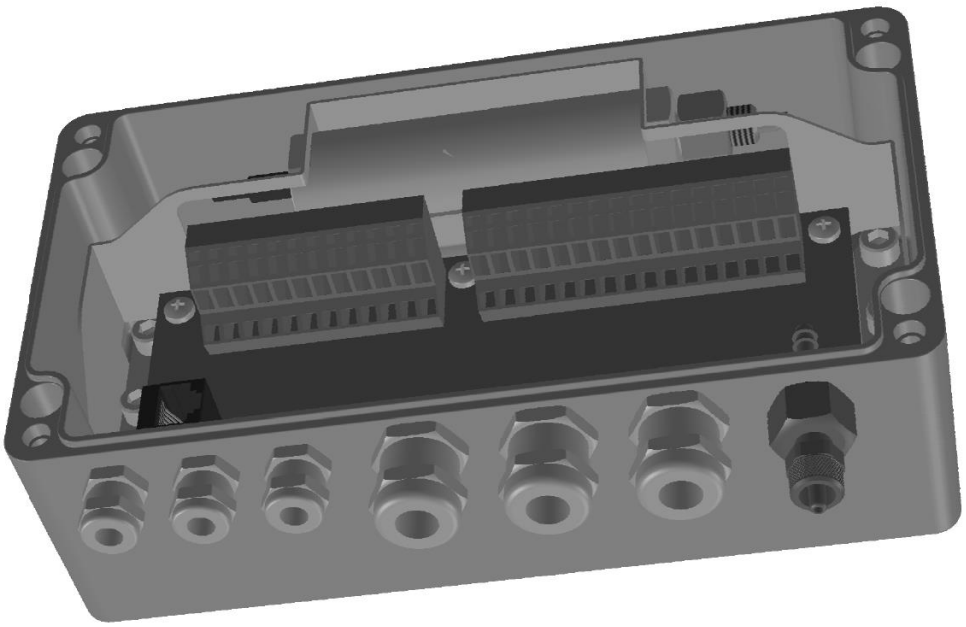
OBSERVATOR
instruments

MeteoLink



MeteoLink Data combiner

Manual

Version 1.03 – November 2016

Author: Observator Instruments

Revisions:

0.1	(May 2016)	First issue
0.2	(August 2016)	Preliminary edition
1.01	(October 2016)	First Release
1.02	(November 2016)	Added connection data of OIC-406 and barometric pressure sensors.
1.03	(November 2016)	Official release. Correction baro-sensor connections text, updated data format, improved configuration information.

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1 Introduction

Observator MeteoLink is a serie 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.

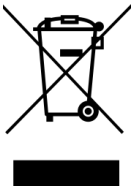
2 Safety

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 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 has no configuration requirements or options, it will simply convert and combine all recognized incoming data into a NMEA stream.

The SMART node 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 (up to 3) Basic nodes as well.

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

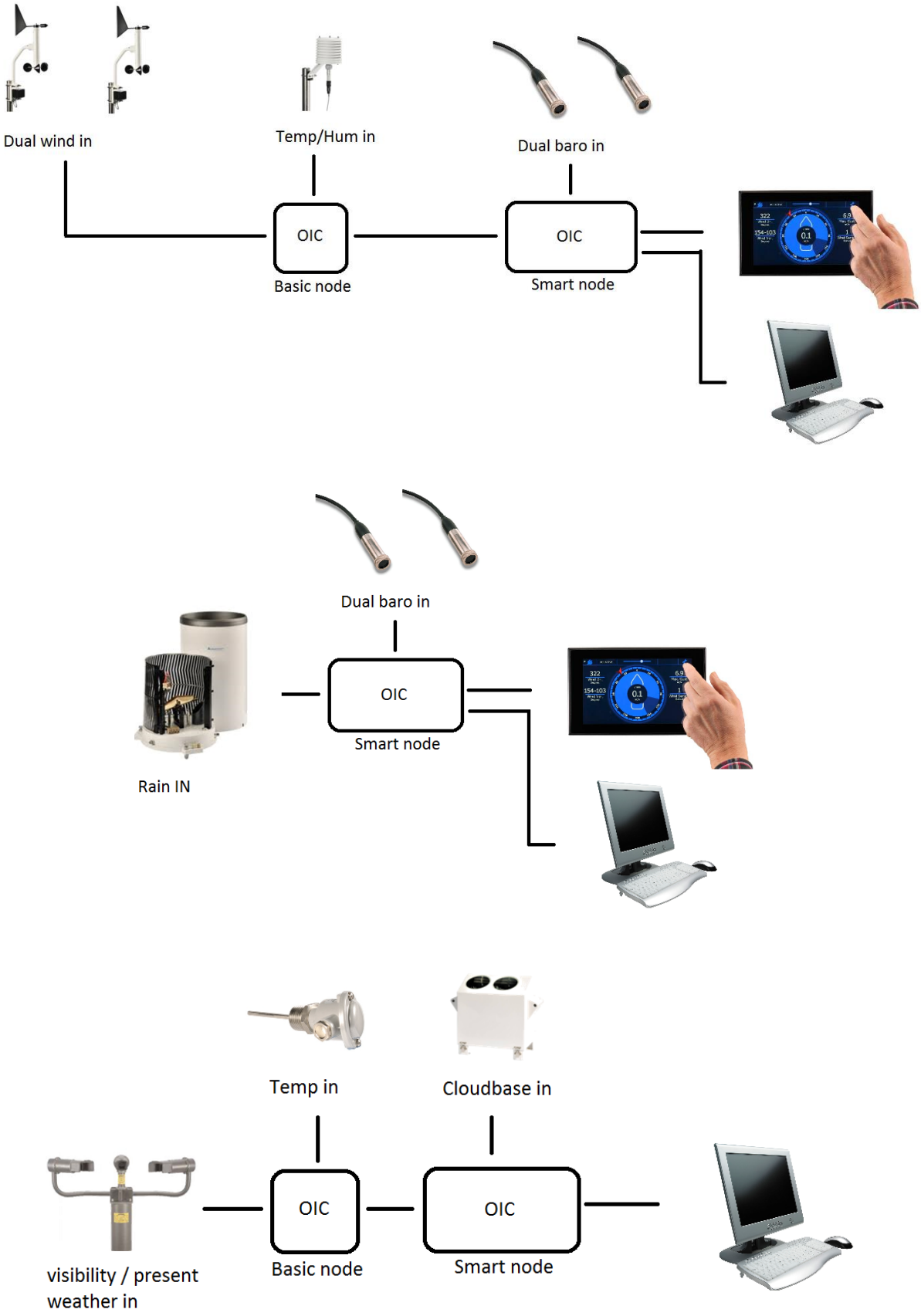
Default all recognized non NMEA data will be converted to a XDR string, the SMART node has a Custom String convertor, which allows you to make other NMEA-like formats.
All NMEA data messages will be forwarded untouched by both nodes, however a tag will be added which includes the Node & Port number. 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	
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



4 Installation

4.1 General

- The SMART node should be installed indoors, the Basic node can installed 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.

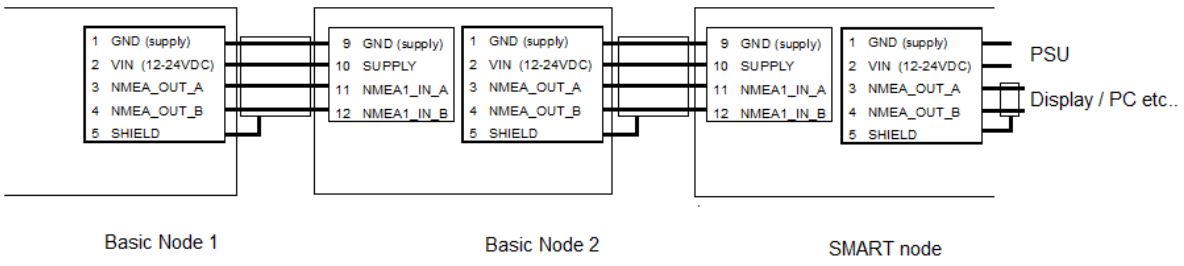
Do not use any force!

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 this should always be the last node in line.
Example:

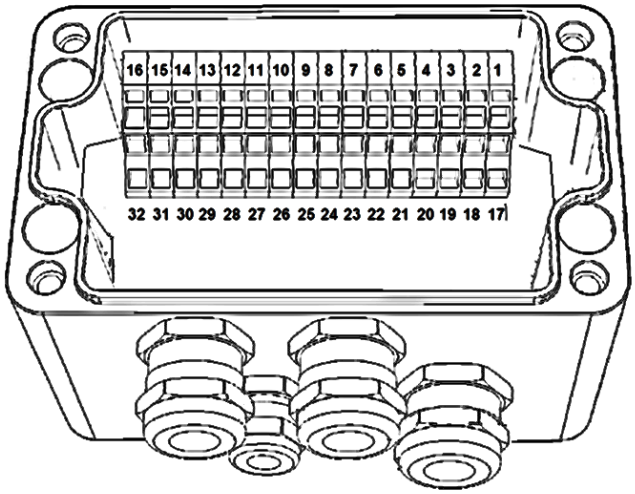
Linking nodes



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 and the 2 basic nodes are fed by it through the SMART node. As long as the total power consumption doesn't exceed 10A, all sensors connected to the nodes can be fed as well.

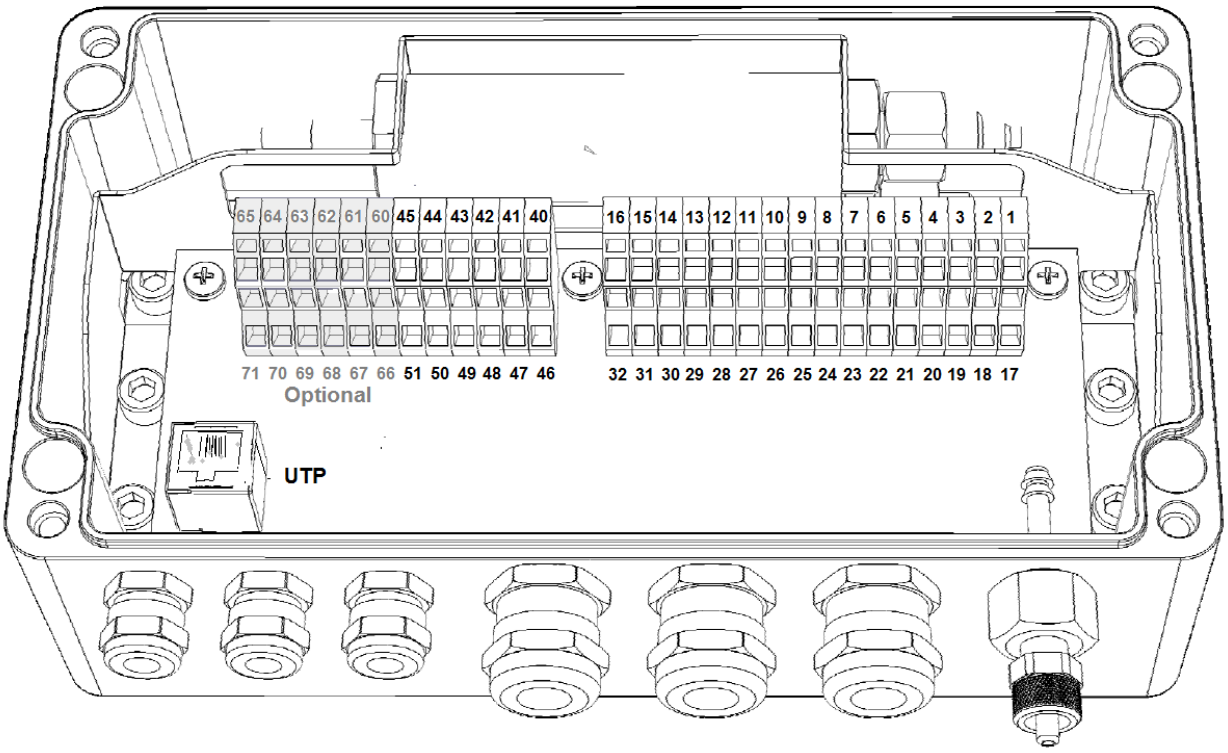
4.4 Basic Node connections



Basic node

Top		Bottom	
1	GND (Supply)	17	GND (Sensor)
2	VIN [12-24VDC]	18	SUPPLY
3	NMEA_OUT_A	19	RS232_TX
4	NMEA_OUT_B	20	RS232_RX
5	SHIELD		
		21	RS485_422_IN_A
6	NMEA_RETURN_A	22	RS485_422_IN_B
7	NMEA_RETURN_B		
8	SHIELD	23	GND (Sensor)
		24	SUPPLY
9	GND (Supply)	25	0-5VDC_IN_1
10	SUPPLY		
11	NMEA1_IN_A	26	GND (Sensor)
12	NMEA1_IN_B	27	SUPPLY
		28	0-24mA_IN_1
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

4.5 SMART Node connections



SMART node 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_A	22	RS485_422_IN_B *	45	RS485_B *	51	GND (Sensor)
7	NMEA_RETURN_B						
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 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 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

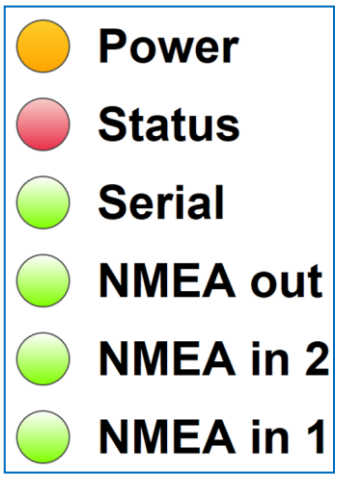
Pulse input (SMART node only):
The SMART node has a pulse counter input for a Rain sensor with a potential free contact.

UTP port is for configuration only.

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

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 (preferable)

The SMART node has a build in web based configurator.
To access the configurator your pc and the SMART node 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 direct via a UTP cable. However you do need to set a fixed IP address in your pc. If you have no experience with this we recommend you use the network option.

On your pc the fixed IP address should be in the 192.168.x.x range, subnet mask 255.255.0.0.

Set the fixed IP before you power the SMART node!

This will avoid duplicate addresses:
Once powered the SMART node will first try to get an IP address from a DHCP server. If it doesn't get one, it will generate an **available** fixed address in the 192.168.x.x range.

5.2.3 Webserver

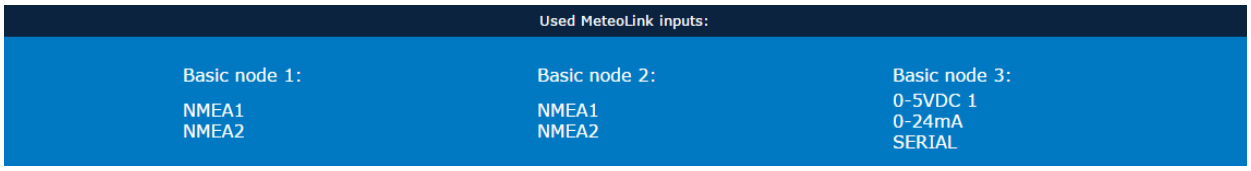
The configuration website is optimized for use with Google Chrome browser. Other browsers will probably work, but might have layout issues.
Once connected you can access the configurator in your browser via the following address:

meteolink/

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

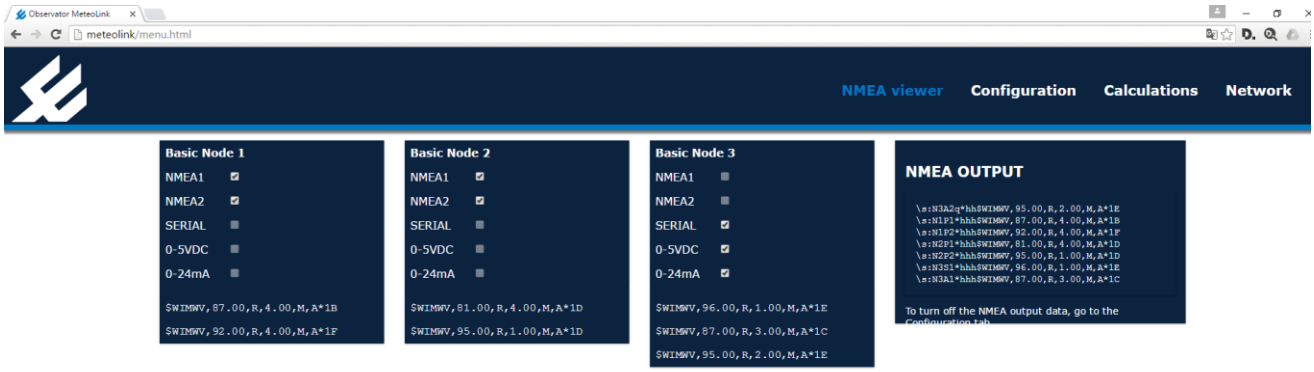
The following screen will be loaded:

The blue bar will show any configured nodes. On the above screen, the configuration is empty.
Following an example with 3 Basic nodes connected to the SMART node.



Click  to enter the menu.

5.2.4 NMEA viewer page.

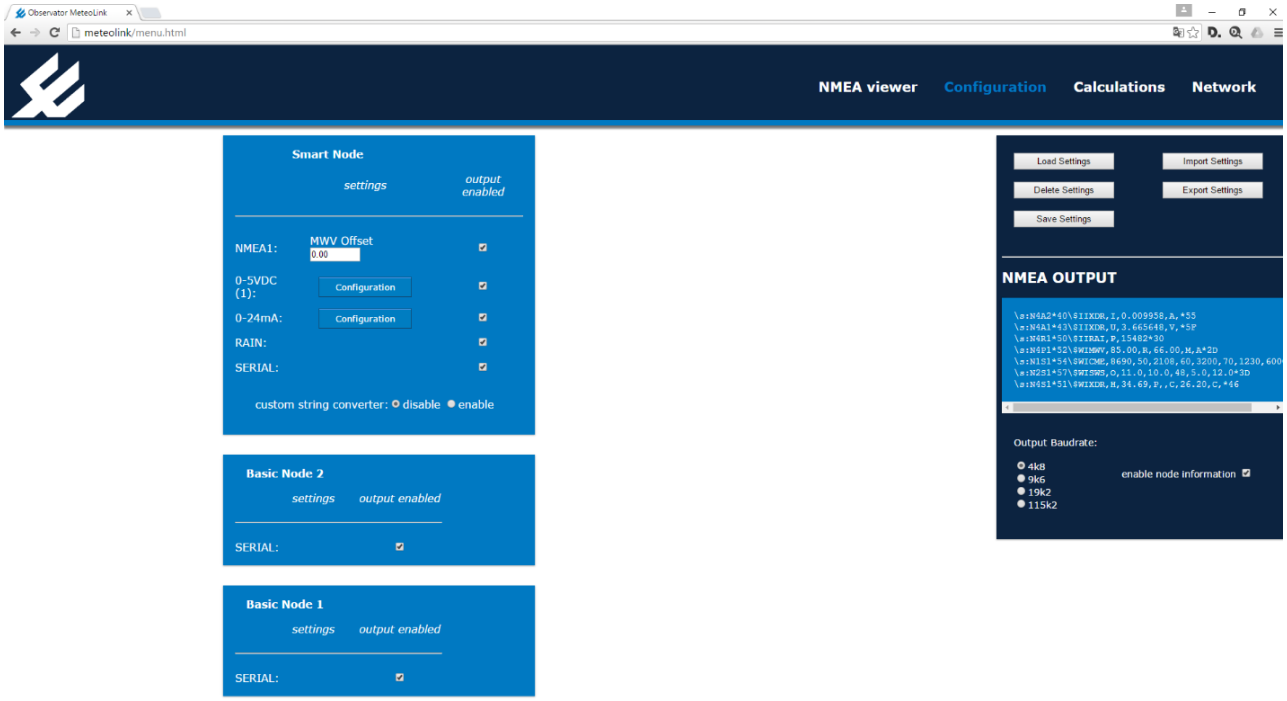


This page will show the incoming data and outgoing data streams.

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



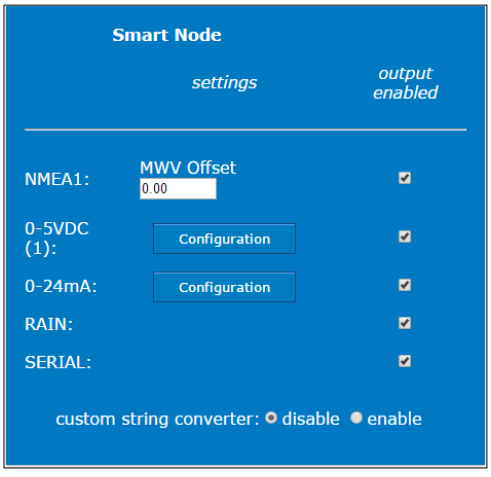
On this page you can configure the SMART node including any ADC value conversions of Basic node data.

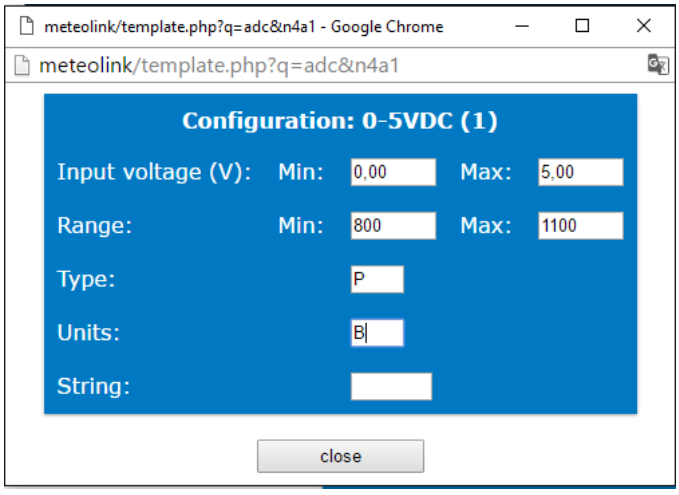
In case of any MWV (wind) data you can set an offset for the wind direction, so you can line up the wind sensor.

Example: -25.0 will change 90.0 degrees to 65.0

Inputs can be disabled by removing the tag.

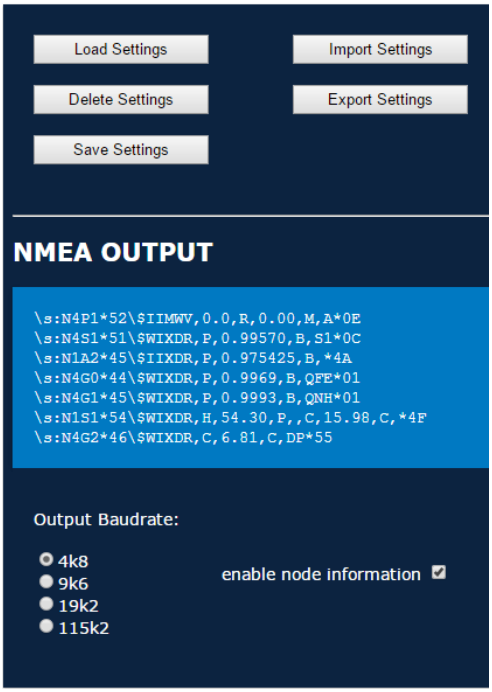
The analogue inputs can be configured for NMEA -$WIXDR output by clicking on ‘configuration’:





- 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.

A window will popup and a name can be entered, if no name is used, it will be stored under ‘undefined’.
Multiple configurations can be stored.

Use load settings to load a previous saved configuration.
Select ‘factory settings’ to restore default settings.

Delete settings allows you to delete stored settings, except ‘factory settings’.

Configurations can be imported and exported to files using the ‘Import Settings’ and ‘Export Settings’ buttons.

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

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.

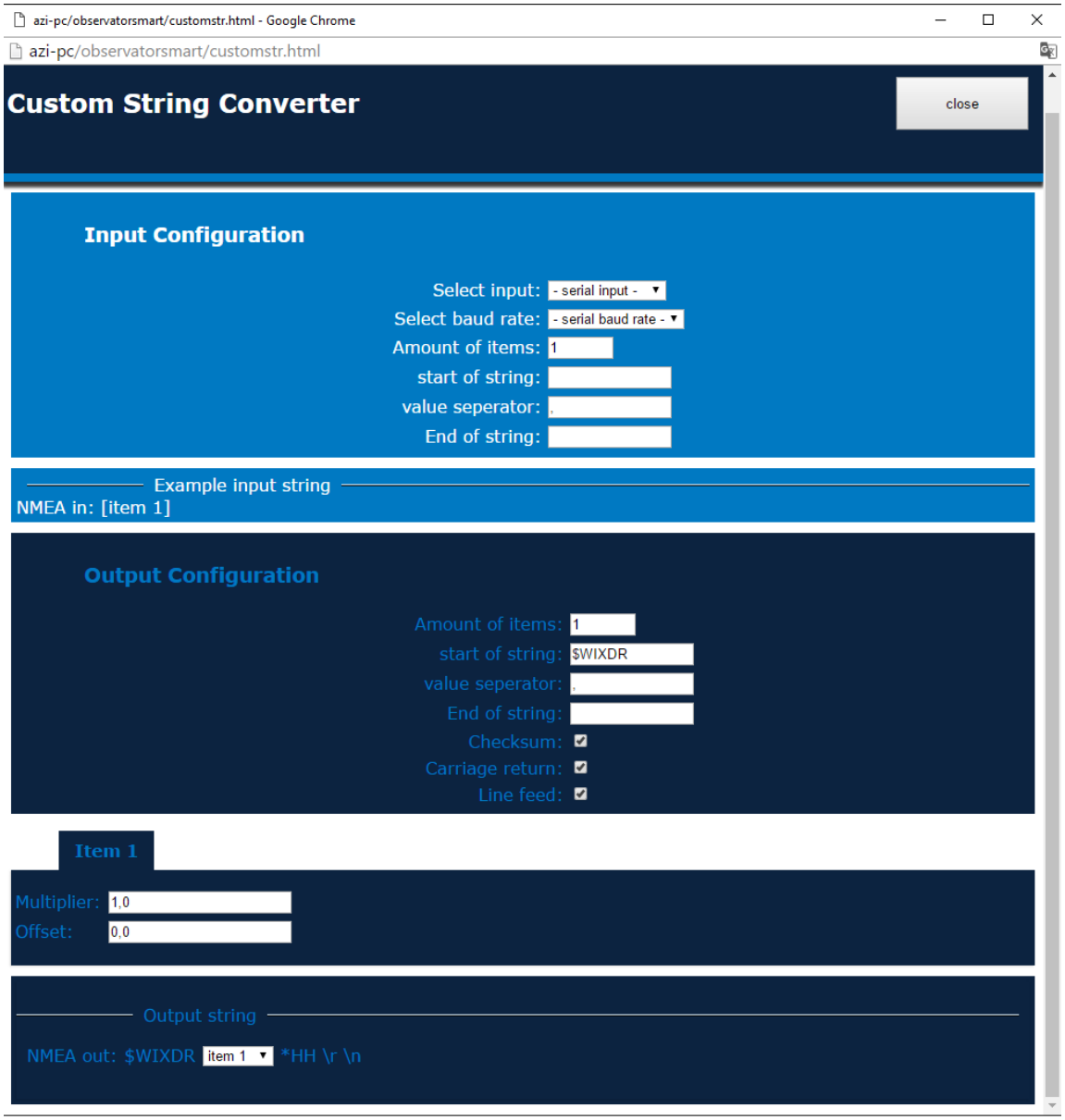
Note: Disabling the tag data with multiple identical sensors will make it impossible to identify the individual sensor data!

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

5.2.6 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)

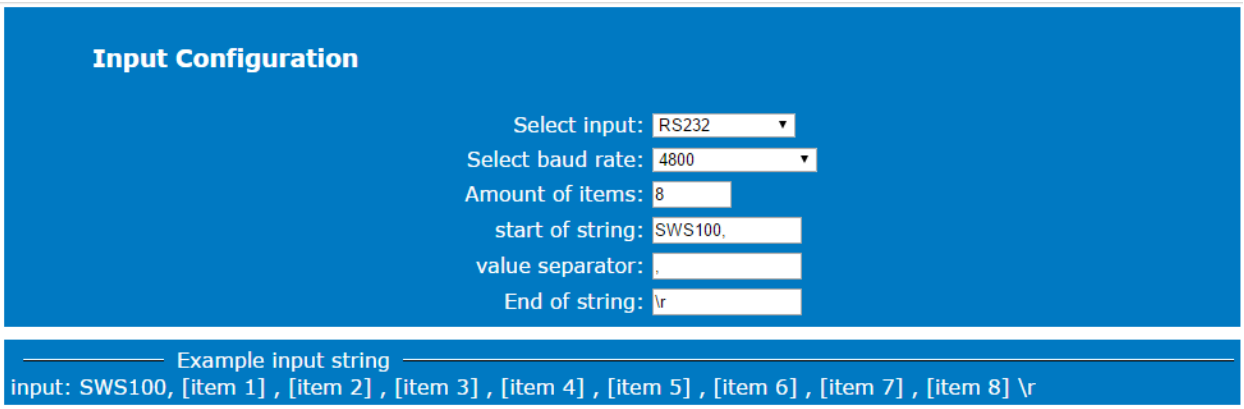
Per item you can set an offset and multiplier (Offset 0.0 & Multiplier 1.0 will leave the data untouched).

.
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 8th 'X00'.
So we have 8 items.

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

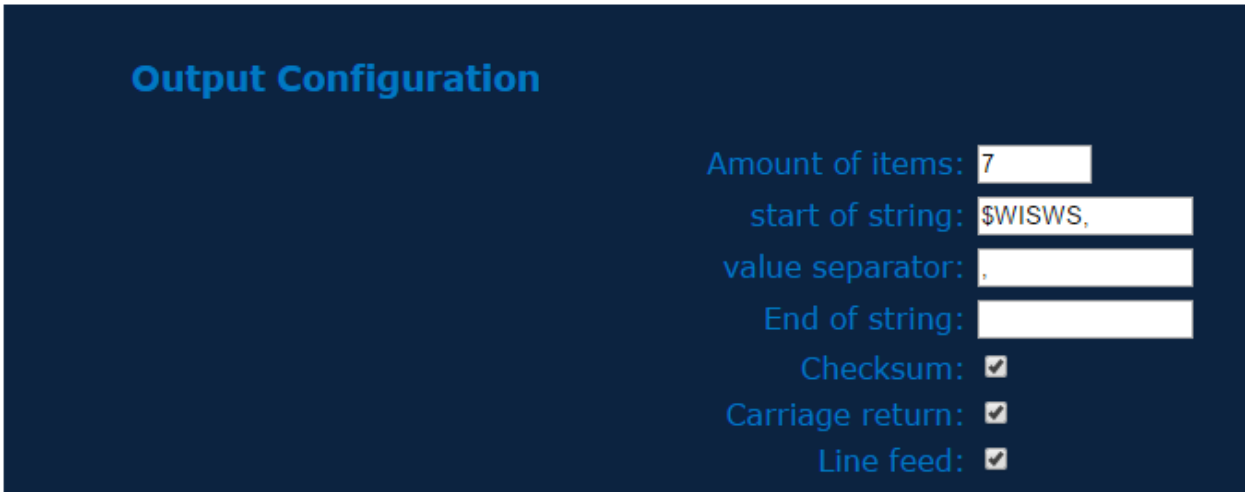
Start of string would be 'SWS100,'

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

Value separator: ','

End of string: \r ([CR])

5.2.7 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.

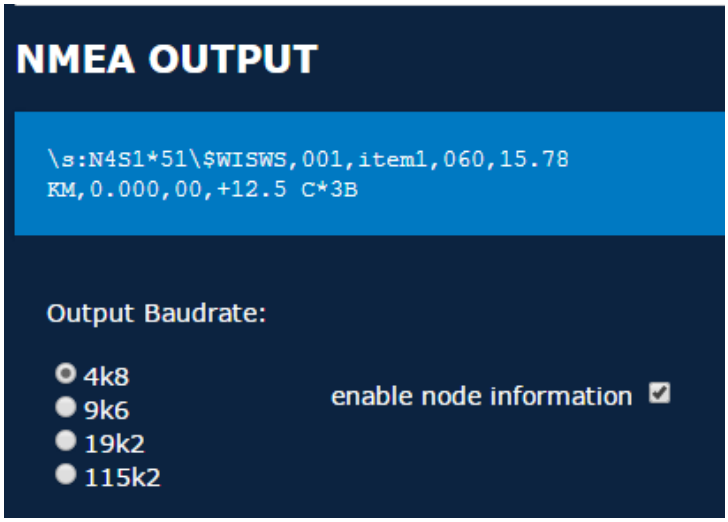
Items

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:

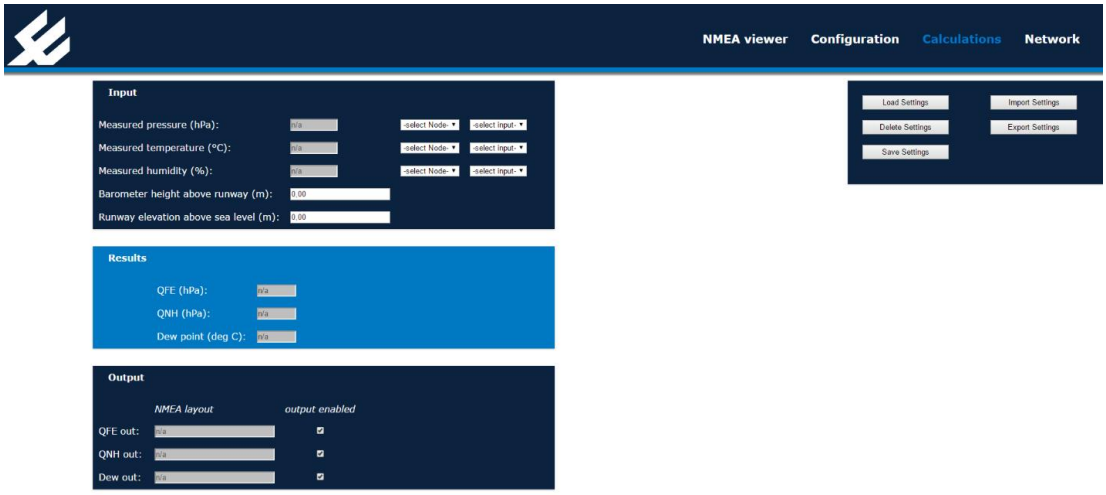


Do not forget to save via ‘Save Settings’:

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

5.2.8 Calculations page

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

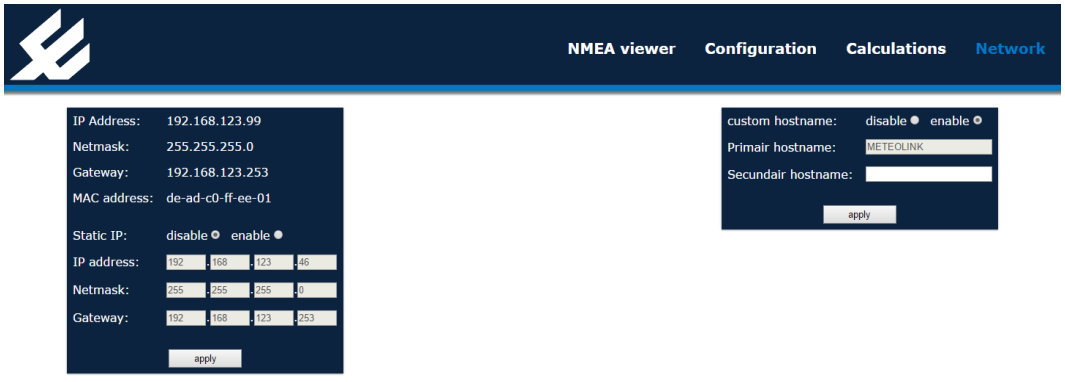


The SMART node can calculate the barometric pressure at sea level (QNH) and runway level (QFE).
You do need to fill in the correct height of the runway above sea level (negative value for below sea level) and the height of the barometric pressure sensor above the runway (negative value for below the 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.

If the sensors are already connected, the measured and calculated values will made visible in this screen.

5.2.9 Network page



This page shows the network configuration.
Default the SMART node 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 must be installed indoors.
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	

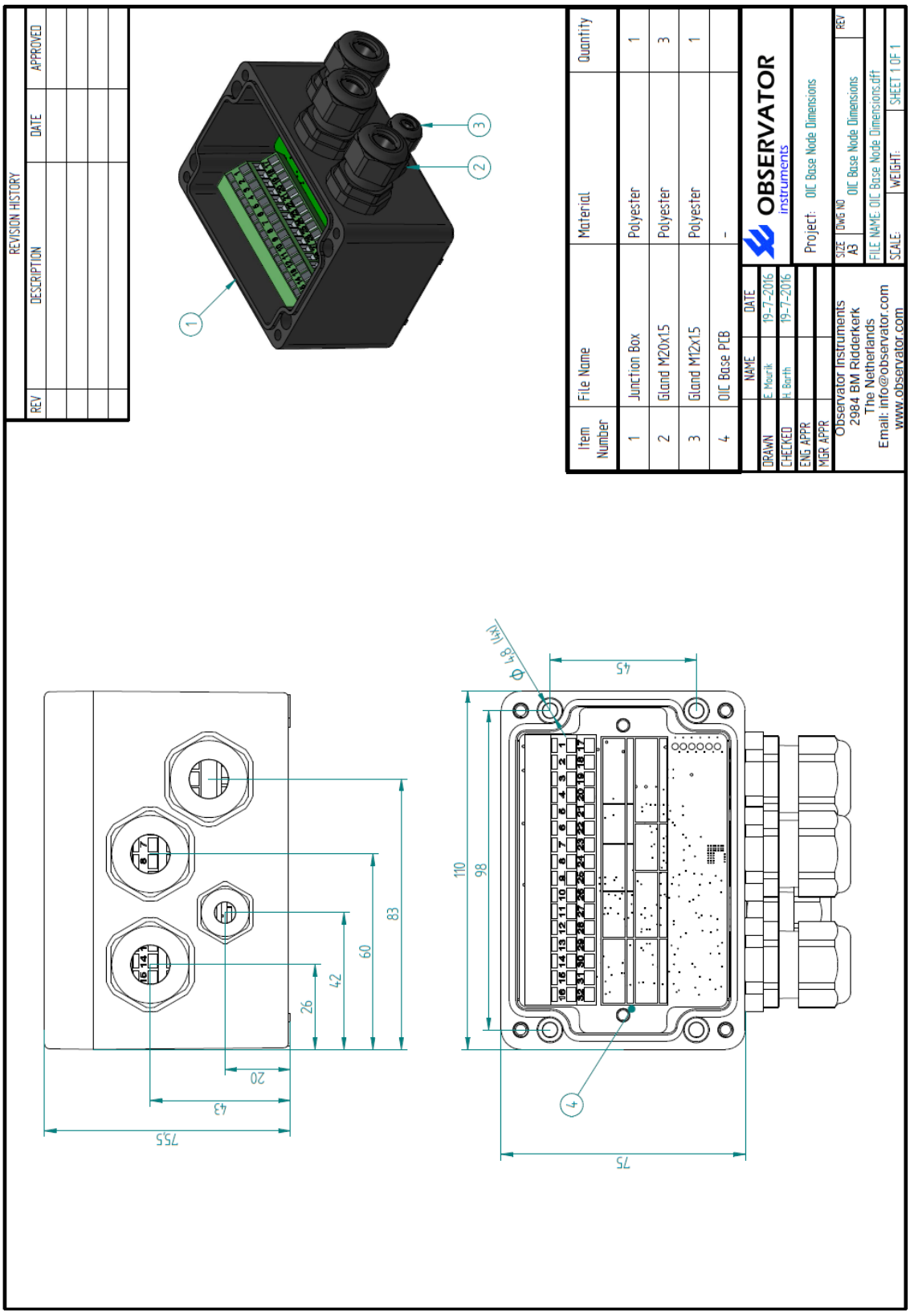
6.2 Maximum allowed cable lengths

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

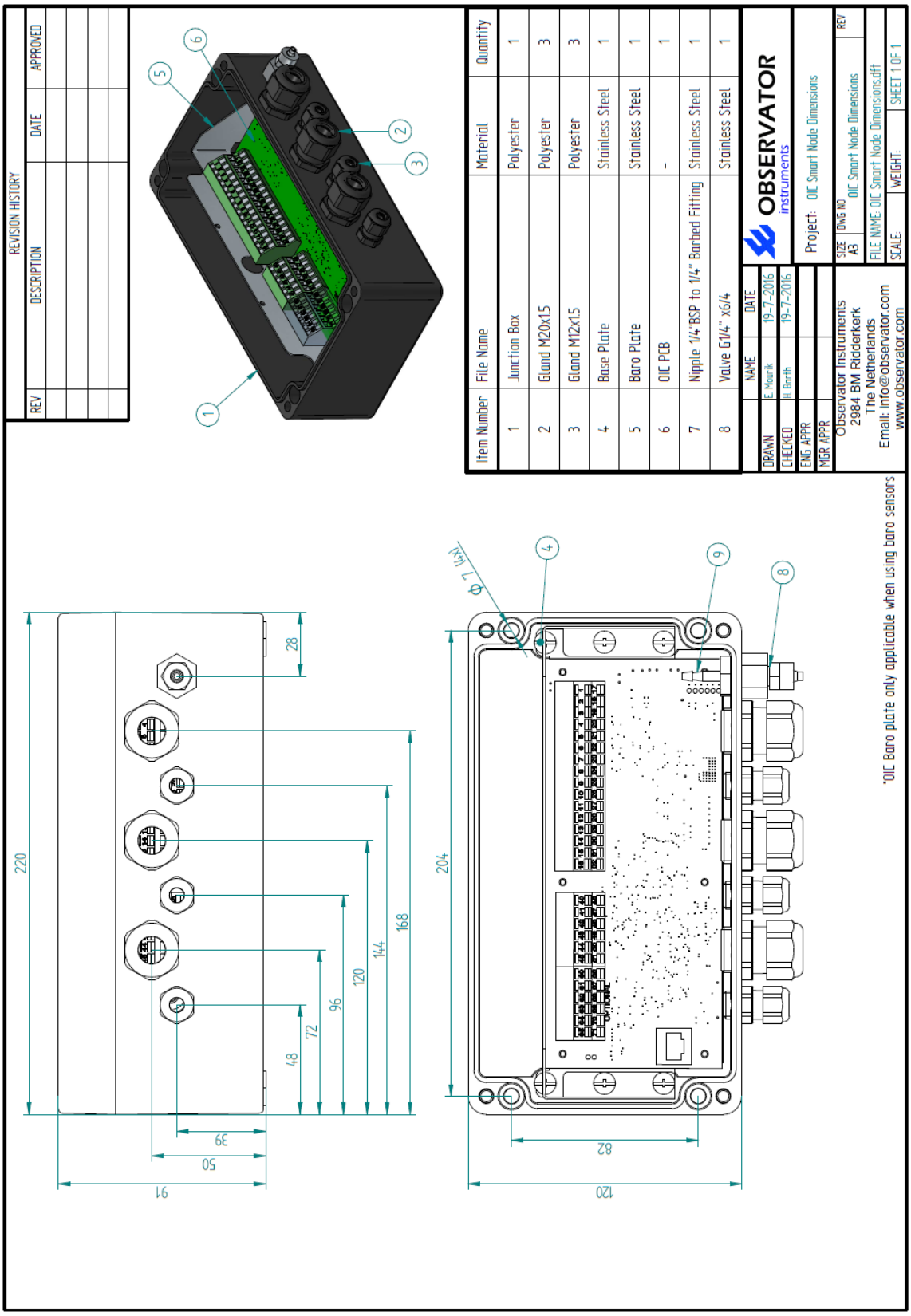
Above cable lengths may not be exceeded to comply with EMC regulation.
Shield must be connected to transmitting or load side only!

7 Dimensional drawings

7.1 Basic Node



7.2 SMART Node



8 Appendix: Declaration of Conformity

OBSERVATOR instruments

Observator Instruments B.V.

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2984 BM Ridderkerk
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EU DECLARATION OF CONFORMITY

(1) Apparatus model: **Meteolink**
OMC-183-ML

(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:

Meteolink
OMC-183-ML
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 2014/35/EU of the European Parliament and of the Council of 26 February 2014 the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits
- 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 61010-1:2010 including EN IEC 61010-1/C1:2011 and /C2:2013
EN 50581:2012

(7)

(8) Ridderkerk, 14 October 2016,
Observator Instruments B.V.

dr. R. de Vries
CEO

9 Appendix: Data protocol

9.1 Baudrate

The default OIC output baudrate is 4800 baud.

9.2 Timing Intervals

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

9.3 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)

9.4 Standard NMEA protocol

Incoming messages of standard NMEA-0183 format are directly queued for output.

Messages are validated according to the NMEA 4.10 standard.

TAG notes

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

Each node adds specific node information if there is none from the previous string.

Each node automatically detects its own # within the node chain based on the node information it receives from the previous nodes.

Also port specific information is added.
The Tag format is as follows:

\s:NxYy*hh\

x = Node number
Y= Port type
y = Port number*
hh = Checksum

* In case of RS485 the address (|z) will be add
\s:NxYy**|z***hh\

Port input types:

A = Analogue
G = Calculated value
P = NMEA
R = Rain (pulse)
S = Serial

Node numbers 1, 2 & 3 are for Basic nodes
The SMART node has always number 4.

Basic node numbering works as follows:

When a basic node doesn't receive any Tag data on a NMEA input, it assumes it is the first in line and start with number 1.
The second will receive Tag info from node 1, so it will use number 2 ect…

Examples:

- NMEA IN 1 \s:Nx**P1***hh\
- NMEA IN 2 \s:Nx**P2***hh\
- ADC IN 1 \s:Nx**A1***hh\
- ADC IN 2 \s:Nx**A2***hh\
- ADC IN 3* \s:N4**A3***hh\
- RAIN IN 1* \s:N4**R1***hh\
- SERIAL IN 1 with address 1 \s:Nx**S1I1***hh\
- Calculated value* \s:N4**G0***hh\

* only available on SMART node

On the NMEA output at the last node the data could look like this:

\s:N1P1*hh\$WIMWV,352.0,R,17.0,M,A*12
\s:N1P2*hh\$WIMWV,116,R,15.1,M,A*48
\s:N2A1*hh\$IIXDR,U,1.2345,V,*52
\s:N3S1*hh\$WIXDR,C,35.2,C,,H,40,P,*A9

First node: Two NMEA Sensors

NMEA in 1 MWV $WIMWV,352.0,R,17.0,M,A*12
NMEA in 2 MWV $WIMWV,116,R,15.1,M.A*18

NMEA Out 1 **\s:N1P1*hh**$WIMWV,111,R,12.1,M,A*12
\s:N1P2*hh$WIMWV,116,R,15.1,M,A*48

Second Node : Baro(by ADC)

ADC in 1	**\s:N2A1*hh**$IIXDR,U,1.2345,V,*52<CR><LF>	(VOLTAGE)
	Or	
	\s:N2A2*45$IIXDR,I,0.013266,A,*58<CR><LF>	(CURRENT)

NMEA Out

\s:N1P1*hh$WIMWV,111,R,12.1,M,A*12
\s:N1P2*hh$WIMWV,116,R,15.1,M,A*48
\s:N2A1*hh$IIXDR,U,1.2345,V,*52

Third Node : Temp Humidity (by SERIAL)

SERIAL in **\s:N3S1I1*hh**$WIXDR,C,35.2,C,,H,40,P,*A9

NMEA Out

\s:N1P1*hh$WIMWV,111,R,12.1,M,A*12
\s:N1P2*hh$WIMWV,116,R,15.1,M,A*48
\s:N2A1*hh$IIXDR,U,1.2345,V,*52
\s:N3S1*hh$WIXDR,C,31.4,C,S1*12

In case of multiple sensors on one serial port (for example dual baro on the SMART node), the sensor origin is given in the XDR “text” field.

9.5 XDR messages

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	W	C		Unit is Celsius
Air Temperature	C	C		Unit is Celsius
Humidity	H	P		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

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 ending data are correct.

10 Appendix: Sensors

10.1 Introduction

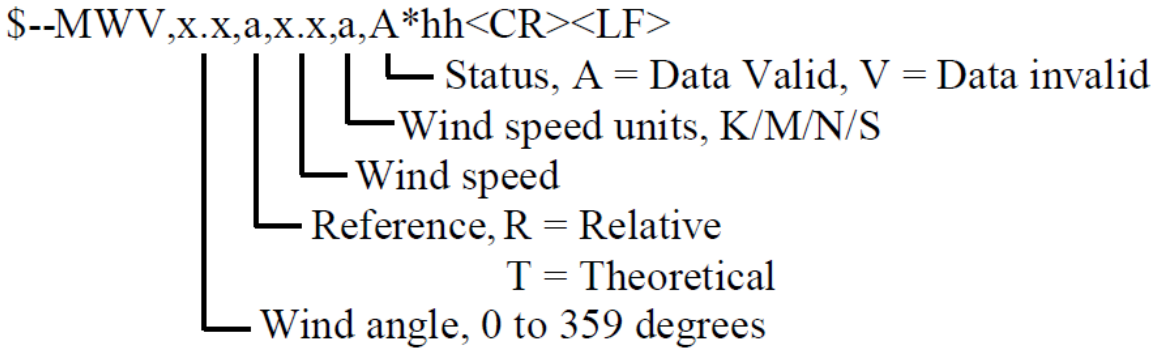
This appendix contains information of the data format of the sensors that are automatically identified.
If you require other data formats you can define it using the Custom String Convertor.

10.2 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

10.3 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). 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 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). 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 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

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**,+**000**71**,OOO

OIC converts to NMEA:

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

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 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

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>

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>

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>

10.4 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>

10.5 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

10.6 Voltage Conversion Sensors

Standard Voltage Conversion Method

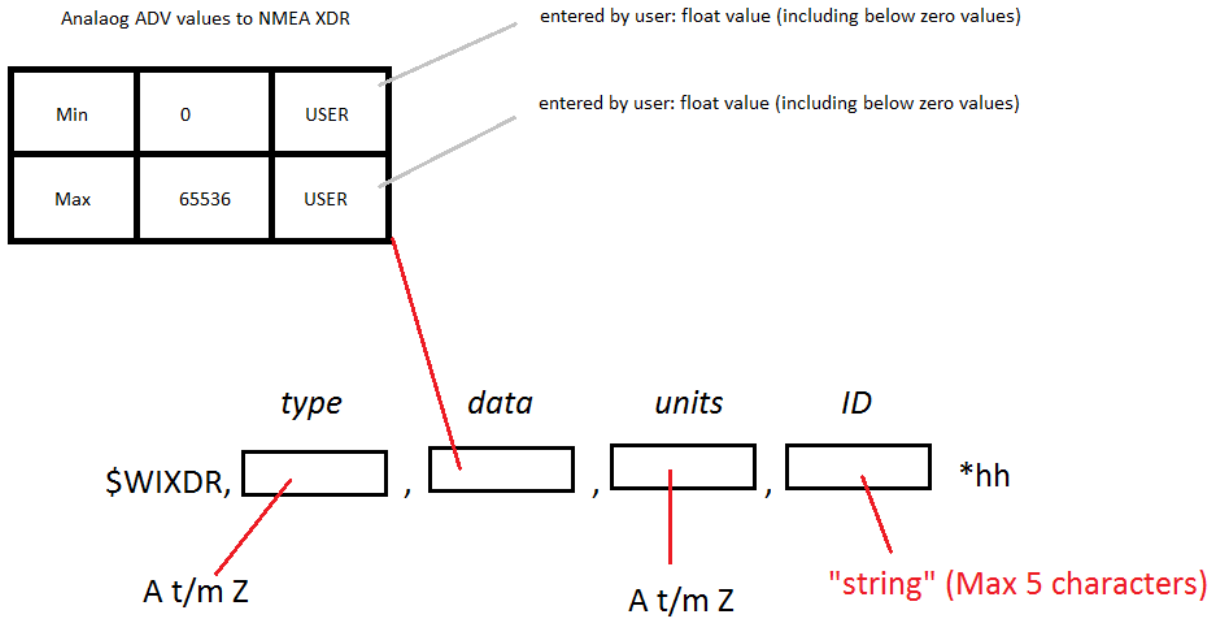
ADC ranges from 0 – 65536.

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>

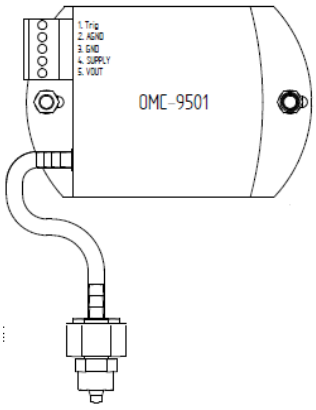
The ADC string can later on be converted to an XDR message by using the SMART nodes interface:



10.6.1 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



10.7 Current Conversion Sensors

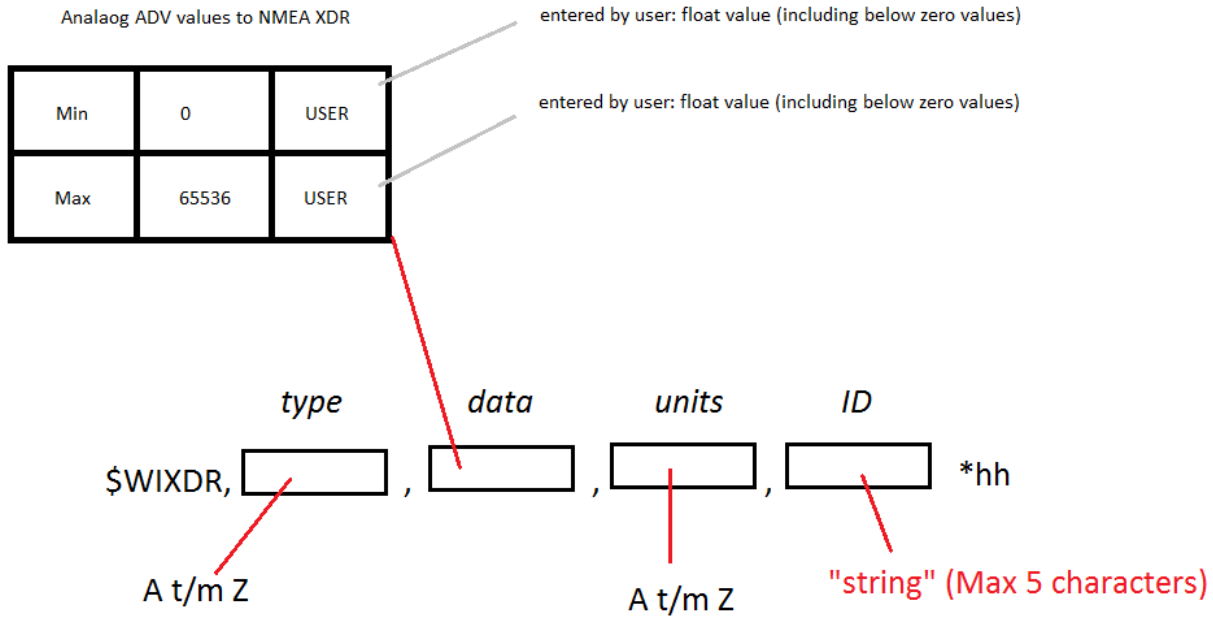
ADC ranges from 0 – 65536.

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:



10.8 CMOS Sensors

10.8.1 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.R	Roll
+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>

10.8.2 Rotronic HC2-S

General

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

Connections:

HC2-S	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>

HC2S 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**,,H,**4.47**,,* 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!**

10.9 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>

10.10 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 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	SUPPLY (Sensor)
Black	43	GND (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 housing.