



ALTOS PoE User Manual

Prepared by Opsys Tech Ltd.



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Opsys Tech Ltd.

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MODEL NUMBERS

This user manual refers to all combinations of the ALTOS PoE sensor variants.

Model number information:

IMUXSP3YXZG-IDAV

Y: Angular Resolution

- **H:** ALTOS 300: 0.1°x0.1° / 22.5° x 6.6°
- **L:** ALTOS 150: 0.2°x0.2° / 45° x 13°
- **A:** ALTOS 70: 0.4°x0.4° / 80° x 22°

X: Wavelength

- **S:** 905nm
- **F:** 940nm

Z: Hardware Variants

- **L:** Plastic Window

Glass window is available upon request for applications that require additional durability. Please contact your Opsys representative or info@opsys-tech.com.

G: Module Generation

- **4:** ALTOS – POE
- **5:** ALTOS – POE, Stainless Steel Housing
- **6:** ALTOS –POE, Explosion Proof Housing

ID: Customer ID

- **00:** General ALTOS configuration, non customized

Customer specific customer code available upon request. Please consult with your Opsys representative or contact info@opsys-tech.com.

AV: Application Variant Code

- **03:** Vanilla, LiDAR point cloud output
- **04:** Vanilla high framerate with subframe output
- **13:** Integrated perception, ITS, MQTT output
- **23:** Integrated perception, Perimeter Security, MQTT output
- **33:** Integrated perception, Healthcare, MQTT output
- **43:** Integrated perception, ITS with integrated analytics

Example:

- **IMUXSP3LFL4-0013**
- **IMUXSP3ASL4-0023**

ACCESSORIES

Ordering code	Description
1287450	Sunshield for ALTOS (including screws)
1287460	Adapter plate for brackets (including screws)

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer shall perform repairs to components.

Failure to observe this information can result in injury or equipment damage.

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PRODUCT MODIFICATIONS

Year	Type	Modifications
2024	S1	

DOCUMENT REVISIONS

Date	Type	Modifications
23-07-2025	A00	Document creation
16-01-2025	A01	Added assembly instructions and accessories. Updated max power consumption Small textual corrections
22-07-2026	A02	Updated Ordering codes Updated mechanical drawing and nameplates Added security details Small textual corrections

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1. About Opsys Tech Ltd.

Opsys has developed the world's most advanced solid-state scanning LiDAR sensor. Opsys technology uses fully addressable VCSEL arrays, combined with a single chip addressable CMOS SPAD array. No moving parts allows for 24/7 operation. This gives the benefit of ensuring there are no mechanical failures over time, which increases the LiDAR's lifetime expectancy well beyond any other solution on the market today.

The patented technology provides a 3D point cloud in real time. Opsys sensors provide major cost savings as they are semiconductor-based, and the solution is scalable. The high-performance sensor is already in mass production.

Opsys technology is designed as a Lego brick system to enable complete customization at an affordable price. The ALTOS PoE provides a fully integrated solution to meet the myriads of demands of industry across numerous different sectors, such as Smart Cities, Intelligent Traffic Systems (ITS), Robotics, Smart Factories, AGV and Security (for example in Perimeter Security, Public Safety, Healthcare and Education).

Founded in 2016, the company has major investment, is headquartered in Israel, with offices in USA, APAC, and Europe.

2. Description of the Product

Opsys' Industrial LiDAR sensor, ALTOS, is a pure solid-state LiDAR without any moving parts based on fully addressable 2D VCSELs and a SPAD detector. The ALTOS (Advanced LiDAR Technology Opsys Sensors) is based on electrical scanning of the VCEL, which allows the sensor to work 24/7 without limitations. The VCEL and SPAD cells are individually controlled at each scan for a very short period of time. The field of view (FOV) and angular resolution of the sensor is defined only by the optics. This modular approach makes the system very scalable and cost-effective. The ALTOS can therefore be supplied with different FOVs and angular resolutions to match each use case, while keeping the system cost low.

ALTOS PoE adds the simplicity of a single ethernet connection for data communication and supplying power to the device. ALTOS has the option of integration perception for ITS, security and other applications. This smart sensor approach allows for easy integration and minimal design in effort.

Opsys' LiDAR sensors are based on Micro Flash Technology (MFT), which allows for very fast point-by-point scanning of the FOV (as opposed to flash or row-/ column-scanning techniques) without any scanning degradation across the entire FOV. This technology enables the LiDAR to scan the entire FOV at a very high rate to improve the SNR of each point in the point cloud and achieve a very high POD (probability of detection), even for low reflectivity targets at longer distances. The entire FOV is scanned 1000 times per second.



2.3. Functions

2.3.1. Integrated perception (Optional)

The ALTOS PoE can be ordered with integrated perception. The perception engine is tuned for ITS and security applications but is not limited to these. The perception engine outputs its data as MQTT and can be integrated into many 3rd party analytic software packages.

2.4. Communication Interface

The ALTOS PoE provides its data over a 1000 Base-T interface in UDP packets using IPv4. The UDP payload has a big-endian format and uses the ISO 23150 protocol for its data structure. Each packet consists of a header and pixel data.

The specifications of the data structure of the different packets can be found in a dedicated application note. Please contact your Opsys representative for more information or contact info@opys-tech.com.

2.5. Specifications

2.5.1. Typical Operating Conditions

Parameter	Minimum	Typical	Maximum	Unit
Supply voltage*	10.2	12	14.4	Vdc
Power consumption 12V		8.5	9.5	W
Power consumption PoE		9	10.5	W
Operating temperature	-30		65	°C
Storage temperature	-40		75	°C
MTBF		160 000		Hr

Table 1: Typical operating conditions

* When not using PoE: according to EN/IEC 62368-1

External Power Supply Restrictions when not using PoE (Power supply not supplied)	
Location	Indoor shelter cabinet
Voltage	12Vdc
Power supply limits	Limited Power Source (LPS) ES1, PS2 1.5A max

Table 2: External power supply restrictions

2.5.2. Performance Specifications

Parameter	ALTOS 300	ALTOS 150	ALTOS 70
Field of view (horizontal x vertical)	22.5° x 6.5°	45° x 13°	80° x 22°
Typical range, 10% reflective Lambertian target, 90klux	200m	100m	55m
Typical range, 70% reflective Lambertian target, 90klux	300m	150m	100m
Maximum observable range	300m	150m	150m
Minimum range	0.4m*	0.4m*	0.4m*
Range measurement accuracy	±0.1m <100m	±0.075m <100m	±0.05m <100m
Range measurement precision	±0.1m	±0.075m	±0.05m
Horizontal angular resolution	0.1°	0.2°	0.4°
Vertical angular resolution	0.1°	0.2°	0.4°
Number of returns per pixel	Up to 2	Up to 2	Up to 2
Frame rate	Up to 20Hz	Up to 20Hz	Up to 20Hz

Table 3: Performance specifications

* The accuracy will be higher in the close range, objects can still be detected in this range (close range: ALTOS 70: 0.4m to 0.8m, ALTOS 150: 0.4 to 1.2m, ALTOS 300: 0.4 to 2m)

Illumination Specifications	
Wavelength	905nm, 940nm
Laser safety	Class 1 Eye-safe per IEC/EN 60825-1: 2014

Table 4: Illumination specifications

Mechanical Specifications	
Dimensions	109 x 68 x 100 mm
Weight	750g
Ingress protection	IP67, Enclosure type 3 (UL50E)
Physical interfaces	1000Base-T
Supported PoE versions	PoE, PoE+, PoE++ (IEEE802.3af/at/bt)

Table 5: Mechanical specifications

Data Specifications	
LiDAR data	• Data per echo for all pixels: Time of flight, intensity • Data per pixel: Ambient illumination (passive grayscale IR image), row, column • Timestamp per scan step
Time synchronization protocol	PTP, NTP

Table 6: Sensor output

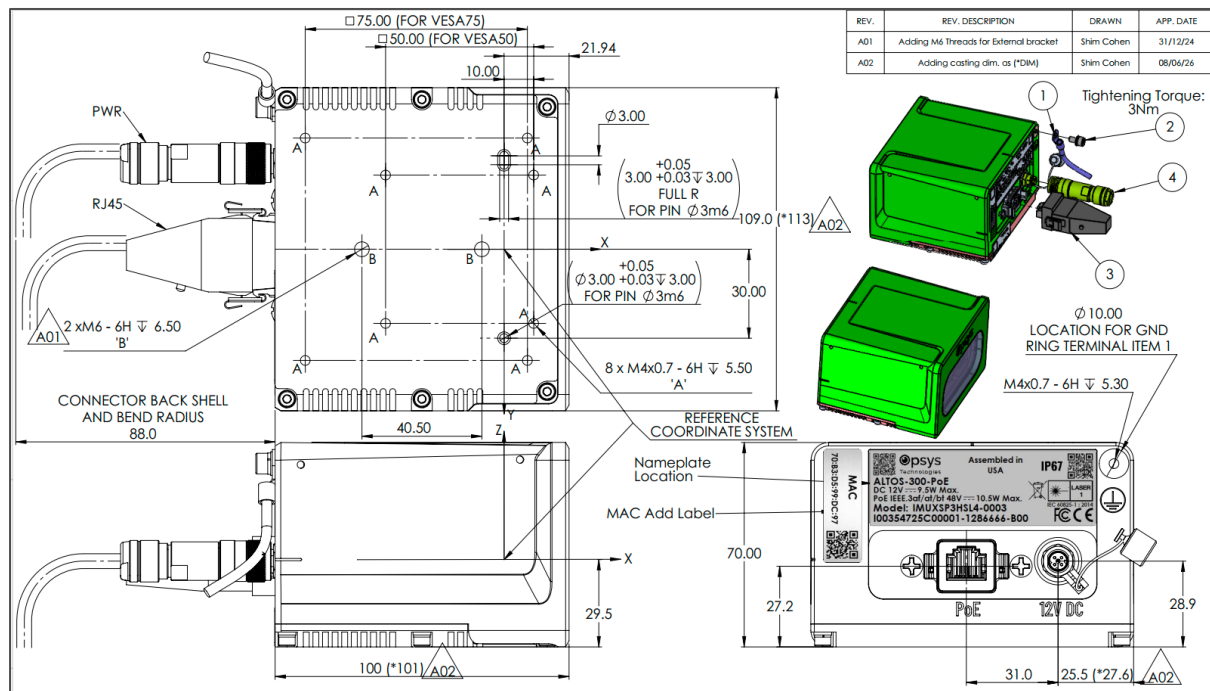
2.6. Mechanical Specifications

2.6.1. Mechanical Interface

The ALTOS PoE sensor is shipped with the following items:

- Sensor
- POE connector
- Power connector sealing cap
- Grounding terminal

2.6.2. Dimensions



ALTOS PoE has 3 mounting options: VESA 50 M4 holes, VESA 75 M4 holes and 2 M6 holes in the middle. All the mounting holes are located at the bottom of the unit.

The backside of the unit holds the ethernet connector, power connector, nameplate and the location for the ground terminal.

2.7. Connector Specifications

2.7.1. Ethernet Connector

The ethernet connector on the ALTOS PoE is used for data communication, as well as supplying power to the device when using PoE. For installations for which PoE is not available there is the option to supply power to the device using a dedicated power connector. See the next paragraph for details about the power connector. When using POE it is needed to seal the power connector with the supplied sealing cap.

Opsys supplies the mating connector for the cable assembly with each ALTOS unit. Depending on the ethernet cable thickness two parts of Samtec are available with only difference the sealing rubber. Table 7 below shows the details of the ethernet connector and the mating options. Opsys supplies the connector with sealing rubber for both ethernet cable thickness ranges. It is required to use a Cat 5e or Cat 6 ethernet cable with a temperature rating between -30°C and 65°C. The maximum cable length depends on the combination of the ethernet cable and PoE type. For most combinations for PoE versions supported by ALTOS, it is 100m. For correct operation and sealing of the ethernet cable connector, please refer to the assembly instructions of the ethernet cable connector which can be found in the documentation package. Please contact your Opsys representative or info@opys-tech.com for any questions.

Location	Manufacturer	Type	Angle	Cable Assembly	Ethernet Cable Thickness
ALTOS PoE part	Samtec	RPBE-01-01-E	N/A	N/A	
Mating	Opsys	1287056	Right	Crimp	5.00mm to 6.50mm
Mating	Samtec	RCEF-G-01	Right	Crimp	5.00mm to 5.75mm
Mating	Samtec	RCEF-G-02	Right	Crimp	5.75mm to 6.50mm

Table 7: Ethernet connector details

2.7.2. Power Connector

Power to the ALTOS PoE can also be supplied via a dedicated power connection when PoE is not available for the installation in which the ALTOS will be installed. In this case the data communication still happens via the ethernet connector while the power is supplied through the dedicated power connector.

Table 8 below shows the details of the power connector as well as the mating options. A maximum cable length of 12m is supported by ALTOS. It is required to use wires of 20AWG for the power. If a larger distance to the power supply is needed, please contact your Opsys representative or info@opys-tech.com.

Location	Manufacturer	Type	Angle	Cable Assembly	Wire
ALTOS PoE part	Binder	86 6321 1121 00404	N/A	N/A	N/A
Mating	Binder	99 3368 100 04	Right	Screw	20AWG
Mating	Binder	99 3368 600 04	Right	Screw	20AWG

Table 8: Power connector details

Pin #	Function
1	GND
2	+12V DC
3	Not connected
4	Not connected

Table 9: Power connector pinout

The unit is intended for outdoor installation. Ensure the ALTOS PoE unit is properly grounded. Failure to properly ground the device can permanently damage it.

Permanently connect the ground on the metal body of the ALTOS POE (protective earth) using a 12 AWG (3.31mm²) PE conductor. The screw used is an M4, 8mm hex screw. Figure 7 shows a detailed view of the components needed for the ground connection. A skilled individual is required to install a PE conductor to the ground the sensor.

2.7.3. Ethernet Connector Assembly Instructions

POS	COLOR	WIRE	POS	COLOR	WIRE
01	WHITE/ORANGE	TWISTING	05	WHITE/BLUE	TWISTING
02	ORANGE		06	GREEN	
03	WHITE/GREEN	TWISTING	07	WHITE/BROWN	TWISTING
04	BLUE		08	BROWN	



2.Strip the Ethernet CAT 5e cable to 15.00 mm.



1. Thread the SCN-17-02, NCC-17-01, SG-17-XX and RCEF-B-01 on to the Ethernet CAT 5e cable.

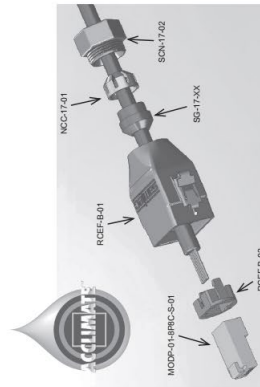
Assembly Instructions

3. Crimp MODP-01-8P8C-S-01 on to the stripped cable end.



4. Snap the MODP-01-8P8C-S-01 past beams on RCEF-B-02 and locate RCEF-B-02 in to the RCEF-B-01 housing.

5. Slide SG-17-XX, NCC-17-01 and SCN-17-02 down the Ethernet Cat 5e cable and locate in the RCFE-B-01 housing. Finally, screw SCN-17-02 on to the RCFE-B-01 housing until the SCN-17-02 rests on the housing.



STYLE
-01: FOR CABLE OD RANGE
OF 5.00[.197]-5.75[.226]
(YELLOW SEALING GLAND)
-02: FOR CABLE OD RANGE
OF 5.75[.226]-6.50[.256]
(ORANGE SEALING GLAND)



Field Terminated Ethernet Kit Wiring/Assembly Instructions for RCEF-G-01 & RCEF-G-02



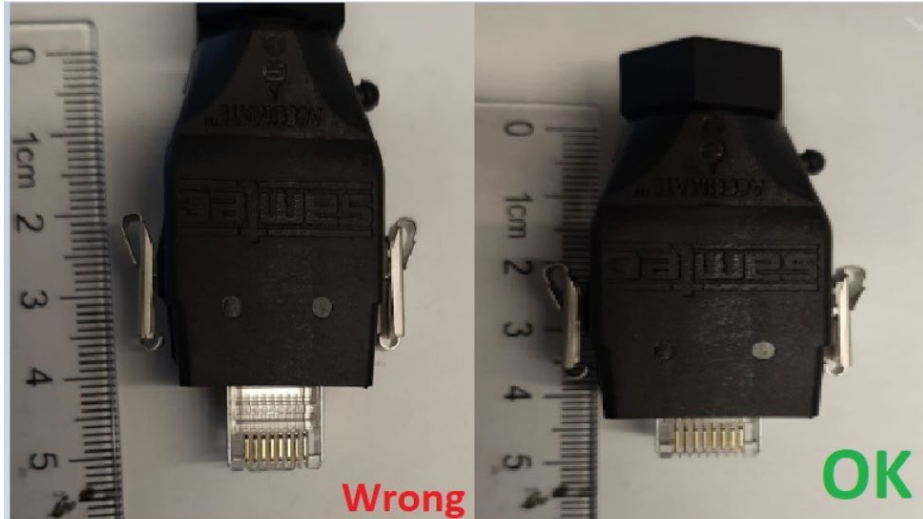
WWW.SAMTEC.COM
1-800-SAMTEC-9
812-944-6733
info@samtec.com
520 Park East Blvd.
New Albany, IN 47150
812-944-6733
Revised: April, 2010
/rcfe.indd

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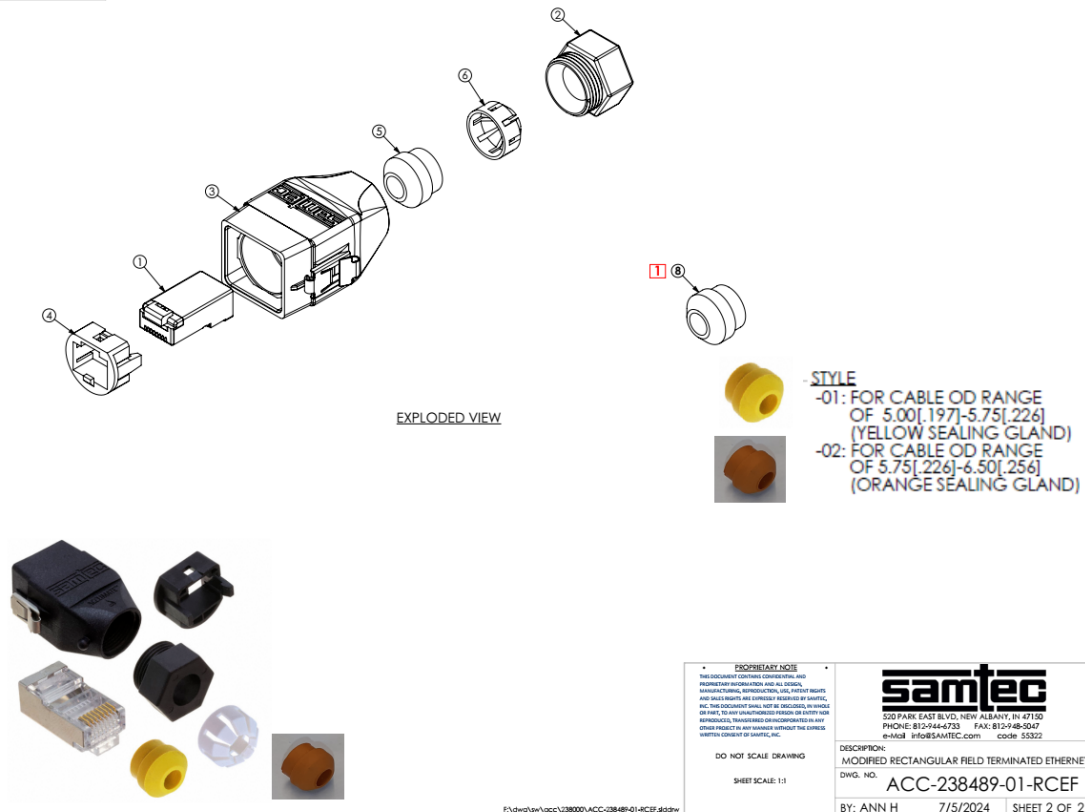
Precaution

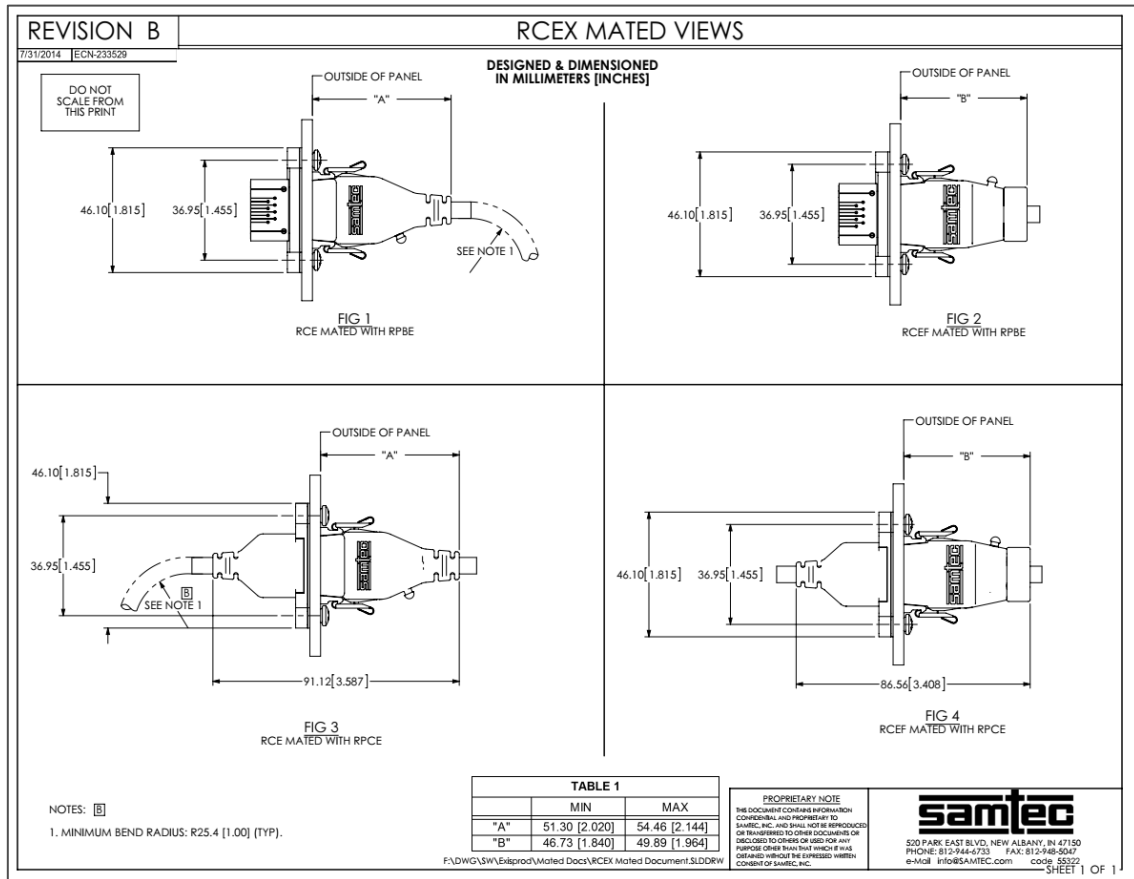
Note for step 4 of the cable assembly (see first page of the assembly guide) that the MODP-01-8P8C-S-01 and RCEF-B-02 are properly inserted into the RCEF-B-01 housing. An example of an incorrect and correct placement is shown at the picture below.

4. Snap the MODP-01-8P8C-S-01 past beams on RCEF-B-02 and locate RCEF-B-02 in to the RCEF-B-01 housing.



REVISION 1





2.7.4. Power Cable Assembly Instructions



DATENÜBERTRAGUNG
DATA TRANSMISSION

www.binder-connector.com

Inhaltsverzeichnis Contents

Bereich	Range	Serie Series	Seite Page	Schutzart Degree of protection	Spannung Voltage	Strom Current	Poltzahl No. of contacts
Automatisierungstechnik – Datenübertragung Automation Technology – Data Transmission							
M8-D	M8-D	818	4 – 13	IP67	60 V	1 A	4
M12-B	M12-B	715 - 766	14 – 59	IP67 / IP68	60/250 V	1 / 4 A	2 – 5
M12-D/-X	M12-D/-X	825 - 876	60 – 105	IP67	50 V AC/60 V DC/250 V	0,5 – 4 A	4, 8
M12 Hybrid	M12 Hybrid	767	106 – 111	IP68 / IP69	63 V DC/12 V DC	12 / 0,5 A	2+7
M16-X	M16-X	415	112 – 117	IP67	50 V AC/60 V DC	0,5 A	8

Übersicht Summary



M8-D

Serie 818

- Steckverbinder mit M8 x 1 Schraubverriegelung 8 mm
- 4-polig
- Steckverbinder umspritzt am Kabel
- Schutzart IP67
- Konfektionierbar, Schraubklemmanschluss
- Verbindungsleitungen
- 2 m und 5 m Kabellänge
- PUR-Kabel
- Flanschsteckverbinder mit Tauchlötanschluss

818 Series

- Connectors with M8 x 1 screw locking 8 mm
- 4 contacts
- Connectors moulded on cable
- Degree of protection IP67
- Field wireable, screw clamp termination
- Connecting cables
- 2 m and 5 m cable length
- PUR cable
- Panel mount connectors with dip solder contacts



M12-B

Serie 715 - 766

- Steckverbinder mit M12 x 1 Schraubverriegelung, schirmbar „B-kodiert“ für Profibus
- Steckverbinder umspritzt am Kabel
- Metallgehäuse 360° EMV-sicher geschirmt
- Schutzart IP67/IP68
- Konfektionierbar, Schraub-, Crimp- und Käfigzugfederanschluss
- Flanschsteckverbinder mit verschiedenen Anschlussarten
- 2 m und 5 m Kabellänge
- UL-Zulassung
- Weitere Kabellängen auf Anfrage

715 - 766 Series

- Connectors with M12 x 1 screw locking "reverse key" for Profibus
- Connectors moulded on cable
- Metal housing with 360° EMC protected shielding
- Degree of protection IP67/IP68
- Field wireable, screw, crimp and wire clamp termination
- Panel mount connectors with different types of connection
- 2 m and 5 m cable length
- UL approval
- Further cable lengths upon request



M12-D/-X

Serie 825 - 876

- Steckverbinder mit M12 x 1 Schraubverriegelung, schirmbar „D- und X-kodiert“ für Profinet und Ethernet
- Steckverbinder umspritzt am Kabel
- Einbausteckverbinder
- RJ45
- Schirmbar/360° Schirmanbindung
- Schraub-/Schneidklemmanschluss
- Schutzart IP67
- Übertragungseigenschaften DIN EN 50173/ CAT 5/ CAT6_e
- UL-Zulassung

825 - 876 Series

- Connectors with M12 x 1 screw locking, shieldable, "D- and X-coded" for Profinet and Ethernet applications
- Connectors moulded on cable
- Receptacles
- RJ45
- Shieldable/360° shielding
- Screw termination/IDT connection
- Degree of protection IP67
- Transmission features DIN EN 50173/ CAT 5/CAT6_e
- UL approval

Automatisierungstechnik 818

M8-D

Montageanleitung Assembly instruction

Kabelsteckverbinder, schirmbar, Schraubklemmanschluss, Irisfeder
Cable connectors, shieldable, screw clamp connection, iris type spring

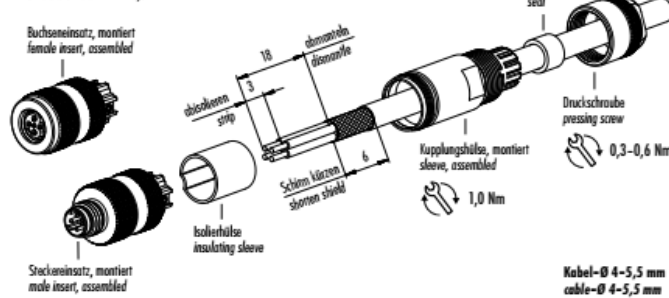
Schirmdurchmesser > 3,5 mm

1. Vormontiertes Gehäuse auf Kabel aufdübeln (bestehend aus: Kupplungshülse montiert, Dichtung und Druckschraube).
2. Kabel abmanteln, Adern absolieren, Schirm kürzen.
(Bei Bedarf mit Kupfer-Tape umwickeln)
3. Litzen anschrauben.
4. Kupplungshülse mit Stecker- bzw. Buchseneinsatz verschrauben.
5. Druckschraube festdrehen.

Shielding braid diameter > 3,5 mm

1. Bead pre-assembled housing to cable (consisting of: assembled sleeve, seal and pressing screw).
2. Dismantle cable, strip single wires, shorten shielding braid.
(Wrap with copper tape if necessary)
3. Screw on single wires.
4. Screw sleeve to male/female insert.
5. Tighten pressing screw.

Schirmdurchmesser > 3,5 mm
Shield-diameter > 3,5 mm



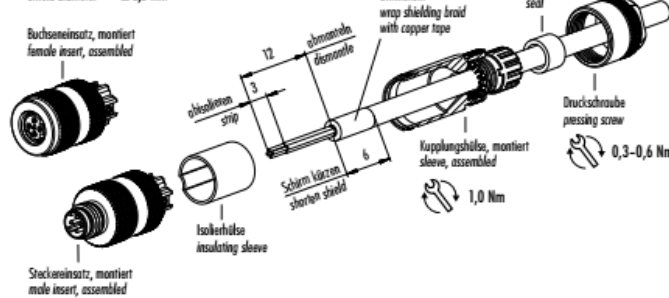
Schirmdurchmesser ≤ 3,5 mm

1. Vormontiertes Gehäuse auf Kabel aufdübeln (bestehend aus: Kupplungshülse montiert, Dichtung und Druckschraube).
2. Kabel abmanteln, Adern absolieren, Schirm kürzen, auf Kabelmantel umschlagen und mit Kupfer-Tape umwickeln.
3. Litzen anschrauben.
4. Kupplungshülse mit Stecker- bzw. Buchseneinsatz verschrauben.
5. Druckschraube festdrehen.

Shielding braid diameter ≤ 3,5 mm

1. Bead pre-assembled housing to cable (consisting of: assembled sleeve, seal and pressing screw).
2. Dismantle cable, strip single wires, shorten shielding braid, revert to cable and wrap with copper tape.
3. Screw on single wires.
4. Screw sleeve to male/female insert.
5. Tighten pressing screw.

Schirmdurchmesser ≤ 3,5 mm
Shield-diameter ≤ 3,5 mm



Automatisierungstechnik 818

M8-D

Montageanleitung
Assembly instruction

Kabelsteckverbinder, schirmbar, Schraubklemmanschluss, Irisfeder
Cable connectors, shieldable, screw clamp connection, iris type spring

Schirmdurchmesser > 5,5 mm

1. Vormontiertes Gehäuse auf Kabel auffädeln (bestehend aus: Kupplungshülse montiert, Dichting und Druckschraube).
2. Kabel abmanteln, Adern abisolieren, Schirm kürzen. (Bei Bedarf mit Kupfer-Tape umwickeln)
3. Litzen anschrauben.
4. Kupplungshülse mit Stecker- bzw. Buchseneinsatz verschrauben.
5. Druckschraube festdrehen.

Shielding braid diameter > 5,5 mm

1. Bead pre-assembled housing to cable (consisting of: assembled sleeve, seal and pressing screw).
2. Dismantle cable, strip single wires, shorten shielding braid. (Wrap with copper tape if necessary)
3. Screw on single wires.
4. Screw sleeve to male/female insert.
5. Tighten pressing screw.

Schirmdurchmesser > 5,5 mm
Shield-diameter > 5,5 mm

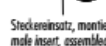
Buchseinsatz, montiert
female insert, assembled



Stecker-einsatz, montiert
male insert, assembled



Isolierhülse
insulating sleeve



Kupplungshülse, montiert
sleeve, assembled



Dichting seal



Druckschraube
pressing screw



1,0 Nm



0,8-1,0 Nm



Kabel-Ø 5-8 mm
cable-Ø 5-8 mm



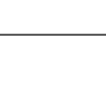
18



abmanteln
dismantle



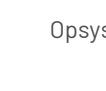
abisolieren
strip



Schirm kürzen
shorten shield



6



Schirmdurchmesser ≤ 5,5 mm

1. Vormontiertes Gehäuse auf Kabel auffädeln (bestehend aus: Kupplungshülse montiert, Dichting und Druckschraube).
2. Kabel abmanteln, Adern abisolieren, Schirm kürzen, auf Kabelmantel umschlagen und mit Kupfer-Tape umwickeln.
3. Litzen anschrauben.
4. Kupplungshülse mit Stecker- bzw. Buchseneinsatz verschrauben.
5. Druckschraube festdrehen.

Shielding braid diameter ≤ 5,5 mm

1. Bead pre-assembled housing to cable (consisting of: assembled sleeve, seal and pressing screw).
2. Dismantle cable, strip single wires, shorten shielding braid, revert to cable and wrap with copper tape.
3. Screw on single wires.
4. Screw sleeve to male/female insert.
5. Tighten pressing screw.

Schirmdurchmesser ≤ 5,5 mm
Shield-diameter ≤ 5,5 mm

Buchseinsatz, montiert
female insert, assembled



Stecker-einsatz, montiert
male insert, assembled



Isolierhülse
insulating sleeve



Kupplungshülse, montiert
sleeve, assembled



Dichting seal



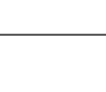
Druckschraube
pressing screw



1,0 Nm



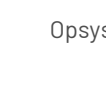
0,8-1,0 Nm



Schirm mit Kupfer-Tape
umwickeln
wrap shielding braid
with copper tape



12



Product data sheet

Automation technology - Sensors and actuators



Product description	M8 Female cable connector, Contacts: 4, 4.0-5.5 mm, shieldable, screw clamp, IP67, M8x1.0
Area	M8-D
Part no.	99 3368 100 04

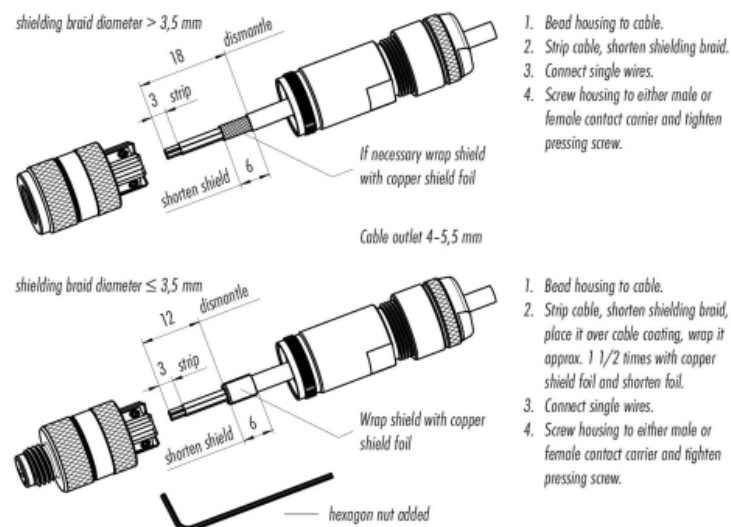
Material

Housing material	PA
Contact body material	PA
Contact material	CuZn (brass)
Contact plating	Au (gold)
Locking material	CuZn (brass)
REACH SVHC	CAS 7439-92-1 (Lead)

Classifications

eCl@ss 11.1	27-44-01-02
ETIM 9.0	EC002635

Assembly instructions



Date: 19.06.2024

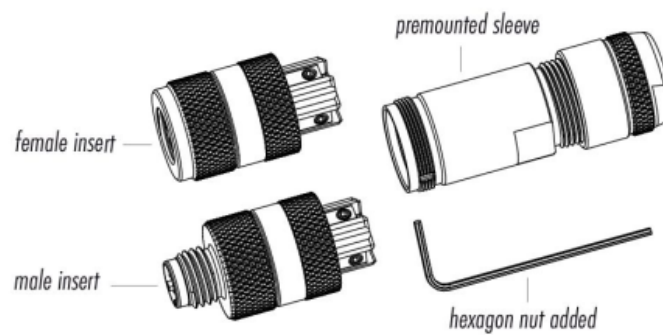
Product data sheet

Automation technology - Sensors and actuators



Product description	M8 Female cable connector, Contacts: 4, 4.0-5.5 mm, shieldable, screw clamp, IP67, M8x1.0
Area	M8-D
Part no.	99 3368 100 04

Component part drawing



Date: 19.06.2024



**Franz Binder GmbH & Co.
Elektrische Bauelemente KG**

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vk@binder-connector.de
www.binder-connector.com

Technische Änderungen und Irrtum vorbehalten.
Specifications may be changed without notice, errors excepted.
AGB: www.binder-connector.com/AGB.php / Terms: www.binder-connector.com/en/terms

Stand/Status 11/2024

2.8. Product Compliance

This product complies with all relevant Quality Standards. The Declarations of Conformities can be found in appendix A. The product conforms to the following standards.

Standards marked with * are ongoing qualification at the time of document release.

USA

Laser Safety:

IEC/EN 60825-1:2014 Class 1 eye safe

FDA US 21CFR1040 Notice 56 Class 1

EMC:

FCC 47CFR Part 15, Subpart B, Class A and Class B

EU

Laser Safety:

IEC/EN 60825-1: 2014 Class 1 eye safe

Product Safety:

EN/IEC 62368-1*

EMC Class A and Class B

EN 55032

EN 55035 // IEC 61000-4-(2,3,4,5,6)

KOREA

EMC

KS C 9832:2023 *

KS C 9835:2019 *

AUSTRALIA

EMC

CISPR 35

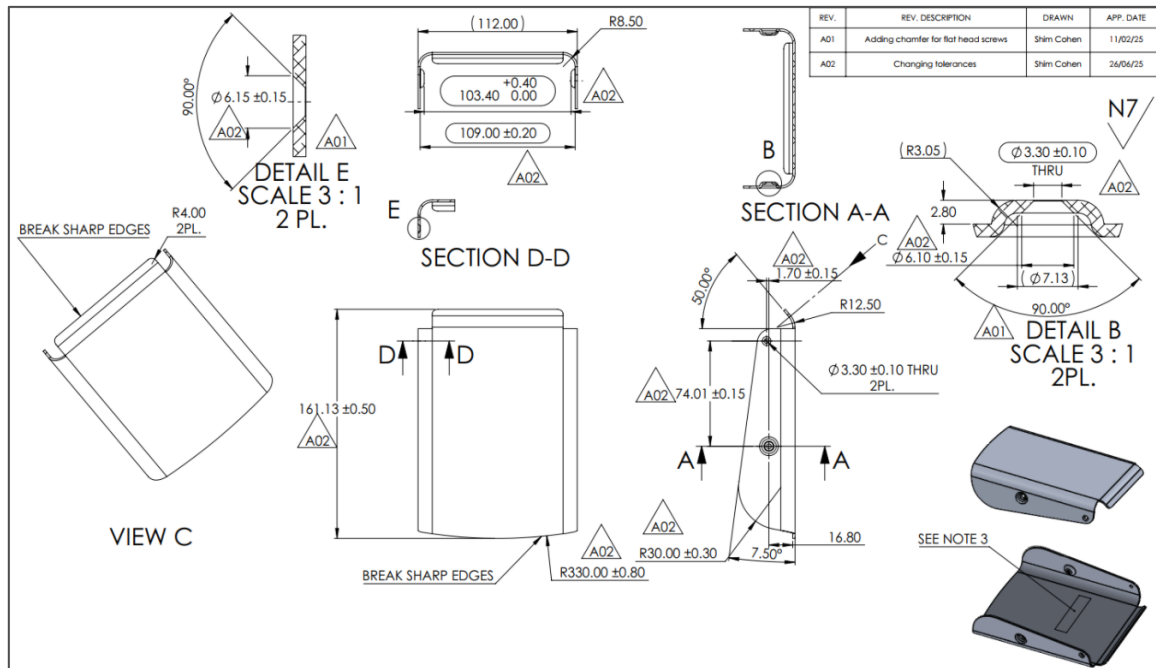
Product Safety:

AS/NZS 62368.1

3. Accessories

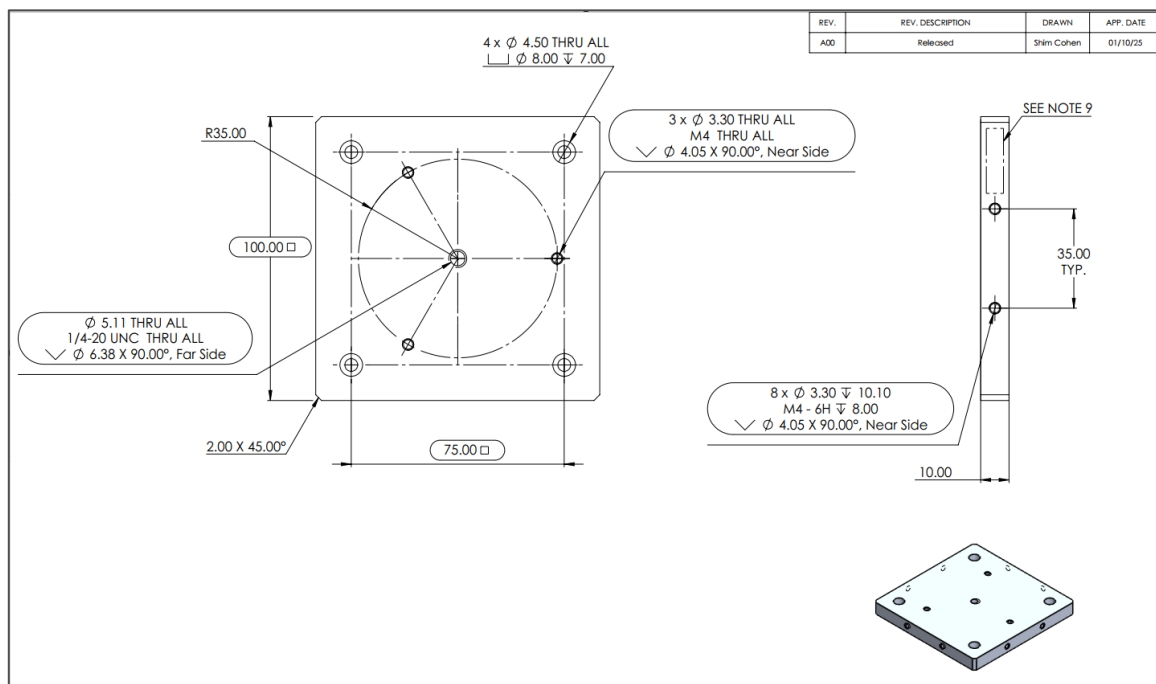
3.1. Sunshield

The sunshield cover is specifically made to reduce sun exposure to the ALTOS sensor. It blocks direct sun to the optical part, as well as reducing the thermal sun exposure. It also helps reducing raindrops on the glass.



3.2. Mounting Plate Adapter

An optional mounting plate adapter is available. It connects to ALTOS with the VESA 75 holes and has the option mount the ALTOS onto a tripod using a standardized 1/4"-20 UNC tripod screw. It also includes 3 triangular positioned M4 mounting holes that can be used on different CCTV mounts.



3.3. Mounting bracket

Opsys does not sell or supply the ALTOS with a mounting bracket. The mounting hole configurations available support multiple standard mounts to be used. Below is an example of an off the shelf bracket that can be used as a reference.

The mounting hole configuration can be found in the mechanical drawing in Figure 2 above. The two M6 mounting holes, spaced 40.5mm apart, can be used with different off the shelf CCTV camera mounts. The adapter plate, 3.2 Mounting Plate Adapter, available for purchase as an optional accessory adds 3 triangular placed mounting holes that also supports multiple off the shelf brackets.

3.3.1. Mounting bracket with arm

The mounting bracket below can be used with the two M6 mounting holes, available on ALTOS. It includes tilt and swivel. Different pole and corner mounting accessories are available.

[Amazon link at time of writing the user manual](#)



4. Safety Instructions

4.1. Safety and Legal Notices

The ALTOS PoE sensor is designed and manufactured according to safety standards.
This is a Class 1 Laser product



Warnings:

- Invisible laser radiation, do not stare into beam
- Device case housing is an essential part. Do not open or remove the case.
- This product has no serviceable parts. Do not open this device for maintenance.

Complies with 21 CFR 1040.10 and 1040.11
except for conformance with IEC 60825-1
Ed. 3., as described in Laser Notice No. 56,
dated May 8



Figure 3: Class 1 Laser Product



Figure 4: Laser irradiation symbol.

4.1.1. Cautions

- The ALTOS PoE sensor is a hermetically sealed unit and is non-user serviceable.
- Use of controls, adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Use of the ALTOS PoE sensor is subject to the Terms of Sale that you agreed to and signed with Opsys Technologies or your distributor/integrator. Included in these terms are the prohibitions of:
 - Removing or otherwise opening the sensor housing
 - Inspecting the internals of the sensor
 - Reverse-engineering any part of the sensor
 - Permitting any third party to do any of the foregoing
- Operating the sensor outside the specified thermal limits runs the risk of damaging the sensor.
- The ALTOS PoE features a modular sunshield design to enable more flexible mounting and integration solutions for the sensor.
- If you wish to operate the sensor with a custom mounting solution, please contact our Field Application Team, and we can answer your questions and provide guidance for achieving proper operations.
- This product emits Class 1 invisible laser radiation. The entire window is considered to be the laser aperture. While Class 1 lasers are considered “eye-safe,” avoid prolonged direct viewing of the laser and do not use optical instruments to view the laser.
- When operated at an ambient temperature > 40°C, the metallic surfaces of the sensor may be hot enough to cause potential skin burns. Avoid skin contact with the sensor’s base, lid, and heatsink when the sensor is operated under these conditions. The sensor should not be used in an ambient temperature above 65°C. The maximum safety-certified ambient operating temperature is 65°C.

4.1.2. Equipment Label

Equipment Label: Includes model and serial number and a notice that states the unit is a Class 1 Laser Product, which is affixed on the base extension. It is only visible after the attached mount with which the sensor is shipped is removed. Please refer to the figure Sensor Components (Mechanical Drawings) in the Mechanical Specifications section for location details.

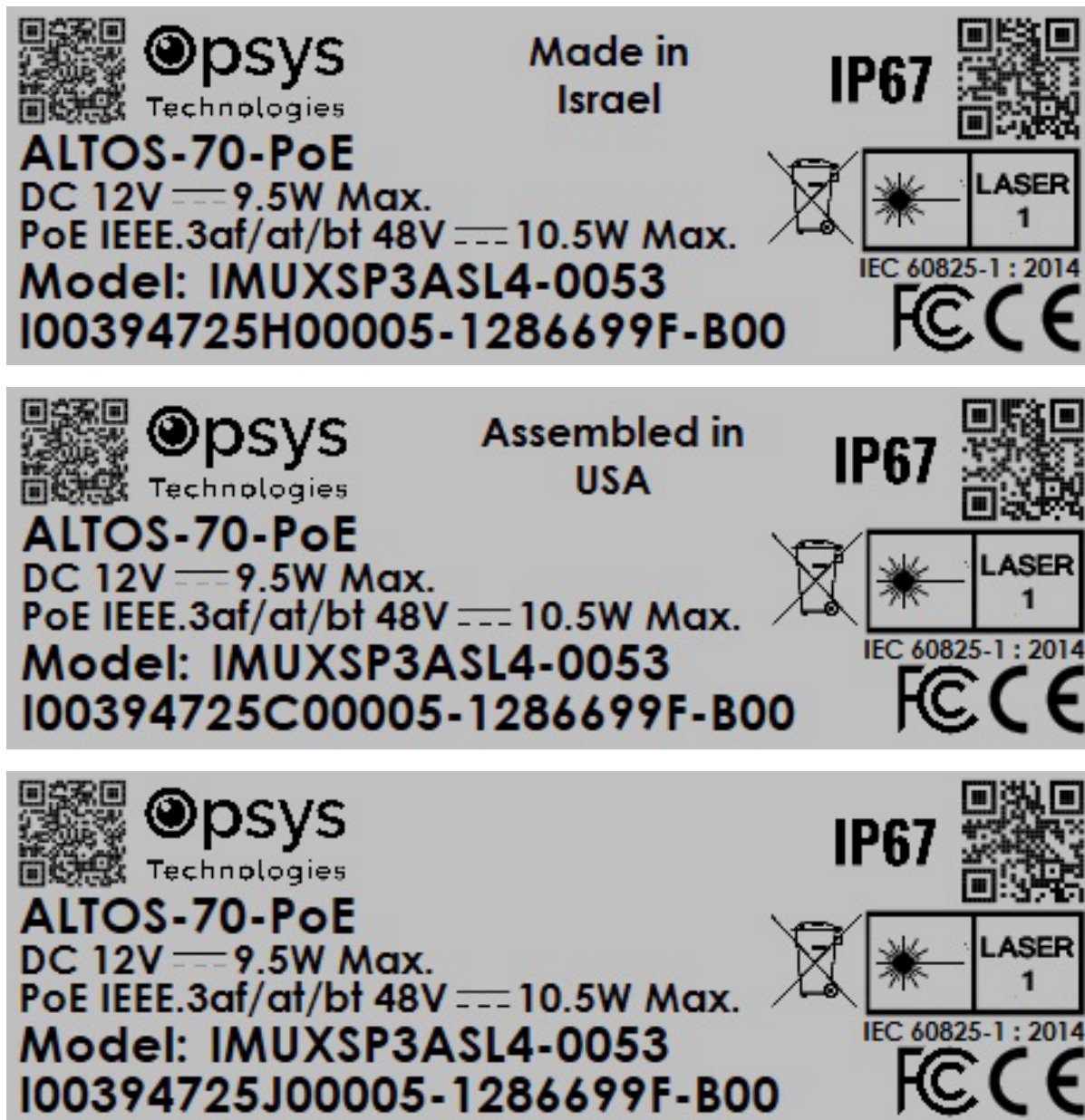


Figure 5: ALTOS PoE Equipment Label

4.1.3. Electromagnetic Compatibility

The ALTOS PoE sensor is an FCC 47 CFR 15 Subpart B device. This device complies with part 15 of the FCC Rules. Operation is subject to the following 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.

4.2. Graphical Symbols on label

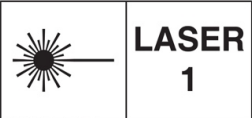
Symbol	Meaning
	The CE Marking on the product is the manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety, and environmental protection legislation.
	The symbol on the product, the accessories, or the packaging indicates that this device must not be treated as unsorted municipal waste but must be collected separately.
	The FCC marking is the manufacturer's declaration that the product complies with the essential requirements of the relevant Federal Communications Commission.
	The Laser Class 1 symbol on the product is the manufacturer's declaration that the product has an eye safety level of Class 1.

Table 10: Packaging label information

4.3. Data Protection

- **Encryption:** Utilize robust encryption methods for data at rest and in transit. This ensures that even if data is intercepted or accessed without authorization, it remains unreadable and secure.
- **Access Controls:** Implement strict access controls to the sensor data. Only authorized personnel should have access to the data, and roles should be clearly defined and restricted based on necessity.
- **Regular Updates:** Keep the sensor's firmware and any associated software up to date with the latest security patches. Regular updates protect against vulnerabilities and ensure the highest level of security is maintained.
- **Data Minimization:** Collect only the data necessary for the sensor's intended function. Reducing the amount of data stored and processed minimizes the potential impact in the event of a data breach.
- **Monitoring and Response:** Establish a system for monitoring data access and handling incidents. Quick response to any unauthorized access or data breaches is vital for minimizing potential damage.
- **Compliance and Standards:** Ensure compliance with relevant data protection regulations and industry standards, adapting practices as necessary to meet these requirements.

5. Installation

5.1. How to Install the Product

Product installation is designed to be straightforward and can be performed by individuals without specialized skills. Follow these simple steps for a safe and correct setup.

5.1.1. Removal of the Transport and Packaging Restraints

1. Carefully remove all packaging materials.
2. Detach any transport restraints securing the ALTOS PoE sensor.

5.1.2. Unpacking the Product

1. Gently remove the ALTOS PoE sensor from its packaging.
2. Verify all components against the packaging contents list.

5.1.3. Packaging Contents

- ALTOS PoE sensor unit
- POE connector
- Cap to seal the power connector when not in use
- Grounding terminal

5.1.4. Minimum Space Needed

Ensure a minimum clearance per the mounting holes' 50x50mm or 75x75mm VESA configuration. The ALTOS PoE can be installed at any height, keeping the maximum cable length (12m for external power supply, 100m for PoE) into account. The bending radius of the cables must be taking into account when installing the ALTOS PoE.

5.1.5. Installation of the ALTOS PoE Sensor

Mounting:

- The sensor can be mounted on any solid area to insure full capability
- Use a metal plate with good thermal interface
- Use M4 screws to connect the unit
- The ALTOS PoE can be mounted in different elements like drywall, poles and others.
 - The technical person should follow Opsys' assembly recommended screws and mounting element – VESA 50X50mm or VESA 75x75mm, M4 screws.
- 50x50mm or 75x75mm VESA mount.

Required tools:

- Ethernet cable when using PoE or ethernet cable + power cable compatible with the Binder 86 6321 1121 00404 connector
- 4x M4 screw (length depends on the VESA mount thickness. See below table for the calculation)

Screw length calculation:

Thread depth maximum	5mm
Washer thickness	0.6mm
Split spring thickness	0.9mm
Vesa mount thickness	4mm
Total length	10.5mm
Screw length	10mm
Screw thread insertion	4.5mm

Depending on the thickness of the washer, split spring and VESA mount, the length of the screw must be calculated. **Make sure the screw thread is inserted at least 4mm when calculating the screw length.**

To install the ALTOS PoE sensor:

Note: the installation pictures show a VESA 50x50mm mount. Installation is similar when using a VESA 75x75mm mount. Make sure to use the 4 VESA 75x75mm holes on the ALTOS PoE unit in this case.

1. Align the sensor with the 50x50mm VESA mount and secure it with the four M4 screws. Figure 6 below shows the location of the 4 mounting holes. It also shows the screw, washer and split spring, needed for the mounting of the ALTOS PoE. Note that one of the four mounting holes is not visible in the picture, it is indicated with the dotted arrow.
2. Connect the PoE cable or the ethernet and power cables.

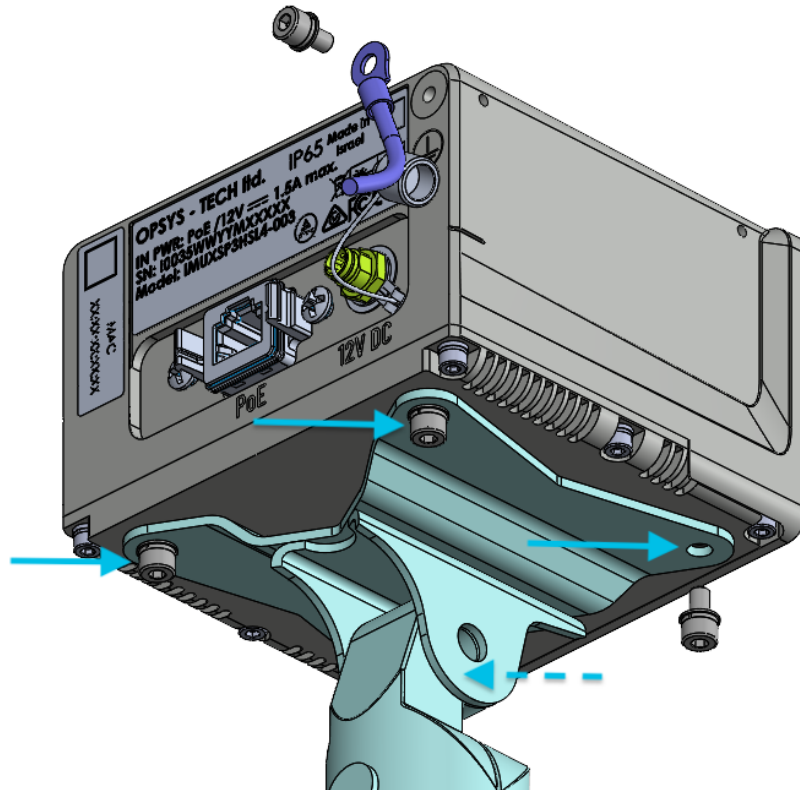


Figure 6: ALTOS PoE VESA mount screw locations

5.1.6. Electrical Installation

To install the ALTOS PoE sensor electrically:

1. Ground the sensor. The ground wire should be connected to the ground of the facility.



Trust only a certified electrician to perform grounding by following the local law at the country of installation.

2. When using the external power: connect to the power source, ensuring voltage is within the specified range.
When using PoE: connect the ethernet cable and make sure it is connected to a PoE compatible switch.
3. Follow safety protocols for electrical connections.

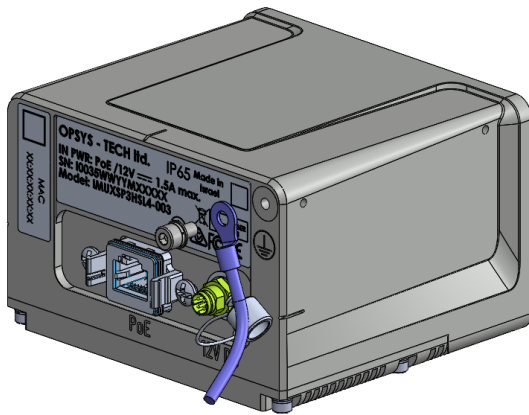


Figure 7: ALTOS PoE grounding connection

Grounding connection parts (inner to outer) are supplied with the unit

1. Ring terminal M4, 12AWG wire
2. Flat washer M4, 8mm outer diameter, 0.6mm thickness
3. Split spring washer M4, 7.6mm outer diameter, 0.9mm thickness
4. M4 screw, 8mm, hex head

5.1.7. Installation of Protective Features

Install any covers or shields as required for the sensor's operating environment.

5.2. How to Commission the ALTOS PoE Sensor

Before using the ALTOS PoE sensor, it is important to set it up properly. Follow the steps outlined to ensure the sensor is operational and ready for use.

Power on the sensor, ensure all connections are secure, and check for proper initialization and response.

6. Operation / Use

6.1. How to Use the ALTOS PoE Sensor

6.1.1. Operational Environment

The sensor is designed for long-term use both indoors and outdoors. Its durability is enhanced by not having any moving parts.

6.1.2. Starting/Stopping the ALTOS PoE Sensor's Operation

The sensor has three operating modes:

- **Power off:** The sensor is not operational.
- **Standby:** The sensor turns ON, performs internal routines, checks all elements, and waits for activation.
- **Operating:** The sensor is fully functional and up and running.

Checks before using the product:

- Before connecting the power, ensure that the front glass is undamaged.
- Ensure that electrical cables are in good condition.

6.2. Protection and Security

6.2.1. Data Protection

To protect stored data:

- All credentials, keys, tokens, and configuration parameters are encrypted at rest using industry-standard algorithms - no sensitive data is stored in plaintext or exposed via the file system.
- The sensor does not capture or store personally identifiable information (PII). The 2D intensity view can be disabled by an administrator for privacy-sensitive deployments; this setting persists across power cycles.
- All security-relevant events - including authentication attempts, configuration changes, firmware updates, and anomalies - are logged with timestamps. Logs are integrity-protected against tampering and accessible only to Admin users.

6.2.2. Preventing Unauthorized Access

To prevent unauthorized access:

- No factory-default passwords are shipped. On first boot, the device enters Secure Setup Mode, requiring creation of a unique admin password compliant with NIST SP 800-63B (minimum 8 characters, dictionary blacklist enforced, salted hash storage via Argon2/PBKDF2).
- Two predefined user roles (admin, user) enforce granular permissions across WebGUI, REST API, and MQTT interfaces. Users cannot elevate their own privileges; only Admins can manage accounts.
- Account lockout triggers after 5 failed login attempts within 60 seconds. Sessions auto-expire after ≤15 minutes of inactivity.
- All management and telemetry channels enforce TLS 1.2 or higher. Plaintext protocols (HTTP, Telnet, FTP) are disabled by default.
- Only essential network services are exposed (HTTPS/443, MQTT over TLS, ONVIF). All unused ports and services are disabled by default.
- All user-supplied inputs across WebGUI, REST API, MQTT, and configuration files are validated for type, range, and format. Out-of-spec values are rejected and replaced with safe defaults.

7. Troubleshooting and Repair

7.1. How to Identify and Solve Problems

Error	Cause	Solution
Broken glass	Accidental impacts or drops	Return the unit to the manufacturer for repair or replacement.
Bad power or data cable	Can result from wear and tear, improper handling, or environmental damage	Contact support for cable repair or replacement.

Table 11: Troubleshooting by non-skilled persons

7.2. Testing the ALTOS PoE Sensor

Run the following steps to confirm the sensor's operational efficiency.

To test if the sensor is functioning correctly:

1. Connect the sensor to a power supply and PC.
2. Once ready, move the unit to operating mode.
3. Measure performances against a flat wall.

7.3. Cleaning

It is recommended to clean the optical window of the ALTOS PoE with Isopropyl Alcohol (IPA) or an optics cleaning solution. Do not use any cleaning solutions containing ammonia.

8. Disposal

8.1. How to Recycle Parts

To recycle:

1. Check parts for recycling symbols and sort them accordingly.
2. Ensure all parts are clean and free of any hazardous materials or waste.
3. Take the recyclable parts to a local recycling facility or use a manufacturer take-back program if available.

8.2. How to Dispose the Product

To dispose of the product as a whole:

1. Keep the unit intact to ensure proper handling of all components by professionals.
2. Locate a certified electronic waste disposal facility or service in your area. Many regions have dedicated services for e-waste that ensure safe, environmentally friendly disposal.
3. Deliver the entire unit to the chosen facility or arrange for a pickup, if available. Ensure you receive documentation or certification of proper disposal, if applicable.

8.2.1. Disposal of Electronic Components

The symbol on the product, the accessories, or the packaging indicates that this device must not be treated as unsorted municipal waste but must be collected separately! Dispose of the device via a collection point for recycling waste electrical and electronic equipment if you live within the EU and in other European countries that operate separate collection systems for waste electrical and electronic equipment. By disposing of the device correctly, you help to avoid possible environmental and public health hazards that could otherwise be caused by improper treatment of waste equipment. The recycling of materials contributes to the conservation of natural resources. Therefore, do not dispose of your old electrical and electronic equipment with the unsorted municipal waste.

To dispose of electronic components:



1. Find a designated collection point for electronic waste in your area.
2. Wipe or destroy any data storage components to protect sensitive information.
3. Deliver the components to the collection point, ensuring they are accepted and processed correctly.

8.2.2. Disposal of Packaging Waste

The packaging is made of environmentally friendly materials, which may be disposed of through local recycling facilities. Disposing of the packaging and packaging waste properly helps avoid environmental and public health hazards. The symbol on the packaging indicates that the packaging is made of PAP.

To dispose of packaging waste:

1. Break down the packaging into its constituent materials - typically paper, cardboard, or plastic.
2. Ensure the packaging is empty, clean, and flattened for recycling.
3. Dispose of the packaging materials at a local recycling facility or through curbside recycling if available.

9. Supplied Accessories, Consumables and Spare Parts

For ordering accessories, consumables, and/or spare parts, please contact:

Opsys Technologies Ltd.
Harokmim 2
Holon
Israel
<http://www.opsys-tech.com>
Tel: +972-73- 3997800

10. Glossary

This glossary is intended to provide clarity and enhance your understanding of the specialized language pertaining to LiDAR technology and its applications.

Term	Description
Conformité Européenne (CE)	A mark that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area.
Electromagnetic Compatibility (EMC)	The ability of electrical equipment and systems to function acceptably in their electromagnetic environment, by limiting the unintentional generation, propagation, and reception of electromagnetic energy.
Ethernet	A family of computer networking technologies commonly used in local area networks, metropolitan area networks, and wide area networks.
Federal Communications Commission (FCC)	An independent agency of the United States government created to regulate interstate communications by radio, television, wire, satellite, and cable.
Field of View (FOV)	The extent of the observable world seen at any given moment by the sensor.
Ingress Protection (IP)	A rating system that classifies the degrees of protection provided against the intrusion of solid objects, dust, accidental contact, and water in electrical enclosures.
International Special Committee on Radio Interference (CISPR)	A part of the International Electrotechnical Commission (IEC) that deals with standards related to electromagnetic compatibility.
International Organization for Standardization (ISO)	An international standard-setting body composed of representatives from various national standards organizations.
Internet Protocol Version 4 (IPv4)	The fourth version of the Internet Protocol used to identify devices on a network through an addressing system.
Micro Flash Technology (MFT)	A technology used in LiDAR systems allowing for high-speed scanning of the environment.
Opsys SP3.0 Industrial LiDAR Sensor	A state-of-the-art sensing device that utilizes light to detect and map its surroundings in 3D.
PCAP	A file format used to store network packet data captured from a network interface
PoE	Power over Ethernet
Probability of Detection (POD)	The chance that the sensor successfully identifies and records an object within its range.
Pure Solid-State LiDAR	A LiDAR system without moving parts, utilizing electronic means for scanning.
Signal-to-Noise Ratio (SNR)	A measure used in science and engineering to quantify how much a signal has been corrupted by noise.
Single-Photon Avalanche Diode (SPAD)	A highly sensitive semiconductor photodiode that can detect single photons

Term	Description
Technischer Überwachungsverein (TUV)	A German organization that works to validate the safety of products of all kinds to protect humans and the environment against hazards.
User Datagram Protocol (UDP)	One of the core members of the Internet Protocol Suite, used with applications that do not require ordered data delivery.
Vertical-Cavity Surface-Emitting Laser (VCSEL)	A type of semiconductor laser diode with laser beam emission perpendicular from the top surface, contrary to conventional edge-emitting semiconductor lasers.

Table 12: Glossary

11. Abbreviations

The following table is a list of all abbreviations and meanings used in this document.

Term	Description
AWG	American Wire Gauge
CE	Conformité Européenne
CISPR	International Special Committee on Radio Interference
CSA	Canadian Standards Association
EMC	Electromagnetic Compatibility
FCC	Federal Communications Commission
FDA	Food and Drug Administration
FOV	Field of View
FPS	Frames per Second
Hz	Hertz
IPv4	Internet Protocol Version 4
ISO	International Organization for Standardization
LiDAR	Light Detection and Ranging
LCU	Lidar Control Unit
MFT	Micro Flash Technology
PCAP	Packet Capture
POD	Probability of Detection
ROI	Region of Interest
SNR	Signal-to-Noise Ratio
SPAD	Single-Photon Avalanche Diode
TRX	Opto-electronic base module
TUV	Technischer Überwachungsverein
UDP	User Datagram Protocol
VCSEL	Vertical-Cavity Surface-Emitting Laser
VESA	Video Electronics Standards Association

Table 13: Abbreviations

12. Appendix A – FCC Declaration of Conformity



FCC SUPPLIER'S DECLARATION OF CONFORMITY

(47 CFR Section 2.906)

We **OPSYS Technologies LTD.**

Hereby, declare that the above referenced product has been tested on samples according to FCC requirements and found compliant with the following standards: FCC Part 15 Subpart B, and acknowledges the corresponding test report in accordance with 47 CFR § 2.938 (b) (10).

1. Product info

Product Name ALTOS POE

Models No. IMUXSP3FWL4-XZY

Description Solid stated LiDAR sensor which delivers point cloud video to the main management system Computer Unit.

Intended use : Outdoor , Indoor , Industrial , commercial and residential environments

2. Applied Standard

Standards

Lab Report No.

E-CFR Title 47 Part 15 Subpart B—Unintentional Radiators

7412316191

3. FCC Caution.

✓ Class A device compliance statement (CFR Title 47 Part 15.105 a)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

✓ Class B device compliance statement (CFR Title 47 Part 15.105 b)

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

1 / 3



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.

4. Remark: This SDoc only for unintentional device compliance

Applicant's Authorization

Company name: **Opsys Tech Ltd**

Mailing Address: Campus Amot - 14th Floor

2 Harokmim St. Holon 5885825, Israel

Contact person (print name): RAFI HAREL

Signature:

Email address: info@opsys-tech.com

Tel: +972 52-2813733

אופסיס טק בע"מ
ח.ג. 515386001

Date: Jan 30, 2025

Responsible party in USA

Company name: **Opsys Tech Inc**

Mailing Address: Opsys Tech Inc.

697 E. Brokaw Road

San Jose, CA 95112

Contact person (print name): MARK DONOVAN

Signature:

Email address: mark.donovan@opsys-tech.com

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Date: February 3, 2025

13. Appendix B – CE Declaration



Declaration of Conformity

We, OPSYS Technologies LTD, located at:

Campus Amot - 14th Floor

2 Harokmim St. Holon 5885825, Israel

Hereby, declare under our sole responsibility that the products:

Product Name : Scanning Lidar ALTOS PoE
Model No. : IMUXSP3FWLV-XZY
 F- resolution: H-HH,L-LL,A-AA ;
 W - wavelength: S-905nm, F-940nm ;
 V - 4 – PoE (power over ethernet) -power supply addition to the regular power supply
 X - customer code
 Z – addition S/W : 0 – generic, 1 – ITS , 2 – perimeter , 3 – healthcare, 4 – ITS and integrator AI
 Y – window configuration: 0 – 4.5mm glass, 2 – plastic 1mm, 3- plastic 4.5mm
Description : Solid stated LiDAR sensor which delivers point cloud video to the main management system Computer Unit.
 Intended use : Outdoor , Indoor , Industrial , commercial and residential environments

to which this declaration relates are in conformity with the essential requirements and other relevant requirements of the following Directives:

EMC: Directive 2014/30/EU

LVD: Directive 2014/35/EU

Health and safety: Directive 2006/25/EC

ROHS: Directive 2011/65/EU

References to the relevant harmonized standards used

EMC:

EN 55032 Electromagnetic Emissions Compatibility of Multimedia Equipment
 EN 55032 RE multimedia equipment EN
 61000-3-2 CI Power line current mode.
 EN 61000-3-3 CI Power Line voltage mode.
EN 55035 Electromagnetic Immunity Compatibility of Multimedia Equipment.
 EN 61000-4-2 ESD, Electrostatic discharge immunity.
 EN 61000-4-3 RI, Radiated electromagnetic field immunity.

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- EN 61000-4-4 TI, fast transient/burst immunity.
- EN 61000-4-5 Surge immunity.
- EN 61000-4-6 Conducted disturbances immunity.
- EN 61000-4-8 Magnetic Field immunity.

LVD:

- EN 62368-1** Safety Requirements for Audio/Video and communication Equipment.

Health and safety:

- IEC 60825-1** Safety of laser products

ROHS:

- IEC 62321-3-5-6-7-8** Determination of certain substances in electrotechnical products

Name of responsible details

Rafi Harel – CEO

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Signature :

Date: July 22, 2025