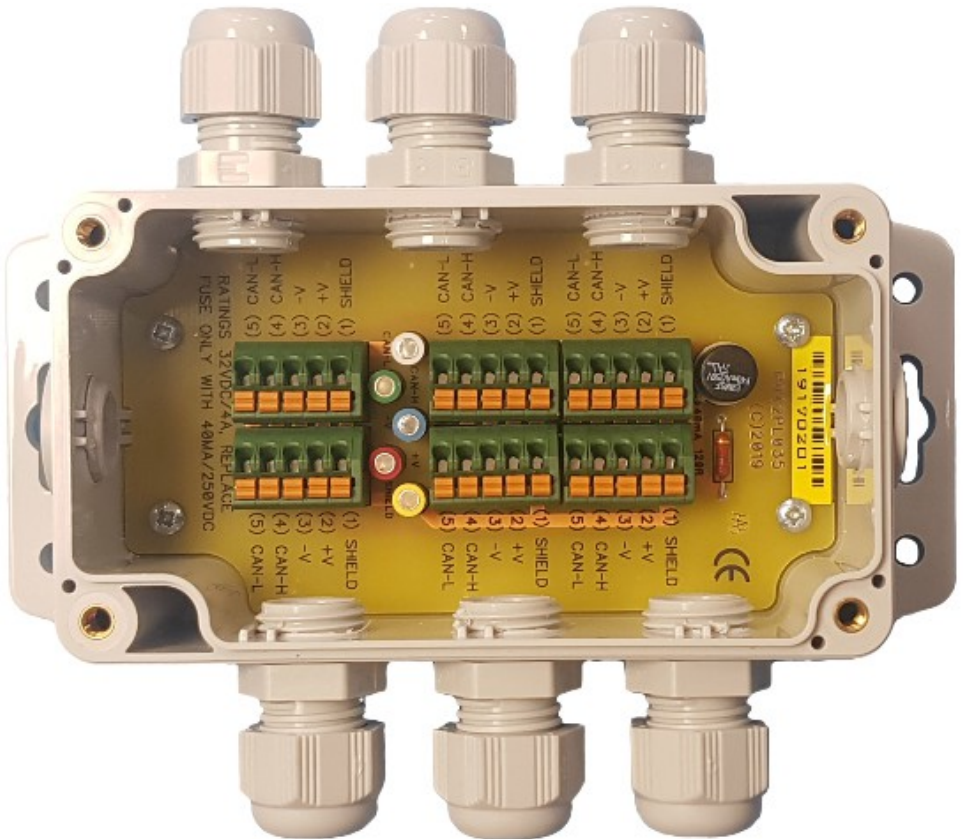


# CAN-bus Junction Box



<b>White Bream Oud-Beijerland The Netherlands</b> <a href="https://whitebream.com">https://whitebream.com</a>		
Description:	Reference manual	P942RP002 Manual Junction Box.odt
Project:	P942	 * P 9 4 1 R P 0 0 2 *
Status:	Draft	

## Table of Contents

<b>1</b>	<b>Preface</b> .....	<b>3</b>
1.1	Disclaimer .....	3
1.2	Trademarks & copyrights .....	3
1.3	Warranty .....	3
1.4	Liability .....	3
<b>2</b>	<b>Overview</b> .....	<b>4</b>
<b>3</b>	<b>Specifications</b> .....	<b>5</b>
3.1	Hardware .....	5
3.2	Connections .....	5
3.3	Environmental .....	6
3.4	Dimensions .....	7
<b>4</b>	<b>Installation</b> .....	<b>9</b>
4.1	Wire selection and preparation .....	9
4.2	Wire assembly .....	10
4.3	CAN-bus Termination and fuse .....	10
4.4	Test points .....	10
4.5	Pluggable connections .....	10
4.6	Specific instructions for ATEX .....	10
<b>5</b>	<b>Ordering information</b> .....	<b>12</b>
5.1	Hardware revision info .....	12
<b>6</b>	<b>Document revisions</b> .....	<b>13</b>
<b>A</b>	<b>Declaration of Conformity for ATEX/CE</b> .....	<b>14</b>
<b>B</b>	<b>Declaration of Conformity for FCC</b> .....	<b>16</b>

# **I Preface**

## **I.1 Disclaimer**

White Bream products are not authorized for use in, or in connection with surgical implants, or as critical components in any medical or nuclear, or aircraft, or other transportation devices or systems where failure to perform can reasonably be expected to cause significant injury to the user, without the express written approval of an executive officer of White Bream. Such use is at buyer's sole risk, and buyer is responsible for verification and validation of the suitability of products incorporated in any such devices or systems. Buyer agrees that White Bream is not liable, in whole or in part, for any claim or damage arising from such use and shall have no obligation to warranty such products. Buyer agrees to indemnify, defend and hold White Bream harmless from and against any and all claims, damages losses, costs, expenses and liabilities arising out of or in connection with buyer's use of White Bream products in such applications to the extent buyer has not obtained the express written approval of an executive officer of White Bream.

## **I.2 Trademarks & copyrights**

Throughout this manual, the trade names and trademarks of various companies and products may have been used, and no such uses are intended to convey endorsement of or other affiliations with this manual or product. Any brand names or product names used within this manual are trademarks or registered trademarks of their respective holders.

## **I.3 Warranty**

This product is warranted to be in good working order for a period of two years from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

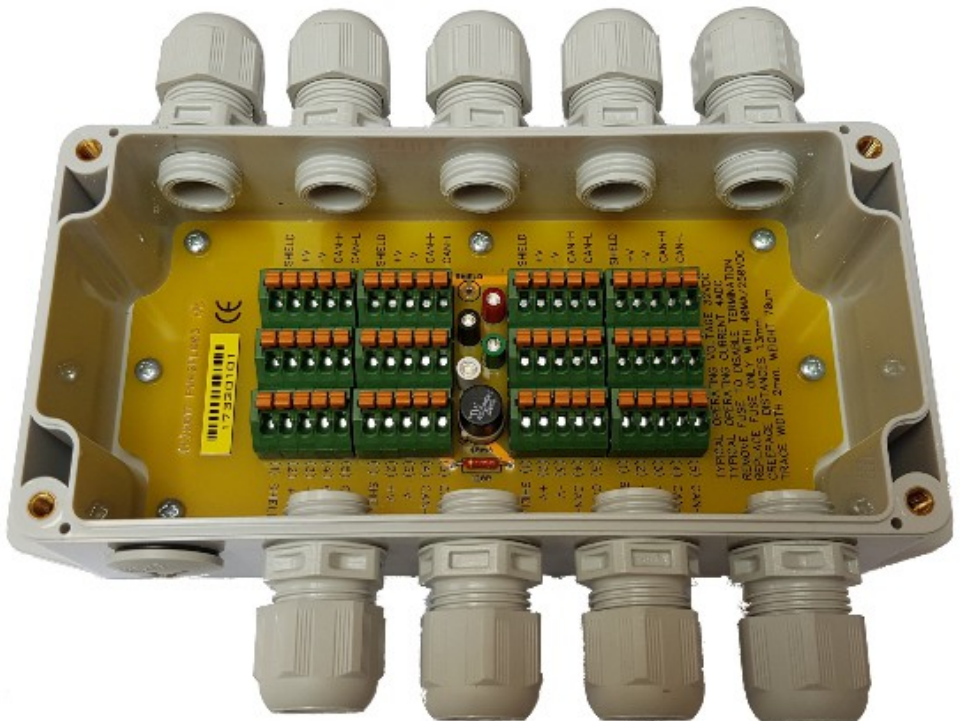
## **I.4 Liability**

White Bream assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. White Bream will not be liable for any claim made by any other related party.

## 2 Overview

CAN-bus installations running at long distances and low speeds can use fairly long stub lines. This allows for a simpler wiring topology where the different nodes can be placed up to 5 meters away from the 'backbone'. Particularly on long distances, this is extra beneficial because the effective length of the CAN-bus can remain shorter, which saves on wiring cost and - more importantly - reduces voltage drops along the line.

To aid such install, we have this field bus distribution box, which allows for up to 6 or 12 cable segments to be joined together. This is done with 5-pole spring terminal connections. The connections are mounted in an IP67/NEMA4X rated polycarbonate enclosure with M16 holes for cable glands. Integrated termination resistor and 2mm multimeter probe-points allow for easy configuration and diagnostic of the network wiring.



## 3 Specifications

### 3.1 Hardware

- Operating voltage max  $32V_{DC}$
- Operating current max  $4A_{DC}$
- 5-pin 3.5mm spring clamp terminal blocks
- 1.3mm signal clearance & creepage distances
- 2.0mm wide copper traces,  $70\mu m$  thick
- $120\Omega/2W$  termination resistor in series with 40mA fuse, this fuse also acts as termination enable switch
- Polyamide M16x1.5 cable gland entries for cables ranging from 4mm to 8mm
- IP65 ingress protection
- Optionally with CANopen® style M12 plug or socket connectors
- ATEX II 3GD increased safety 'ec', type of protection 'nA' and dust enclosure 'tc'

#### 3.1.1 6-Way, P/N 80-942-\*35

- 6x 5-pin 3.5mm spring clamp terminal block
- 8x or Polyamide M16x1.5 cable gland entry
- 115x65mm Polycarbonate enclosure 55mm high
- Flange mounting, width 145mm

#### 3.1.2 12-Way, P/N 80-942-\*03

- 12x 5-pin 3.5mm spring clamp terminal block
- 12x Polyamide M16x1.5 cable gland entry
- 160x80mm Polycarbonate enclosure 55mm high
- Flange mounting, width 190mm
- Earthing frame and earthing terminal for ATEX version to overcome IEC 60079-0 maximum non-conductive surface area limitation

### 3.2 Connections

#### 3.2.1 CAN-Bus (6x or 12x)

Connections are provided with spring clamp terminals that accept wiring between 0.5 and 2.0 mm<sup>2</sup> (20 to 14 AWG). Wires shall be stripped to  $8mm \pm 0.5mm$ . Stranded wires must be equipped with a suitably sized ferrule.

#	Name	Description	Signal
1	SHIELD	Cable shielding	

#	Name	Description	Signal
2	+V	Bus power supply	0-32VDC
3	-V	Bus ground	0V
4	CAN-H	CAN H-signal	
5	CAN-L	CAN L-signal	

### 3.2.2 CANopen<sup>®</sup> M12 pluggable connections (optional)

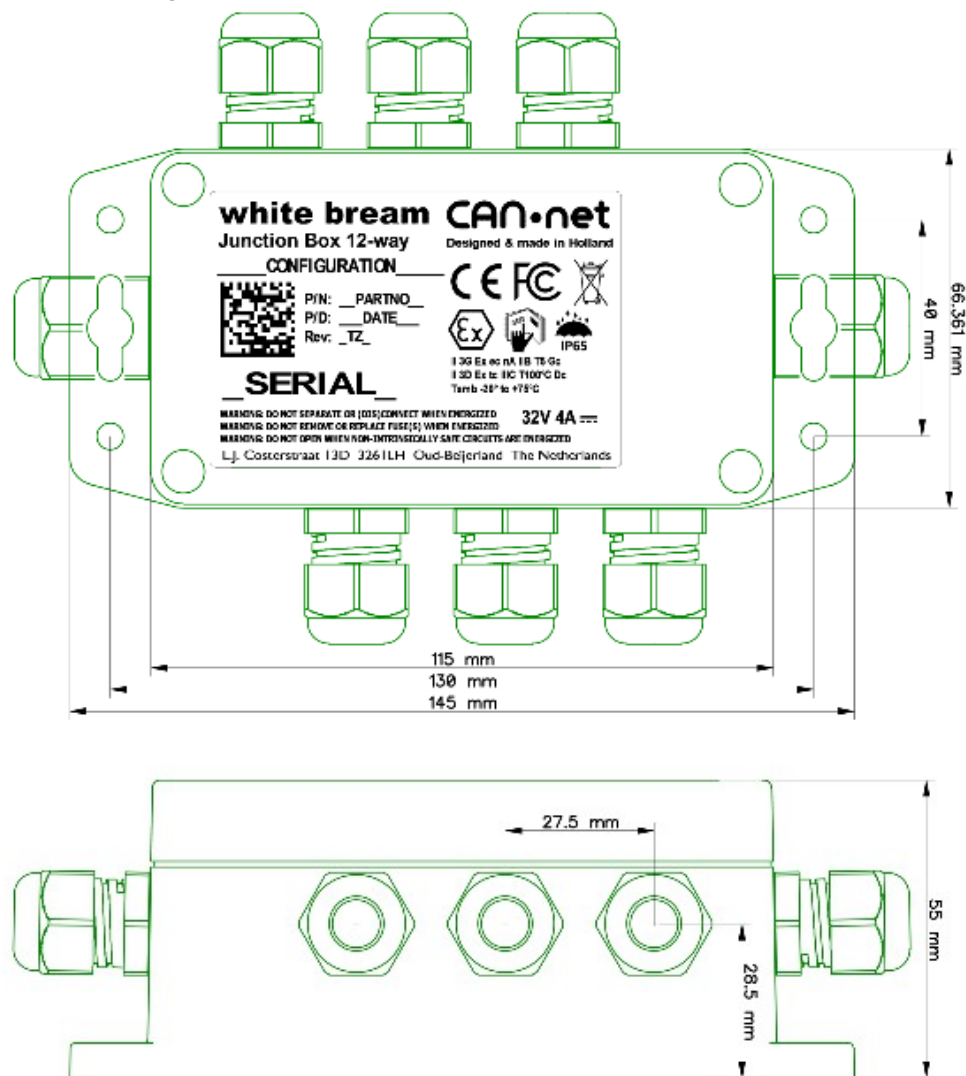
The signals by pin-number is identical to the table listed above.

### 3.3 Environmental

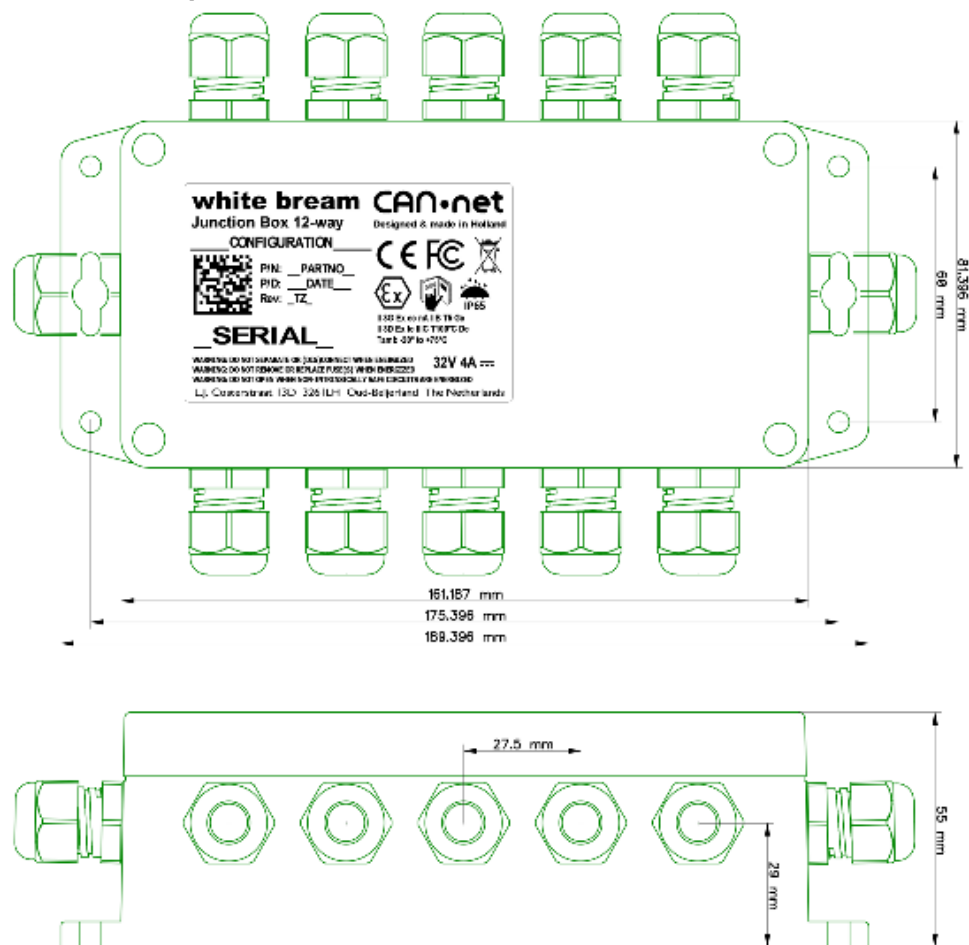
Parameter	Min	Max	Unit
Operating temperature range	-20	+75	°C
Non-operating temperature range	-40	+120	°C
Humidity	0	100	%
Ingress Protection	IP65		

## 3.4 Dimensions

### 3.4.1 6-Way, P/N 80-942-\*35



## 3.4.2 12-Way, P/N 80-942-\*03





## 4 Installation

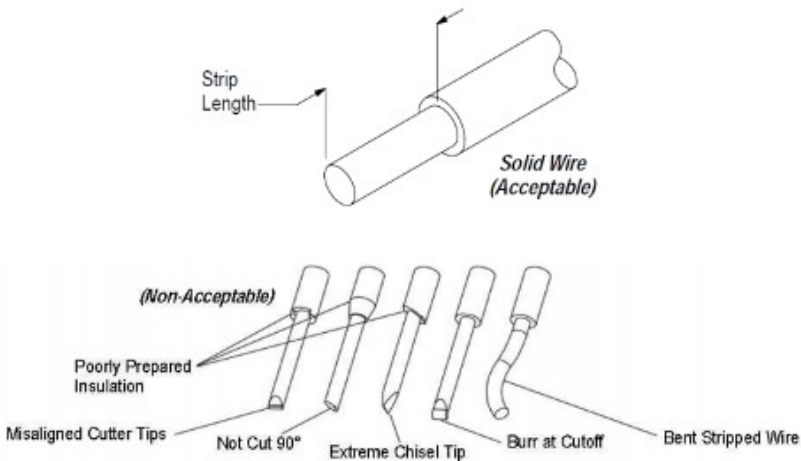
Mount the junction box on a flat surface with properly aligned holes. This prevents excessive stresses in the enclosure and reduces the risk of voiding the ingress protection rating.

All M16x1.5 holes in the junction box shall be fitted with either a suitable cable-gland containing a cable, M12-style pluggable connection or M16 blanking plug. All of which shall be equipped with a matching sealing ring.

If possible, only install the cables after the junction box has been mounted. At very least wait until the box has been mounted before tightening the cable glands. This reduces risk of excessive strain on cables or glands and also reduces the risk of failing to comply with the prescribed minimum bending radius of the cables.

### 4.1 Wire selection and preparation

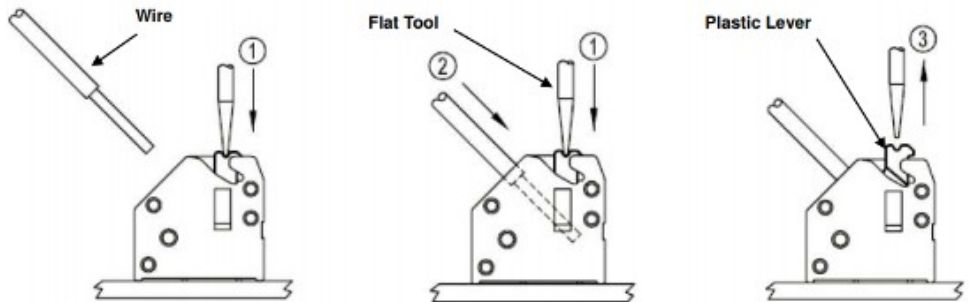
Use wires with outside diameter in less than 2.6mm and with cores within the allowed diameter as given in the specifications; stranded 0.25mm<sup>2</sup> to 1.0mm<sup>2</sup> with suitable ferrule or solid 0.5mm<sup>2</sup> to 2.5mm<sup>2</sup>. Wires must be stripped for 8±0.5mm.



Shielded cables shall be terminated using heatshrink shield-to-wire terminations or an equivalent means of reliably connecting the shield to a terminal connection.

## 4.2 Wire assembly

Push down the lever with a flat tool. Then insert the wire fully so that the insulation is inserted into the hole. Release the lever to fix the wire.



## 4.3 CAN-bus Termination and fuse

The junction box contains a 120 $\Omega$  termination resistor in series with a 40mA removable fuse. Note that the fuse has a fairly high self-resistance of about 10 $\Omega$ , so the effective termination resistance can be expected to be around 130 $\Omega$ . If no termination is needed, the fuse can be removed.

When blown, the fuse must be replaced by same rating and voltage; 40mA/125V.

## 4.4 Test points

The testpoints accept typical 2mm multimeter probe tips.

These testpoints are not intended for any form of permanent connections.

## 4.5 Pluggable connections

During operation, pluggable M12 connections on the junction boxes shall either be connected to a mating cable element or it shall be equipped with a matching cover plug.

## 4.6 Specific instructions for ATEX

### 4.6.1 Operating temperature

For application with a service temperature in excess of 70°C, proper attention must be given to cable specifications in accordance with IEC 60079-0 clause 16.6.

#### **4.6.2 Intrinsically safe circuits**

When used for intrinsically safe circuits, no exposed circuits with other protection are allowed inside the junction box.

#### **4.6.3 Flexible cables**

Supplied cable glands are suitable only for fixed installation of cables. In case of flexible cables, for example for hand-held control pendants, the cable should be secured independently of the glands in the enclosure.

#### **4.6.4 Pluggable M12 connection**

All connections shall be of female / socket type, except at most one which shall then be used as the power feed for all devices connected to the junction box. In other words; no exposed energized connector pins are allowed!

When supplied with connections out of the factory, protection type “nA” is not applicable.

#### **4.6.5 Maintenance and re-use**

**WARNING:** Do not open the enclosure, connect or disconnect cables when the circuit is energized and explosive atmosphere is present!

Cable glands used with this enclosure must be fitted with a sealing ring to maintain compliance with clause 5.3.2 regarding threading requirements of EN 60079-31.

## 5 Ordering information

Partno	Description	Revision
82-942-203	12-Way 5-pin CAN junction box	0, Aug 3, 2017
82-942-303	12-Way 5-pin CAN junction box (ATEX)	0, Aug 3, 2017
80-942-335	6-Way 5-pin CAN junction box (ATEX)	0, Apr 10, 2019

### 5.1 Hardware revision info

#### 5.1.1 6-Way, P/N 80-942-\*35

Rev	Date	Changes
0	Apr 10, 2019	Initial version

#### 5.1.2 12-Way, P/N 80-942-\*03

Rev	Date	Changes
0	Aug 3, 2017	Initial version

## 6 Document revisions

### 6.0.1 Rev 1.2 (April 29, 2019)

Ref	Description
-	Added overview section and added photo of 6-way box
3.4	Updated dimension drawings

### 6.0.2 Rev 1.1 (April 10, 2019)

Ref	Description
-	Added 6-way junction box

### 6.0.3 Rev 1.0 (May 22, 2018)

Ref	Description
-	Initial version

## Annex A: Declaration of Conformity for ATEX/CE

The manufacturer hereby declares that this product is according to the requirements of annex II of the EEC directive 2014/34/EC regarding ATEX and directive 2014/30/EU regarding electromagnetic compatibility (EMC), directive 2014/35/EU regarding low voltage equipment (LVD) and directive 2011/65/EU regarding RoHS.

**Manufacturer,  
facility:**

White Bream  
L.J. Costerstraat 13d  
3261LH, Oud-Beijerland  
The Netherlands

**Product:**

6-Way / 12-Way 5-pin CAN Junction box

**Model:**

80-942-203 (12-way not ATEX),  
80-942-303 (12-way ATEX),  
80-942-335 (6-way ATEX).

**ATEX Marking:**



II 3G Ex ec nA IIB T5 Gc  
II 3D Ex tc IIIC T100°C Dc  
Tamb -20° to +75°C



32V== 4A

WARNING: DO NOT SEPARATE OR (DIS)CONNECT WHEN ENERGIZED

WARNING: DO NOT REMOVE OR REPLACE FUSE(S) WHEN ENERGIZED

WARNING: DO NOT OPEN WHEN NON-INTRINSICALLY SAFE CIRCUITS ARE ENERGIZED

**ATEX Certificate:**

N/A, conformity evaluated according annex VIII of directive 2014/34/EC (internal production control)  
Our lecEx checklists are available on request.

**CE & RoHS Marking:**



continued on next page

This product has been found in conformity with directive 2014/34/EU (ATEX) by testing and verification with the following standards:

- **EN 60079-0:2012/A11:2013** Explosive atmospheres – Part 0: General requirements
- **EN 60079-7:2015** Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
- **EN 60079-15:2010** Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
- **EN 60079-31:2014** Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

This product has been found in conformity with directive 2014/30/EU (EMC) by testing and verification with the following standards:

- **EN 61000-6-1:2007** Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
- **EN 61000-6-3:2007/A1:2011/AC:2012** Electromagnetic compatibility (EMC) - Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments

This product has been found in conformity with directive 2014/35/EU (LVD) by testing and verification with the following standards:

- **EN 61010-1:2010/C1:2011** Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
- **EN 62368-1:2014/A11:2017** Audio/video, information and communication technology equipment - Part 1: Safety requirements

This product has been found in conformity with directive 2011/65/EU (RoHS) by testing and verification with the following standards:

- **EN 50581:2012** Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Apr 10, 2019

Henk Bliet, White Bream, Owner

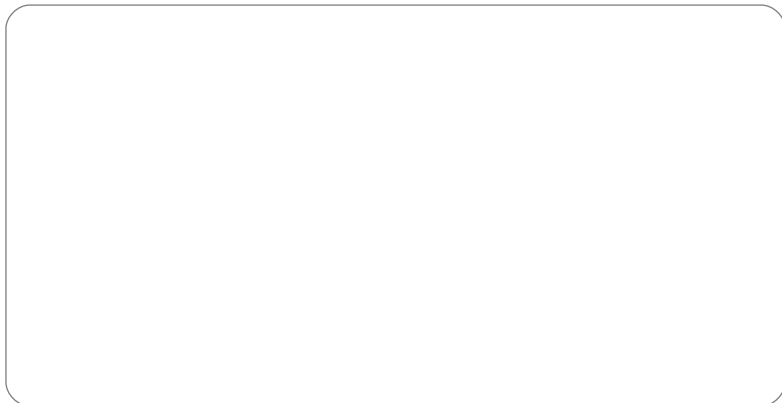
## **Annex B: Declaration of Conformity for FCC**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help





# CAN•net

## **white bream**

L.J. Costerstraat 13d  
3261LH Oud-Beijerland  
The Netherlands

<https://whitebream.com>  
<https://whitebream.nl>

