5 Vdc max 1.5 W
- Connections, pluggable screw terminals for max 2.5 mm²

13.4 Environmental specifications

- Operating temperature –15°C..+55°C
- Storage temperature –30°C..+80°C
- Humidity: 10..93 %RH
- Vibration: IEC 60068-2-6 test Fc
- EMC: IEC 60945; IEC 61326-1
- IP rating: IP22 when fully flush mounted (228 x 142mm)

13.5 Dimming possibilities

- From 0,5..700 cd/m²
- Day and night pallet selectable
- Manual by means of 'slider bar'
- Automatic by means of ambient light sensor
- Central by means of NMEA DDC input

13.6 Dimensions

- Packing 30 x 30 x 40 cm
- Weight 1.2 kgs (excl packing)
- Weight 3 kgs (incl packing & mounting materials)

13.7 Alarms

- Build-in alarms on parameters and system functioning
- Outputs, potential free relay outputs through optional OMC-140-2 module

13.8 In accordance with

- DNVGL-CG-0339
- EMC Directive 2014/30/EU
- LV Directive 2014/35/EU
- RoHS-2 Directive 2011/65/EU
- EMC: ESD IEC 61000-4-2; Radiated Immunity IEC 61000-4-3; Conducted Immunity IEC 61000-4-6; Fast Transients IEC 61000-4-4; Surge IEC 61000-4-5
- Electrical safety: IEC 61010:2010
- NMEA 0183 version 4.10 / IEC 61162-1:2010
- IEC 62288:2008 Draft IEC 62288:2012
- All relevant IMO resolutions
- WMO / ICAO / CAP

13.9 Cable specs remote & relay outputs:

- Relay outputs:

Cable length maximum:	30 meter
Cable type AC:	Shielded (single ended)
Cable type DC:	Shielded (twisted pair)
Advised	0.75 mm ²
Min	0.75 mm ²
Max	2.50 mm ²



**The relays are for signal use only, no power should be switched.
Use additional external relays for power applications!**

- Remote input:

Cable length maximum:	30 meter
Cable type:	Shielded (single ended)
Advised:	0.75 mm ²
Min:	0.25 mm ²
Max:	2.50 mm ²

13.10 Compass safe distance

Standard compass safe distance = 0.2m.

Steering, standby and emergency compass safe distance = 0.1m.

14 Menu structure Touch screen



Opens settings menu

General

Dimming Control:

Manual
Automatic
NMEA DDC

Sensor selection:

Auto
Sensor 1
Sensor 2

Average *(Wind only)*

10 minute
2 minute
Instant
User (settings from User Average Interval)

Wind Speed *(Wind only)*

Bft
Mph
m/s
kn
km/h

Wind Reference *(Wind only)*

Relative
Theoretical
True

User Average Interval *(Wind only)*

Wind Speed
Wind Direction
Gust
Wind Variation

Advanced

Keypad

085	Shows Operator available codes'
0851	Terminal input 1
0852	Terminal input 2
0853	Terminal UDP
0851234	Demo Mode
0852984	Factory reset
1382	Advanced Mode

Offset Sensor 1 *(Wind only)*

Offset Sensor 2 *(Wind only)*

Display Mode

Landscape
Portrait

Marked Discontinuity (On / Off) *(Wind only)*

Wind Alarm (On / Off) *(Wind only)*

Wind Alarm (settings) *(Wind only)*

Wind Alarm
Pre Alarm
Hysteresis
Alarm Delay

Output Baudrate

4800
9600
19200
38400

Secure User Items

Average	(un)lock	<i>(Wind only)</i>
Wind Speed	(un)lock	<i>(Wind only)</i>
Dimming Control	(un)lock	
Sensor Selection	(un)lock	
Wind Reference	(un)lock	<i>(Wind only)</i>

System Name *(GPS only)*

Edit GPS names *(GPS only)*

Options

Displays installed option boards

NMEA

Configured NMEA Sentences

received sentences (missing sentences in red)

Configuration (only visible in Advanced menu)

Inc, Sentences Unlock (default) lock

Incoming Sentences (only visible in Advanced menu)

Clear missing

Reset All

Info (info only, no settings on this page)

Output configuration

Audible Alarm (ON)
Forward Tag Block (OFF)
NMEA BAM (OFF)

Ethernet Configuration

DHCP Client (ON)
IP (0.0.0.0)
Subnet (0.0.0.0)
Gateway (0.0.0.0)
UDP Input (ON)
UDP Output (ON)
LAN Link Status (DOWN)

Product information

Serial#: OMC-140000xxxxx
MAC: xx-xx-xx-xx-xx-xx
Firmware: xx.xxBxx
Bootloader: 00.06B07

Observator Instruments

www.observator.com
info@observator.com
+31 (0) 180 463411

Total Uptime: xxxxx hours
Since: dd-mm-yy

Front (only visible in Advanced Menu)

Edit data fields in Front screen

Sensors (only visible in Advanced Menu)

NMEA VER Message Table

15 Menu Structure Terminal Mode

Main Menu:

1 Device Settings

- 1 Display Intensity (ON)
 - 1 ON
 - 2 OFF
 - 3 NMEA DDC

2 Sensor 1

Installation Settings Sensor 1:

- 1 Baud rate (4800) *Watchdog Time*
 - 1 4800
 - 2 9600
 - 3 19200
- 2 Watchdog (OFF)
- 3 MWV Relative (ON) (10) sec

Turn MWV Relative message (2) AUTO / (1) ON / (0) OFF: 1

Watchdog time in seconds (No value = 10 sec):

- 4 MWV Theoretical (AUTO)
- 5 MWD True (AUTO)
- 6 GGA GPS Quality (AUTO)
- 7 VTG GPS Ship Heading (AUTO)
- 8 HDT/THS Gyro Heading (AUTO)
- 9 VHW Log Speed (AUTO)
- A XDR Data (AUTO)
- B GMP GPS Data (AUTO)
- C GST GPS Data (AUTO)
- D MHU Humidity Data (AUTO)
- E MMB Baro Data (AUTO)
- F MTA Air Temp. Data (AUTO)
- G MDA Combined Data (AUTO)
- H MTW Water Temp. Data (AUTO)
- I VIS Visibility Data (AUTO)
- J CME Cloud Data (AUTO)
- K BTM Lightning Data (AUTO)
- L DBK Depth Data (AUTO)
- M DPT Depth Data (AUTO)
- N VLW Water Distance (AUTO)
- O VBW Water Speed (AUTO)
- P ROT Rate Of Turn (AUTO)
- Q Baro Status (AUTO)
- Z NMEA Allow No Checksum (OFF) Port 1 & 2
- 0 Previous Menu

3 Sensor 2

installation Settings Sensor 2:

- 1 Baud rate (4800) *Watchdog Time*

1 4800
 2 9600
 3 19200

2 *Watchdog* (OFF)
 3 *MWV Relative* (ON) (10) sec

Turn MWV Relative message (2) AUTO / (1) ON / (0) OFF: 1

Watchdog time in seconds (No value = 10 sec):

4 *MWV Theoretical* (AUTO)
 5 *MWD True* (AUTO)
 6 *GGA GPS Quality* (AUTO)
 7 *VTG GPS Ship Heading* (AUTO)
 8 *HDT/THS Gyro Heading* (AUTO)
 9 *VHW Log Speed* (AUTO)
 A *XDR Data* (AUTO)
 B *GMP GPS Data* (AUTO)
 C *GST GPS Data* (AUTO)
 D *MHU Humidity Data* (AUTO)
 E *MMB Baro Data* (AUTO)
 F *MTA Air Temp. Data* (AUTO)
 G *MDA Combined Data* (AUTO)
 H *MTW Water Temp. Data* (AUTO)
 I *VIS Visibility Data* (AUTO)
 J *CME Cloud Data* (AUTO)
 K *BTM Lightning Data* (AUTO)
 L *DBK Depth Data* (AUTO)
 M *DPT Depth Data* (AUTO)
 N *VLW Water Distance* (AUTO)
 O *VBW Water Speed* (AUTO)
 P *ROT Rate Of Turn* (AUTO)
 Q *Baro Status* (AUTO)
 Z *NMEA Allow No Checksum (OFF) Port 1 & 2*
 0 *Previous Menu*

Installation Settings Sensor 3 UDP:

		Watchdog Time
3	<i>MWV Relative</i>	(AUTO)
4	<i>MWV Theoretical</i>	(AUTO)
5	<i>MWD True</i>	(AUTO)
6	<i>GGA GPS Quality</i>	(AUTO)
7	<i>VTG GPS Ship Heading</i>	(AUTO)
8	<i>HDT/THS Gyro Heading</i>	(AUTO)
9	<i>VHW Log Speed</i>	(AUTO)
A	<i>XDR Data</i>	(AUTO)
B	<i>GMP GPS Data</i>	(AUTO)
C	<i>GST GPS Data</i>	(AUTO)
D	<i>MHU Humidity Data</i>	(AUTO)
E	<i>MMB Baro Data</i>	(AUTO)
F	<i>MTA Air Temp. Data</i>	(AUTO)
G	<i>MDA Combined Data</i>	(AUTO)
H	<i>MTW Water Temp. Data</i>	(AUTO)
I	<i>VIS Visibility Data</i>	(AUTO)
J	<i>CME Cloud Data</i>	(AUTO)
K	<i>BTM Lightning Data</i>	(AUTO)
L	<i>DBK Depth Data</i>	(AUTO)
M	<i>DPT Depth Data</i>	(AUTO)
N	<i>VLW Water Distance</i>	(AUTO)
O	<i>VBW Water Speed</i>	(AUTO)

- P ROT Rate Of Turn (AUTO)
- Q Baro Status (AUTO)
- Z NMEA Allow No Checksum (OFF) Port 1 & 2
- 0 Previous Menu

4 Output

Serial Output Settings:

- 1 Format (NMEA)
Serial Output Format options:
 1 OMC-2900
 2 NMEA
- 2 Interval (0.25 sec)
Serial MWV/MWD Output Interval options:
 1 0.25 seconds
 2 1 second
- 3 Baudrate (4800)
Serial Output Baudrates:
 1 300
 2 600
 3 1200
 4 1800
 5 2400
 6 4800
 7 9600
 8 19200
 9 38400
 a 57600
 b 115200
 c 230400
 0 Previous Menu

4 NMEA Sentences

Serial Output NMEA Sentences:

- 1 NMEA MWV (Calculated)* (OFF)
 - 2 NMEA MWV (Unattended)* (ON)
 - 3 NMEA MWD (Calculated)* (OFF)
 - 4 NMEA MWD (Unattended)* (ON)
 - 5 NMEA GGA (Unattended) (OFF)
 - 6 NMEA VTG (Unattended) (OFF)
 - 7 NMEA HDT / THS (Unattended) (OFF)
 - 8 NMEA VHW (Unattended) (OFF)
 - 9 NMEA XDR (Unattended) (ON)
 - A NMEA VER (Unattended) (ON)
 - B NMEA VER (Display specific) (ON)
 - C NMEA DDC (Unattended)* (ON)
 - D NMEA DDC (As Master)* (OFF)
 - E NMEA GMP (Unattended) (OFF)
 - F NMEA GST (Unattended) (OFF)
 - G NMEA VIS (Unattended) (OFF)
 - H NMEA CME (Unattended) (OFF)
 - I NMEA BTM (Unattended) (OFF)
 - 0 Previous Menu
- 5 NMEA MWV Reference (Relative)
Serial Output NMEA MWV References:
 1 Relative
 2 Theoretical
 3 Relative & Theoretical
 - 6 OMC-2900 Wind speed sign (V)

- 7 OMC-2900 Wind direction sign (D)
- 8 Node Info Pass Through (Enabled)
- 0 Previous Menu

- 5 Extention Board Settings
 - 1 *Invert Alarm Relais* (DISABLED)
 - 2 *Follow (Wind) Alarm State* (DISABLED)

- 6 Upload Firmware (Y-modem)

- 7 Ethernet Settings
 - Menu Ethernet Settings:*
 - 1 Ethernet (ON)
 - 2 DHCP Client (OFF)
 - 3 Static IP (192.168.123.48)
 - 4 Static Gateway (192.168.123.1)
 - 5 Static Subnet (255.255.0.0)
 - 6 UDP Input (ON)
 - 7 UDP Output (ON)

2 Wind / Meteo Settings

Menu Wind:

- 1 Average (Instant)
 - 1 *Instant*
 - 2 *2 Minutes*
 - 3 *10 Minutes*
 - 4 *User Defined*
 - 5 *Set User Defined Interval*

- 2 Wind Speed Units (kn)
 - 1 *Bft*
 - 2 *Mph*
 - 3 *m/s*
 - 4 *kn*
 - 5 *Km/h*

- 3 Sensor Selection (Automatic)
 - 1 *Automatic*
 - 2 *Sensor 1*
 - 3 *Sensor 2*

- 4 Wind Reference (True)
 - 1 *Relative*
 - 2 *Theoretical*
 - 3 *True*

- 5 Offset Sensor 1 (0 degree)
- 6 Offset Sensor 2 (0 degree)
- 7 Wind Alarm (OFF)
 - 1 *Pre Alarm* (10.0 m/s)

- 2 *Wind Alarm* (15.0 m/s)
- 3 *Hysteresis* (0.0 m/s)
- 4 *Alarm Delay* (0 sec)
- 5 *Alarm ON/OFF* (OFF)

- 8 *Marked Discontinuity* (OFF)
 - 1 *ON*
 - 2 *OFF*

- 9 *Max. Deviation of 2 Sensors* (100.0 m/s)

A *Secure User Items*

- 1 *Average* (UNLOCKED)
- 2 *Wind Speed* (UNLOCKED)
- 3 *Auto Display Intensity* (UNLOCKED)
- 4 *Sensor Selection* (UNLOCKED)
- 5 *Wind Reference* (UNLOCKED)

B *Wind Sensor Address & Sensor Name*

Menu: Wind Sensor Name & XDR Config:

	<i>Sensor Address</i>	<i>Type</i>	<i>Sensor Name</i>	<i>Sensor Nr</i>
1	<i>P1 : A070S3</i>	<i>XDR</i>	<i>0</i>	
2	<i>P1 : B218S1</i>	<i>XDR</i>	<i>0</i>	
3	<i>P1 : A070U1</i>	<i>XDR</i>	<i>0</i>	
4	<i>P1 : A070U2</i>	<i>XDR</i>	<i>0</i>	
5	<i>P1 : A070G4</i>	<i>XDR</i>	<i>0</i>	
6	<i>P1 : A070G1</i>	<i>XDR</i>	<i>0</i>	
7	<i>P1 : A070G2</i>	<i>XDR</i>	<i>0</i>	
8	<i>P1 : A070G3</i>	<i>XDR</i>	<i>0</i>	
9	<i>Not Used</i>			
A	<i>Not Used</i>			
B	<i>Not Used</i>			
C	<i>Not Used</i>			
D	<i>Not Used</i>			
E	<i>Not Used</i>			
F	<i>Not Used</i>			
X	<i>Clear All Wind Sensor Info</i>			

- C *Auto NODE Detect* (ON)
- D *Runway Direction* (0 deg)
- E *CAP437 Baro Rule* (ON)
- F *Multi sensor display* (OFF)
- G *Gill Fix* (OFF)
- H *Airport Direction Rounding* (ON)
- I *Wind Arrow Color* (Red)

3 **GPS Settings**

Menu GPS:

- 1 *Sensor Selection* (Automatic)
 - 1 *Automatic*
 - 2 *Sensor 1*
 - 3 *Sensor 2*

- 2 *Front View 1* (LAT/LON)

- 1 *LAT/LON*
 - 2 *UTM*
- 3 Front View 2 (User Defined)
 - 1 *User Defined*
 - 2 *SOG View*
- 4 Secure User Items
 - 1 *Dimming Control* (UNLOCKED)
 - 2 *Sensor Selection* (UNLOCKED)
 - 3 *Front View 1* (UNLOCKED)
 - 4 *Front View 2* (UNLOCKED)
- 5 Set Selectable System Names
 - 1 *GNSS#1*
 - 2 *GNSS#2*
 - 3 *GNSS#3*
 - 4 *GNSS#4*
 - 5 *GNSS#5*
 - 6 *GNSS#6*

4 Heading Settings

Menu Heading:

- 1 Sensor Selection (Automatic)
 - 1 Automatic
 - 2 Sensor 1
 - 3 Sensor 2
- 2 Front View 1 (Heading)
 - 1 Course
 - 2 Heading
- 3 Secure User Items
 - 1 Dimming Control (UNLOCKED)
 - 2 Sensor Selection (UNLOCKED)
 - 3 Front View (UNLOCKED)
- 4 Set Selectable System Names
 - 1 GNSS#1
 - 2 GNSS#2
 - 3 GNSS#3
 - 4 GNSS#4
 - 5 GNSS#5
 - 6 GNSS#6

5 SD Log settings

Menu SD Log:

- 0 1 SD Logging (OFF)
- 1 2 NMEA MWV (OFF)
- 2 3 NMEA AWS(EUMB) (OFF)
- 3 4 Set Date (yy-mm-dd) (2019-02-05)
- 4 5 Set Time in UTC (hh:mm:ss) (15:25:37)

6 Graph Settings

Menu Graph:

- | | Min | Max | Decimals |
|---|---------|------|----------|
| 1 | Default | | |
| 2 | -40.0 | 60.0 | 1 |

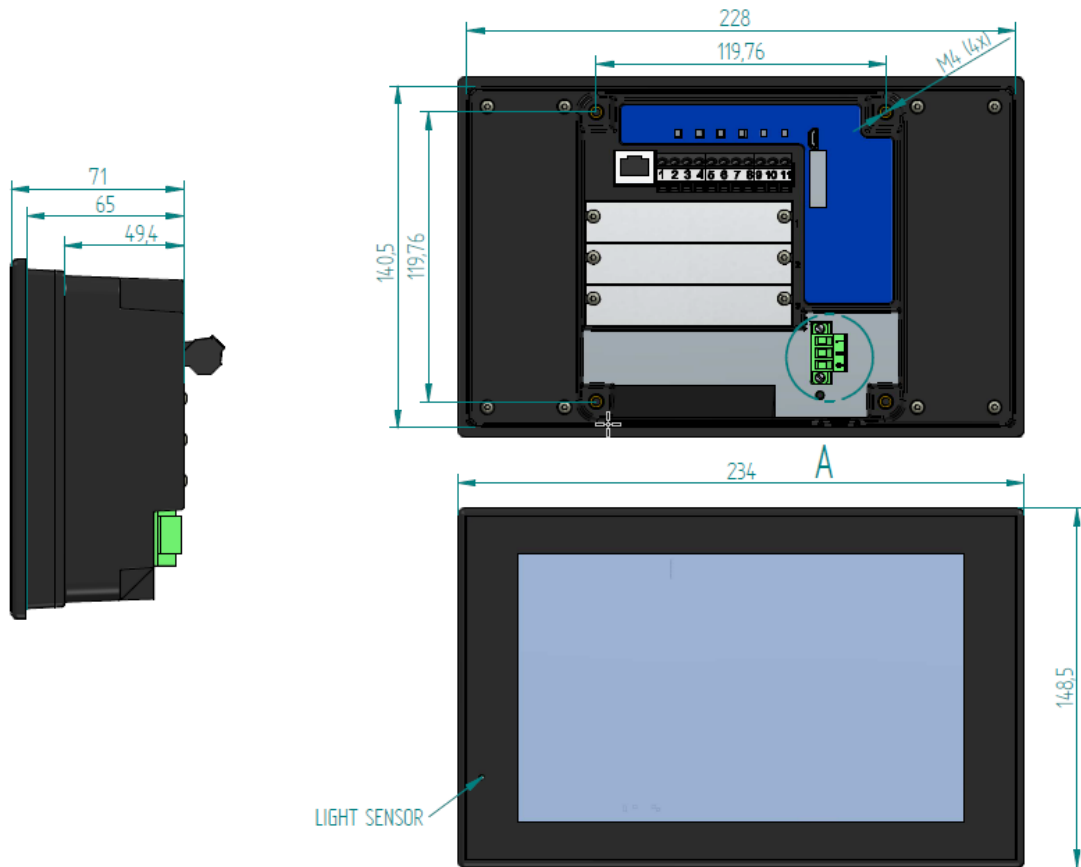
7 Ethernet Settings

Menu Ethernet Settings:

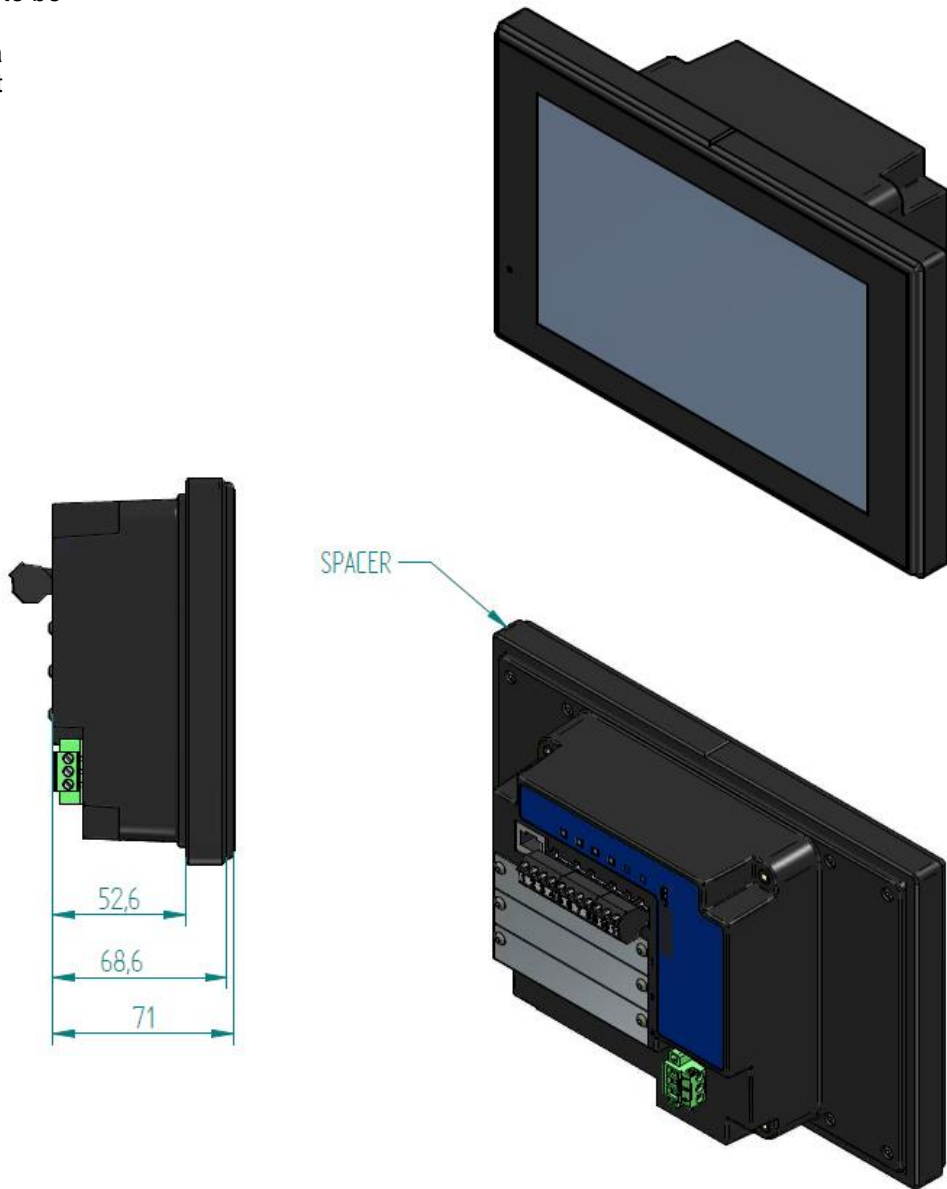
- 1 Ethernet (ON)
- 2 DHCP Client (OFF)
- 3 Static IP (192.168.123.48)
- 4 Static Gateway (192.168.123.1)
- 5 Static Subnet (255.255.0.0)
- 6 UDP Input (ON)
- 7 UDP Output (ON)

0 Exit Menu

16 Dimensional drawings

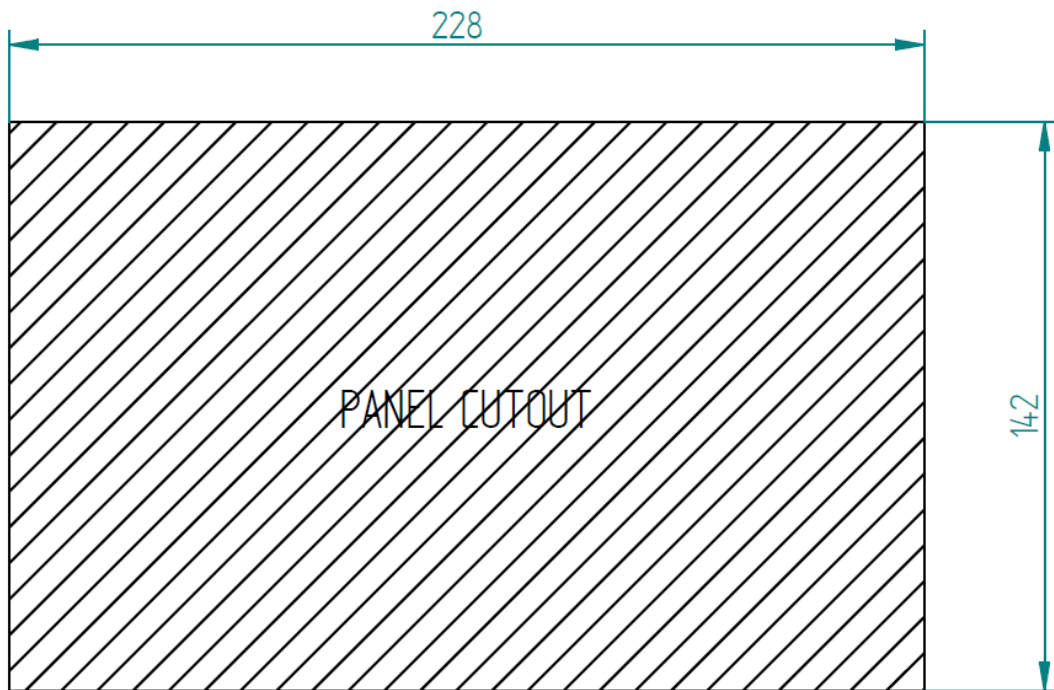


Spacer advised to be used in case of retrofitting into a 144x144 cut-out

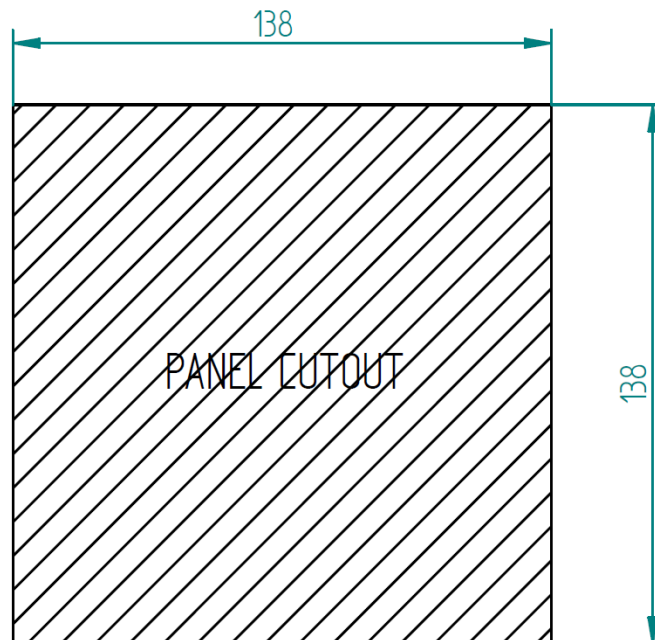


17 Panel cut-outs

17.1 Recommended panel cut-out



17.2 Panel cut-out for retrofit 144x144 instrument



17.3 Optional Keypad panel cut-out

