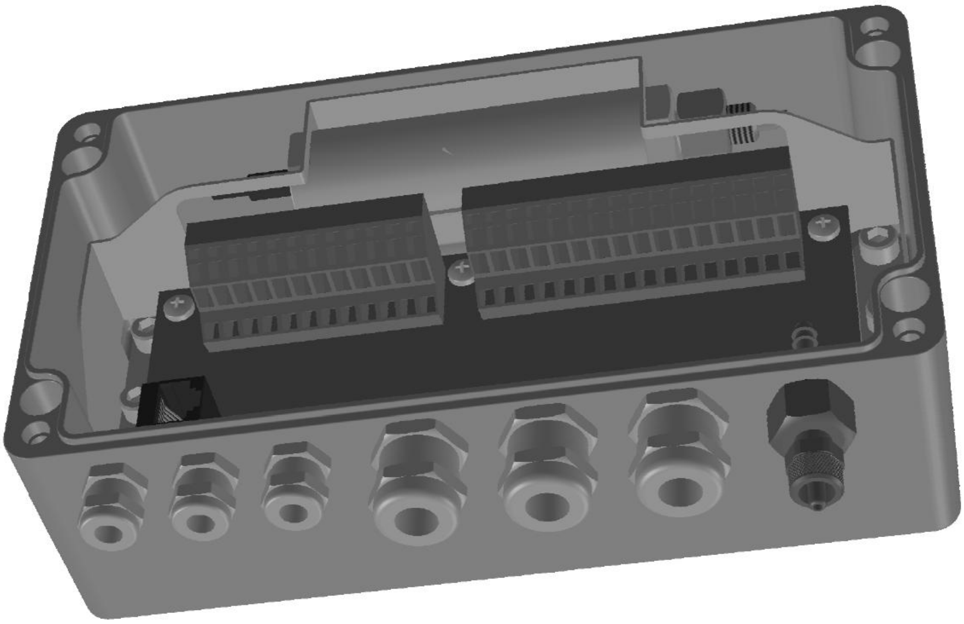


Manual

MeteoLink

Data Combiner

Version: 1.20

Date: 25 September 2025

Author: Observator

www.observator.com

Document history

The Observator range is in continuous development and so specifications may be subject to change without prior notice. When in doubt about the accuracy of this document, contact the Observator Group.

Reference documents

Type of document / tool	Product type and name
Software	MeteoLink FW 2.7

Revision history

Version	Date	Amendments	Company, position
0.1	2016-5	Initial document creation	Observator Instruments
0.2	2016-8	First iteration description	Observator Instruments
1.01	2016-10	First Release	Observator Instruments
1.02	2016-11	Added connection data of OIC-406 and barometric pressure sensors.	Observator Instruments
1.03	2016-11	Official release. Correction baro-sensor connections text, updated data format, improved configuration information.	Observator Instruments
1.04	2016-12	update Temp/hum probe type	Observator Instruments
1.05	2017-1	update conversion XDR output format HC2-S(3)	Observator Instruments
1.10	2017-11	update functionality for firmware 2.4b01 and up.	Observator Instruments
1.11	2018-3	update functionality	Observator Instruments
1.12	2018-11	update functionality 2.5b1	Observator Instruments
1.13	2019-3	update functionality for firmware 2.6	Observator Instruments
1.14	2020-10	update NMEA output (Appendix 9)	Observator Instruments
1.15	2020-12	Update specs with environmental data	Observator Instruments
1.16	2021-9	Update functionality FW 2.7 (NMEA input filter chapter 5.2.6)	Observator Instruments
1.17	2021-10	Update XDR sentences	Observator Instruments
1.18	2024-02	Minor non-technical corrections	Observator Instruments
1.19	2024-04	Update EU Declaration of Conformity	Observator Instruments
1.20	2025-09	Update FW2.7 B20 and up functionality	Observator Instruments

Table of contents

1 Introduction

Observator MeteoLink is a series of flexible Signal Conditioning Units comprising Basic & SMART nodes, capable of combining all sorts of sensor data into NMEA data strings.

This manual is intended for the System integrator, Installer and Commissioner of the Observator MeteoLink system.
The Operator can use this as a reference manual. Once installed Observator MeteoLink doesn't require any attention of the Operator.

2 Safety

For correct functioning of Observator MeteoLink the system and connected sensors must be installed according installation instructions.

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

Do not install the Smart Node (OIC-05) outdoors, indoor use only!

Basic node: when installed outdoors any unused gland should be filled with a suitable plug.

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

3 Description

3.1 General description

Observator MeteoLink combines all sort of sensor data and signals either serial or analogue into a NMEA data stream.
The nodes can be linked, and each will work as a multiplexer and will add data to the stream.

There are 2 types: The Basic and the SMART node.

The Basic Node (OIC-01)has no configuration requirements or options, it will simply convert and combine all recognized incoming data into a NMEA stream.

The Smart Node (OIC-05) has configuration options and can convert analogue values into sensible NMEA data which can be read by other compatible NMEA devices. It can do this for all connected Basic nodes as well. From v2.4 the Smart Node (OIC-05) has NMEA over Ethernet abilities as well using UDP.

Both nodes will recognize specific serial data and convert this by default. See Appendix 'Sensors' for details.

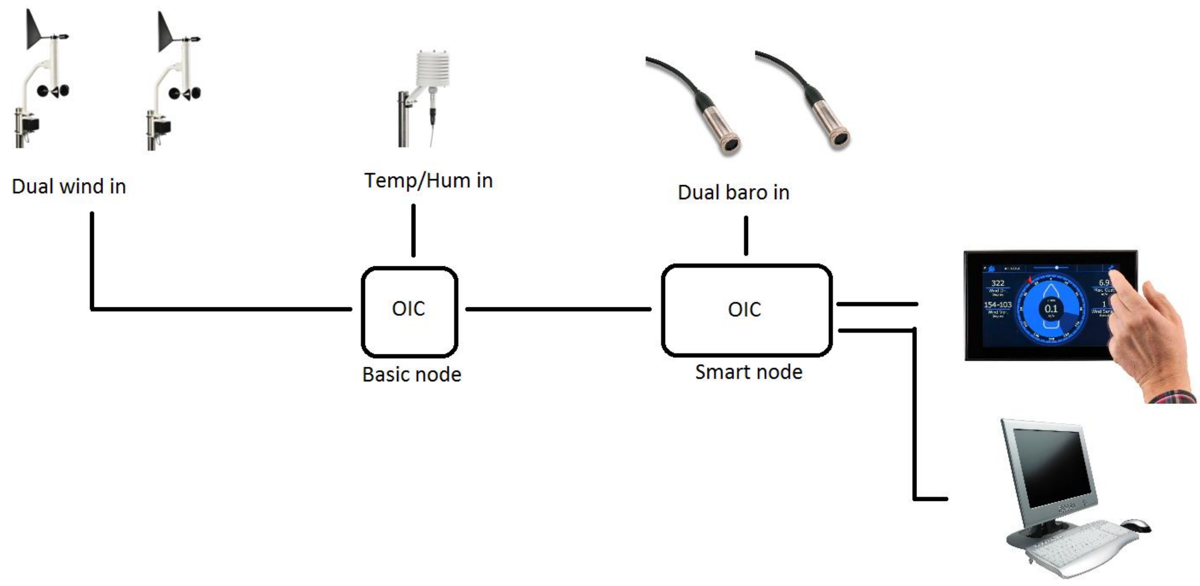
Default all recognized non NMEA data will be converted to an XDR string, the Smart Node (OIC-05) has a Custom String convertor, which allows you to make other NMEA-like formats.
All NMEA data messages will be forwarded untouched by both nodes, however a tag will be added which includes the Node & Port number. This will allow you to connect identical sensors (for example multiple wind sensors) and still be able to identify them.

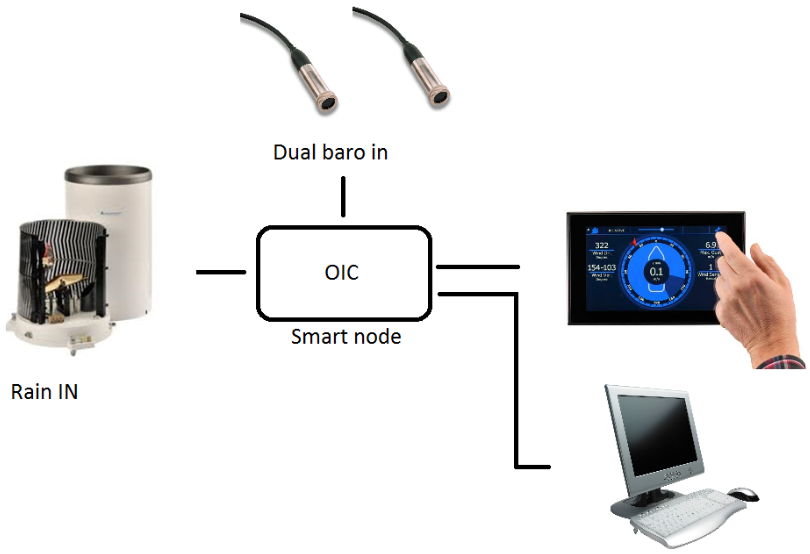
3.2 Basic vs SMART node

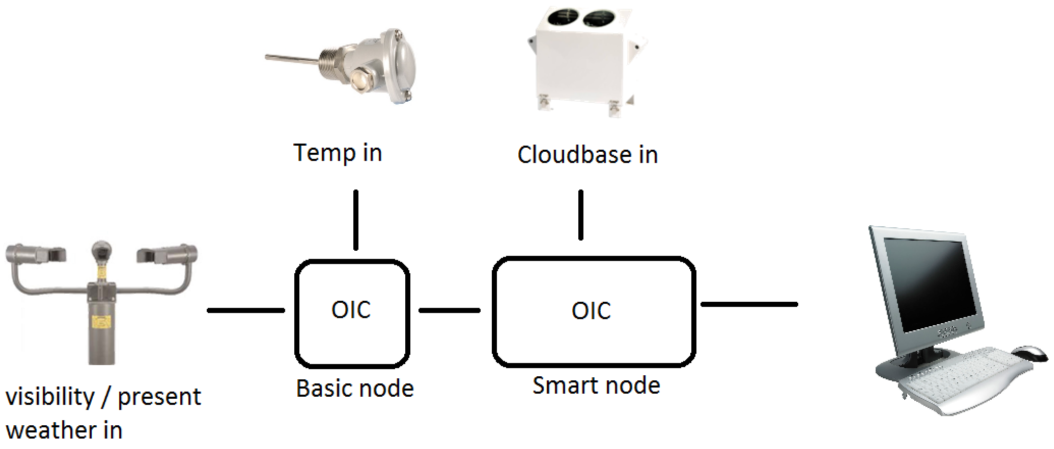
In underneath table you will find the available i/o and functions for both nodes:

Description	name	Basic	SMART	Remarks
NMEA input	NMEA IN 1	x	x	
NMEA input	NMEA IN 2	x	x	
NMEA output	NMEA OUT	x	x	
NMEA return	NMEA RTN	x	x	
NMEA over UDP output	UDP		x	
RS232 / RS422 / RS485 / CMOS	SERIAL IN 1	x	x	
RS485	SERIAL IN 1	-	x	For 2nd barometric pressure sensor.
0-5 VDC input	ADC 1	x	x	
4-20mA (0-24mA) input	ADC 2	x	x	
0-5 VDC input	ADC 3	-	x	
Pulse input	RAIN IN 1	-	x	Rain counter
Analogue range conversion		-	x	
QNH & QFE calculation		-	x	
Dew point calculation		-	x	
Custom string converter		-	x	
Optional build in Barometric Pressure sensor		-	2	Several options available.

3.3 Field use examples






Temp in
Cloudbase in
OIC
OIC
visibility / present weather in
Basic node
Smart node

4 Installation

4.1 General

- The Smart Node (OIC-05) should be installed indoors, the Basic Node (OIC-01)can install outdoors.
- When the optional build in barometric pressure sensors are installed, they should be vented outside when installed in a pressurized accommodation. A pressure port (OMC-509) at the end of the tube is strongly recommended.

- Use shielded cable (see Chapter 6 for maximum lengths).
- Use twisted pair cable for all RS422/485 connections (See Chapter 6).
- The nodes require a 12 .24 Vdc power supply. Power can be linked through all nodes, however, check the power rating of connected sensors, especially when they have heating!

Note: Use the specific power out connections (pin 9&10 or pin 13&14) for linking nodes! Maximum allowed total current is 10A when using these connections

Avoid ground loops: Shield must be connected on the output side of each cable only!

4.2 Terminals

Terminals used in both MeteoLink nodes are of the push in cage type. The terminals are opened with a **gently** push using a small screwdriver in the opening above the terminal.

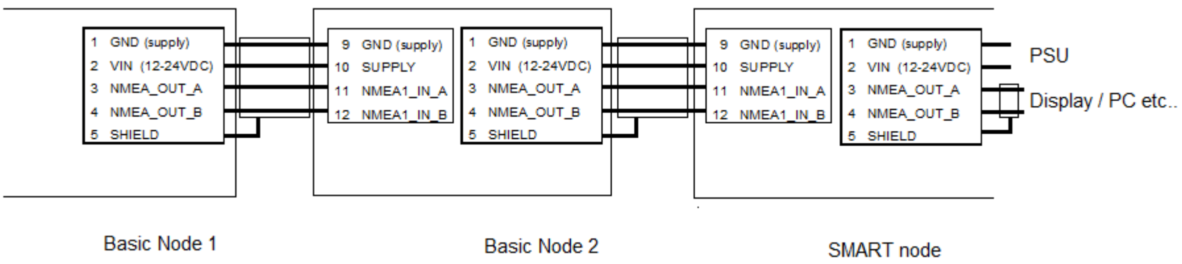
Do not use any force!

4.3 Linking Nodes

Nodes are linked through the NMEA input and output ports.
Next to the NMEA input ports, supply power connections are available to power the next node.

If you have a Smart Node (OIC-05) this should always be the last node in line.
Example:

Linking nodes



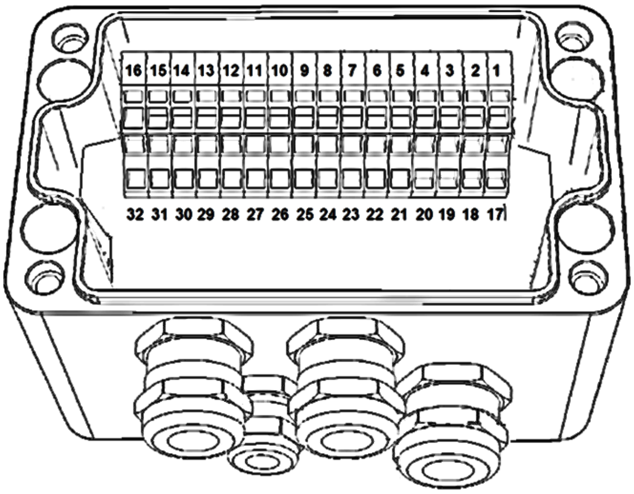
Linking nodes

In this example NMEA1_IN is used, but you are free to use NMEA2_IN instead. The nodes combine all inputs into one NMEA output string, which is available at NMEA_OUT and NMEA_RETURN.

The power supply (PSU) is connected to the Smart Node (OIC-05) and the 2 basic nodes are fed by it through the SMART node. If the total power consumption doesn't exceed 10A, all sensors connected to the nodes can be fed as well.

High data rate applications:
Please note the max amount of data. Between (Basic) nodes the baud rate is fixed @ 4800baud. Route high data rate devices directly to the Smart Node (OIC-05) and use preferable UDP (alternatively NMEA out @ a high baud rate) to transfer data from the Smart Node (OIC-05) to displays / PC's in that case!

4.4 Basic Node (OIC-01) connections

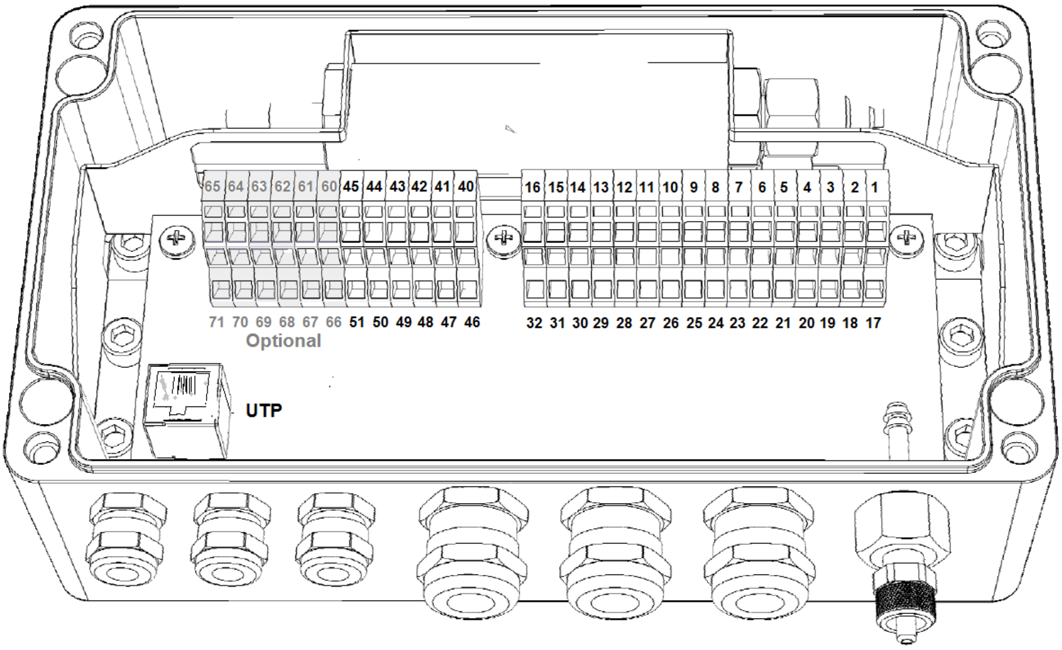


Basic Node (OIC-01)

Top	
1	GND (Supply)
2	VIN [12-24VDC]
3	NMEA_OUT_A
4	NMEA_OUT_B
5	SHIELD
6	NMEA_RETURN_
7	NMEA_RETURN_
8	SHIELD
9	GND (Supply)
10	SUPPLY
11	NMEA1_IN_A
12	NMEA1_IN_B
13	GND (Supply)
14	SUPPLY
15	NMEA2_IN_A
16	NMEA2_IN_B

Bottom	
17	GND (Sensor)
18	SUPPLY
19	RS232_TX
20	RS232_RX
21	RS485_422_IN_A
22	RS485_422_IN_B
23	GND (Sensor)
24	SUPPLY
25	0-5VDC_IN_1
26	GND (Sensor)
27	SUPPLY
28	0-24mA_IN_1
29	GND (Sensor)
30	CMOS_SUPPLY (3.3V)
31	CMOS_TX
32	CMOS_RX

4.5 Smart Node (OIC-05) connections



Smart Node (OIC-05) with 2 (optional) barometric pressure sensors

Top	Bottom	Top	Bottom
1 GND (Supply)	17 GND (Sensor)	40 GND (Sensor)	46 GND (Sensor)
2 VIN [12-24VDC]	18 SUPPLY	41 RAIN_IN	47 SUPPLY
3 NMEA_OUT_A	19 RS232_TX		48 0-5VDC_IN_2
4 NMEA_OUT_B	20 RS232_RX	42 GND (Sensor)	
5 SHIELD		43 SUPPLY	49 GND (Sensor)
	21 RS485_422_IN_A *	44 RS485_A *	50 SUPPLY
6 NMEA_RETURN_	22 RS485_422_IN_B *	45 RS485_B *	51 GND (Sensor)
7 NMEA_RETURN_			
8 SHIELD	23 GND (Sensor)	60 EXP_1	66 EXP_6
	24 SUPPLY	61 EXP_2	67 EXP_7
9 GND (Supply)	25 0-5VDC_IN_1	62 EXP_3	68 EXP_8
10 SUPPLY		63 EXP_4	69 EXP_9
11 NMEA1_IN_A	26 GND (Sensor)	64 EXP_5	70 EXP_10
12 NMEA1_IN_B	27 SUPPLY		
	28 0-24mA_IN_1	65 GND (Sensor)	71 SUPPLY
13 GND (Supply)			
14 SUPPLY	29 GND (Sensor)		
15 NMEA2_IN_A	30 CMOS_SUPPLY (3.3V)		
16 NMEA2_IN_B	31 CMOS_TX		
	32 CMOS_RX		

Terminals 60 ..71 are optional.

** Connections are parallel connected to the RS485/422 port, the 2nd RS485 connection can only be used when the 1st sensor is of an identical type with RS485 connection on a different address (either 1 or 2). Currently exclusively available for 2 OMC-9506 or 2 TERPS 8000 barometric pressure sensors.*

4.6 Basic and Smart Node (OIC-05) connection description

Power supply:

The VIN [12-24VDC] and GND[SUP] are the input power supply for the nodes, these power input clamps are directly bypassed to all other SUPPLY & GND [SUP] signals in order to supply the sensors. (One exception the is the CMOS_SUPPLY, which is regulated to 3.3VDC)

Note: Check power requirements for all connected sensors (besides CMOS) comply with the VIN before you power the system!
Do not use GND(signal) for linking nodes or high power sensors: use GND[SUP]!

NMEA output (*NMEA_OUT & NMEA RETURN*)

The nodes got one NMEA output signal and one RETURN signal, the last one got the same functionality as the output signal. Both groups the twisted pair clamps of NMEA RS422: A & B
(It's called RETURN to be able to reply on certain special customer requests NMEA messages)

NMEA IN (*NMEA1_IN & NMEA2_IN*)

The NMEA input contains four clamps each; two for the power supply to the sensor [SUPPLY & GND] and two for the twisted pair data wires [RS422: *A & B*] from the sensor. According to NMEA specifications these input data wires are galvanic isolated. The SUPPLY & GND[SUP] are bypassed on the PCB, so they are similar to VIN [12-24V] and GND[SUP].

Serial input

There are several serial inputs available: RS232, RS-485-422 or CMOS input.
The RS232 & RS 485-422 share the power supply connections. The Supply voltage is bypassed on the PCB, so identical to VIN [12-24V].

The RS232 i/o port is available for sensors with such output, like the CBME80 Cloudbase sensor. Please note it is not galvanic isolated.

The RS485-422 i/o is not terminated and has no pull-up or pull-down resistors. Place them externally if required (usually a 4k7 pull-up, between pin xx and xx will do). The port is not galvanic isolated, use one of the NMEA inputs if this is required.

The Smart Node (OIC-05) has 2nd RS485 connection available (parallel to the 1st connection), which can be used simultaneously for a 2nd barometric pressure sensor. Both sensors should be on a unique (1 or 2) address.

The CMOS i/o is meant for 3.3V CMOS sensors and includes the 3.3V power supply connections.

Analogue inputs

All inputs have SUPPLY & GND which are bypassed on the PCB, so they are similar to VIN [12-24V].

Note: The analogue values will only be transmitted when they are above 0V!

0-5VDC input (2 inputs for the SMART node).
0-24mA input

Pulse input (Smart Node (OIC-05) only):
The Smart Node (OIC-05) has a pulse counter input for a Rain sensor with a potential free contact.

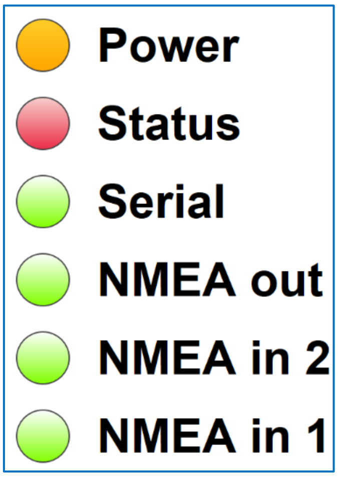
Note the maximum allowed cable lengths as specified in Chapter 6!

UTP

Used for configuration and NMEA over Ethernet using the UDP protocol.

4.7 Device status LED's

There are six LED's on the bottom right corner of the printed circuit board, they indicate the status of the device. After power-up the orange LED indicates that the microcontroller is powered. The second LED is red and indicates a bus overflow, when this LED blinks there is too much data input to send all incoming messages as output. In this case the device has to ignore some input messages and information might not be sent as output and information might get lost.



The other four green LED's indicate the status of the *Serial*, *NMEA out*, *NMEA in 2*, *NMEA in 1* inputs. When valid messages are received these LED's blink. All NMEA messages have to be compliant in order to let de LED blink. For the serial LED a blink means that a valid RS-485, RS-232 or other sensor message is received. For each serial sensor a software driver is included in the device. In order to connect jet unknown sensors an additional driver and new firmware is needed.

If you experience difficulties connecting with the device; Check if the LED's are blinking, Check the wiring of the Tx/Rx or A/B wires; Check the data settings of your COM port.

5 Configuration

5.1 Basic Node

No configuration required or possible.

5.2 SMART Node

5.2.1 Connection via wired network router

The Smart Node (OIC-05) has a build in web based configurator.
To access the configurator your pc and the Smart Node (OIC-05) should be connected to the same network.
If you do not have a network, you can connect direct, see 5.2.2 Connection without router.

5.2.2 Connection without router

You can connect to the Smart Node (OIC-05) direct via a UTP cable.
The Smart Node (OIC-05) will run a DHCP server if it doesn't get an IP address and will assign an IP address to the connected PC. **The Smart Node (OIC-05) will get IP address 192.168.1.1**

5.2.3 Webserver

The configuration website is optimized for use with Google Chrome browser. Other browsers will probably work, but might have layout issues.
Once connected you can access the configurator in your browser:

When a router is used:

meteolinkxxx/

xxx = last 3 digits of the serialnumber

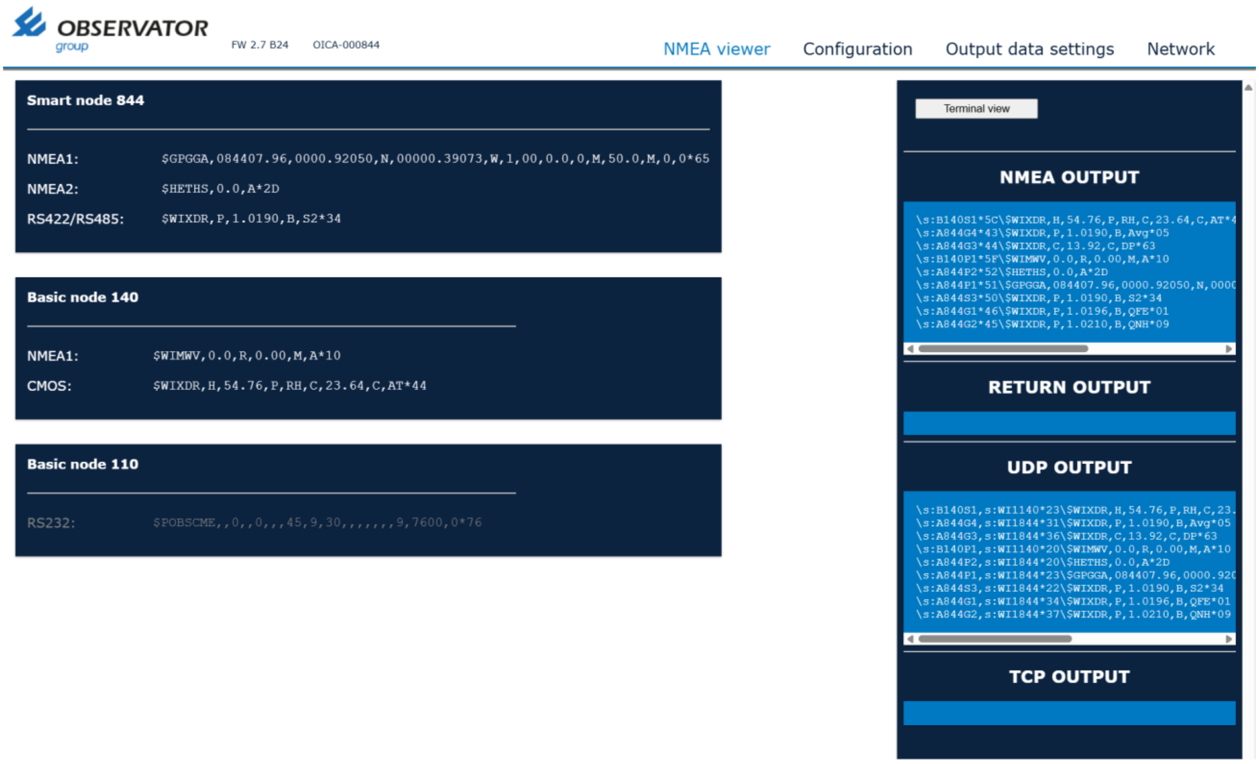
Note: You must be wire connected, via WiFi you'll need the IP address of the SMART node!

Via direct connection (DHCP server of the SMART node) type the IP address:

192.168.1.1

The NMEA viewer page will be loaded (See 5.2.4).

5.2.4 NMEA viewer page.

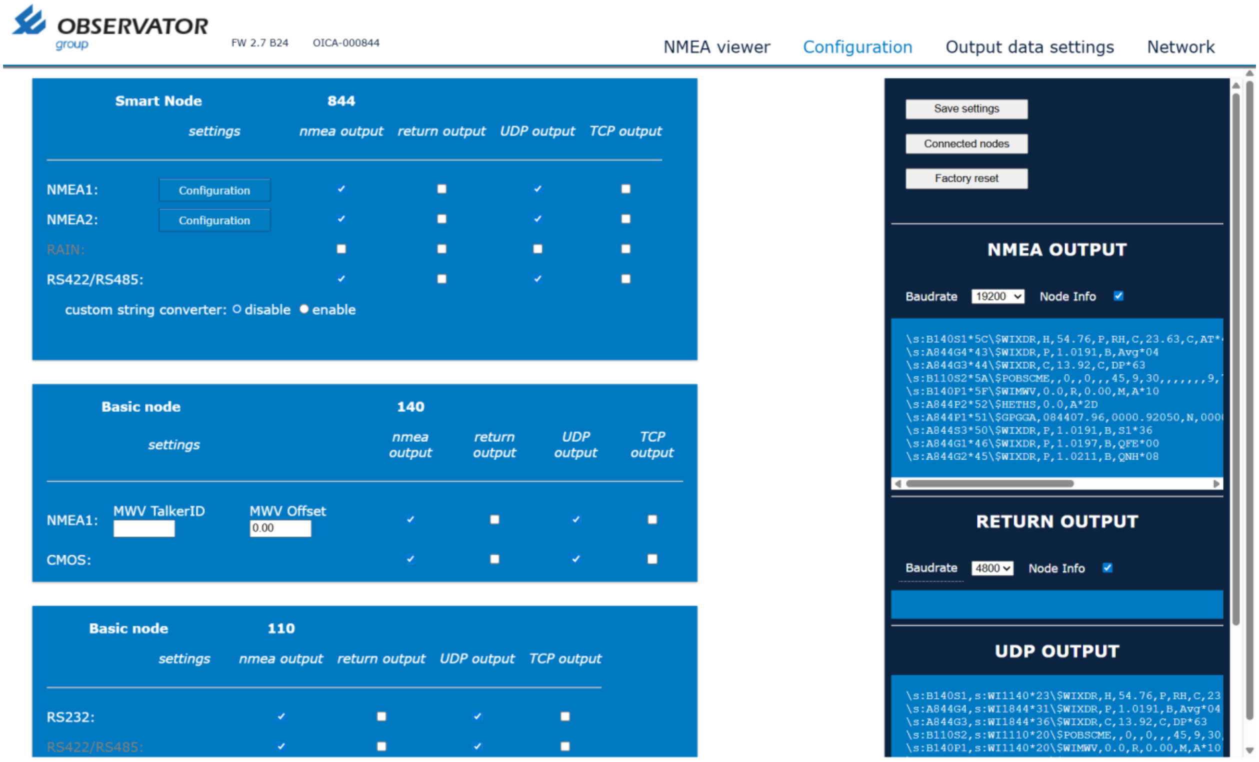


This page will show the incoming data and outgoing data streams.

Available (recognized) inputs are light gray and can be tagged or untagged to show or remove the corresponding data.

Disabling of streams in this menu will only influence the view on this page, **no changes to the actual configuration are made!**

5.2.5 Configuration page



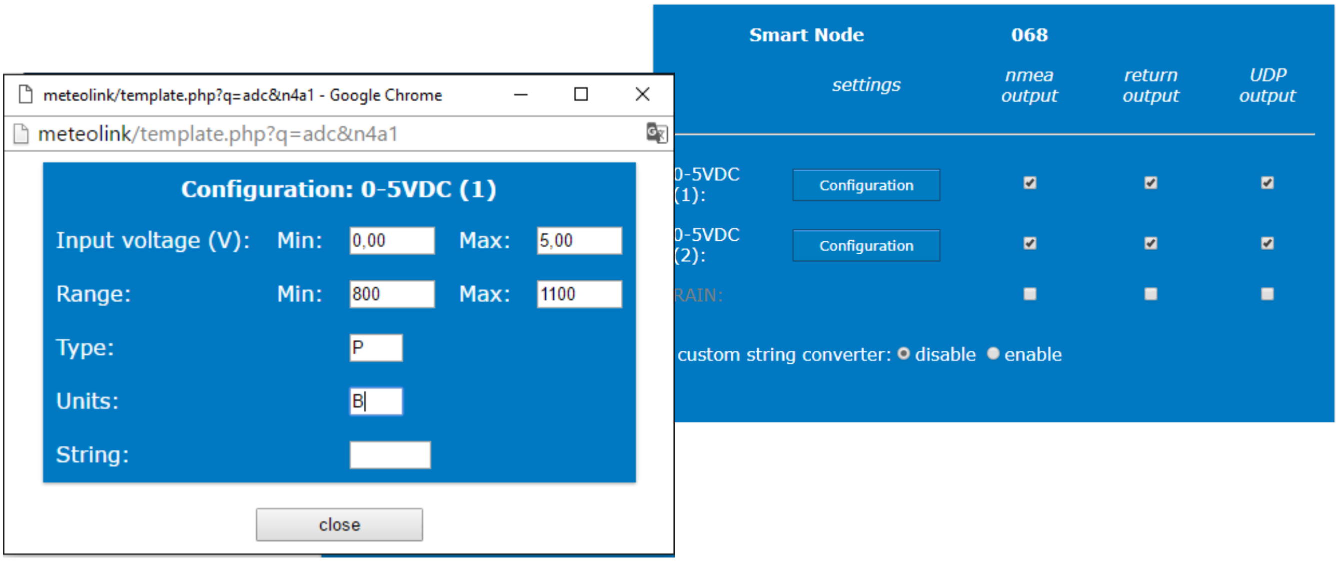
On this page you can configure the Smart Node (OIC-05) including any ADC value conversions of Basic node data.

In case of any MWV (wind) data you can set an offset for the wind direction, so you can line up the wind sensor.

Example: -25.0 will change 90.0 degrees to 65.0

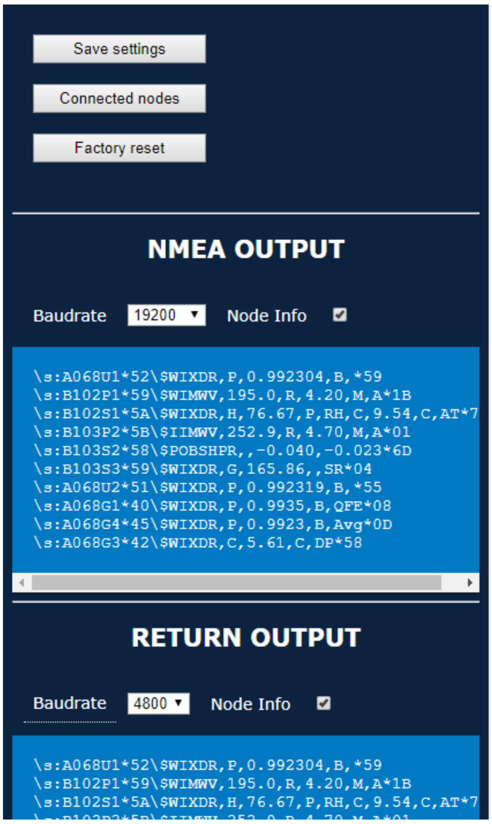
Inputs can be disabled by removing the tag.

The analogue inputs can be configured for NMEA -$WIXDR output by clicking on ‘configuration’:



- At input you can correct the minimum and maximum analogue value (either Voltage or Current).
- At range you can fill in the corresponding values for minimum and maximum analogue values.
- Type is the transducer type according the NMEA XDR table
- Unit is the unit according NMEA XDR table.
- String is an extra text field which can be used for the sensor id in case you have multiple sensors of 1 type. Maximum is 5 characters.

Note: Changes must be saved before leaving a page, otherwise they will be lost!



Settings can and should be stored in the SMART nodes memory by using the ‘Save Settings’ button.

.
Select ‘factory settings’ to restore default settings.

The NMEA output baud rate can be changed by tagging the corresponding rate.

The Return (2nd NMEA output) baud rate is linked to the baud rate of NMEA input 2!

The tag data can be switched off by un-tagging the ‘enable node information.
This can be useful in case the connected device is not fully NMEA compliant and con not handle these tags.

Note:

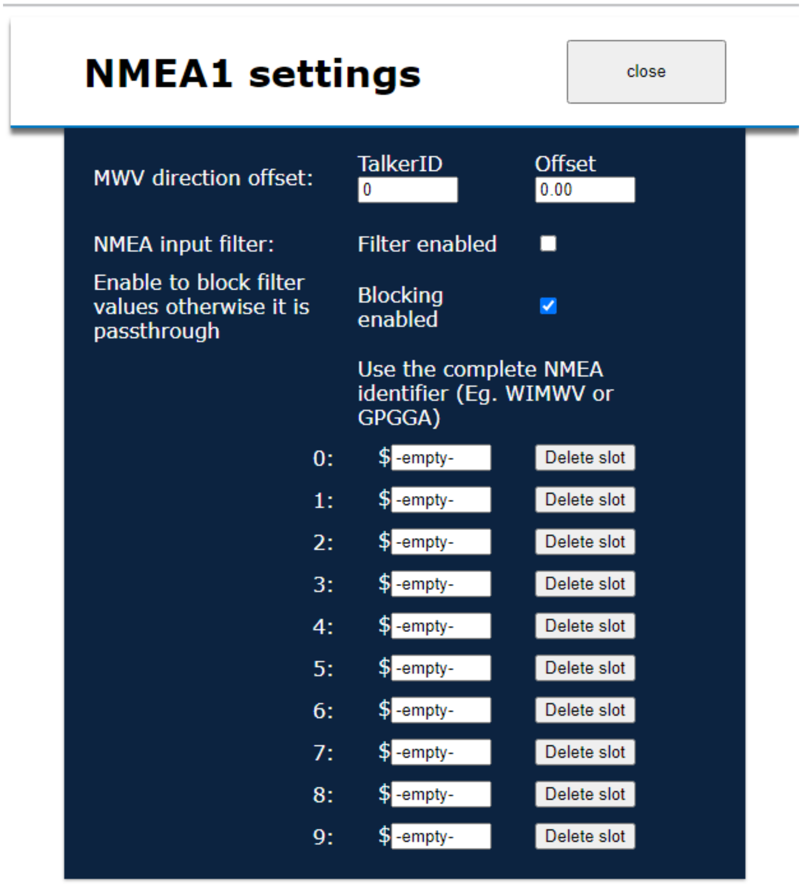
Disabling the node information with multiple identical sensors will make it impossible to identify the individual sensor data!

For example with 2 wind sensors, you won’t be able to identify which MWV message belongs to which sensor**!**

5.2.6 NMEA input filter

From FW2.7 a NMEA input filter has been added to NMEA port 1 & 2.
These ports are now recommended for 3rd party NMEA streams and offer you multiple options to reduce the amount of data by filtering the input data.

Especially if GPS & gyro data is used from the (ships) board net, a lot of unnecessary data might be send to Meteolink, which could lead to reduced reading of the required data.



Besides enabled or not, the filter offers 2 operation modes:

1. **Blocking enabled: Everything will pass except the sentences specified**
2. **Blocking disabled (untagged): Everything is blocked, except the sentences specified.**

The 2nd option will usually result in the least amount of data, but might require some more research and effort than the first option.

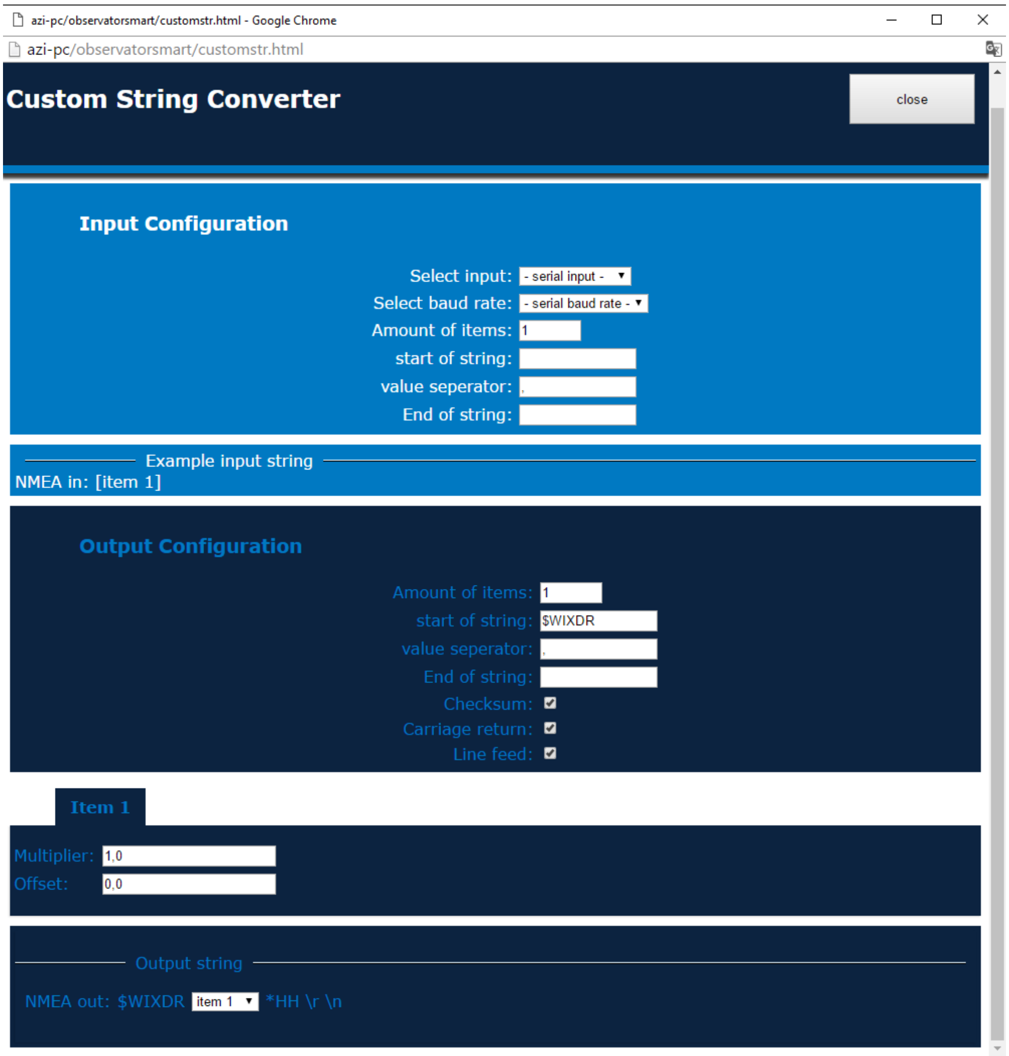
Remember to specify the exact sentence identifier including the first 2 ID letters.
Up to 10 sentences can be specified.

Do not forget to save the settings afterwards.

5.2.7 Custom String Converter

The custom string converter can be used to convert any serial data string into a NMEA type string.

Note: Enabling the Custom String Converter will overrule the auto sensor identify option!



Define the input in Input Configuration field:

- Select the port and baud rate
- Define the exact number of parameters of the input data string
- Define the start, end & separator of the input data string (Use the backslash code for special characters like linefeed, Carriage return etc.)

Special Characters:	
\n	Linefeed
\r	Carriage return
\t	Tab
\s	Space
\\	Backslash (\)

Note: The first item will start directly after the 'Start of String' characters. If you have a separator before the first item, the separator must be included in the 'Start of String'.

Define the output in Output Configuration:

- Select the number of parameters (items) you will use.
- Start of string including fist separator symbol if applicable ('$WIXDR,' for standard XDR output).
- Value separator (',' for NMEA)
- End of string (empty for NMEA)
- NMEA compliant checksum on/off (On for NMEA)
- Carriage Return & Line Feed (both On for NMEA)

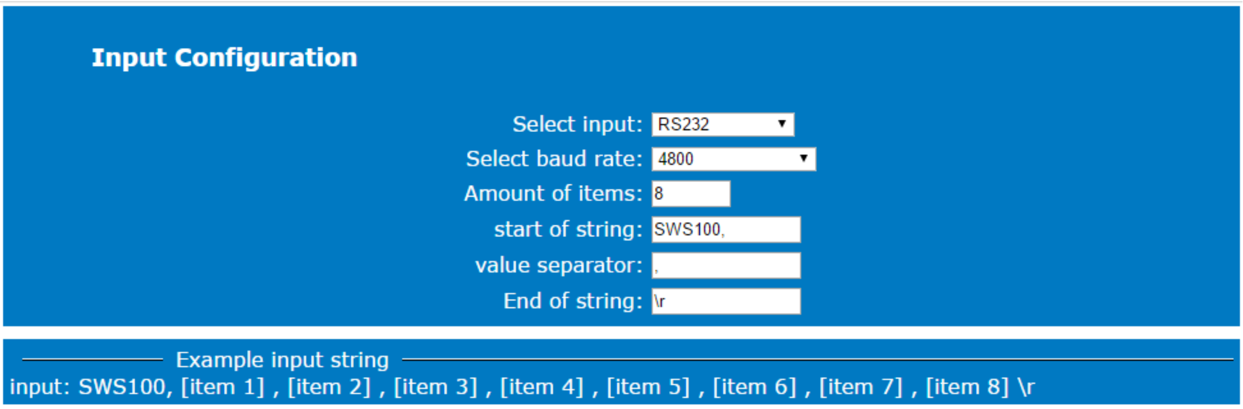
Per item you can set an offset and multiplier (Offset 0.0 & Multiplier 1.0 will leave the data untouched).

.
Example:

Input string is:

`SWS100,001,060,15.78 KM,00.000,00,+12.5 C,18.75 KM,XOO [CR][LF]`

Connected to the RS232 port @ 4800 baud.



Amount of items: the number of parameters in the input data string

The first parameter would be '001' in this example, the 8^{th} 'X00'.
So we have 8 items.

Note: The amount of items must be exact: it will also be used to reject incomplete data strings!

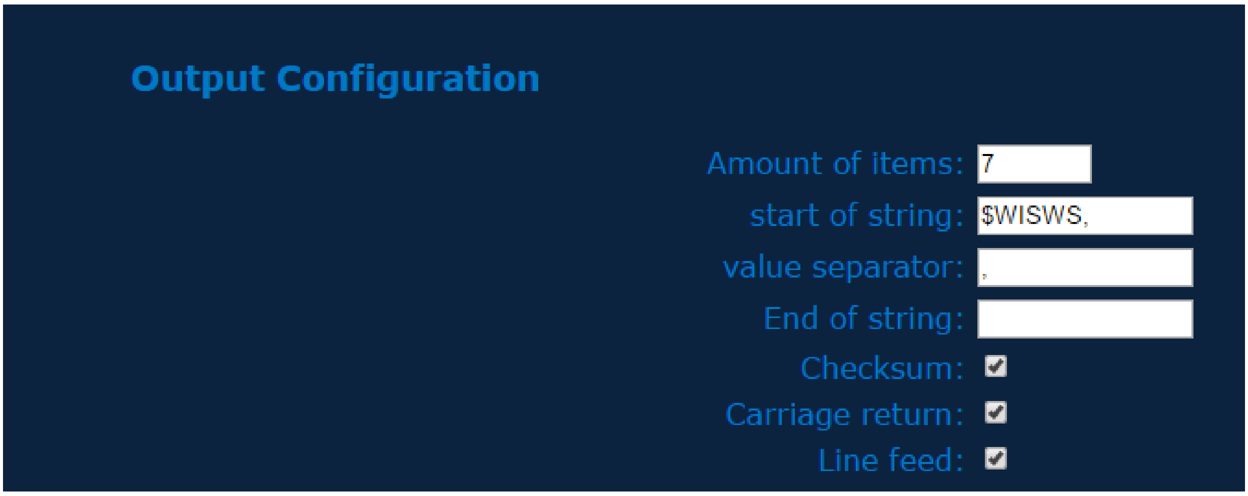
Start of string would be 'SWS100,'

Alternatively you could use \n ([LF] which is last character of the previous data string. As a result 'SWS100' will become the 1^{st} item, '001' will be the 2^{nd} and you will need to change the amount of items to 9!

Value separator: ','

End of string: \r ([CR])

5.2.8 Output Configuration



The amount of items defines the number of fields you will use.

Start of string: in this example $WI for Weather Instruments followed by SWS which is in this case fictional. This will become a NMEA like message, but note this is not an official correct NMEA message.

Value separator: ‘,’
End of string: can remain empty
Checksum, Carriage return & Line feed should normally be tagged to comply with NMEA.

Items

Per item you can set a Multiplier and Offset, but it will have only effect when the item contains a value only.

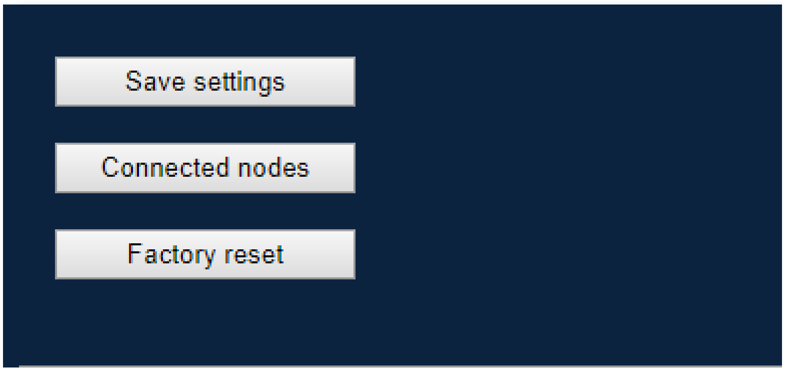
Output string

Here you can configure where the output string itself. For every position you can choose either an item or a text field. The text field is free, in this example we have put there ‘item1’.

So we have 6 parameters and 1 text item, which makes it a total of 7 items.

If the sensor is already connected you will be able to see the result on the configuration page under NMEA output:

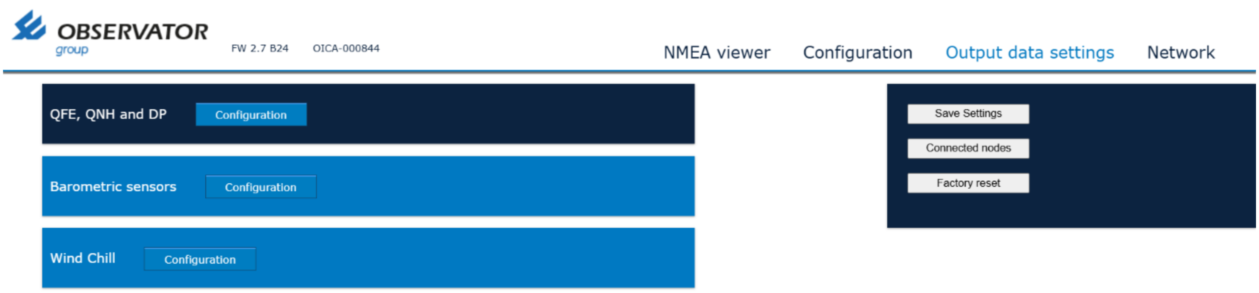
Do not forget to save via ‘Save Settings’:



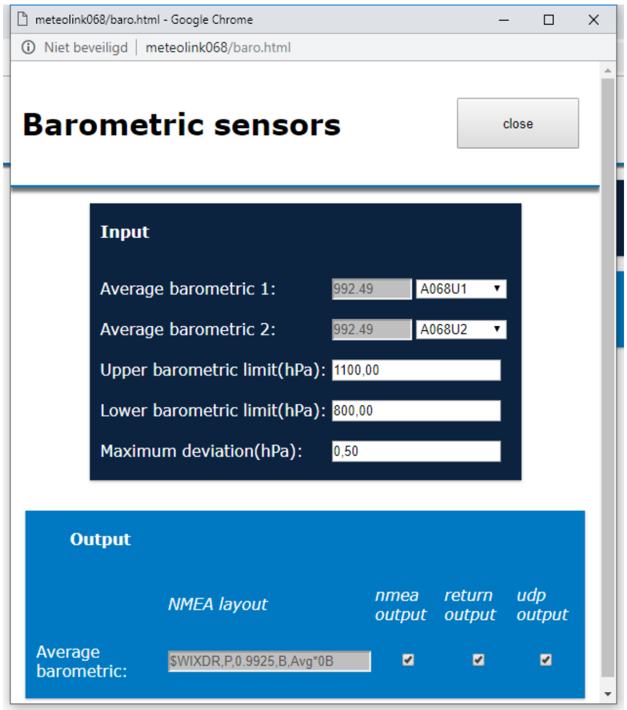
If you try to leave the page without saving you will be notified via a popup.

5.2.9 Output data settings page

This page contains settings for some parameters that can be calculated by the SMART node:



The Smart Node (OIC-05) can calculate the barometric pressure at sea level (QNH) and runway level (QFE).



If you have 2 Barometric sensors start with the Barometric sensors configuration.

You can select if you want the average data on the output or not (For HMS systems this required, since it will also contain he status of the barometric pressure sensors!)

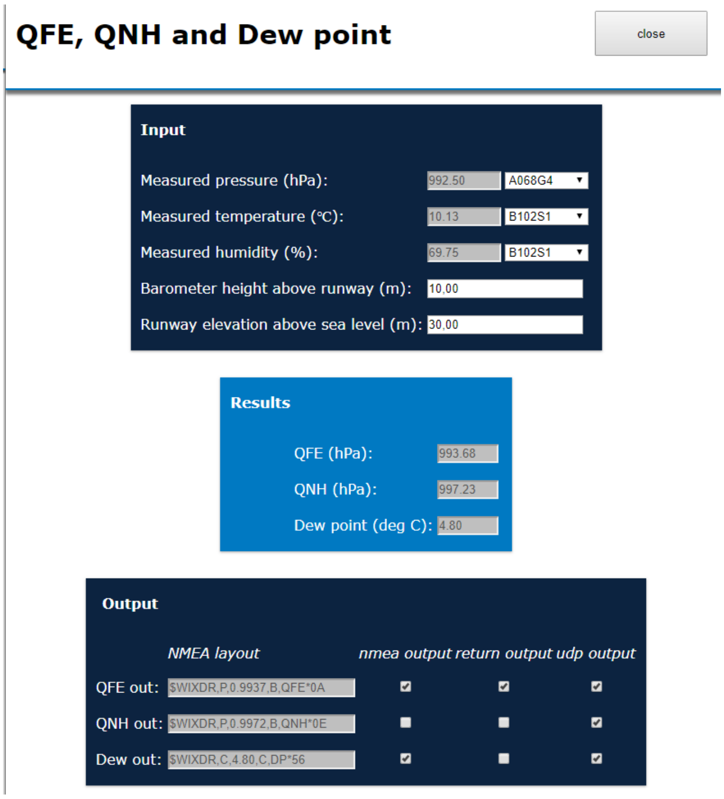
Close the popup and open the QFE, QNH and DP configuration if required (otherwise use save before you exit the screen).

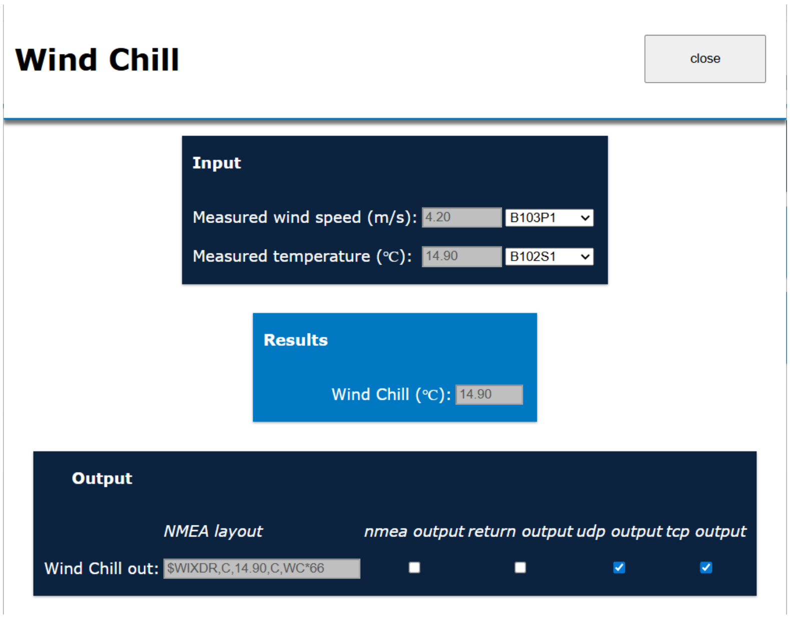
Select the required sensors. If you have 2 Barometric sensors setup, use the average which will be the G4 (example: A068**G4**) labelled port.

You do need to fill in the correct height of the runway above sea level (negative value for below sea level) and the height of the barometric pressure sensor above the runway (negative value for below the runway). You must also select on which input & node the barometric pressure sensor is connected.

For dew point calculations you are required to select on which input and node the temperature and humidity is read.

Tag the outputs on which you want the sentences.





For Wind Chill calculations you will need to select:

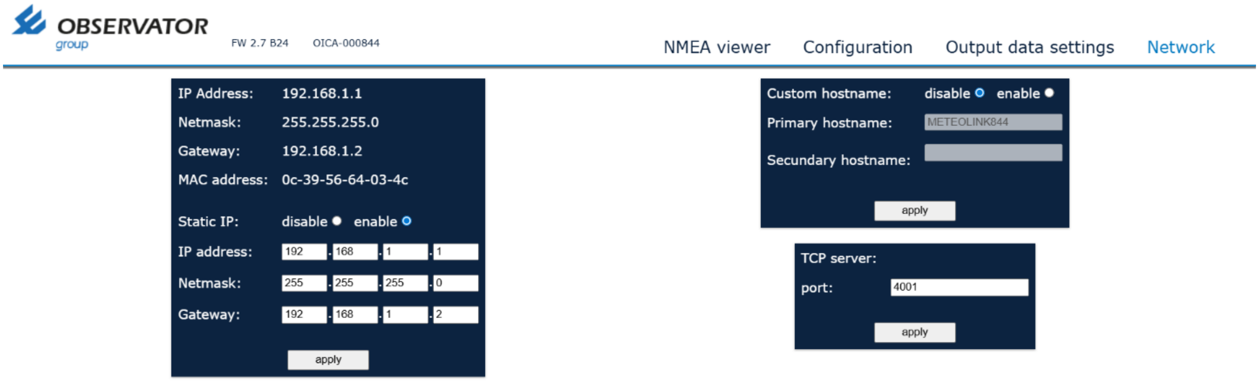
1. the wind speed source
2. the air temperature source.

If the data is available and the correct sources are selected, the calculated Wind Chill will be presented.

Tag the outputs on which you want the sentences.

Once finished, do not forget to use ‘save settings’ before leaving the ‘Output data settings’ screen!

5.2.10 Network page



This page shows the network configuration.
Default the Smart Node (OIC-05) will try to get an IP address from a DHCP server, but if it doesn't get one it will generate an address in the 192.168.x.x range. It will check if the address is not in use.
By enabling the Static IP you can set a fixed address. You will have to set the Netmask and Gateway as well.

Enable 'custom hostname' if you want to add a secondary name.

6 Specifications

6.1 Specifications

	Basic node	**SMART node**	**Remarks**
Voltage	12..24 Vdc	12..24Vdc	
Power consumption	<1W	< 1.5W	Without sensors
Max current pass through via SUPPLY & **GND(SUP)** (terminal 1,2 & 9,10 & 13,14)	10A	10A	For linking through nodes
Max total current via SUPPLY & **GND(sensor)**	500mA	500mA	Total of all sensor connections per node.
Max current CMOS_SUPPLY	50mA	50mA	
IP rating	IP 65	IP 20	Smart Node (OIC-05) must be installed indoors.
Temperature	-25 ... +70 deg.C	20 ... +55 deg.C	according to DNV class D
Humidity	up to 100%RH	10 - 90% RH, non condensing	according to DNV class A
Terminals wire size	0.5 .. 2.5 mm2	0.5 .. 2.5 mm2	push in cage type
NMEA in	2	2	
NMEA out / return*	2	2	2nd is either return or output.
Serial in (RS232/422/485)	1	2	2nd is 485 connection on the same port!
Analogue in 0-5 VDC	1	2	
Analogue in 0 – 24 mA	1	1	
Rain (pulse) input	-	1	
UTP	-	1	Configuration only
QNH, QFE & Dewpoint calc	-	yes	
Custom string converter	-	yes	

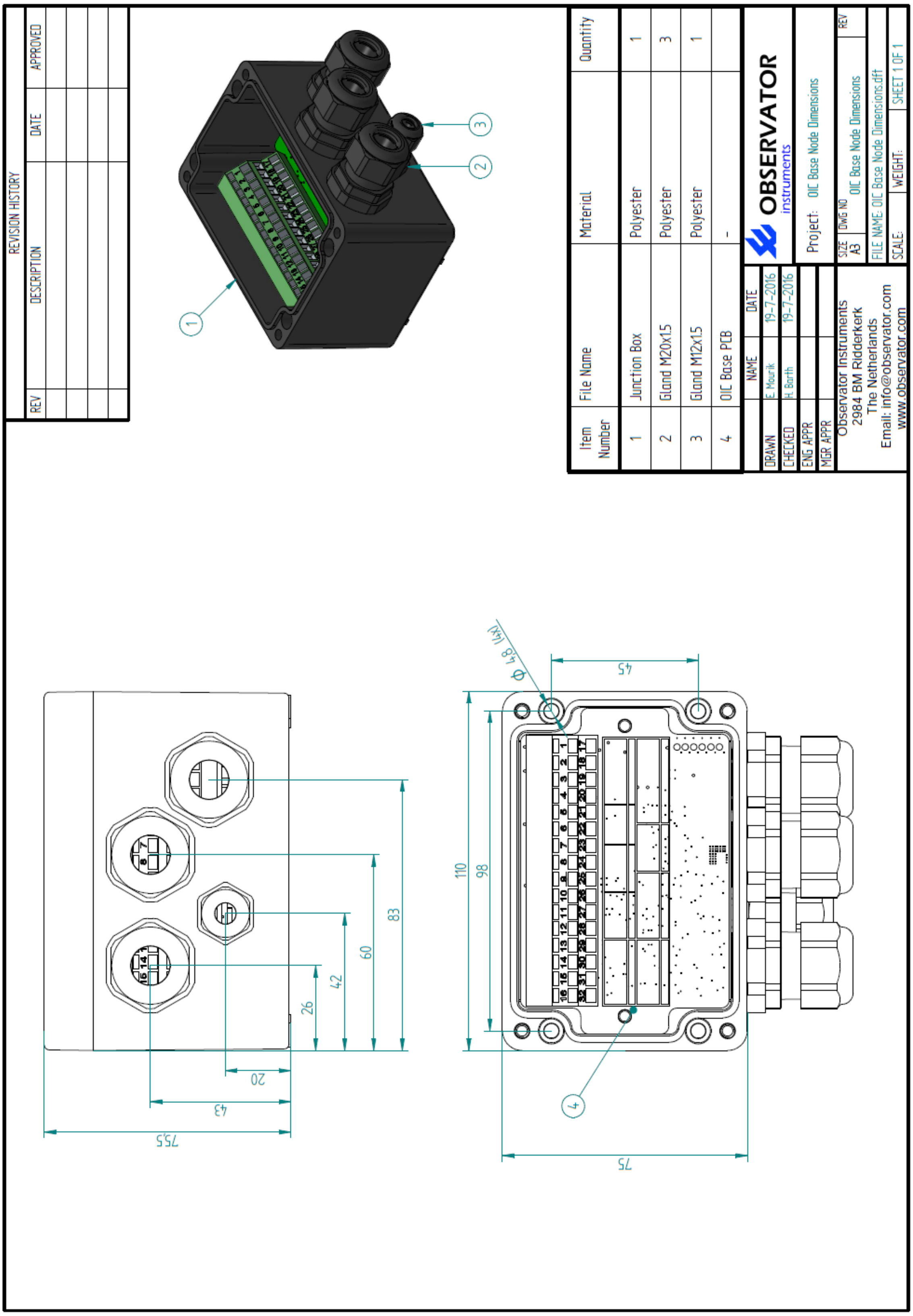
6.2 Maximum allowed cable lengths

I/O connection	**Max cable length (m)**	**Cable type**
DC power	200	Shielded
NMEA input	200	Shielded twisted pair
NMEA output	200	Shielded twisted pair
RS232	15	Shielded
RS422 / 485	200	Shielded twisted pair
0-5V input	2	Shielded twisted pair
0-24mA	200	Shielded twisted pair
Rain (puls)	200	Shielded twisted pair
UPT	100	Shielded twisted pair
CMOS	2	Shielded twisted pair

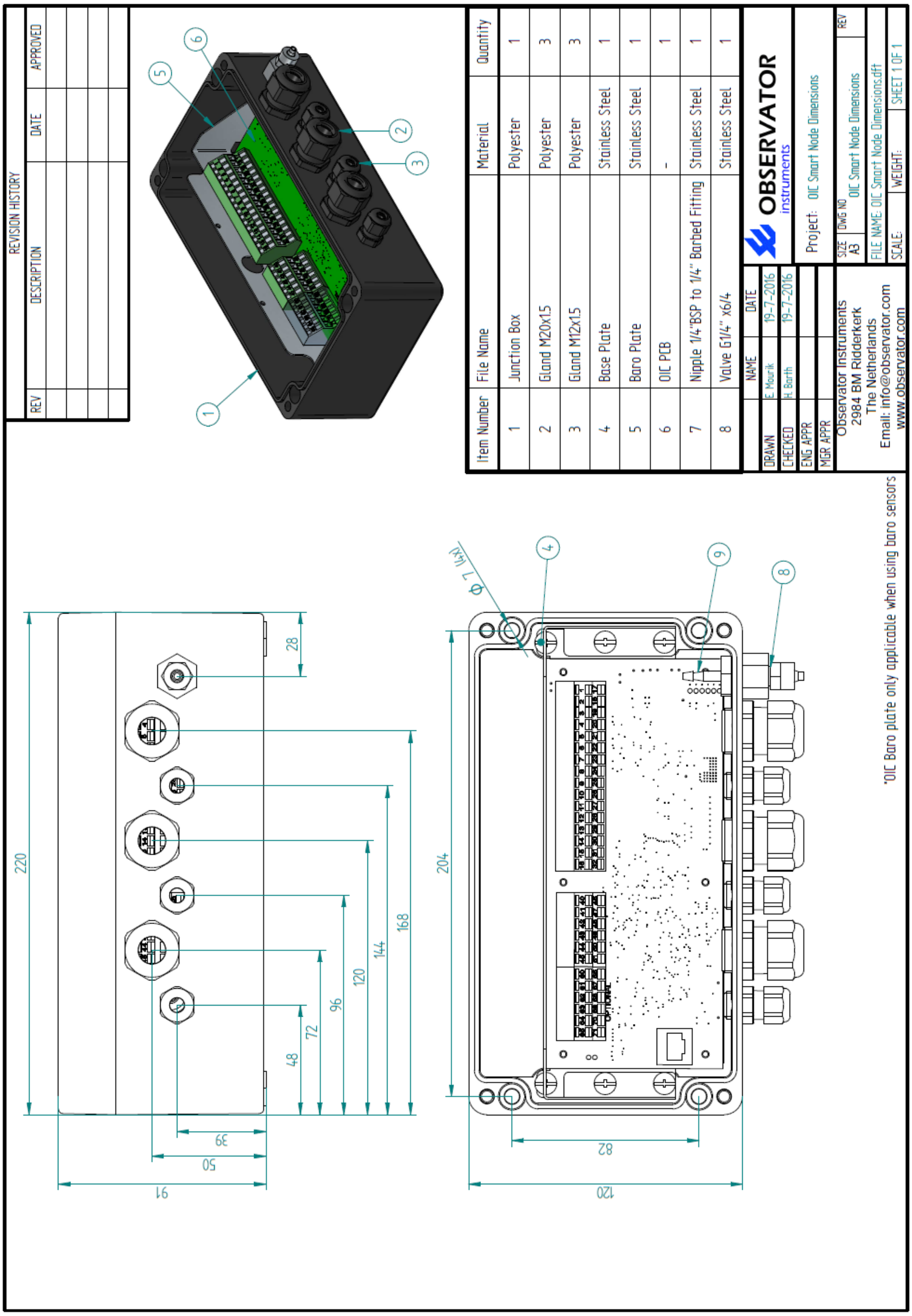
Above cable lengths may not be exceeded to comply with EMC regulation.
Shield must be connected to transmitting or load side only!

7 Dimensional drawings

7.1 Basic Node



7.2 SMART Node



Appendix A: Data protocol

1.1 Baudrate

The default OIC output baudrate is 4800 baud.

1.2 Timing Intervals

Output messages with the same indicator are capped to 4 Hz.

1.3 Data overflow / Buffering

Up to 1 sec buffering, overflow warning by specific node LED.

Version 1.0 contains the following sensor connection capabilities:

Serial:
RS-422
RS-232
RS-485
CMOS

Analoge:
0-5 V
4- 20 mA

Contact:
Pulse Input

The maximum number and types of sensors compatible to each node type is:

Basic Node: 2x NMEA Input (NMEA-0183)
1x Serial (RS-422 / RS-232 / RS-485 / CMOS)
1x Analogue Input 0-5 V
1x Analogue Input 4-20 mA

SMART Node: 2x NMEA Input (NMEA-0183)
1x Serial (RS-422 / RS-232 / RS-485 / CMOS)
1x Serial Input (RS-485) (this is an additional connector to the RS-485 bus)
2x Analogue Input 0-5 V
1x Analogue Input 4-20 mA
1x Pulse Input (potential free contact)

1.4 Standard NMEA protocol

Incoming messages of standard NMEA-0183 format are directly queued for output.
Messages are validated according to the standard given in the document: NMEA 0183 release v4.10

1.5 TAG notes

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

Each node presents the last three digits of its serial number to the TAG. This is for source reference of the data.

For example a node with serial number: OICA-000123 shall output a node number:

\s:A**123**P1*hh\

Node specific data is represented as A for Smart nodes, B for basic nodes, D for OMC-140 displays:

\s:**A**123P1*hh\ (smart node)
\s:**B**123P1*hh\ (basic node)
\s:**D**123P1*hh\ (OMC-140 display)

Also port specific information is added:

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 (OIC-05) 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\

1.6 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.

1.6.1 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: A123**P5***hh\ (Smart Node (OIC-05) 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\"

1.6.2 UDP-tag combination

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

\s: A123**P5**, s:WI**1123***hh\

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

1.7 XDR sentences

All data will be put or converted into a XDR format message, with the exception of wind data (which will be a MWV message).

To comply and make use of calculated data (Dewpoint, QNH & QFE) the correct identifiers and units must be used.

$WIXDR, a,x.x,a,c—c,…… , a,x.x,a,c—c *hh
1 2 3 4

1. Transducer type
2. Data
3. Unit
4. Text (optional)

Parameter	Type	Unit	Text	remarks
Water Temperature	C	C	WT	Unit is Celsius
Air Temperature	C	C	AT	Unit is Celsius
Humidity	H	P	RH	Unit is Percentage
Barometric Pressure	P	B		Unit is Bar

MeteoLink uses the following formats for output:

Parameter	Type	Unit	Text	remarks
Voltage	U	V		Output Analogue Voltage input
Current	I	A		Output Analogue 4-20mA input
QNH	P	B	QNH	Calculated baro Sea Level
QFE	P	B	QFE	Calculated baro Runway Level
Dewpoint	C	C	DP	Calculated Dewpoint
Rain (Pulse counter)	G		RP	Pulse counter 0 – 65535 (for OMC-140)

XDR messages can be send individual or can contain multiple parameter data.

Example:

*$WIXDR,H,52.93,P,,C,16.22,C,*42 (humidity & temperature)*

Is identical to:

*$WIXDR,H,52.93,P,*6B (humidity)*
*$WIXDR,C,16.22,C,*79 (temperature)*

Both ways of sending data are correct.

Appendix B: Sensors

1.8 Introduction

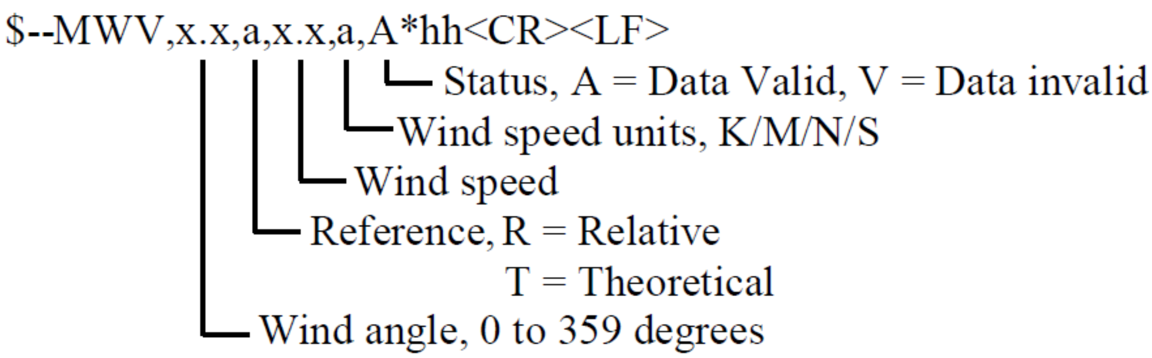
This appendix contains information of the data format of the sensors that are automatically identified. If you require other data formats you can define it using the Custom String Convertor.

1.9 NMEA Compliant Wind Sensors: OMC-116, OMC-118, OMC-160 etc.

General
RS 422/485
Set sensor to 4800 Baud 8N1.
Sensor without heating can be powered via node.

Note: If heating is required the heating should be powered separate, not via the nodes!

Interface



Example Strings

$WIMWV,90.0,R,5.0,N,A*1F

$WIMWV,90.0,R,17.0,N,A*2C

$WIMWV,250.0,R,2.0,N,A*26

1.10 HSS VPF 700 series

General

Power Supply: External (not via nodes)
Output: Rs-422 (Rs-232 not supported by OIC nodes)
Set to 4800 Baud 8N1.

Interface

Automatic reading sent every minute enabled.
Compressed data message mode enabled
No checksum

Data message VPF 710

Data Output Message VPF710

VPF710 Compressed Data Message

The data message format is:

<Date>,<Time>,CPaa,bbb.bb,ccc<cs><crlf>

Message	Meaning
<Date>	Optional Date string in the form DD/MM/YY.
<Time>	Optional Time string in the form HH:MM:SS.
CP	Compressed message header.
aa	Instrument identification number set by the user.
bbb.bb	Total EXCO in km^{-1}.
c c c	Self-Test and Monitoring (see paragraph 4.2). Third c: O = Other self-test values OK X = Other self-test fault exists Second c: O = Windows not contaminated X = Windows contaminated – cleaning recommended/required F = Windows contaminated – fault First c: O = Sensor not reset since last "R?" command X = Sensor reset since last "R?" command
<cs>	If selected this will be the checksum character. The checksum is off by default.

Data message VPF 730

The data message format is:

<Date>,<Time>,CPaa,bb,ccc.cc,dd.dddd,±eee.e,fff<cs><crlf>

Message	Meaning
<Date>	Optional Date string in the form DD/MM/YY.
<Time>	Optional Time string in the form HH:MM:SS.
CP	Compressed message header.
aa	Instrument identification number set by the user.
bb	Present weather codes. From WMO Table 4680 (Automatic Weather Station). 00 No significant weather observed, or sensor starting 04 Haze or Smoke or Dust 30 Fog 40 Indeterminate precipitation type 51 Slight Drizzle 52 Moderate Drizzle 53 Heavy Drizzle 61 Slight Rain 62 Moderate Rain 63 Heavy Rain 71 Slight Snow 72 Moderate Snow 73 Heavy Snow 89 Hail
ccc.cc	Transmissometer equivalent EXCO (km^{-1}).
dd.dddd	Amount of water in precipitation in last measurement period (mm).
±eee.e	Temperature (°C).
f f f	Self-Test and Monitoring (see paragraph 4.2). O = Other self-test values OK X = Other self-test fault exists O = Windows not contaminated X = Windows contaminated – cleaning recommended/required F = Windows contaminated – fault O = Sensor not reset since last "R?" command X = Sensor reset since last "R?" command
<cs>	If selected this will be the checksum character. The checksum is off by default.

Data message VPF 750

Data Output Message VPF750

VPF750 Compressed Data Message

The data message format is:

<Date>,<Time>,CP,nnn,ww,aa.aa KM,bb.bbbb,±ccc.c,ddd,+eeeee,fff<cs><crlf>

Message	Meaning
<Date>	Optional Date string in the form DD/MM/YY.
<Time>	Optional Time string in the form HH:MM:SS.
CP	Compressed message header.
nnn	Instrument identification number set by the user.
ww	Present weather codes. From WMO Table 4680 (Automatic Weather Station). XX Not Ready (first 5 minute from restart) 00 No significant weather observed 04 Haze or Smoke or Dust 10 Mist 20 Fog in last hour but not at time of observation 21 Precipitation in last hour but not at time of observation 22 Drizzle in last hour but not at time of observation 23 Rain in last hour but not at time of observation 24 Snow in last hour but not at time of observation 25 Freezing Drizzle or Freezing Rain in last hour but not at time of observation 30 Fog 31 Fog in patches 32 Fog becoming thinner in last hour 33 Fog no appreciable change in last hour 34 Fog begun or becoming thicker in last hour 35 Freezing Fog 40 Indeterminate precipitation type 51 Slight Drizzle 52 Moderate Drizzle 53 Heavy Drizzle 54 Freezing Slight Drizzle 55 Freezing Moderate Drizzle 56 Freezing Heavy Drizzle 57 Slight Drizzle and Rain 58 Moderate or Heavy Drizzle and Rain

Message	Meaning
	61 Slight Rain
	62 Moderate Rain
	63 Heavy Rain
	64 Freezing Slight Rain
	65 Freezing Moderate Rain
	66 Freezing Heavy Rain
	67 Slight Rain and Snow
	68 Moderate or Heavy Rain and Snow
	71 Slight Snow
	72 Moderate Snow
	73 Heavy Snow
	74 Slight Ice Pellets
	75 Moderate Ice Pellets
	76 Heavy Ice Pellets
	77 Snow Grains
	78 Ice Crystals
	81 Slight Rain Showers
	82 Moderate Rain Showers
	83 Heavy Rain Showers
	85 Slight Snow Showers
	86 Moderate Snow Showers
	87 Heavy Snow Showers
	89 Hail
aa.aa KM	Meteorological Optical Range (KM).
bb.bbbb	Amount of water in precipitation in last minute (mm).
±ccc.c	Temperature (°C)
d d d	Self-Test and Monitoring (see paragraph 4.2). Third d: O = Other self-test values OK X = Other self-test fault exists F = Forward Scatter Receiver Flooded with Light B = Back Scatter Receiver Flooded with Light T = Temperature / Humidity sensor Fault Second d: O = Windows not contaminated X = Windows contaminated – cleaning recommended/required F = Windows contaminated – fault First d: O = Sensor not reset since last "R?" command X = Sensor reset since last "R?" command

Message	Meaning
±eeeee	ALS signal, 1 minute average value (cd/m^2).
f f f	ALS Self-Test and Monitoring (see paragraph 4.2). O = Other self-test values OK X = Other self-test fault exists O = Window not contaminated X = Window contaminated – cleaning recommended/required F = Window contaminated – fault S = Sensor input saturated O = Sensor not reset since last "R?" command X = Sensor reset since last "R?" command
<cs>	If selected this will be the checksum character. The checksum is off by default.

Example VPF 710

CP01,000.10,OOO
CP01,000.12,OOO

CP01,001.52,XOO
CP01,001.48,XOO
CP01,001.48,XOO
CP01,001.48,XOO

Conversion by OIC to NMEA according to the NMEA protocol:

$IIVPA
,
x.x Total EXCO in km
*<hh>
<CR><LF>

OIC received:

CP01,00**0.10**,OOO

OIC converts to NMEA:

$IIVPA,**0.10***74<CR><LF>

Example VPF 730

CP01,71,000.96,00.0048,-005.4,OOO
CP01,71,000.11,00.0005,-005.3,OOO

Conversion by OIC to NMEA according to the NMEA protocol:

$IIVPB
,
xx Present weather code
,
x.x Total EXCO in km
,
x.x Amount of water participation (mm) past measurement period.
,
x.x Temperature (degrees centigrade)
*<hh>
<CR><LF>

OIC received:

CP01,**71,**00**0.96,**0**0.0048,-**00**5.4**,OOO

OIC converts to NMEA:

$IIVPB,**71,0.96,0.0048,-5.4***43<CR><LF>

Example VPF 750

CP,001,52,09.30 KM,00.0426,+008.6,OOO,+00071,OOO
CP,001,62,09.87 KM,00.0612,+008.6,OOO,+00102,OOO

Conversion by OIC to NMEA according to the NMEA protocol:

$IIVPC
,
xx Present weather code
,
x.x Meteorological optical range km
,
x.x Amount of water participation (mm) past measurement period.
,
x.x Temperature (degrees centigrade)
,
x ALS 1-minute average cd/m²

*<hh>
<CR><LF>

OIC received:

CP,001,**52,09.30 KM,00.0426,+**00**8.6**,OOO**,+**00**71**,OOO

OIC converts to NMEA:

$IIVPC,**52,9.30,0.00426,+8.6,+71***72<CR><LF>

1.11 SWS-200

General

Power Supply: 9- 36 V DC, 3.5 W
Output: Rs-422 (Rs-232 and Rs-485 not supported by OIC nodes)
Set to 4800 Baud 8N1.

Interface

Time/Date set to OFF.
Standard mode (NOT Polled!).
Checksum set to OFF.
Measurement period of 1 minute.

Standard Operating Data Message

The data message format is:

<Date>,<Time>,SWSz00,NNN,XXX,AA.AA KM,BB.BBBB,CC,±DD.D C,EE.EE KM,FFF<cs><crlf>

MESSAGE	MEANING
<Date>	Optional Date string in the form DD/MM/YY
<Time>	Optional time string in the form HH:MM:SS
SWSz00	Either SWS-100 or SWS-200 dependent on model
NNN	Instrument identification number set by the user
XXX	Averaging Time period in seconds.
AA.AA KM	Meteorological Optical Range (KM). This is the averaged value.
BB.BBB	Amount of water in precipitation in last measurement period (mm) (SWS-200 only, otherwise 99.999)
CC	Present weather codes. From WMO Table 4680 (Automatic Weather Station) **For SWS-100:** XX Not Ready (first 5 measurement periods from restart) 00 No Significant weather observed or sensor starting 04 Haze or smoke 30 Fog 40 Indeterminate precipitation type 50 Drizzle 60 Rain 70 Snow

CC	Present weather codes. From WMO Table 4680 (Automatic Weather Station) **For SWS-200** XX Not Ready (first 5 measurement periods from restart) 00 No Significant weather observed or sensor starting 04 Haze or smoke 30 Fog 40 Indeterminate precipitation type 51 Light Drizzle 52 Moderate Drizzle 53 Heavy Drizzle 61 Light Rain 62 Moderate Rain 63 Heavy Rain 71 Light Snow 72 Moderate Snow 73 Heavy Snow 89 Hail
±DD.D C	Temperature (°C) (SWS-200 only, otherwise 99.9 C)
EE.EE KM	Meteorological Optical Range (KM). This is the instantaneous value.
FFF	Remote maintenance (RM) (Remote self-test) F.F.F Third F: O - no RM fault; X - RM fault exists Second F: O = windows not contaminated; X = windows contaminated – cleaning recommended/required; F = windows contaminated – fault First F: O = sensor not reset since last "R?" command; X = sensor reset since last "R?" command
<CS>	If selected this will be the checksum character. The checksum is off by default.

Examples

SWS200,001,060,15.78 KM,00.000,00,+12.5 C,18.75 KM,XOO
SWS200,001,060,20.00 KM,00.000,00,+13.5 C,18.75 KM,XFO
SWS200,001,060,02.34 KM,00.000,04,+12.0 C,00.27 KM,XOO

NMEA Conversion

The used variables from the SWS-200 are:

Meterological optical range (KM) instantaneous
Meterological optical range (KM) averaged
Present weather code
Temperature (degree celcius)
Water per measurement period (mm per minute)

Conversion by OIC to NMEA according to the NMEA protocol.

Non standard NMEA message for SWS-200

$WISWS	
,	
x.x	Meterological optical range (KM) instantaneous
,	
x.x	Meterological optical range (KM) averaged
,	
xx	Present weather code (WMO Table 4680)
,	
x.x	Temperature (degree celcius)
,	
x.x	Water per measurement period (mm per minute)
*<hh>	
<CR><LF>	

Example 1

OIC received:

SWS200,001,060,**15.78 KM,00.000,00,+12.5 C,18.75 KM**,XOO

OIC converts to NMEA:
$WISWS,18.75,15.78,00,12.5,0.0*53<CR><LF>

Example 2

OIC received:

SWS200,001,060,**15.78 KM,00.500,62,-12.5 C,18.75 KM**,XOO

OIC converts to NMEA:
$WISWS,**18.75,15.78,62,-12.5,0.5***7F<CR><LF>

1.12 SWS-100

General
Power Supply: 9- 36 V DC, 2.5 W
Output: Rs-422 (Rs-232 and Rs-485 not supported by OIC nodes)
Set to 4800 Baud 8N1.

Interface
Time/Date set to OFF.
Standard mode (NOT Polled!).
Checksum set to OFF.
Measurement period of 1 minute.

Standard Operating Data Message

The data message format is:

<Date>,<Time>,SWSz00,NNN,XXX,AA.AA KM,BB.BBBB,CC,±DD.D C,EE.EE KM,FFF<cs><crlf>

MESSAGE	MEANING
<Date>	Optional Date string in the form DD/MM/YY
<Time>	Optional time string in the form HH:MM:SS
SWSz00	Either SWS-100 or SWS-200 dependent on model
NNN	Instrument identification number set by the user
XXX	Averaging Time period in seconds.
AA.AA KM	Meteorological Optical Range (KM). This is the averaged value.
BB.BBB	Amount of water in precipitation in last measurement period (mm) (SWS-200 only, otherwise 99.999)
CC	Present weather codes. From WMO Table 4680 (Automatic Weather Station) **For SWS-100:** XX Not Ready (first 5 measurement periods from restart) 00 No Significant weather observed or sensor starting 04 Haze or smoke 30 Fog 40 Indeterminate precipitation type 50 Drizzle 60 Rain 70 Snow

CC	Present weather codes. From WMO Table 4680 (Automatic Weather Station) **For SWS-200** XX Not Ready (first 5 measurement periods from restart) 00 No Significant weather observed or sensor starting 04 Haze or smoke 30 Fog 40 Indeterminate precipitation type 51 Light Drizzle 52 Moderate Drizzle 53 Heavy Drizzle 61 Light Rain 62 Moderate Rain 63 Heavy Rain 71 Light Snow 72 Moderate Snow 73 Heavy Snow 89 Hail
±DD.D C	Temperature (°C) (SWS-200 only, otherwise 99.9 C)
EE.EE KM	Meteorological Optical Range (KM). This is the instantaneous value.
FFF	Remote maintenance (RM) (Remote self-test) F.F.F O - no RM fault X - RM fault exists O = windows not contaminated X = windows contaminated – cleaning recommended/required F = windows contaminated – fault O = sensor not reset since last "R?" command X = sensor reset since last "R?" command
<CS>	If selected this will be the checksum character. The checksum is off by default.

Examples

SWS100,001,060,15.78 KM,00.000,00,+12.5 C,18.75 KM,XOO
SWS100,001,060,20.00 KM,00.000,00,+13.5 C,18.75 KM,XFO
SWS100,001,060,02.34 KM,00.000,04,+12.0 C,00.27 KM,XOO

NMEA Conversion

The used variables from the SWS-200 are:

Meterological optical range (KM) instantaneous
Meterological optical range (KM) averaged
Present weather code
Temperature (degree celcius)
Water per measurement period (mm per minute)

Conversion by OIC to NMEA according to the NMEA protocol.

Non standard NMEA message for SWS-100

$WISWS
,
x.x Meterological optical range (KM) instantaneous
,
x.x Meterological optical range (KM) averaged
,
xx Present weather code (WMO Table 4680)
,
x.x Temperature (degree celcius)
,
x.x Water per measurement period (mm per minute)
*<hh>
<CR><LF>

Example 1

OIC received:

SWS100,001,060,**15.78 KM,00.500,62,-12.5 C,18.75 KM**,XOO

OIC converts to NMEA:

$WISWS,**18.75,15.78,62,-12.5,0.5***7F<CR><LF>

1.13 Sontek Argonaut SL

General

Power Supply: 9- 15 V DC, 1 W
Output: Rs-232 (Optional Rs-422 not supported by OIC nodes)
Set to 4800 Baud 8N1.

Interface

Deployment software: enable flow display & Theoretical flow calculation!
Units: Metric

Argonaut ASCII/Metric/English Data Output Format

Col	Contents	ASCII	Metric	English
1	Sample time (start of averaging interval) – Year			
2	Sample time (start of averaging interval) – Month			
3	Sample time (start of averaging interval) – Day			
4	Sample time (start of averaging interval) – Hour			
5	Sample time (start of averaging interval) – Minute			
6	Sample time (start of averaging interval) – Second			
7	Velocity component 1 (Beam 1/X/East*)	0.1 cm/s	cm/s	ft/s
8	Velocity component 2 (Beam 2/Y/North*)	0.1 cm/s	cm/s	ft/s
9	Velocity component 3 (Beam 3/Z/Up*) **– OR –** Water level (SL or SW systems with vertical beam)	0.1 cm/s mm	cm/s m	ft/s ft
10	Standard error of velocity 1 (Beam 1/X/East)	0.1 cm/s	cm/s	ft/s
11	Standard error of velocity 2 (Beam 2/Y/North)	0.1 cm/s	cm/s	ft/s
12	Standard error of velocity 3 (Beam 3/Z/Up) [0 for SWs]	0.1 cm/s	cm/s	ft/s
13	Signal strength (Beam 1)	counts	counts	counts
14	Signal strength (Beam 2)	counts	counts	counts
15	Signal strength (Beam 3) [0 for SWs]	counts	counts	counts
16	Percent good pings	%	%	%
17	Heading	0.1°	°	°
18	Pitch (rotation about the Y-axis)	0.1°	°	°
19	Roll (rotation about the X-axis)	0.1°	°	°
20	Standard deviation heading	0.4°	°	°
21	Standard deviation pitch	0.4°	°	°
22	Standard deviation roll	0.4°	°	°
23	Mean temperature	0.01°C	°C	°F
24	Mean pressure [0 for SWs]	counts	dBar	PSI
25	Standard deviation of pressure [0 for SWs]	counts	dBar	PSI
26	Input power level	0.2 V	V	V
27	Starting location of sampling volume (vertical distance)	0.1 m	m	ft
28	Ending location of sampling volume (vertical distance)	0.1 m	m	ft
29	Noise level (Beam 1)	counts	counts	counts
30	Noise level (Beam 2)	counts	counts	counts
31	Noise level (Beam 3)	counts	counts	counts

*ENU velocity components require the system to have a compass installed.

Flow Data Output Format				
Col	Contents	ASCII	Metric	English
1	Flow	0.0001 m^3/s	m^3/s	ft^3/s
2	Area	0.0001 m^2	m^2	ft^2

NMEA Conversion

The used variables from the Sontek Argonaut SL are:

Velocity component 1 (beam 1, X) (cm/s)
Velocity component 2 (beam 2, Y) (cm/s)
Velocity component 3, or water level (beam 3, Z) (cm/s)
Mean temperature (°C)
Flow (m^3/s)
Area (m^2)

Conversion by OIC to NMEA according to the NMEA protocol:

$IIASL	
,	
x.x	Velocity component 1 (beam 1, X) (cm/s)
,	
x.x	Velocity component 2 (beam 2, Y) (cm/s)
,	
x.x	Velocity component 3, or water level (beam 3, Z) (cm/s)
,	
x.x	Mean temperature (°C)
,	
x.x	Flow (m^3/s)
,	
x.x	Area (m^2)
*<hh>	
<CR><LF>	

Example 1

OIC received:

2015 09 22 14 48 51 **123.5** **561.3 156.600** 25.5 25.5 0.0 0 0 0 0 16.3 2.0 -0.4 0.1 0.0 0.0 **23.71** 0.035 0.002 11.4 4.5 4.5 28 26 21 **150.3000** **1508.6000**

OIC converts to NMEA:

$IIASL,123.5,561.3,156.6,+23.71,150.3,1508.6*4F<CR><LF>

1.14 CBME80

General

Power Supply: 230V
Output: Rs-232 (service port)
4800 Baud 8N1. (On Service port)

Interface
OS21 format.
Units in meters.
Service port port as output (OS21)
30 sec interval (60 sec also acceptable)

Data message

Message Format 6 (OS21)

This format is intended for use in the OS21 system or in similar implementations. This message includes information of status, measuring range, cloud bases, penetration depths and vertical visibility.

MESSAGE FORMAT

<STX> **DATABLOCK** <CR><LF><ETX>LRC

Symbol	*Explanation*
STX	Start of text (ASCII 02 Hex)
ETX	End of text (ASCII 03 Hex)
CR	Carriage Return (ASCII 0D Hex)
LF	Line Feed (ASCII 0A Hex)
LRC	Checksum character

DEFINITION OF DATABLOCK

IIII_SSSSS_HHHHH_PPPPP_HHHHH_PPPPP_HHHHH_PPPPP_VVVVV_RRRRR

Symbol	*Explanation*
IIII	Identity (The identity of the ceilometer default CBM1)
SSSSS	Status word (hexadecimal coded)
HHHHH	Cloud base height (base one, two and tree) in meter or feet
PPPPP	Penetration depth (depth one, two and tree) in meter or feet
VVVVV	Vertical visibility in meter or feet
RRRRR	Measuring range in meter or feet
_	Space

LRC (Longitudinal Redundancy Checksum) calculation

The first character <STX> is not included in the LRC-sum. The following characters inclusive the termination character <ETX> is included in the LRC-calculation. The LRC-sum is calculated as exclusive-OR sum.

NMEA Conversion

The used variables from the CME80 are:

Cloud base height (m)
Penetration depth (m)
Vertical visibility (m)
Measuring range (m)

Conversion by OIC to NMEA according to the NMEA protocol:

$WICME

,

x Cloud base height (m) Layer 1
,
x Penetration depth (m) Layer 1
,
x Cloud base height (m) Layer 2
,
x Penetration depth (m) Layer 2
,
x Cloud base height (m) Layer 3
,
x Penetration depth (m) Layer 3
,
x Vertical visibility (m) Layer 3
,
x Measuring range (m) Layer 3
*<hh>
<CR><LF>

Example 1

OIC received:

.CBME1 00000 0**1000** 000**10** 0**2000** 000**20** 0**3000** 00030 0**1234** 0**7500**

OIC converts to NMEA:

$WICME,**1000,10,2000,20,3000,30,1234,7500***53<CR><LF>

1.15 GE TERPS 8000 series

General

Power Supply: 11- 28 V DC, 16 mA (32 mA peak)
Output: Rs-485 (Rs-232 not supported by OIC nodes)
Set to 4800 Baud 8N1.

Interface

Auto Send Reading off (Device in addressed mode!)
Unit set to **bar.**
Address set to **1** and / or **2**

Connections:

TERPS 1	**MeteoLink**	
Red	24	SUPPLY (Sensor)
Blue	23	GND (Sensor)
White	22	RS485_B
Green	21	RS485_A

TERPS 2	**MeteoLink**	
Blue	42	GND (Sensor)
Red	43	SUPPLY (Sensor)
Green	44	RS485_A
White	45	RS485_B

Sensor 1

OIC Read sensor 1 (address 1) Command (interval 1 Hz only when bus is free):

1:*G<CR>

Reply of Sensor 1 (after measurement is complete):

01:1.02629 Bar<CR><LF>

Sensor 2

OIC Read sensor 2 (address 2) Command (interval 1 Hz only when bus is free):

2:*G<CR>

Reply of Sensor 2 (after measurement is complete):

02:1.02629 Bar<CR><LF>

Example

OIC request: 1:*G<CR>
Sensor Response: 01:1.02629 Bar<CR><LF>
OIC NMEA Conversion: $WIXDR,P,1.02629,B,S1* 00<CR><LF>

OIC request: 2:*G<CR>
Sensor Response: 01:0.45 Bar<CR>
OIC NMEA Conversion: $WIXDR,P,0.45,B,S2*3C<CR><LF>

Note:
If terps doesn't talk to RS485 converter connect pullup and pulldown resistor(6k8) to A and B channel
Signal A (White) to GND (Blue)
Signal B (Green) to VCC (Red)

Configuration
Open RS485 terminal window 9600baud 8N1
Terps transmits pressure every second
Type:
<enter> *O<enter>(command)
000<enter>(pin)
2<enter>(4800 baud rate)
N<enter>(parity)
8<enter>(databits)
1<enter>(stopbit)
N<enter>(handshake)
2<enter>(termination characters)
Y<enter>(save)

Type:
<enter>N,1<enter>(command to set in address mode 1, select 2 for address 2)

Check settings:
<enter>1:*G<enter>
Or
<enter>2:*G<enter>

Response should be:
01:1.02629 Bar<CR><LF>

Baudrate will be changed after a power cycle

1.16 Voltage Conversion Sensors

Standard Voltage Conversion Method

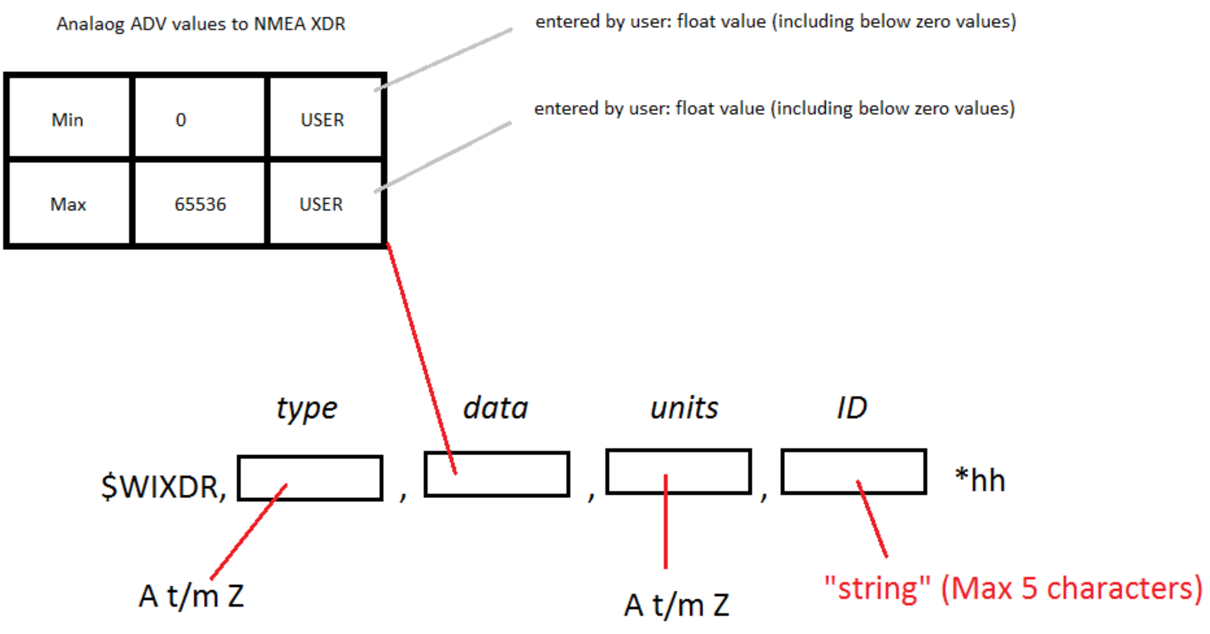
ADC ranges from 0 – 65536.

A voltage adc adds the calibrated measured voltage to the string, as well as the indication “U” that the string represents a voltage conversion.

Example:

$IIXDR,U,1.2345,V,*52<CR><LF>

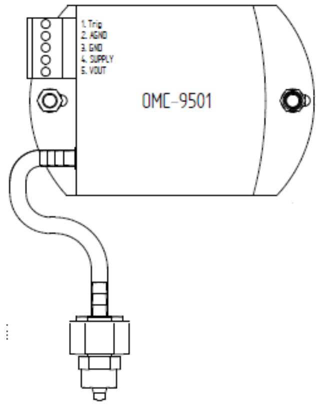
The ADC string can later on be converted to an XDR message by using the SMART nodes interface:



7.1.1 OMC-9501 Barometric pressure sensor(s). (0 - 2.5V / 0 -5V)

Connections:

Meteolink			**OMC-9501**	
Sensor	**1**	**2**		
GND [Sensor]	23	46	GND	Power GND
			AGND	Analogue GND
SUPPLY	24	47	TRIG	Trigger
			Supply	Supply
V_IN	25	48	VOUT	V out



1.17 Current Conversion Sensors

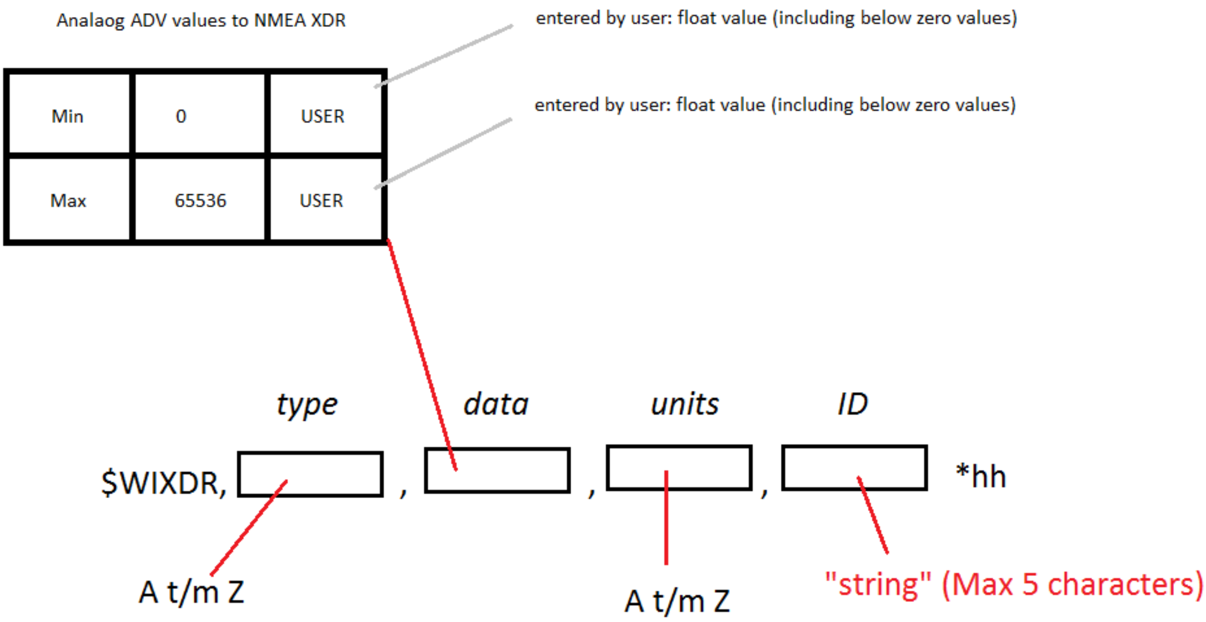
ADC ranges from 0 – 65536.

A current ADC adds the calibrated measured Amperes to the string, as well as the indication “I” that the string represents a current conversion.

Example:

$IIXDR,I,0.12345,A,*77<CR><LF>

The ADC string can later on be converted to an XDR message by using the SMART nodes interface:


Analaog ADV values to NMEA XDR
entered by user: float value (including below zero values)
entered by user: float value (including below zero values)
Min
0
USER
Max
65536
USER
type
data
units
ID
$WIXDR,
,
,
,
*hh
A t/m Z
A t/m Z
"string" (Max 5 characters)

1.18 CMOS Sensors

1.18.1 SSAHRS Inclinometer

General
Power Supply: 3.3 – 5.5 VDC ,14 – 48 mA
Baudrate 115200 Baud 8N1.

Interface
3.3V UART CMOS.
Output rate set to 4 Hz max (1 Hz also acceptable).
Output set to Fupsed Data.

Output Data: The SSAHRS transmits its data in the form of a fixed number of ASCII characters followed by a carriage return for each sample.

There are two possible formats based on the active mode of operation.

Data is presented in the format: $PRY,SPP.P,SRRR.R,+YYY.Y<CR>

S is the sign of the value, PP.P is the pitch, RRR.R is the roll, and YYY.Y is the yaw.

Regardless of the values the same number of ASCII characters will be printed from each sample. The data is always followed by a carriage return (hex 0x0D).

A data sample is as follows.

$PRY,-00.7,+002.6,+350.7

NMEA Coversion

$PRY,SPP.P,SRRR.R,+YYY.Y<CR>

OIC converts to NMEA:

$IIPRY,SPP.P,SRRR.R,+YYY.Y*<hh><CR><LF>

In which:

SPP.P Pitch
SRRR.RRoll
+YYY.Y Yaw

Example

Sensor sends:

$PRY,-00.7,+002.6,+350.7

OIC NMEA Conversion:

$IIPRY,-0.7,+2.6,+350.7*76<CR><LF>

1.18.2 Rotronic HC2-S(3)

General
Power Supply: 3.3 – 5 VDC , 4.5 mA @ 3.3V
Baudrate 19200 Baud 8N1.

Connections:

HC2-S(3)	MeteoLink	
Gray	29	GND (Sensor)
Green	30	CMOS_SUPPLY (3.3V)
Red	31	CMOS_TX
Blue	32	CMOS_RX

Interface

RDD command: read values

Returns the measured and calculated values as well as the information necessary to interpret the data (calculated parameter type, engineering units, status, serial number and name of the device, etc.)

Command format:

{	ID	Adr	RDD	Chksum or }	CR

Answer format:

{	ID	Adr	rdd	Data	Chksum

Example	Type	Description
1..3	Byte	Probe type (1= digital probe, 2=analog probe, 3=pressure probe)
1234.56	Float	Relative humidity or analog value
%RH	String	Humidity or analog value engineering unit
0..1	Bool	Humidity or analog value alarm (out-of-limits)
+	Char	Humidity or analog value trend (+,-,= or " ")
1234.56	Float	Temperature value
°C	String	Temperature engineering unit
0..1	Bool	Temperature alarm (out-of-limits)
=	Char	Temperature trend (+,-,= or " ")
Dp	String	Calculated parameter type (nc: no calculation, Dp: dew point, Fp: frost point)
1234.56	Float	Calculated numerical value
°C	String	Calculated parameter engineering unit
0..1	Bool	Calculated parameter alarm (out-of-limits)
+	Char	Calculated parameter trend (+,-,= or " ")
1..255	Byte	Device type (HygroClip, Logger, HF, HM, ...)
V1.0	String	Firmware version
12345678	String	Device serial number
Name	String	Device name
000...255	Byte	Alarm Byte: (Bit0=out-of-limits value, Bit5= sensor quality, Bit6 = humidity simulator, Bit7= temperature simulator)

Example

OIC Sends:
{F00RDD}<CR>

HC2-S(3) Responds:

{F04rdd 001; 4.45;%RH;000;=; 20.07;°C;000;=;Fp;-19.94;°C;000;+;001;B2.8;0000000002;HyClp 2 ;006;J^M

NMEA Conversion

Conversion by OIC to NMEA according to the NMEA protocol:

Example

OIC Sends:
{F00RDD}

Sensor sends:
{F00rdd 001; **4.47**;%RH;000;=; **20.04**;°C;000;=;nc;-19.92;°C;000;=;001;B2.8;0000000002;HyClp 2 ;006;4^M

OIC NMEA Conversion:

$IIXDR,T,**20.04**,C,H,**4.47**,P,* 00<CR><LF>

Note: **it can take up to 6 minutes before the 1st XDR message is send using a heated probe after power up!**

1.19 Pulse Sensors (SMART node)

OMC-210-2 and OMC-212-2

Rain sensors are connected to OIC SMART modules by using the rain input.
Each tip of the bucket is counted as a pulse by the smart node.

Once a pulse is detected a NMEA output message (if enables by user) is directly queued for output (with a maximum output frequency of 4 Hz).

To make sure if all tips/messages are received correctly a counter is implemented. A 16 bit counter is used which resets to zero at reboot / startup or when 65535 (max value) is incremented.

The device listening to the OIC SMART NMEA output needs to register the time of the received pulse and checks if no pulses/messages are missing. Then a conversion to the required unit can be calculated.

Example

Pulse registered
Pulse registered
Pulse registered
Pulse registered

NMEA Conversion

$IIRAI,P,121*38<CR><LF>
$IIRAI,P,122*3B<CR><LF>
$IIRAI,P,123*3A<CR><LF>
$IIRAI,P,124*3D<CR><LF>

1.20 OMC-9506 (RS485)

Up to 2 OMC-9506 sensors can be connected via the RS485 bus (SMART node).
This will result in a higher accuracy compared to the 4-20mA connection.
The Smart Node (OIC-05) has 2 RS485 connection options on 1 bus, so in case 2 sensors are used they must have a unique address: address 1 or 2.

Specifications:

Power Supply: 8- 28 V DC
Output: Rs-485
Baud rate: 9600 Baud 8N1 (standard).

Interface
Address set to **1** and **2**.

Requests are sampled every 1Hz after the first successful reading.

Connections:

OMC-9506 (1)	MeteoLink	
Black	24	SUPPLY (Sensor)
White	23	GND (Sensor)
Yellow	22	RS485_B
Blue	21	RS485_A

OMC-9506 (2)	MeteoLink	
White	42	GND (Sensor)
Black	43	SUPPLY (Sensor)
Blue	44	RS485_A
Yellow	45	RS485_B

Example

OIC request: <non character data, unreadable to user>
Sensor Response: <non character data, unreadable to user>
OIC NMEA Conversion: `$WIXDR,P,1.02629,B,S1* 00<CR><LF>`

OIC request: <non character data, unreadable to user>
Sensor Response: <non character data, unreadable to user>
OIC NMEA Conversion: `$WIXDR,P,0.45,B,S2*3C<CR><LF>`

Maximum of 2 sensors per smart node. In case of single sensor the address must be 1 or 2.

A special bracket is available for mounting the sensors in the Smart Node (OIC-05) housing.

Appendix C: EU Declaration of Conformity

OBSERVATOR
instruments

Observator Instruments B.V

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EU DECLARATION OF CONFORMITY

(1) Apparatus model: **Meteolink**

(2) Manufacturer:
Observator Instruments B.V.
Rietdekkerstraat 6
2984 BM Ridderkerk
The Netherlands

(3) This declaration of conformity is issued under the sole responsibility of the manufacturer.

(4) Object of the declaration:

OIC-01 Meteolink Basic Node
OIC-05 Meteolink Smart Node
Including all manufacturer-supplied options for these products

(5) The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
- Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility
- Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

(6) References to the relevant harmonised standards used:

EN IEC 60945:2002 including EN IEC 60945/C1:2008
EN IEC 61326-1:2013
EN IEC 63000:2018

(7) -

(8) Ridderkerk, 23 November 2023,
Observator Instruments B.V.

dr. R. de Vries
CEO

OBSERVATOR instruments

Since 1924 Observator has evolved to be a trend-setting developer and supplier in a wide variety of industries. Originating from the Netherlands, Observator has grown into an internationally oriented company with a worldwide distribution network and offices in Australia, Germany, the Netherlands, Singapore and the United Kingdom.