

# Argos3D-Pulse

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## Hardware User Manual

Version 1

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**Argos3D-Pulse** – Hardware User Manual

Publication date: September 2, 2021

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Information

For further information on technology, delivery terms and conditions and prices please contact BECOM Systems [www.becom-group.com](http://www.becom-group.com)

# 1 General Information

This guide applies to the Argos3D-Pulse from BECOM Systems. Follow this guide chapter by chapter to set up and understand your product. If a section of this document only applies to certain camera parts, this is indicated at the beginning of the respective section.

## 1.1 Symbols Used

This guide makes use of a few symbols and conventions:



### Warning

Indicates a situation which, if not avoided, could result in minor or moderate injury and/or property damage or damage to the device.



### Caution

Indicates a situation which, if not avoided, may result in minor damage to the device, in malfunction of the device or in data loss.



### Note

Notes provide information on special issues related to the device or provide information that will make operation of the device easier.



### Procedures

**A procedure always starts with a headline**

1. The number indicates the step number of a certain procedure you are expected to follow.



Steps are numbered sequentially.

This sign ➤ indicates an expected result of your action.



### References

This symbol ⇄ indicates a cross reference to a different chapter of this manual or to an external document.

## 1.2 Certification

BECOM Systems hereby declares that this Argos3D-Pulse product is in compliance with the essential requirements and other relevant provisions of Directive 2014/35/EU.



### 1.2.1 Eye Safety

<b>Illumination:</b> <b>Laserdiodes</b>	<b>Wavelength</b>	850nm (typ.)	This is a class 1 Laser product In accordance with IEC 60825-1:2014, Edition 3
	<b>Output power</b>	24 W peak	

#### Label:

The following label is applied on the camera:

TBD

## 1.3 Safety instructions



### **Important**

This manual is part of the device and contains information and illustrations about the correct handling of the device and must be read before installation or use. Observe the operating instructions. Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or handling can affect the safety of people and machinery.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the unit.

## 1.4 Electrical connection



### **Note**

The unit must be connected by a qualified electrician.  
Device of protection class III (PC III).  
The electric supply must only be made via PELV circuits.

The device must only be powered by a limited energy source ( $\leq 30$  V;  $\leq 8$  A;  $\leq 100$  VA).  
Disconnect power before connecting the unit.



## 2 Argos3D-Pulse Components

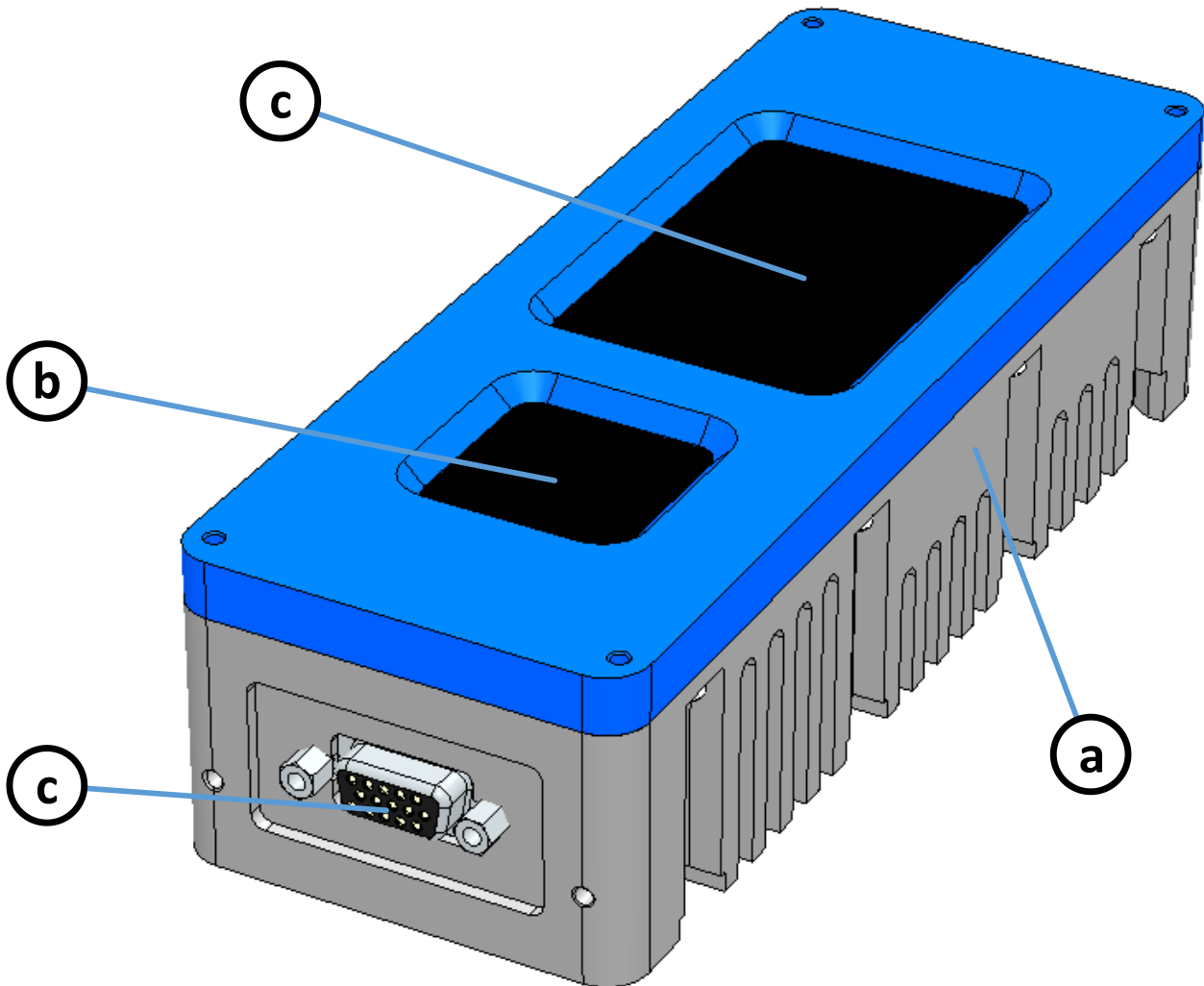


Figure 2-1: Argos3D-Pulse components

- a. Case
- b. Viewing window for 3D sensor
- c. Viewing window for illumination module
- d. IP67 compliant connector

### 3 Mechanical Description

#### 3.1 Dimensions

All dimensions are in mm, tolerance +/-0,2mm.

##### 3.1.1 Top view

Top mounting hole size: M3

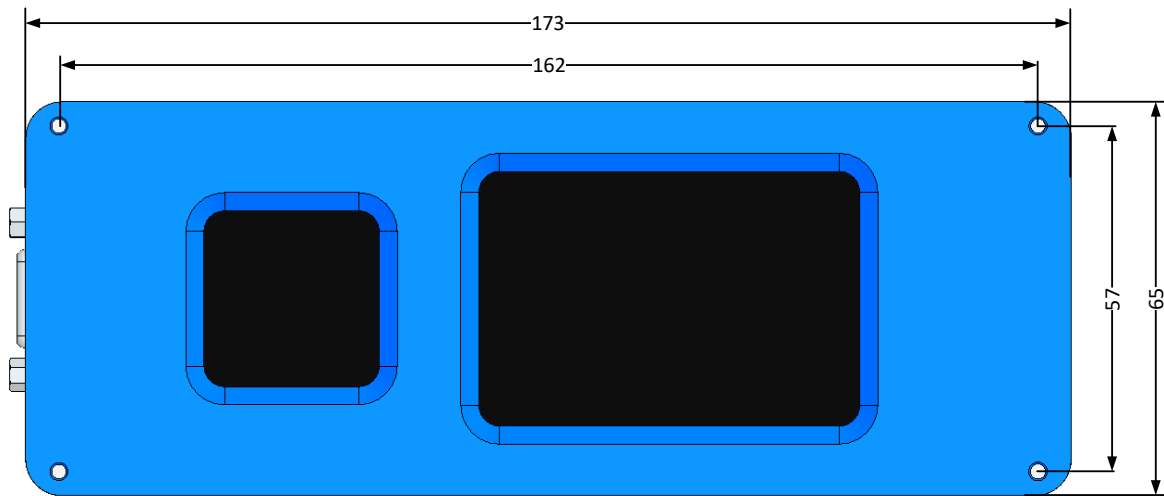


Figure 3-1: Top view dimensions without cover panel

##### 3.1.2 Bottom view

Bottom mounting hole size: M3

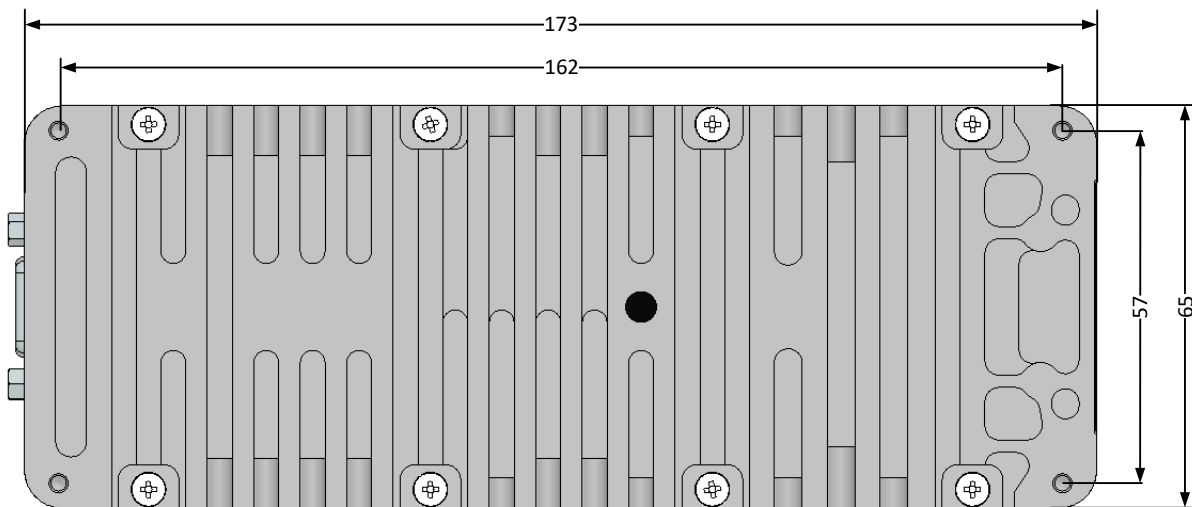


Figure 3-2: Bottom view dimensions

### 3.1.3 Front view

Front mounting hole size: M3

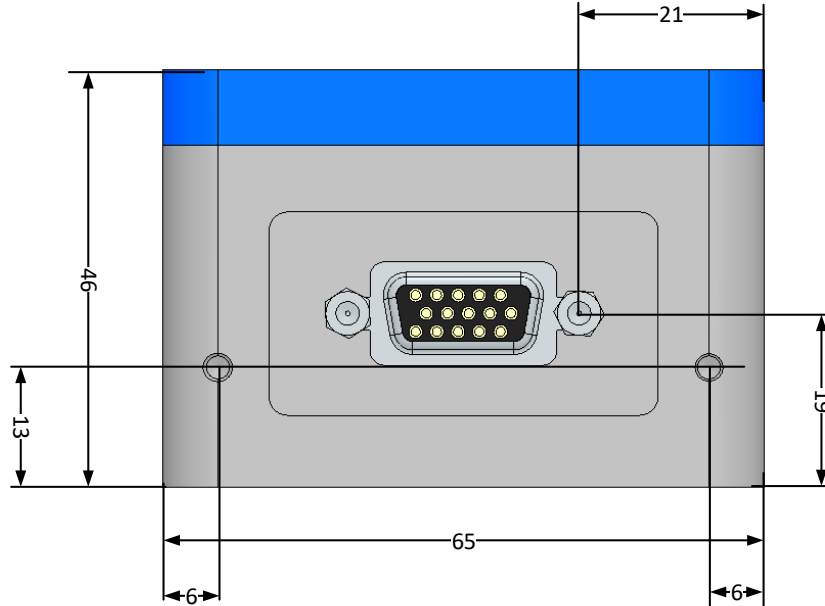


Figure 3-3: Front view without cover panel

### 3.1.4 Back view

Back view mounting hole size: M3

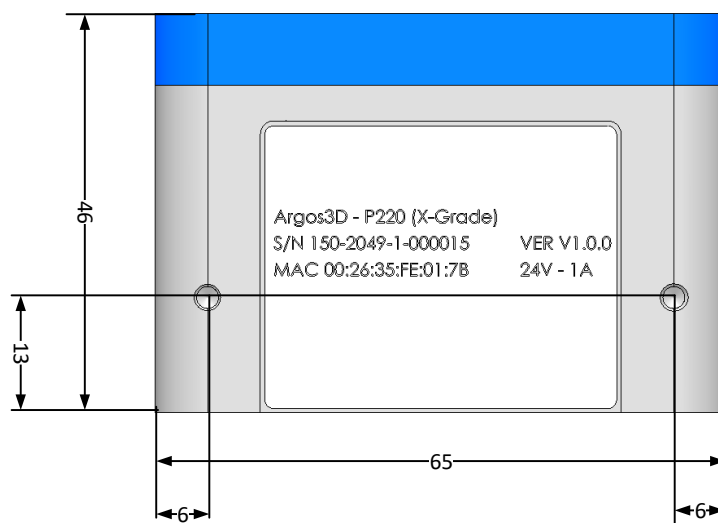


Figure 3-4: Back view without cover panel

### 3.1.5 Side view

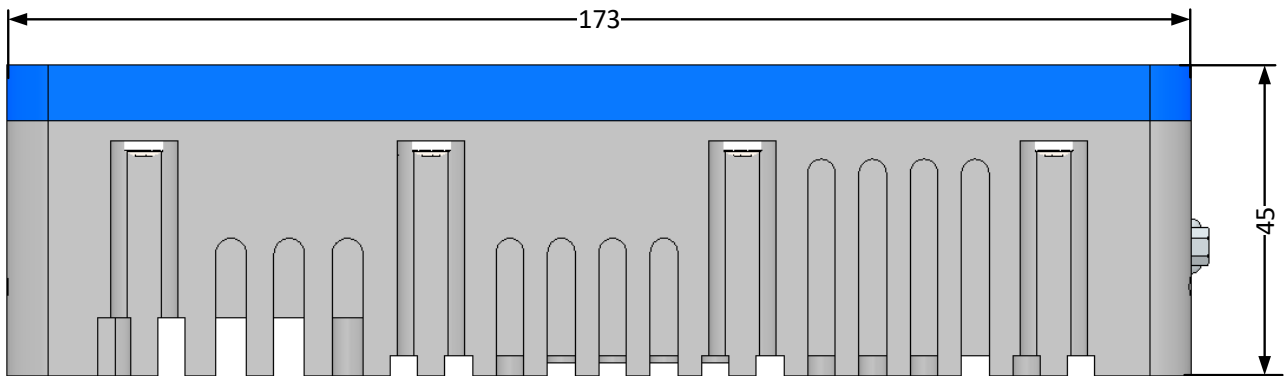


Figure 3-5: Side view without cover panel

### 3.1.6 Mount Spacing



**Caution**

Case may become hot!

The user is responsible to take care for an appropriate cooling.

To prevent the Argos3D-Pulse from overheating, it is strongly recommended, to keep away nearby objects. This guarantees a constant airflow for proper cooling. This bounding box may be violated, when other cooling techniques are provided.

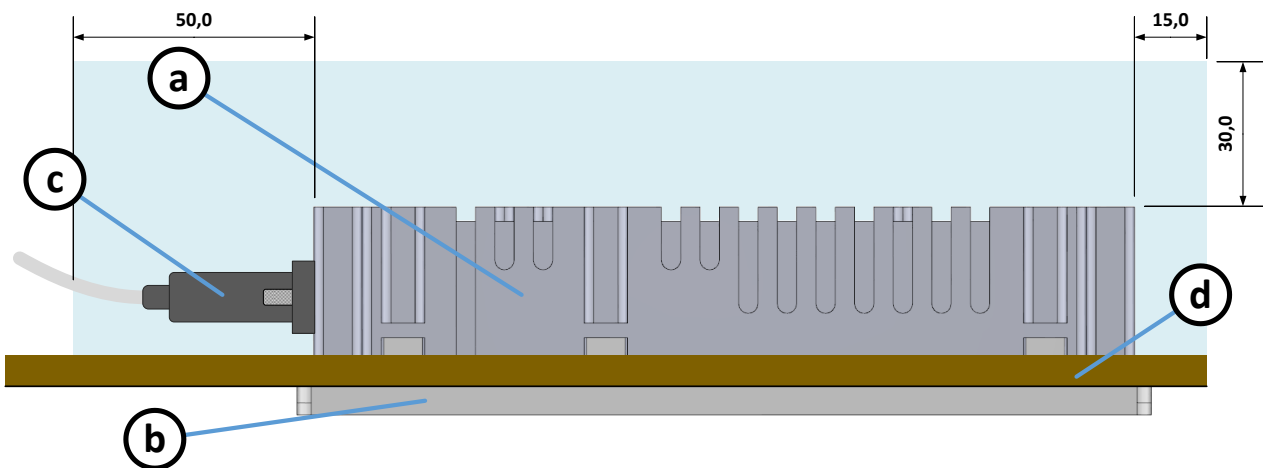


Figure 3-6: Bounding box

- a. Argos3D-Pulse Case
- b. Argos3D-Pulse Cover plate (optional)
- c. Mating IP67 connector
- d. Wall or mounting panel

## 4 Interface Description

### 4.1 Signal naming

Signal names are usually written in capital letters. They are noted in positive logic (positive asserted). If the signal is negative asserted an "n" will be added as prefix to the signal name.

#### Type:

The type describes the electrical characteristics of the signal. The following types are available:

- I Input
- O Output
- DN Negative Differential I/O
- DP Positive Differential I/O
- P Power supply
- LCMOS33 Low voltage CMOS compatible signal with 3.3 V high level and 0 V low level.
- 50 V tolerant Accepts input voltage levels up to 50 V (2.5 V logic high threshold)

### 4.2 Connector Numbering

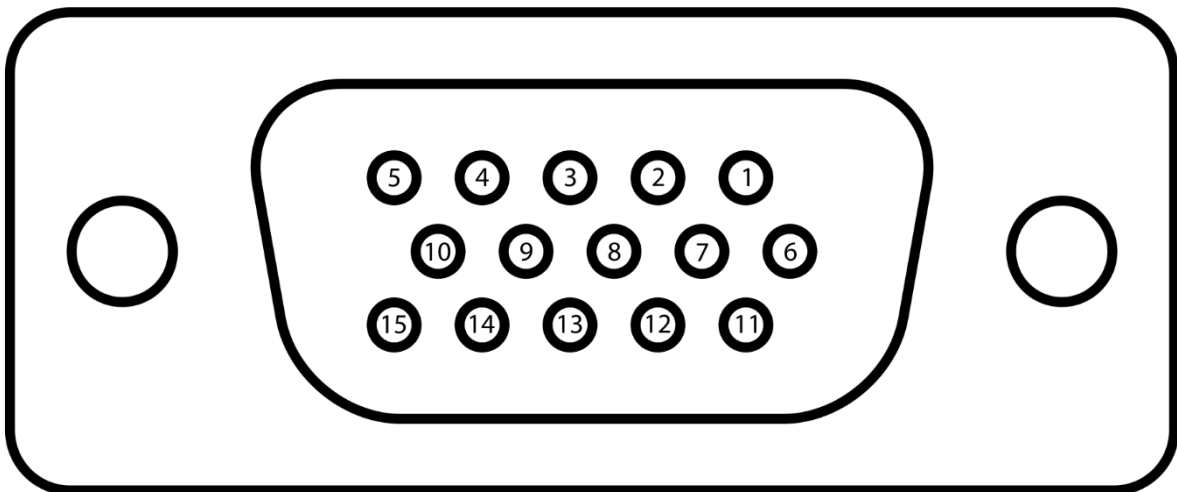


Figure 4-1: Connector Pin Numbering

## 4.2.1 Connector description

No.	Signal	Type	Description
1	ETH-B_N	DN	Ethernet Lane B
2	ETH-B_P	DP	Ethernet Lane B
3	GND	P	DIO Reference Ground
4	DO	O (50V tolerant)	Digital Output Signal
5	V+	P	Positive Power Supply
6	ETH-C_N	DN	Ethernet Lane C
7	ETH-C_P	DP	Ethernet Lane C
8	ETH-D_N	DN	Ethernet Lane D
9	ETH-D_P	DP	Ethernet Lane D
10	nTRIGGER	I (LCVMOS33)	Trigger Input
11	ETH-A_N	DN	Ethernet Lane A
12	ETH-A_P	DP	Ethernet Lane A
13	GND	P	DI Reference Ground
14	DI	I (50V tolerant)	Digital Input Signal
15	V-	P	Power Ground

Table 4-1: Connector Description

## 4.2.2 Power supply

The power supply pins are protected against wrong polarity.

Although the operating input voltage range is between 18 V and 33 V, using a stable 24 V power supply unit is suggested for best performance.



### Note

Use inherently limited power sources only!

## 4.2.3 Power over Ethernet

Some derivatives of the Argos3D-Pulse have the possibility to be powered via Power over Ethernet (PoE). The IEEE 802.3bt specification allows a maximum power consumption of 75 W.



### Note

For Argos3D-Pulse types without PoE support an external Power over Ethernet adapter is available. This can be used to operate the cameras on a PoE Plus (IEEE 802.3at) PSE. Please refer to 8.1 for related products.

#### **4.2.4 DIO**

The digital Input-Output interface has an optical isolated input and output stage. Driven by the GPIOs 1 (output) and GPIO 2 (input). See the Software User Manual specifications for GPIO functionality.

The output stage is a solid state relais, and gives the possibility to use the output as a simple switcher. The current is limited to 200 mA.

If this interface is used as input, the corresponding output must be set to logically 0. Otherwise the input is constantly shorted. The maximum LOW input detection voltage is 2 V, the minimum HIGH input detection voltage is 5 V.

#### **4.2.5 Trigger In**

The trigger Input is not optically isolated to minimize the propagation delay. But the input is protected against 50V clamp voltages. A standard 3.3 V LVCMOS signal should be used. The corresponding ground reference is the negative supply voltage (V-).

#### **4.2.6 RS485 Mounting Option**

For some Applications a RS485 communication could be needed. Therefore, the internal hardware could be modified to route the RS485-A and -B signals to the connector in state of DI (RS485-A) and DIGND (RS485-B).

Ask BECOM Systems for custom modifications.

### **4.3 Mating Parts**

The mating IP67 connector is an A-HDS15-HOOD-WP from ASSMANN WSW components GmbH and available for purchase e.g. at Digi-Key.

An adjusted adapter cable is available from BECOM Systems.

#### **4.3.1 Interconnection cable**

A customized 5 m IP67 compliant cable is available from BECOM Systems. Please refer to 8.1 for related products.

#### **4.3.2 Development Adapter**

For development purposes there is an adapter available with standard Ethernet RJ45 interface and a 2.1 mm DC power supply socket and for digital input, digital output and trigger input a two-pole header each.



Figure 4-2: Adapter for Argos3D-Pulse

Please refer to 8.1 for related products.



## **5 Software**

### **5.1 Firmware**

For a description of the firmware related interfaces, protocol descriptions, register settings, etc. please refer to the Software User Manual.

### **5.2 Demo Application**

For the first evaluation of the camera and to evaluate different settings and configurations a .NET demo application for Microsoft Windows is provided: BLT-ToF-Suite. The demo application can be downloaded from our support web site [support.systems.becom-group.com](http://support.systems.becom-group.com).

### **5.3 Getting Started Software Development Example**

To facilitate the integration of the Argos module in your own application a getting started example will be available on our download site. Please refer to our support site [support.systems.becom-group.com](http://support.systems.becom-group.com).

## 6 Appendix

### 6.1 Operating Conditions

Symbol	Parameter	Min	Typical	Max	Unit
$V_{IN}$	Input supply voltage <sup>1)</sup>	14,4	24	33,6	V
$I_{AVG}$	Average input current		1		A
$I_{PK}$	Peak input current				A
$T$	Operating temperature <sup>2)</sup>	-20		45 <sup>2)</sup>	°C
$T$	Storage temperature	-40		+85	°C
<b>FITP</b>	Frame-rate Integration Time Product		400		

Table 6-1: Operating Conditions



**1) Note**

The connector is used as section point.

**2) Note**

The maximum operating temperature depends on the frame-rate and integration time.

#### 6.1.1 Input current

The average input current depends on the selected frame-rate (fps) and the integration time ( $t_{INT}$ ). The following figure shows typical values. The values on the x axis shows the FITP which has been calculated with the following equation:

$$FITP = t_{INT} [ms] \cdot fps \left[ \frac{1}{s} \right] \cdot 4$$

TBD

Figure 6-1: Input current @24V depending on frame-rate integration time product

#### 6.1.2 Temperature at the case

The following figure shows the expected case temperature @ 25 °C ambient temperature depending on the frame-rate integration time product (FITP). The FITP has been calculated as follow:

$$FITP = t_{INT} [ms] \cdot fps \left[ \frac{1}{s} \right] \cdot 4$$

TBD

Figure 6-2: Expected cooling plate temperature depending on frame-rate integration time product

The temperature on the casing can be reduced by mounting an additional heat sink on the cooling plate.



**Caution**

The user is responsible to take care for an appropriate cooling if the Argos camera is mounted into a case.



**Caution**

Be careful to not stress the device beyond the limits, otherwise you may damage the device.

## 6.2 Optical Characteristics

Symbol	Parameter	Min	Typical	Max	Unit
#LEDs	Nr. of laser diodes		8		
$\lambda_{\text{CENTROID}}$	Centroid-wavelength of illumination		850		nm
$\Delta\lambda$	Spectral bandwidth		5		nm
$P_{\text{OPT}}$	Average optical output power during integration		8		W
	Spatial Resolution		640 x 480		Pixel

Table 6-2: Sensor characteristics

For information about the FoV please refer to chapter 8.1.

## 6.3 Performance

### 6.3.1 Measurement Conditions

All the following measurements have been acquired at the following constant environmental conditions.

Parameter	Value
Temperature	23 °C
Humidity	35 %
Ambient light	500 Lux

Table 6-3: Environmental Specification

The camera parameters are as follow:

Parameter	Value
Modulation Frequency	60 MHz
Frame-rate	20 fps

<b>Lens Type</b>	60° horizontal FoV
<b>Integration time</b>	0,6ms
<b>Target Reflectivity</b>	24%

Table 6-4: Camera Parameters

### 6.3.2 Precision

The following diagram shows the standard deviation over 85 frames.

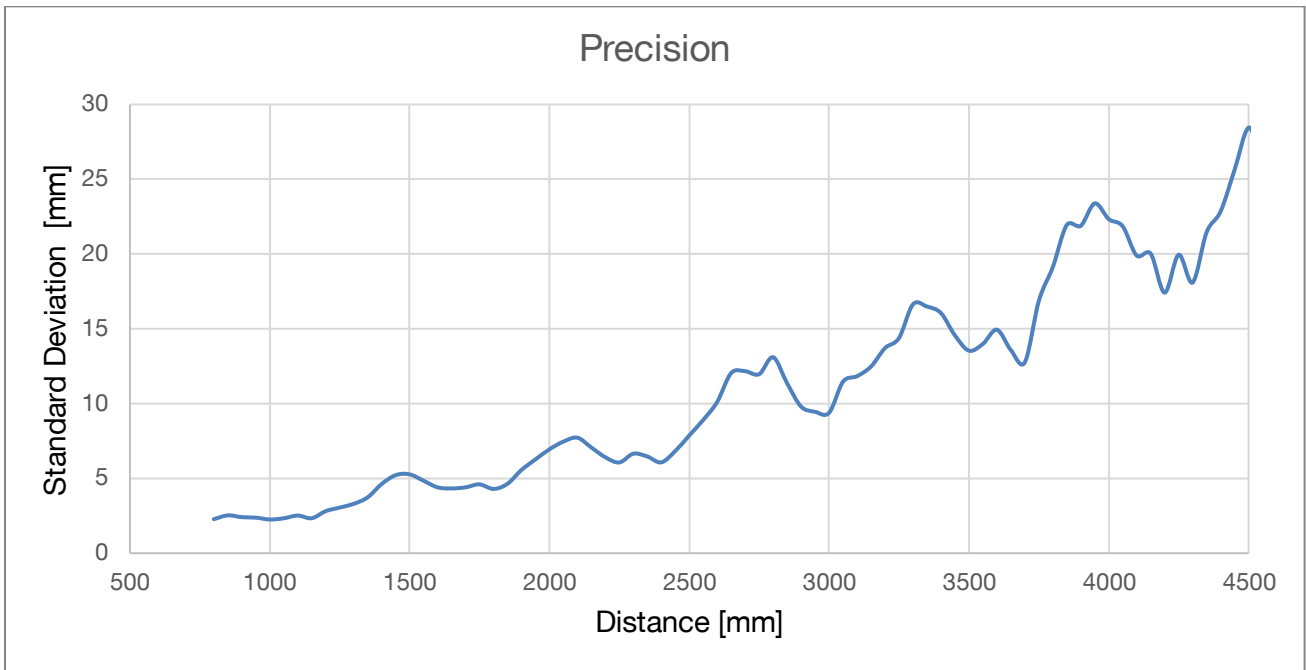


Figure 6-3: Precision

### 6.3.3 Accuracy

The following diagram shows the average over 85 frames.

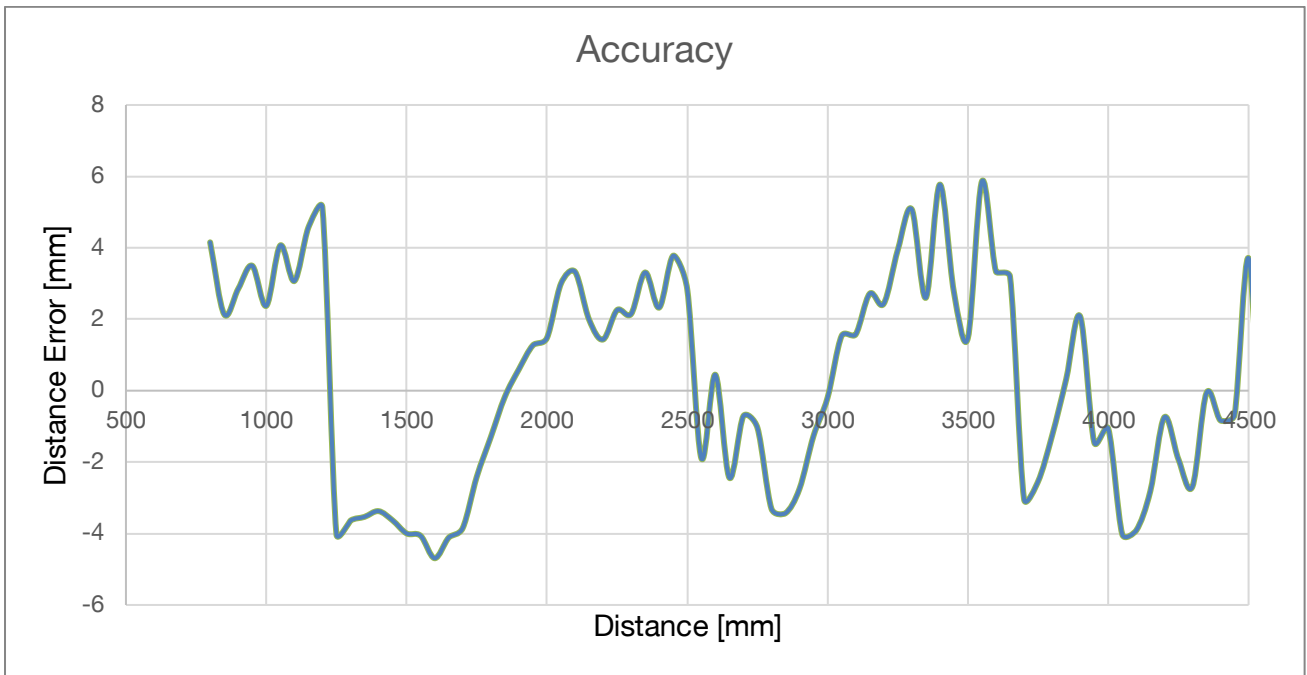


Figure 6-4: Accuracy

## 6.4 Sensor Location

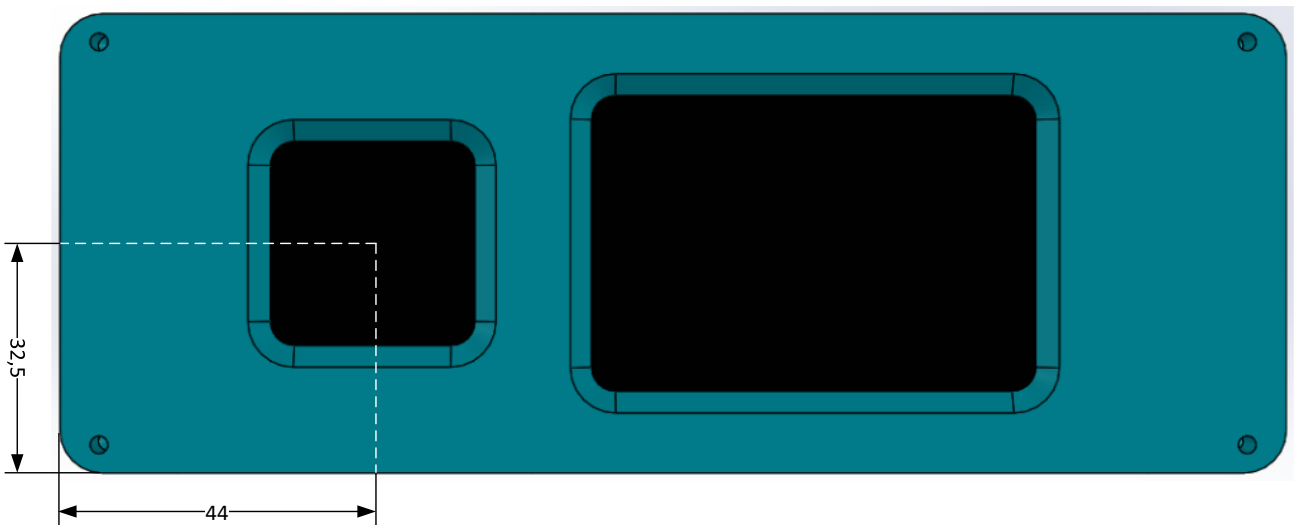


Figure 6-5: Location of optical center of sensor

## 7 Support

### 7.1.1 General Support

General support for products can be found at BECOM Systems' support site

#### Support Link

 [support.systems.becom-group.com](https://support.systems.becom-group.com)

### 7.1.2 Contact

BECOM Systems GmbH

Email: [support.systems@becom-group.com](mailto:support.systems@becom-group.com)

Tel. +43 1 9142091 0

## 8 Product History

### 8.1 Ordering Guide

Article Number	Name	Description
150-3088-1	Argos3D-Pulse-60	60° horizontal FoV

Table 8-1: Ordering guide

### 8.2 Related Products

Article Number	Name	Description
880-0273	P2xx-IP65-Cable-5m	Adapter cable

Table 8-2: Related products

### 8.3 Version Information

#### 8.3.1 Argos3D-Pulse-60

Version	Type	Release date
V0.1.0	X-Grade	August 2021

Table 8-3: Overview Argos3D-Pulse product changes



#### Note

Please refer to our support site for additional information about product changes.

### 8.4 Anomalies

Applies to	Date	Description
V0.1.0		No anomalies reported yet

Table 8-4: Product anomalies



## 9 Document Revision History

Version	Date	Document Revision
1	2021 09 02	First preliminary of the document

Table 9-1: Revision history

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