



OBSERVATOR

instruments

OMC-158-2



Ex interface unit

Manual

Version 1.3 – August 2018

Author: Observer Instruments

Revisions:

0.1	(October 2016)	First issue
0.2	(December 2016)	Prototype
0.3	(January 2017)	Test release
1.0	(March 2017)	Pre-release
1.1	(July 2017)	Update Certificate numbers
1.2	(August 2017)	Update Certificates
1.3	(August 2018)	Minor update

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1 Introduction

This manual is intended for the installer & commissioner of the Observator Instruments OMC-158-2 module.

It can also be used as a reference for the end-user. Once installed the OMC-158-2 doesn't require any attention or maintenance.

Please read the complete manual and take special note of the safety and installation instructions before installing and commissioning the Observator Instruments OMC-158-2 module.

2 Safety

2.1 General



For correct functioning of the Observator OMC-158-2 the system and connected sensors must be installed according installation instructions.



The OMC-158-2 must be installed in an Ex safe area.



Do not install the OMC-158-2 outdoors, indoor use only!








Do not open* or disassemble the OMC-158-2.
No user serviceable parts inside.

**besides the transparent lit for access to the dips switches.*



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

2.2 Marking

 OBSERVATOR instruments Wind sensor interface Type : OMC-158-2 Power : 10 ... 30 VDC max. 3 Watt DC Power in : 1 = 0 2 = +10...30 V NMEA 0183 out : 4 = A 5 = B 6 = shield NMEA 0183 in : 7 = A 8 = B Fault contact out : 10 = NO 11 = COM 12 = NC Intrinsic safe connections: Potentiometer : 13 = A supply + 14 = B supply - 19 = C wiper1 20 = D wiper2 21 = shield Prox.switch : 16 = E + 17 = F - DIP switches : default OFF see manual	 OBSERVATOR instruments Wind sensor interface Type : OMC-158-2 -25°C ≤ Ta ≤ +70°C Um = 250V Circuit A-B : Uo=5.9V Io=64mA Po=93mW Circuit C-D : Uo=5.9V Io= 4mA Po= 6mW Circuit E-F : Uo=12.6V Io=14mA Po=43mW  II (1) G [Ex ia Ga] IIC KIWA 17ATEX0015 IECEx KIWA 17.0005  0344  Observator instruments Rietdekkerstraat 6 www.observator.com 2984 BM Ridderkerk The Netherlands Year of manufacture : 2017 Serial no. : 15820????
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2.3 Safety instructions

- The installation should be in accordance with IEC 60079-14 : *Explosive atmospheres - Part 14: Electrical installations design, selection and erection* (latest edition)
- Install in Ex safe environment
- Install indoors or use suitable cabinet to protect the OMC-158-2 against the environment, note temperature limitations.
- Follow installation and commissioning instructions found in chapter 4 & 5 of this manual.

2.4 Requirements Engineers

The engineers who handle the OMC-158-2 during installation, commissioning and maintenance must have professional knowledge on mechanical and electrical systems in potentially explosive atmospheres.

2.5 Working conditions

Temperature range:	-25 .. +70 °C
Humidity:	10-90% no condensing.
IP rating:	IP20
Ex Zone:	Safe Area

2.6 Usage

This unit is designed for use with the Observator Instruments OMC-150 Ex Wind Sensor. Do not use with other sensors unless approved by Observator Instruments. Once installed and commissioned no specific attention or maintenance is required.

3 Description

3.1 General description

The Observator Instruments OMC-158-2 is the interface module for the OMC-150 Ex approved wind sensor. It will convert the analogue signals of the OMC-150 into a standard NMEA 0183 sentence and is capable of adding a NMEA 0183 VER sentence.

The Observator Instruments OMC-158-2 has a compact IP20 DIN rail housing, which makes it easy to integrate in most installations. It must be installed indoors or protected to the environment in an Ex safe area.

The Observator Instruments OMC-158-2 complies with all relevant Explosion safety standards according to the ATEX directive (for Europe) and IECEx (international).

4 Installation

4.1 General

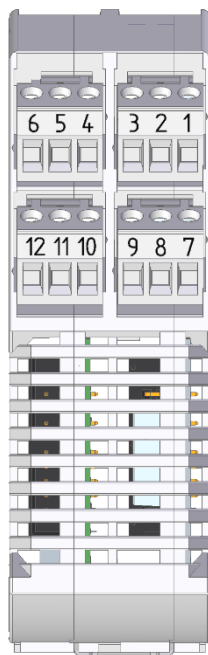
The OMC-158-2 has an IP20 rating and should be installed indoors or in a suitable cabinet in an Ex safe area.

The installation should be in accordance with IEC 60079-14 : *Explosive atmospheres - Part 14: Electrical installations design, selection and erection* (latest edition)

4.2 Terminals

The terminals are screw type and pluggable.
Grey safe area terminals (1 .. 12).

Blue Ex side terminals (13 .. 21).



Top view (Ex Safe side)



Bottom view (Ex side)

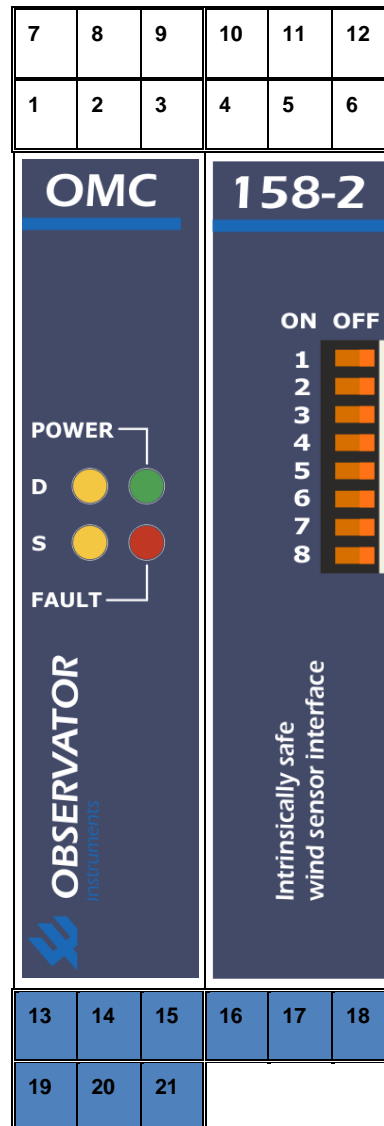
4.3 Connections

Safe area side

1	Power in 0
2	Power in 10 ..30VDC
3	Contact in (Heater -)
4	NMEA-0183 out A
5	NMEA-0183 out B
6	NMEA-0183 out shield
7	NMEA-0183 in A
8	NMEA-0183 in B
9	Contact in (Heater +)
10	Relay NO
11	Relay Common
12	Relay NC

Ex area side (OMC-150 wind sensor connections)

13	Potentiometer supply + A
14	Potentiometer supply - B
15	n.c.
16	Proximity switch + E
17	Proximity switch - F
18	n.c.
19	Potentiometer signal C
20	Potentiometer signal D
21	Shield



Power (1,2):

Power connections of the OMC-158-2

Contact in (3,9):

Potential free contact input for heater (future use).

NMEA-0183 Output (4,5):

NMEA MWV & VER message output.

Output rate and Baud rate depend on dipswitch settings (see Commissioning).

NMEA-0183 Input (6,7):

NMEA input (future use)

Relay (10,11,12):

Alarm Relay output. Relay will be activated when system has a Fault condition.

OMC-150 connections (13 .. 20):

These connections are specific for the OMC-150 Ex Anemometer.

OMC-158-2 connections	sensor cable wire colour	sensor internal wiring colour	OMC-150 connector pin	speed/direction	description
13. A	white	red	A	direction	potentiometer supply (+5V)
14. B	brown	blue	B	direction	potentiometer supply (-5V)
19. C	green	orange	C	direction	potentiometer signal 0°
20. D	yellow	yellow	D	direction	potentiometer signal 90°
16. E	pink	brown	F	speed	NAMUR +
17. F	grey	black	E	speed	NAMUR -
21. G	blue	yellow/green	G		chassis

4.4 Mechanical

The OMC-158-2 is designed for DIN rail mounting.

4.5 Cables

4.5.1 Maximum external capacitance and inductance

Circuit	Lo	Co
A-B	3.8 mH	21.5 µF
C-D	3.8 mH	21.5 µF
E-F	181 mH	1.15 µF

4.5.2 Maximum cable length

Maximum cable length between sensor OMC-150 and OMC-158-2 is 1km.

5 Commissioning

5.1 Procedure

- Before powering the OMC-158-2 module check all connections.
- Check if installation is according the Safety instructions of chapter 2.
- Check if the power supply voltage is within specified range.
- Check dip switch settings (default all are off)

Power the OMC-158-2 only when the above is correct.

The green and 2 yellow LED's should be lit.

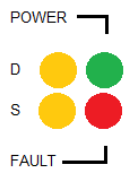
The red LED should be off.

Check NMEA-0183 output.

In case the Alarm relay is used it can be checked by removing one or more of the blue connectors. Any removal should activate the relay. Also the corresponding - 16,17,18 for S(speed) the other 2 for D(irection) - yellow LED should be off and the red LED should be lit.

5.2 LED function

The OMC-158-2 has 4 LED's, which will give you information of the status of the OMC-158-2.



Label	Led colour	ON	OFF
POWER	Green	Power On	No power
FAULT	Red	Module fault detected	No fault detected
D	Yellow	Connection Direction ok	Loose wire(s) or defect sensor*
S	Yellow	Connection Speed ok	Loose wire(s) or defect sensor*

**check also for swapped wires, especially speed (colours are swapped compared to previous OMC-158)*

5.3 Dip switches

Default all dip switches are in OFF position.

Number	Function	ON	OFF (Default)
1	Disable linear wind speed correction	no correction	correction enabled
2	Wind speed correction bracket compensation	correction enabled	no correction
3	Baud rate select: 4800, 9600	9600	4800
4	NMEA VER message disable	No Ver message	Ver message enabled
5	NMEA Validation disable*	Validation check off	Validation check active
6	Set Relay energized when an alarm occurred or set relay de-energized	Energized when alarm is active	Energized when no alarm is active
7	NMEA output rate 1Hz or 4Hz	1 Hz	4Hz
8	Enable test procedure*	Enable test procedure	Normal operation

1. Linear wind speed correction: Compensates the behaviour of the cup set. This is recommended to be enabled.
2. Wind speed correction bracket compensation: Corrects wind speed fault caused by the bracket of the wind sensor. Only recommended when the sensor is ideal placed on top of a mast and no obstacles are of any influence.
3. Baud rate: default NMEA is 4800 baud, 9600 is selectable.
4. NMEA VER message: Default at start-up and every 30 minutes a VER message is send with serial number of the OMC-158-2.
5. NMEA validation disable. This will disable the check for test / fault finding. Status of the MWV message will still be made valid while ether speed or direction is missing.
6. Relay: Default the relay will be energized when the OMC-158-2 is on and No alarm is active. So it will also alarm when power is lost. Alternatively it can be set energized when an alarm is active.
7. NMEA output rate: Default set to 4Hz, can be set to 1 Hz.
8. Test switch: Default off, for factory test purposes only!

If a settings needs to be changed; open the right transparent lit with care from the top. Settings can be changed on the fly and are immediate.



*** Switch 5 & 8 are for test purposes only, do not set 'On' for normal operation!**

6 Support, service and warranty

Support, service, and warranty on Observator Instruments equipment are provided by the company where the product was purchased. Make sure that you have the following information available when contacting

- Type and model of equipment
- Serial number
- Original order number and year of purchase

If it is impossible to find out where the instrument was purchased, please contact the manufacturer:

Observator Instruments
PO Box 60
2980 AB Ridderkerk
The Netherlands
Tel. + 31 180 463 411
Fax + 31 180 463 530
<http://www.observator.com>

Purchase of replacements:
E-mail address: sales@observator.com

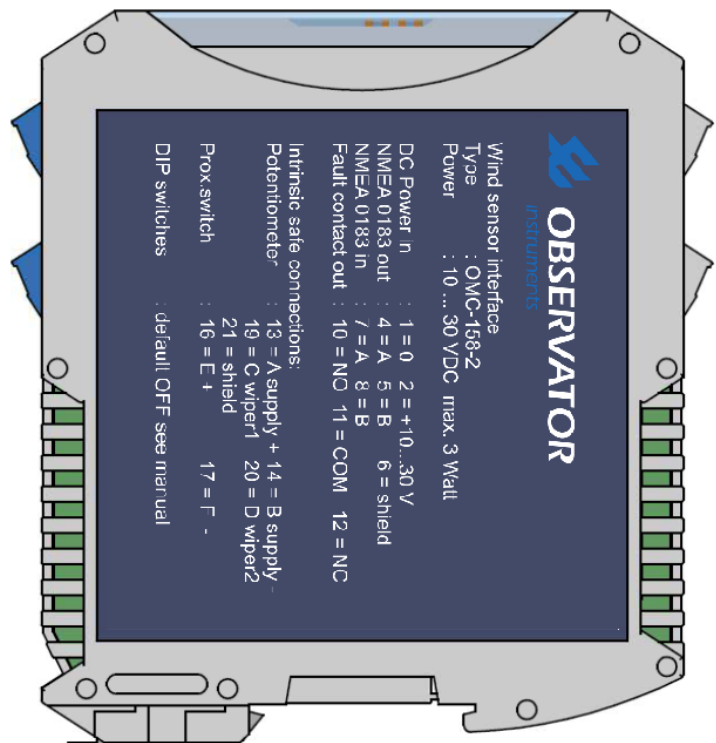
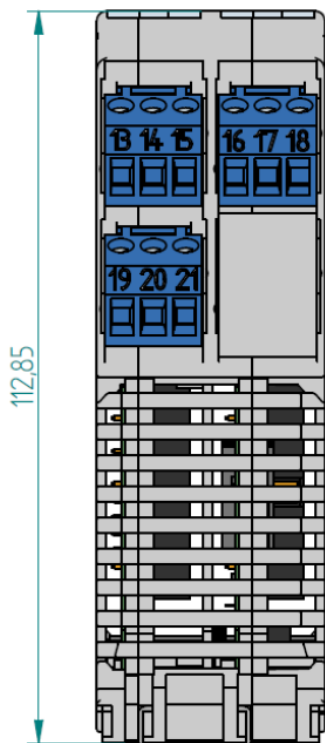
Technical support:
E-mail address: service@observator.com

Service and warranty:
E-mail address: service@observator.com

7 Specifications

parameter	value
Type of instrument	Anemometer interface unit
Certification	
ATEX group and category	II(1) G [Ex ia Ga] IIC
ATEX Certificate number	KIWA 17 ATEX 0015
IECEX 02	[Ex ia Ga] IIC
IECEX Certificate number	IECEX KIWA 17.0005
Ingress Protection	IP-20
Operation Temperature	-25 ... +70 deg. C
Humidity	10 ... 90% no condensing
Power	10-30VDC max 3 Watt
Output signal compatibility	NMEA-0183
Speed signal input	NAMUR signal according to IEC/EN-60947-5-6
Direction supply voltage	3 V
Direction signals input	Dual 0..3V analogue voltage signals
Dimensions (HxWxD)	114x37x108 mm
Mounting method	DIN rail mounted
Weight	Approx. 0.25 kgs.

8 Dimensional drawings



9 Annex: ATEX certificate



1 EU – Type Examination Certificate

2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 2014/34/EU

3 EU – Type Examination Certificate Number: **KIWA 17ATEX0015** Issue: **1**

4 Product: **Wind Sensor Interface, Model OMC-158-2**

5 Manufacturer: **Observator Instruments B.V.**

6 Address: **Rietdekkerstraat 6, 2984 BM Ridderkerk, The Netherlands**

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Kiwa Nederland B.V., notified body number 0620 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential ATEX Assessment Report No. 170200086.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2012 + A11 : 2013 EN 60079-11 : 2012

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This EU – Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:




II (1) G [Ex ia Ga] IIC

Kiwa Nederland B.V.
Unit Kiwa ExVision
Wilmsdorp 50
P.O. Box 137
7300 AC Apeldoorn
The Netherlands

Tel. +31 88 998 34 93
Fax +31 88 998 36 85
ExVision@kiwa.nl
www.kiwaexvision.com

Kiwa Nederland B.V.


Pieter van Breugel
Certification Officer

Issue date:

11 July 2017

First issue:

This certificate shall, as far as applicable, be revised before the date of cessation of presumption of conformity of (one of) the included standards above as communicated in the Official Journal of the European Union.

© Integral publication of this certificate in its entirety and without any change is allowed.



13 SCHEDULE

14 EU – Type Examination Certificate KIWA 17ATEX0015 Issue No. 1

15.1 Description of Product

The Wind Sensor Interface, Model OMC-158-2 is an associated apparatus intended for use with the Anemometer type OMC-150. The apparatus converts the analogue signals of the Anemometer into a RS-485 communication signal in accordance with NMEA-0183.

Ambient temperature range 25 °C to +70 °C

15.2 Electrical Data

Supply voltage: $U_n = 10-30$ Vdc, $U_m = 250$ V

Wind direction sensor supply (pin A and B):
in type of protection intrinsic safety Ex ia IIC, with the following maximum values:
 $U_o = 5,9$ V; $I_o = 64$ mA; $P_o = 93$ mW; $C_o = 21,5$ μ F; $L_o = 3,8$ mH.

Output circuit (pin C and D):
in type of protection intrinsic safety Ex ia IIC, with the following maximum values:
 $U_o = 5,9$ V; $I_o = 4$ mA; $P_o = 6$ mW; $C_o = 21,5$ μ F; $L_o = 3,8$ mH.

Wind speed sensor supply and output circuit (pin E and F):
in type of protection intrinsic safety Ex ia IIC, with the following maximum values:
 $U_o = 12,6$ V; $I_o = 14$ mA; $P_o = 43$ mW; $C_o = 1,15$ μ F; $L_o = 181$ mH.

The sensor supply and output circuits are infallibly galvanically isolated from the supply voltage upto a voltage of 375 V.

The wind direction sensor supply and output circuit are infallibly galvanically isolated from the wind speed sensor supply and output circuit upto a voltage of 30 V.

15.3 Instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

16 ATEX Assessment Report Number

170200086.

17 Specific Conditions of Use

None.

18 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed at section 9.

19 Drawings and Documents

As listed in ATEX Assessment Report No. 170200086.

10 Annex: IECEx certificate

		<h1>IECEx Certificate of Conformity</h1>	
<p>INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres <small>for rules and details of the IECEx Scheme visit www.iecex.com</small></p>			
Certificate No.:	IECEx KIWA 17.0005	Issue No: 0	Certificate history: Issue No. 0 (2017-07-11)
Status:	Current	Page 1 of 3	
Date of Issue:	2017-07-11		
Applicant:	Observator Instruments B.V. Rietdekkerstraat 6 2984 BM Ridderkerk The Netherlands		
Equipment:	Wind Sensor Interface, Model OMC-158-2		
Optional accessory:			
Type of Protection:	Ex i		
Marking:	[Ex ia Ga] IIC		
Approved for issue on behalf of the IECEx Certification Body:	Pieter van Breugel		
Position:	Certification Officer		
Signature: (for printed version)			
Date:	11 JULY 2017		
<ol style="list-style-type: none"> This certificate and schedule may only be reproduced in full. This certificate is not transferable and remains the property of the issuing body. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website. 			
Certificate issued by:	Kiwa Nederland B.V. (Unit Kiwa ExVision) Wilmersdorf 50 7327 AC Apeldoorn P.O. Box 137 The Netherlands		
			



IECEX Certificate of Conformity

Certificate No: IECEX KIWA 17.0005 Issue No: 0
Date of Issue: 2017-07-11 Page 2 of 3
Manufacturer: **Observator Instruments B.V.**
Rietdekkerstraat 6
2984 BM Ridderkerk
The Netherlands

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Explosive atmospheres - Part 0: General requirements
Edition:6.0
IEC 60079-11 : 2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "I"
Edition:6.0

This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[NL/KIWA/ExTR17.0007/00](#)

Quality Assessment Report:


[NL/DEK/QAR13.0001/03](#)



IECEX Certificate of Conformity

Certificate No:	IECEX KIWA 17.0005	Issue No: 0
Date of Issue:	2017-07-11	Page 3 of 3

Schedule

EQUIPMENT: 

Equipment and systems covered by this certificate are as follows:

The Wind Sensor Interface, Model OMC-158-2 is an associated apparatus intended for use with the Anemometer type OMC-150. The apparatus converts the analogue signals of the Anemometer into a RS-485 communication signal in accordance with NMEA-0183.

Ambient temperature range -25 °C to +70 °C

Electrical Data

Supply voltage: $U_n = 10-30$ Vdc, $U_m = 250$ V

Wind direction sensor supply (pin A and B):
in type of protection intrinsic safety Ex ia IIC, with the following maximum values:
 $U_o = 5.9$ V; $I_o = 64$ mA; $P_o = 93$ mW; $C_o = 21.5$ μ F; $L_o = 3.8$ mH.

Output circuit (pin C and D):
in type of protection intrinsic safety Ex ia IIC, with the following maximum values:
 $U_o = 5.9$ V; $I_o = 4$ mA; $P_o = 6$ mW; $C_o = 21.5$ μ F; $L_o = 3.8$ mH.

Wind speed sensor supply and output circuit (pin E and F):
in type of protection intrinsic safety Ex ia IIC, with the following maximum values:
 $U_o = 12.6$ V; $I_o = 14$ mA; $P_o = 43$ mW; $C_o = 1.15$ μ F; $L_o = 181$ mH.

The sensor supply and output circuits are infallibly galvanically isolated from the supply voltage upto a voltage of 375 V.
The wind direction sensor supply and output circuit are infallibly galvanically isolated from the wind speed sensor supply and output circuit upto a voltage of 30 V.

SPECIFIC CONDITIONS OF USE: NO

11 Annex: Declaration of Conformity



Observator instruments B.V.

Rietdekkerstraat 6
2984 BM Ridderkerk
The Netherlands

P.O. Box 60
2980 AB Ridderkerk
The Netherlands

Tel.: +31 (0)180 463411
Fax: +31 (0)180 463530

Email: info@observator.com
Internet: www.observator.com
CoC: 24172722

EU DECLARATION OF CONFORMITY

- (1) Apparatus model : **OMC-158-2**
- (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 :

OMC-158-2 Wind sensor interface
- (5) The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:
 - Directive 2014/34/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 equipment and protective systems intended for use in potentially explosive atmospheres
 - 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 60079-0:2012 + A11 EN IEC 60079-11:2012
EN IEC 60945:2002 + C1 EN IEC 61326-1:2013
EN 50581:2012
- (7) The Notified body KIWA ExVision B.V. performed Type Examination and issued the EC-Type Examination Certificate Number KIWA 17ATEX0015
- (8) Signed for and on behalf of:

Ridderkerk, 12 July 2017,
Observator instruments

Dr. Ir. R. de Vries
CEO



12 Annex: Data protocol

12.1 General

The output of the OMC-158-2 is NMEA-0183 according IEC 61162-1.

12.2 Baudrate

The default baudrate is 4800 baud, 9600 baud can be set with dip switch 3.

12.3 Messages

The OMC-158-2 NMEA-0183 output has the following messages:

\$WIMWV,1,1,R,5.0,N,A*hh<CR><LF>
 1 2 3 4 5

1. Wind angle, 0 to 359 degrees
2. Reference:
 - R = Relative
 - T = Theoretical
 Always R(elative) for OMC-158-2
3. Wind speed
4. Wind speed units: K/M/N/S (always M = Meter / second for OMC-158-2)
5. Status, A = Data Valid, V = Data invalid

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

1. Total number of sentences needed, 1 to 9 (1)
2. Sentence number, 1 to 9 (1)
3. Device type (WI)
4. Vendor ID (OBS)
5. Unique Identifier (n/a, blank)
- 6. Manufacturer serial number (actual serial number of the unit)**
7. Model code (OMC-158-2)
- 8. Software revision (actual firmware revision id of the unit)**
9. Hardware revision (n/a, blank)
10. Sequential message identifier (0)

All parameters except 6 & 8 will be identical for each OMC-158-2 module.
 Parameter 6 will be unique for each unit (Serial number)

Example Strings

```
$WIMWV,90.0,R,5.0,N,A*1F
$WIMWV,90.0,R,17.0,N,A*2C
```

```
$WIVER,1,1,WI,OBS,,15820008,OMC-158-2,00.08B00,,0*02
```