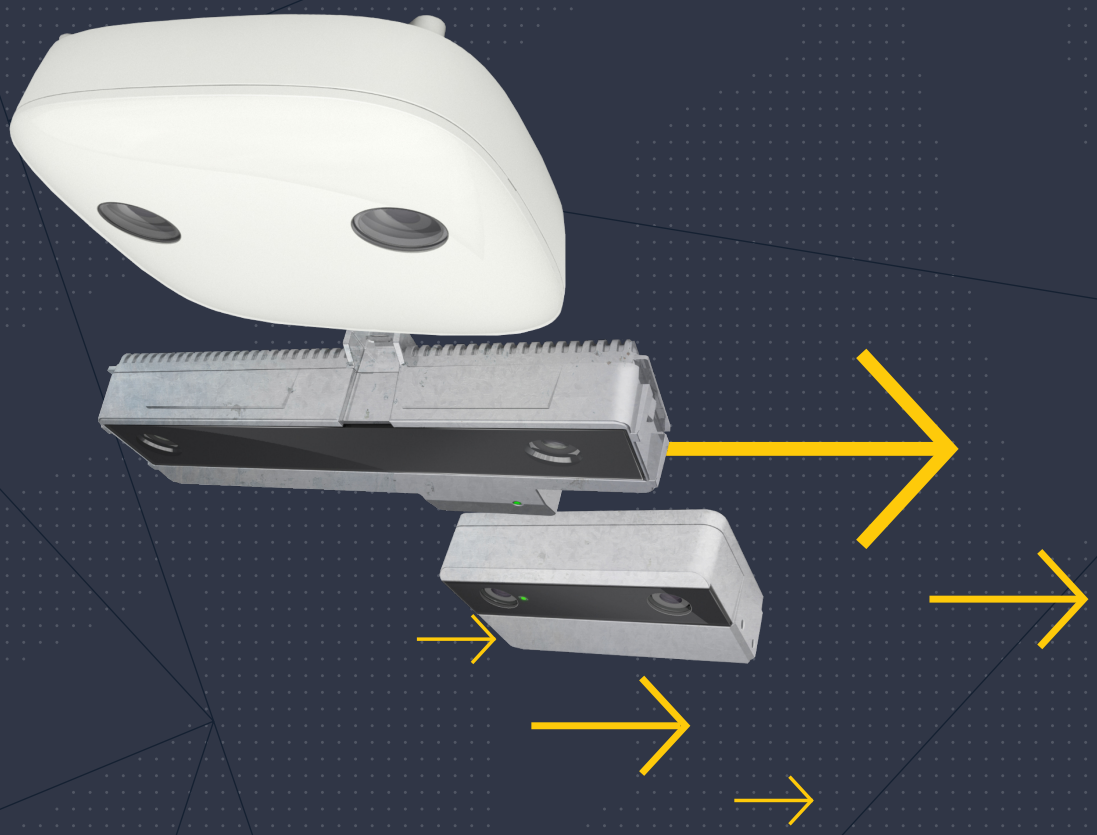
Version 1.19.0

ADVANCED PEOPLE SENSOR

APS-90, APS-180 and APS-90-Outdoor-PoE

Installation and configuration manual



Installation and configuration manual (original)

HAGL-120-00077

HELLA Aglaia People Sensing Technologies
people-sensing.com

Hella Aglaia

HELLA Aglaia Mobile Vision GmbH
Ullsteinstraße 140
12109 Berlin
Germany

phone: +49 30 2000429-0
fax: +49 30 2000429-109
email: support@people-sensing.com
www.people-sensing.com

Supplemental directives

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Table of contents

1 Overview

The Advanced People Sensor (APS) counts persons within the configured area/monitored area based on stereoscopic imaging and image processing. The counting data is stored internally and can be transferred via different interfaces for external processing.

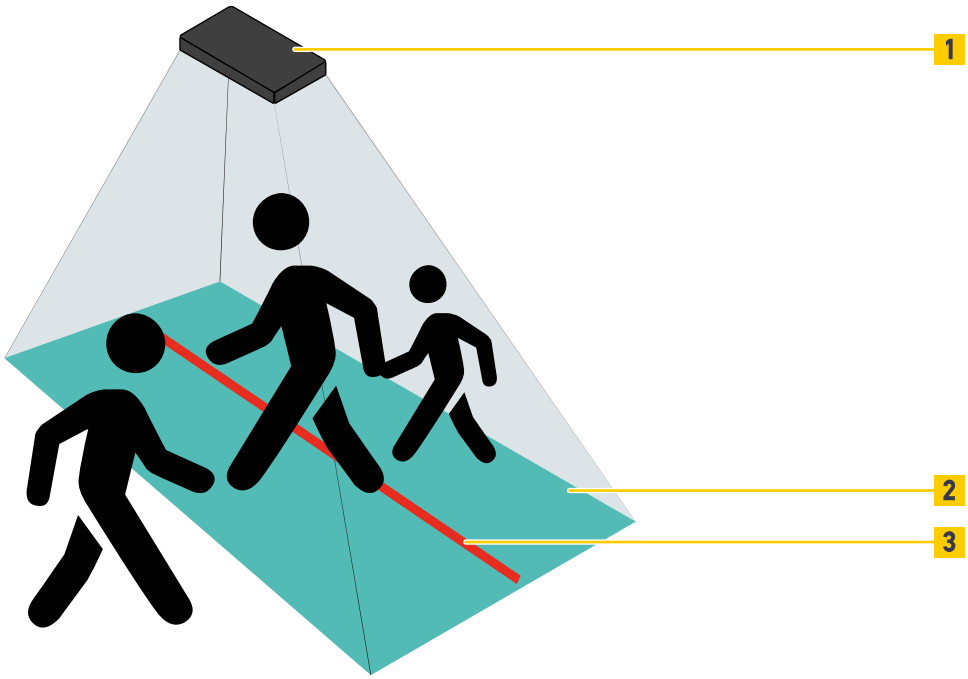

Fig. 1: People sensing

1	Advanced People Sensor (APS)	2	Configured area/monitored area
3	Counting line		

The results can be verified using video recording (optional). This enables a precise validation of the counting accuracy.

2 General information

2.1 About this document

This manual provides information for optimal configuration and efficient operation of the device.

Personnel must carefully read and fully understand this manual before performing any installation or configuration tasks.

The figures in this manual are for information only. Actual design may differ from illustrations.

Target group

This document is addressed to system integrators.

Software and hardware version

All information in this manual refers to firmware version 1.19.0 and hardware APS-90, APS-180 and APS-90-Outdoor-PoE.

Modifications to the functionality which will be implemented through future software updates will be described in separate release notes or in an updated version of the manual.

Notes

Notes and safety instructions are marked by symbols in this manual.

For safety instructions the relevant symbol and words indicate the severity of the danger.

NOTICE

This combination of symbol and signal word indicates a potentially dangerous situation, which can lead to property damage, data loss or misuse of the device if not avoided.

This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Symbols

+ A superscript plus-sign after a word indicates a glossary entry for this word. To view the glossary entry click on the plus-sign.

2.2 About the manufacturer

Service requests

Service requests regarding the device can be sent to the following e-mail address:

support@people-sensing.com

The general contact information is shown on page 2.

Warranty information

The warranty information is included in the general terms and conditions of HELLA Aglaia.

2.3 Limitation of liability

All the data and notes in this manual were compiled considering the applicable standards and regulations as well as the state of the art.

In the following cases HELLA Aglaia assumes no liability for damages:

- Non-compliance with this manual.
- Deviation from the intended use.
- Assignment of untrained personnel.
- Unauthorized technical changes.
- Use of unauthorized accessories.
- Opening the device.
- Damage or removal of the "DO NOT OPEN DEVICE" label.

For special models, use of additional order options, or current technical changes, the actual scope of delivery can deviate from the explanations and illustrations in this manual.

The obligations agreed upon in the delivery contract, General terms and conditions and delivery conditions of HELLA Aglaia as well as any legal regulations applicable at the time of the contract conclusion apply.

2.4 Scope of delivery

The standard scope of delivery for the Advanced People Sensor includes:

- The Advanced People Sensor.
- This operating manual as a digital version by download.

2.5 Use of the Advanced People Sensor

Intended use

The Advanced People Sensor is a sensor assembly, which must be integrated into other systems.

The Advanced People Sensor is intended for automatically counting persons in the configured monitored area.

The Advanced People Sensor is intended for detecting and monitoring persons in the configured monitored zone or detecting wireless devices in combination with a wireless USB adapter.

Proper and safe operation of the product requires appropriate transport, storage and installation as well as attentive operation and care.

The information in this manual must also fully comply with use to be deemed 'intended'.

Any use which deviates or exceeds the intended use is considered as 'misuse'.

Non intended use

The following list contains, but is not limited to, the following examples of non intended use:

- Use with unauthorized modified firmware.
- Opening the device or use without housing.
- Use in unsuitable environments (e.g. use outdoors if the Advanced People Sensor is not specified for outdoor operations).

2.6 Privacy of data statement

It should be noted that the APS can be used as a camera, and that it is possible to record and store video data. Under certain conditions it may also be possible to identify a person.

The standard scope of delivery is no live view, therefore people are usually not visible.

The user must establish in advance whether there are legal requirements or privacy regulations applicable when using the people sensor. Appropriate measures should be taken to prevent unauthorized access to the unit.

To prevent unauthorized access to the unit, change the password for full access (linktarget doesn't exist but @y.link.required='true'). Also change the password for service access via linux ssh.

Changing linux passwords

```
APS9029B6 login: root
Password: counter
~ # passwd customer
Changing password for customer
New password: new123password
Retype password: new123password
passwd: password for customer changed by root
~ # passwd hagl
Changing password for hagl
New password: new987password
Retype password: new987password
passwd: password for hagl changed by root
~ # passwd root
Changing password for root
New password: new678password
Retype password: new678password
passwd: password for root changed by root
~ # reboot
~ #
```

3 Technical data

3.1 Mechanical data

3.1.1 APS-90

Category	Description
Dimensions	159.5 mm x 159.5 mm x 41.4 mm (6.3 in x 6.3 in x 1.7 in)
Weight	430 g (14 oz)
Material	Plastic & Aluminum (ADC12)

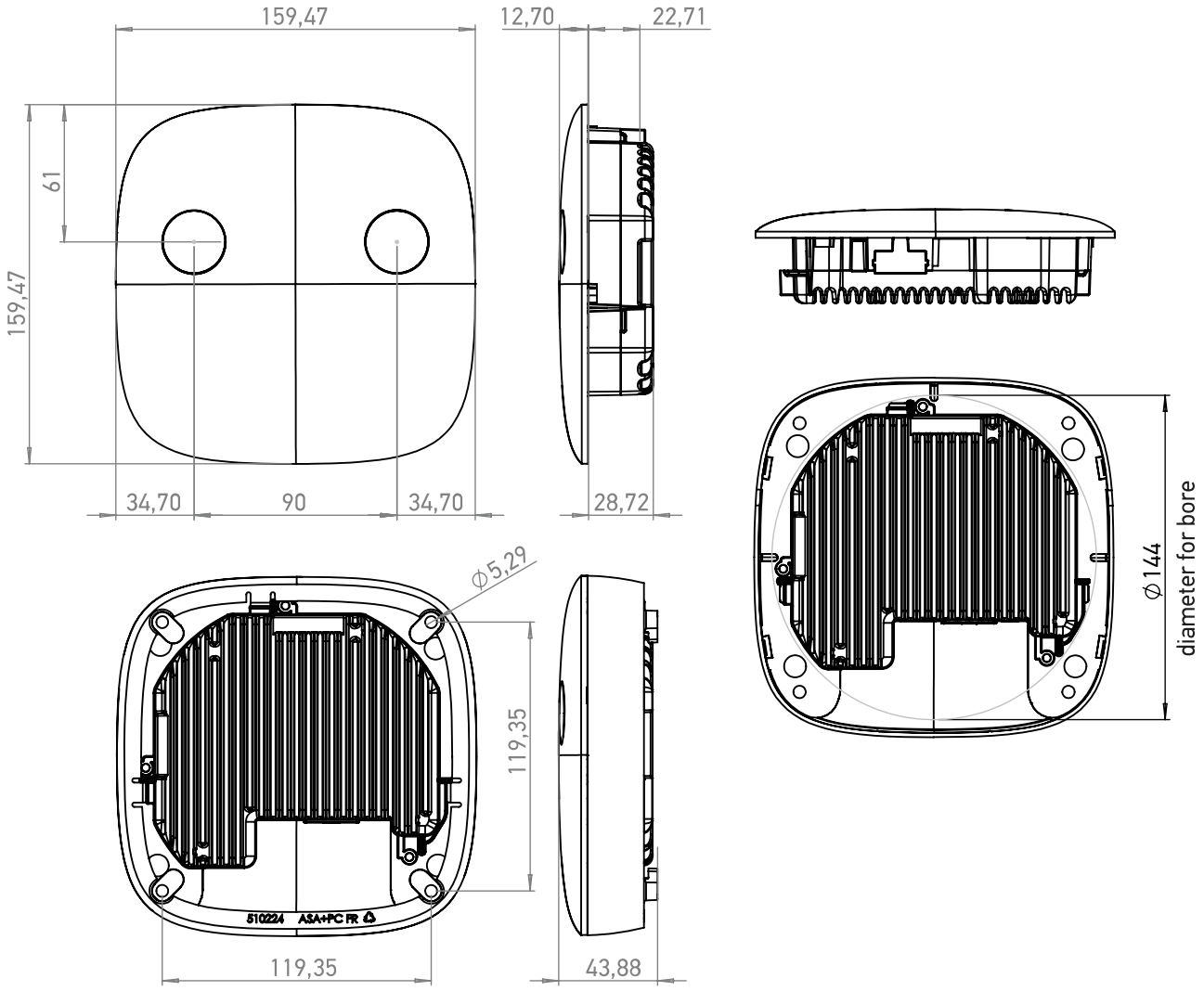

Fig. 2: APS-90 dimensions

3.1.2 APS-180

Category	Description
Dimensions	237.5 mm x 99.2 mm x 36.7 mm (9.3 in x 3.9 in x 1.5 in)
Weight	600 g (21 oz)
Material	Aluminum (ADC12)

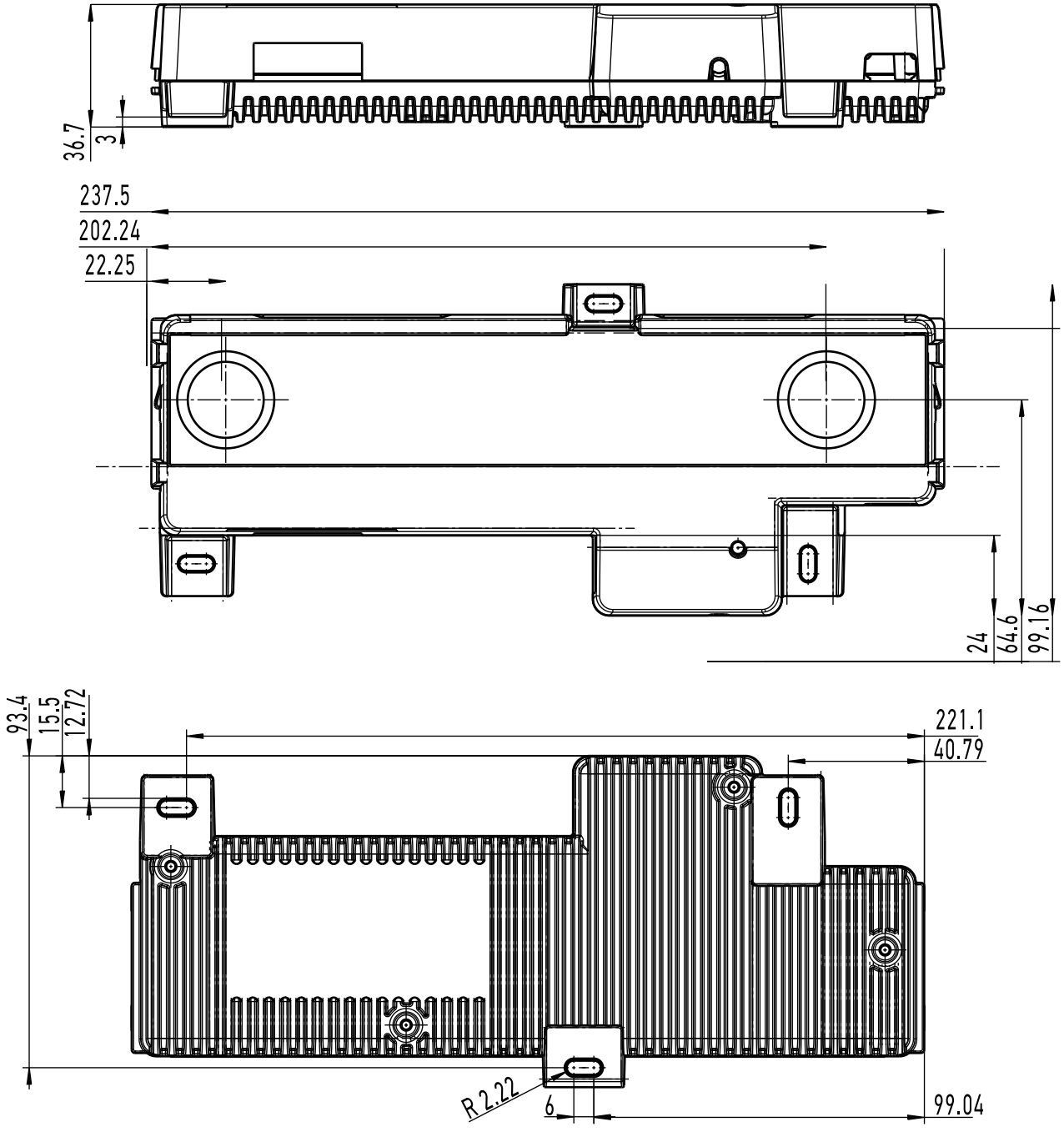

Fig. 3: APS-180 dimensions

3.1.3 APS-90-Outdoor-PoE

Category	Description
Dimensions	140.8 mm x 98.2 mm x 35.0 mm (5.54 in x 3.87 in x 1.38 in)
Weight	440 g (15.17 oz)
Material	Aluminum (ADC12)

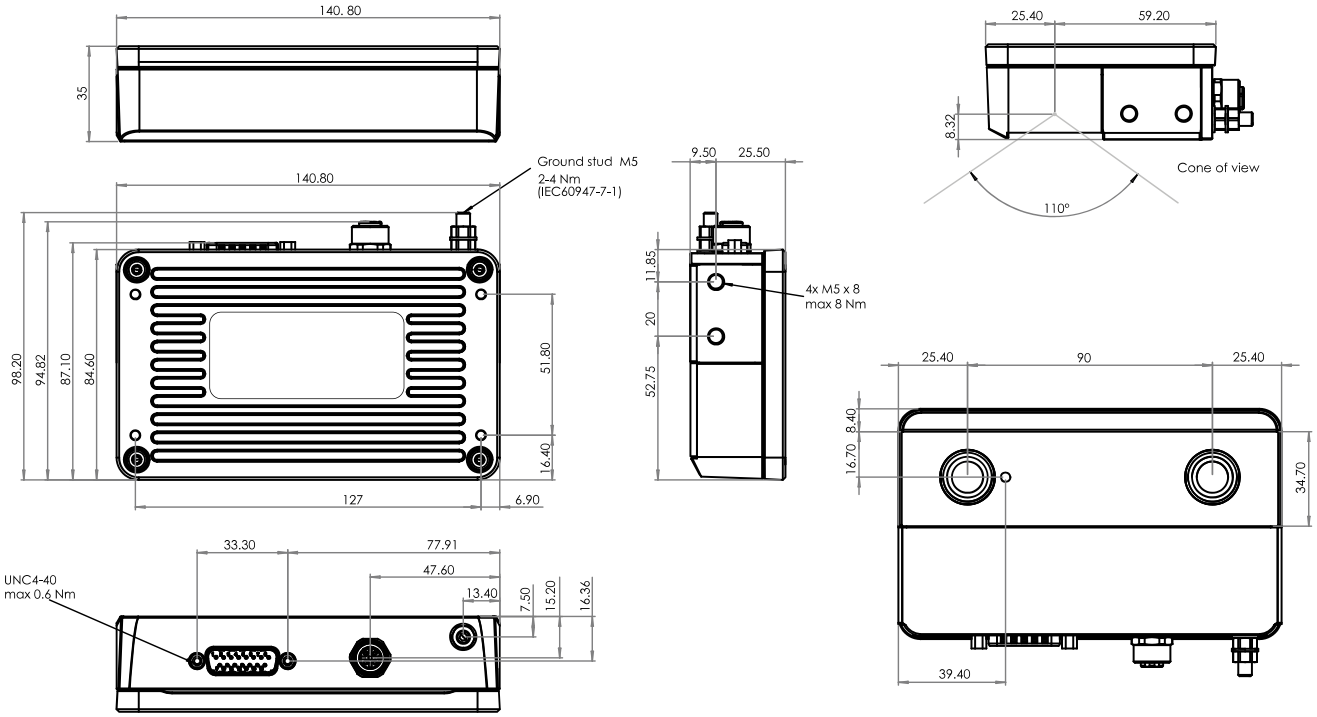

Fig. 4: APS-90-Outdoor-PoE dimensions

3.2 Hardware interface specifications

3.2.1 Ethernet

3.2.1.1 APS-90 and APS-180

Characteristics

Gigabit Ethernet with twisted pair cables, known as 1000BASE-T, IEEE 802.3 Clause 40 (earlier known as IEEE 802.3ab).

This is used in combination with Power over Ethernet (PoE) known as IEEE 802.3af (802.3at Type 1). The used power level class is 0 (0 - 4 mA, 0.44 - 12.96 W). This will also fit in the case of an optional connected USB device. The APS itself take only 6 W (power level class 2).

This Gigabit Ethernet interface serves for the communication of the APS with other devices within an Ethernet network. The interface is also used for connecting a PC in order to configure the device.

Pin allocation on device

Fig. 5: RJ-45 Ethernet interface (arrow "A": optics orientation)

Pin no.	Name	Ethernet	PoE mode A	PoE mode B
1	TxRx A +	Transmit/Receive A (positive polarity)	DC +	
2	TxRx A –	Transmit/Receive A (negative polarity)	DC +	
3	TxRx B +	Transmit/Receive B (positive polarity)	DC –	
4	TxRx C +	Transmit/Receive C (positive polarity)		DC +
5	TxRx C –	Transmit/Receive C (negative polarity)		DC +
6	TxRx B –	Transmit/Receive B (negative polarity)	DC –	
7	TxRx D +	Transmit/Receive D (positive polarity)		DC –
8	TxRx D –	Transmit/Receive D (negative polarity)		DC –

Compatibility of APS-90, APS-180 and PoE switches

		APS-90, APS-180
		Port RJ45
PoE Switch	Port M12 D-coded (4pins)	✓
	Port M12 X-coded (8pins)	✓
	Port RJ45 "Mode A", "Midspan", "Phantom Feed"	✓
	Port RJ45 "Mode B", "Endspan", "Spare wire feed"	✓

3.2.1.2 APS-90-Outdoor-PoE

Characteristics

This interface serves for the communication of the device with other devices within an Ethernet network. The interface is also used for connecting a PC in order to configure the device.

Pin allocation on device

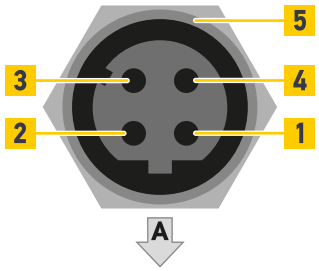

Fig. 6: M12 Ethernet interface ("A": optics orientation)

Pin no.	Name	Description
1	TD+	Transmit data +
2	RD+	Receive data +
3	TD-	Transmit data -
4	RD-	Receive data -
5	SHD	Shield

Compatibility of APS-90-Outdoor-PoE and PoE switches

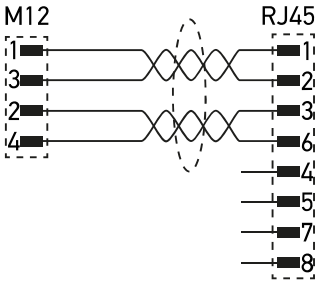

Fig. 7: Ethernet Cable M12 to RJ45

		APS-90-Outdoor-PoE
		Port M12 D-coded (4 pins)
PoE Switch	Port M12 D-coded (4pins)	✓
	Port M12 X-coded (8pins)	✗
	Port RJ45 "Mode A", "Midspan", "Phantom Feed"	✓
	Port RJ45 "Mode B", "Endspan", "Spare wire feed"	✗

3.2.2 I/O Port

3.2.2.1 APS-90E-IO and APS-90-IO

Pin allocation on device

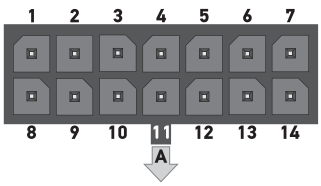

Fig. 8: 14pin I/O interface (arrow "A": optics orientation)

Pin no.	Name	Description
1	PWRIN+	DC voltage supply + (alternative to PoE, 18 ... 29 V)
2	IN1+	Programmable input +
3	IN2+	Programmable input +
4	IN3+	Programmable input +
5	OUT1+	Programmable output +
6	OUT2+	Programmable output +
7	OUT3+	Programmable output +

Pin no.	Name	Description
8	PWRIN-	DC voltage supply - (alternative to PoE, 18 ... 29 V)
9	IN1-	Programmable input -
10	IN2-	Programmable input -
11	IN3-	Programmable input -
12	OUT1-	Programmable output -
13	OUT2-	Programmable output -
14	OUT3-	Programmable output -

	Description	Example
Connector	Micro-Fit 3.0 Receptacle Housing, Dual Row, 14 Circuits, UL 94V-0, Black	Molex: 430251400
Crimp terminal	Micro-Fit 3.0 Crimp Terminal, Female, with Tin (Sn) Plated Phosphor Bronze Contact, 20-24 AWG, Reel	Molex: 430300001
Crimp tool	Hand Crimp Tool	Molex: 638190000

3.2.2.2 APS-180E-IO and APS-180-IO

Pin allocation on device

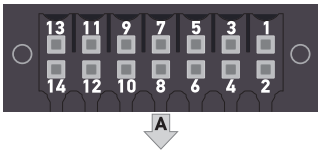

Fig. 9: 14pin I/O interface (arrow "A": optics orientation)

Pin no.	Name	Description
1	OUT3-	Programmable output -
2	OUT3+	Programmable output +
3	OUT2-	Programmable output -
4	OUT2+	Programmable output +
5	OUT1-	Programmable output -
6	OUT1+	Programmable output +
7	IN3-	Programmable input -
8	IN3+	Programmable input +
9	IN2-	Programmable input -

Pin no.	Name	Description
10	IN2+	Programmable input +
11	IN1-	Programmable input -
12	IN1+	Programmable input +
13	PWRIN-	DC voltage supply - (alternative to PoE, 18 ... 29 V)
14	PWRIN+	DC voltage supply + (alternative to PoE, 18 ... 29 V)

	Description	Example
Connector	PCB plug-in connector, female plug, 3.50 mm, No. of poles: 14, 180°, PUSH IN, Tension-clamp connection, Clamping range, max. : 1.5 mm², Box	Weidmüller: 1277520000 B2CF 3.50/14/180 SN BK BX

3.2.2.3 APS-90-Outdoor-PoE

Pin allocation on device

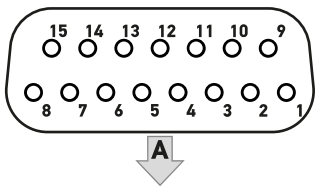

Fig. 10: D-SUB I/O Interface ("A": optics orientation)

Pin no.	Name	Description
1	Reset	Reset Pin (leave open, only required for corrective maintenance)
2	OUT1 +	Programmable output +, potential-free
3	IN1 +	Programmable input +, potential-free
4	IN2 +	Programmable input +, potential-free
5	DID4 A	Code jumper 4 (DID = "Door Identification")
6	DID3 A	Code jumper 3
7	DID2 A	Code jumper 2
8	DID1 A	Code jumper 1
9	OUT1 -	Programmable output -, potential-free
10	IN1 -	Programmable input -, potential-free

Pin no.	Name	Description
11	IN2 -	Programmable input -, potential-free
12	DID4 B	Code jumper 4
13	DID3 B	Code jumper 3
14	DID2 B	Code jumper 2
15	DID1 B	Code jumper 1

3.2.3 USB

Characteristics

This USB 2.0 interface (Hi-Speed, max. 480 MBit/s) is intended for connecting storage media and other devices.

Pin allocation on device

Fig. 11: USB interface (arrow "A": optics orientation for APS-180)

Pin no.	Name	Description
1	VCC	5 V, max. 500 mA
2	D-	Data -
3	D+	Data +
4	GND	Ground

3.3 Electrical data

Supply voltage

Category	Description
Input voltage U_{PoE} (PD class 0) via Ethernet	36 .. 57 V DC
Power consumption P_{IN} (without USB load)	6 W (125 mA at 48 V DC)

Ethernet

	APS-90 APS-180	APS-90-Outdoor-PoE
Transfer rate	100 / 1000 MBit/s	10 / 100 MBit/s
Cable length, maximum	100 m (328 ft)	
Connector type (APS/PC)	RJ-45	M12 D-coded, 4-pin, female

USB

	APS-90 APS-180	APS-90-Outdoor-PoE
USB type	USB 2.0 type host	-
Connector type (APS/PC)	Type-A	-

3.4 Optical data

Category	Description
Image resolution	640 x 480 px, color
Aperture	1.8
Focal length	2.6 mm (0.10 in)
Angle of view	110° diagonal 100° horizontal
Light sensitivity, minimum	3 lx, HDR

3.5 Environmental conditions

Category	APS-180E	APS-90 APS-180	APS-90-Outdoor-PoE
Operating temperature (ambient temperature housing)	-25 to 70 °C (-13 to 158 °F)	0 to 55 °C (32 to 131 °F)	-25 to 70 °C (-13 to 158 °F)
Storage temperature (when device is switched off)	-40 to 85 °C (-40 to 185 °F)		
Relative humidity (non-condensing)	0 .. 90%		95% .. 100% short-time maximum (relative)
Ingress protection (DIN IEC 60529)	IP40		IP65 in conjunction with appropriate mating connectors

Category	APS-180E	APS-90 APS-180	APS-90-Out-door-PoE
Illuminance, minimum	3 lx		

3.6 Product labels

Identification Label

Fig. 12: Identification label

The identification plate contains the following information:

1	Manufacturer name	2	Production country
3	Production date	4	Serial number / MAC address
5	Certification markings (e.g. CE)	6	Preinstalled licenses
7	Software / Firmware version	8	Hardware model
9	Part number	10	Product name (e.g. APS-180-IO-8GB)
11	Manufacturer logo		

Do Not Open Label

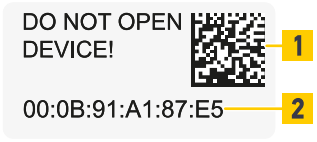

Fig. 13: Do Not Open Label

The small label with the warning "DO NOT OPEN DEVICE!" at the side of the device with data matrix code (Fig. 13 /1) provides the serial number/MAC address (Fig. 13 /2) and some production information in encoded form.

> ***Do not open***
>
> *Opening the device will void the warranty.*

After assembly, all devices are calibrated. Opening the device changes the assembly conditions so that the calibration is invalid.

During production it is possible that the lenses are positioned slightly off the center of the housing cutouts. This is intentional and does not influence the function or quality of the unit.

4 Cleaning, maintenance and trouble-shooting

4.1 Cleaning

Material:

Lint-free cloth

Commonly available neutral cleaners diluted with water

Optimal counting accuracy can be achieved only if the view of the cameras is not obstructed.

1. Check the lens cover plate or outside housing for dirt, scratches and stickers at regular intervals.

NOTICE

Reduced transparency by cleaning with solvents

Solvents can reduce the transparency of the lens cover plate.

– Do not use cleaning agents containing solvents (such as gasoline, acetone, petroleum and turpentine)

2. Clean the lens cover plate or the housing if necessary.

4.2 Maintenance

The device does not require any preventive maintenance.

4.3 Troubleshooting

First try to solve problems using the following table. Apply the measures listed here.

If the problem cannot be resolved or your problem is not listed, contact the support team. Service requests regarding the device can be sent to the following e-mail address:

support@people-sensing.com

Fault description	Cause	Remedy
Status LED lights permanently red	Fallback System is active.	Find out the IP address and connect to the device. Or reboot the device by power off/on.

Fault description	Cause	Remedy
Status LED blinks permanently yellow	Device is in DHCP mode and receives no IP address.	Check the DHCP server in the network.
Device has no connection to the master system	Power supply interrupted	Check power supply.
	Wrong or defective wiring	■ Check Ethernet cabling. ■ Check status LED of Ethernet switch. ■ Check status LED of the device after connecting with power. LED red on starting up for approx. 10 sec, blinking green during startup, blinking yellow while waiting for DHCP, LED green for approx. 6 sec and then off.
	Incorrectly configured network router	■ Check DHCP settings (if device uses DHCP). ■ Check DNS settings. ■ Check firewall settings.
	Unknown (after reboot)	■ Factory reset. ■ If necessary, replace the device.
Optical Self Diagnosis (OSD) status error	status: Covered	Check the optics condition. ■ Is there damage to the optics. ■ Are the optics covered e.g with stickers. ■ Is the camera view obstructed.
	status: Too dark	Weak illumination. Illuminate the scenery with at least 3 lx.
No counting results	Wrong configuration	Check in the user interface: ■ If counting lines are defined and correct in the passageways. ■ Counting lines are in the defined floor area. On both sides are at least 40 cm (1.31 ft) distance to the edge of the floor area.
Inaccurate counting results	Modified environment	Check in the user interface: ■ If counting lines are placed correctly. ■ If In/Out-direction is correctly set. ■ If static environment is masked correctly in floor area. ■ If obstructions are masked correctly.

Fault description	Cause	Remedy
		If checks are negative, reconfigure the device.
	Modified mounting position	Check in the user interface: ■ If the adjusted pitch and yaw angle still correspond to the values measured on the device. ■ If the applied height still corresponds to the value measured on the device. If the checked values differ, reconfigure the device.
	Dirty lens cover plate	Clean lens cover plate.

5 Disposal

After decommissioning, the product shall be recycled as electronic waste in an environmentally safe way. In the European Union, the WEEE Directive 2012/19/EU applies. HELLA Aglaia will recollect its own electronic products free of charge and take care of the further processing.

Decommissioned devices can be sent to the address:

HELLA Aglaia Mobile Vision GmbH
Ullsteinstraße 140
12109 Berlin
Germany

Please clearly mark the goods as **waste**.

6 Appendix

6.1 030001 CE Declaration of Conformity, 2, en_US

Hella Aglaia

CE

EU Konformitätserklärung / EU *Declaration of Conformity (DoC)*

Wir / *We,*

Hella Aglaia Mobile Vision GmbH

(Name des Herstellers / seines Vertreters | *manufacturer / authorised representative)*

Ullsteinstraße 140, 12109 Berlin, Deutschland

(Adresse | *address*)

erklären auf eigene Verantwortung, dass das Produkt /
declare under our own responsibility that the product

Automatic People Sensor; APS-90E, APS-90E-IO

(Produktbeschreibung; Modellnamen | *product description; model names*)

auf das sich diese Erklärung bezieht, die Anforderungen nach den folgenden Normen einhält:
to which this declaration refers complies with the following standards:

EMC ; EN 55024:2010,
EN 55032:2012+AC:2013
RoHS ; EN 50581:2012

(Richtlinie; Nummern : Ausgabedatum der referenzierten Dokumente | *directive, number: date of issue of the referenced documents*)

Gemäß den Bestimmungen von:
According to the requirements of:

2014/30/EU : Elektromagnetische Verträglichkeit - EMV Richtline | *Electromagnetic Compatibility (EMC) Directive*
2011/65/EU : RoHS Richtline | *Restriction of the use of certain Hazardous Substances (RoHS) Directive*

(falls zutreffend | *if applicable*)

Geschehen am:
Done on:

Berlin, 2017-11-22

verantwortliche Personen:
responsible persons:

Matthias Nerling
Head of Business Unit

Stefan Gliem
Head of Hardware development

Fig. 14: APS-90E CE declaration

Hella Aglaia

CE

EU Konformitätserklärung / EU *Declaration of Conformity (DoC)*

Wir / *We,*

Hella Aglaia Mobile Vision GmbH

(Name des Herstellers / seines Vertreters | *manufacturer / authorised representative)*

Ullsteinstraße 140, 12109 Berlin, Deutschland

(Adresse | *address*)

erklären auf eigene Verantwortung, dass das Produkt /
declare under our own responsibility that the product

Automatic People Sensor; APS-180E, APS-180E-IO

(Produktbeschreibung; Modellnamen | *product description; model names*)

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EMC ; EN 55024:2010,
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RoHS ; EN 50581:2012

(Richtlinie; Nummern : Ausgabedatum der referenzierten Dokumente | *directive; number: date of issue of the referenced documents)*

Gemäß den Bestimmungen von:
According to the requirements of:

2014/30/EU : Elektromagnetische Verträglichkeit - EMV Richtline | *Electromagnetic Compatibility (EMC) Directive*
2011/65/EU : RoHS Richtline | *Restriction of the use of certain Hazardous Substances (RoHS) Directive*

(falls zutreffend | *if applicable)*

Geschehen am:
Done on:

Berlin, 2017-11-22

verantwortliche Personen:
responsible persons:

Matthias Nerlin
Head of Business Unit

Stefan Grim
Head of Hardware development

Fig. 15: APS-180E CE declaration

6.2 Federal Communications Commission (FCC) Statement

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.

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example- use only shielded interface cables when connecting to computer or peripheral devices).

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

7 Glossary and abbreviations

APS	**A**dvanced **P**eople **S**ensor Second generation people sensor, successor of the APC.
DHCP	**D**ynamic **H**ost **C**onfiguration **P**rotocol Protocol and service dynamically distributing network configuration parameters, such as IP address and servers.
DNS	**D**omain **N**ame **S**ystem Resolves queries for FQDN host names into IP addresses
HAGL	**H**ELLA **Agl**aia
HDR	**H**igh-**D**ynamic-**R**ange imaging Technique used in imaging to reproduce a greater dynamic range of luminosity.
IEC	The **I**nternational **E**lectrotechnical **C**ommission is an international standards organization that prepares and publishes International Standards for all electrical, electronic and related technologies.
IP address	**I**nternet **P**rotocol address Manually or dynamically assigned in the network
MAC address	**M**edia **A**ccess **C**ontrol address Unique hardware address of a network device.
NAT	**N**etwork **A**ddress **T**ranslation Process of modifying IP address information during transit across a traffic routing device
OSD	**O**ptical **S**elf **D**iagnosis Software function for checking the visual range
PoE	**P**ower **o**ver **E**thernet Procedures for powering network devices over the eight-wire Ethernet cable
RAS	**R**emote **A**ccess **S**ervice Web service to remote access sensors
USB	**U**niversal **S**erial **B**us An industry standard that establishes specifications for cables, connectors and protocols for connection, communication and power supply between personal computers and their peripheral devices.

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CONTACT US

DRIVING SOFTWARE INNOVATION

HELLA Aglaia Mobile Vision GmbH
A member of the HELLA group
Ullsteinstraße 140
12109 Berlin / Germany

phone +49 (0) 30 2000 429-625
fax +49 (0) 30 2000 429-149
mail info@people-sensing.com
www.people-sensing.com