

# ACOUSTIC SIGNALLING DEVICES SAW-3000 ADDRESSABLE ACOUSTIC SIGNALLING DEVICES **SAW-3001/SAW-3006**

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POLON 3000 FIRE ALARM SYSTEM

## INSTALLATION AND MAINTENANCE MANUAL

IK-E394-001-GB

Change I



SAW-3001/SAW-3006 addressable acoustic signaling devices, the subject of this manual, meet the essential requirements of the following regulations of the European Parliament and Council (EU) as well as European Union directives:

- CPR** CPR/305/2011 Regulation (EU) no. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC;
- EMC** Directive 2004/108/WE relating to electromagnetic compatibility.

CNBOP-PIB, notified body No. 1438, issued for the products a certificate of constancy of performance, confirming the possession of technical features/parameters required by the standards EN 54-3: 2001 + A1: 2002 + A2: 2006 and EN 54-17: 2005.

The features/technical parameters above that exceed the requirements of the aforementioned standards and other features/parameters specified in this manual that are not specified in the mentioned standards are confirmed by the Manufacturer.

SAW-3001/SAW-3006 addressable acoustic signaling devices have received the Certificate of Acceptance, issued by CNBOP.

The Certificate, the Certificate of Acceptance, and the Declaration of Performance can be downloaded from [www.polon-alfa.com](http://www.polon-alfa.com).

The contents of this manual should be thoroughly read and understood before installation and operation of the device. Failure to follow the instructions included in this manual may be dangerous or result in the violation of applicable regulations.

As the manufacturer, **POLON-ALFA** is not liable for any damages resulting from the improper device operation that is not in accordance with this manual.



Used product at the end of its service life, unsuitable for further use, should be handed over to one of the collection points for electrical and electronic equipment waste.



**Note** – This manual as well as the device are subject to change without notice.

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Table of content

<b>1. Design</b> .....	<b>4</b>
<b>2. Technical data</b> .....	<b>5</b>
<b>3. Mechanical description</b> .....	<b>6</b>
<b>4. Operating instructions</b> .....	<b>7</b>
<b>5. Operating modes</b> .....	<b>8</b>
<b>6. Description of operation</b> .....	<b>10</b>
<b>7. Installation</b> .....	<b>11</b>
<b>8. Safety conditions</b> .....	<b>12</b>
8.1. Repair and maintenance .....	12
8.2. Work at height.....	12
8.3. Eye protection against dust.....	12
<b>9. Storage and Transport</b> .....	<b>13</b>
9.1. Storage .....	13
9.2. Transport .....	13

## 1. Design

Addressable version of SAW-3000 Acoustic Signaling Devices is available in two functional versions (that differs in sound function) marked as follows:

1. **SAW-3001** – Addressable Acoustic Tone signaling Device,
2. **SAW-3006** – Addressable Acoustic Voice Signaling Device.

SAW-3001/SAW-3006 addressable acoustic signaling device is a signaling element designed to work indoors. It is dedicated for addressable detection line/loop of POLON 3000 fire alarm control panel.

In order to work properly, two supply voltages are needed to be available at the same time:

- from a detection line,
- from a battery or external power supply.

The signaling device can perform synchronization between a group of elements, working in one acoustic space (POLON 3000). The level of emitted sound does not change regardless of how it is powered.

SAW-3001/SAW-3006 is a programmable element. Using a USB cable and a dedicated software it is possible to program acoustic sequences specific to the requirements of a specific facility and compliant with the requirements of the EN 54-3:2003 + A2:2007 standard.

The signaling device is equipped with a software-controlled short-circuit isolator.

## 2. Technical data

Detection line operating voltage	16.5 V ÷ 24.6 V
Current consumption from detection line	≤ 150 μA
Power supply operating voltage	9.6 V ÷ 30.0 V
Battery current consumption	≤ 150 mA
12V (9.6÷16.0V) – Power supply current consumption	≤ 100 mA
24V (16.0÷30.0V) – Power supply current consumption	≤ 50 mA
Battery life	Detection: 2 to 5 years (durability according to battery manufacturer) Minimum 3 hours of indication (alkaline battery 6LR61)
A-weighted sound level at a distance of 1 m	Up to 103 dB
Operating temperature	-25 °C <sup>1</sup> up to +55 °C
Housing tightness	IP 21C
Dimensions (w/o base)	Ø 115 mm x 59 mm
Weight (w/o base and battery)	0,2 kg
Colour	Red
Address encoding method	Programmable from the control panel
<sup>1</sup> For lithium battery or external power supply -25 °C, for alkaline battery -10 °C	

### 3. Mechanical description

The mechanical structure of the Acoustic Signaling Device is shown in Figure 3.1. The main part is a piezoelectric transducer used to generate acoustic signals. Metal mesh prevents insects and larger impurities from entering the signaling device. The element is located inside a red non-flammable plastic enclosure, which consists of a basket, a shield and a screen. Battery can be connected and installed at the bottom of the element.

SAW-3000 works with G-40S base to which detection line and external power supply cables are connected.

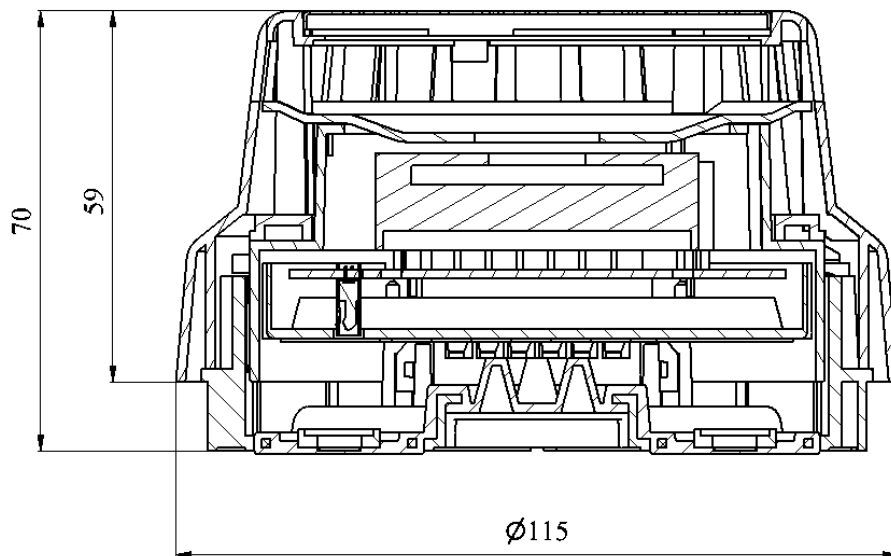


Figure 3.1 Mechanical structure of SAW-3000 signalling devices

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## 4. Operating instructions

The microprocessor controlling the operation of the signaling device constantly checks for the correct operation of basic systems and, in case of any irregularities, provides relevant information to the control panel.

The communication between POLON 3000 control panel and SAW-3001/SAW-3006 signaling devices is carried out via an addressable two-wire detection line. Unique, fully digital communication protocol enables transferring any information from the control panel to the signaling device and from the signaling device to the control panel.

The element monitors the efficiency of its power sources and in case of damage detection, it sends relevant information to the control panel. If battery power is declared at the control panel, the battery status is checked during monitoring and in case of battery depletion in the control panel, the battery fault and the need for battery replacement is indicated. If external power supply is declared at the control panel, in case of power failure it is indicated in the control panel.

The fault status, technical alarm, tripping of the short-circuit insulator, apart from indication at the control panel, is additionally indicated with flashing yellow LEDs located at the circumference of the signaling device.

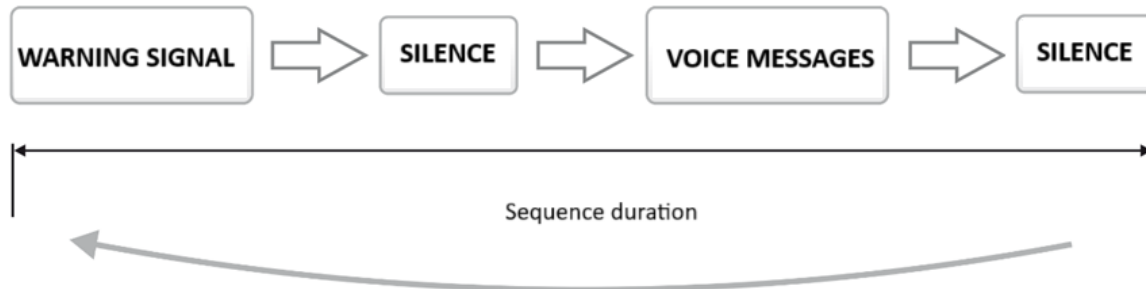
After entering the alarm state, SAW-3006 will replay the warning sequence selected during configuration in accordance with the operation mode, with cyclic flashing red LEDs while monitoring the acoustic synchronization state with other signaling devices in the POLON 3000 network. If the element detects a fault associated with the signaling part, red LEDs will start flashing in series. In emergency state, the signaling device can also start generating a default alarm signal.

If the detection line is damaged during the signaling process, the sound is still generated until the power source is not available or depleted.

The signaling device is equipped with an internal short-circuit isolator that separates the operational part of the detection line from the adjacent short-circuited part, which enables its undisturbed operation.

## 5. Operating modes

In its memory the newly acquired SAW-3006 signaling device stores some standard warning sequences (Appendix C) that consist of a warning signal and an optional voice message separated with periods of silence.



In case of SAW-3001 or SAW-3006 signaling device with no voice message set, the sequence consists of a warning signal only as periods of silence are not then used. Each warning sequence with a voice message in accordance with the requirements of EN 54-3:2003 + A2:2007 must meet the specified timing requirements that are shown in the table below:

Sound pattern	Permissible duration	Remarks
Warning signal (alarm siren)	2 – 10 s	Pattern available in SAW-3001 and SAW-3006 Voice message with silence is optional in SAW-3006, and not available in SAW-3001.
Silence	0.25 – 2 s	
Voice message	1 – 27.5 s	
Silence	0.25 – 5 s	

**"Warning sequence" structure according to the standard.**

The configuration of the signaling device should be started with selecting a warning sequence appropriate to the requirements of the facility where the signaling device is to be installed or, if standard warning sequences are insufficient, with creating and programming individual sequences with USB cable and dedicated software.

Each signaling device in the POLON 3000 system can be assigned a maximum of 4 group addresses, and one of the 16 programmed sequences for each of them. Each assigned group address denotes one output in the system.



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Each sequence can be selected with one of 3 volume levels:

- Level 3 – "nominal volume",
- Level 2 – "nominal volume –6 dB",
- Level 1 – "nominal volume –12 dB".

The current consumption of the signaling device depends on the warning sequence type, volume and power supply voltage. Guidelines for the determination of current consumption in a specific case are set out in Appendix A.

SAW-6001 signaling device does not provide capabilities for voice warning sequence programming. The sequence always consists of a warning signal only.

## 6. Description of operation

During operation of the signaling devices do not allow to form dew and rime on the surface of the element and protect it against excessive dust contamination.

**When carrying out any repair work, the signaling device must be removed or properly secured. If the signaling device is removed, the socket should be secured against painting with a painting tape. Elements damaged during painting and repair works by workers carrying out these works (e.g. signaling device enclosure painted, sealed with paint, etc.) are not subject to warranty.**

During operation, SAW-3000 signaling devices should be periodically inspected in accordance with CEN/TS 54-14:2018. The inspection is carried out in order to determine the proper operation of the element as well as its proper cooperation with the control panel. The inspection should be carried out at least every 6 months.

The signaling device is equipped with magnetic field sensor to enable testing the element communication with the control panel and check its location within the premises of the facility with a service kit. After placing the tester head on it, yellow LED starts flashing, which denotes correct communication with the control panel.

Functional test can be carried out with consecutive commissioning of the acoustic signaling devices from the control panel. Defective signaling devices should be handed over to the manufacturer (**PO-LON-ALFA S.A., ul. Glinki 155 , 85-861 Bydgoszcz**) for repair.

**Note** – Tampering with the signaling device by the user, the installer or the maintenance technician is not permitted!

Signaling devices can only be installed by an authorized installer.

## 7. Installation

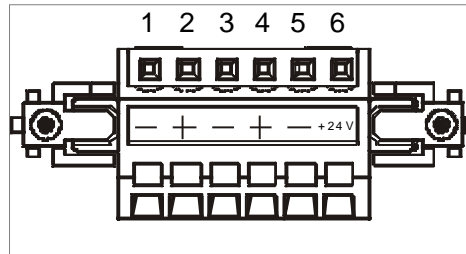
SAW-3000 signaling devices are installed (in terms of height, placement) according to design guidelines. They are to be installed in rooms where the source of fire should be indicated. The signaling devices can operate in loops, loops with side lines or in open detection lines of detection lines of POLON 3000 control panel. (See Operation and Maintenance Manual of POLON 3000 control panel.) They are installed in G-40S bases. Route the alarm system cables in accordance with the regulations applicable to low-voltage electrical installations (below 42 V). Cable connection to the base is almost the same as with 3000 series detectors, but the terminals of the operation indicator can be replaced with 12 or 24 VDC external power supply.

Recommended battery power supply in case of alkaline batteries is Duracell MN1604, Energizer EN22 or Energizer LA522 lithium battery. Replace alkaline battery no later than every 5 years, and lithium battery – every 10 years unless otherwise specified by the battery manufacturer.

When installing signaling devices in bases, battery connecting cables should always be hidden under the rear cover of the signaling device so that they are not cut off with the edge of the signaling device or crushed with an electric socket.

Designation of base terminals:

- "1" – detection line input ground
- "2" – +LD (detection line input)
- "3" – detection line output
- "4" – +LD (detection line output)
- "5" – power supply ground
- "6" – +24 V power supply



### Note:

Signaling devices should not be installed in rooms with corrosive atmosphere, containing corrosive gases, corrosive fumes or dust. Water vapor condensation is not permitted in case of acoustic signaling devices. In rooms where water vapor may condense on the room ceiling, the signaling devices must not be mounted on walls.

## 8. Safety conditions

### 8.1. Repair and maintenance

Maintenance and periodic inspections must be carried out by personnel that is authorized or trained by **POLON-ALFA**.

All repairs must be carried out by the manufacturer.

**POLON-ALFA** is not responsible for the operation of the equipment maintained and repaired by unauthorized personnel.

### 8.2. Work at height

Work at height related to the installation of signaling devices must be carried out with special care using equipment and tools in sound condition.

Please pay particular attention to the stability of ladders, elevators, hoists, jacks etc.

Power tools should be used in accordance with safe working conditions specified in relevant manufacturer's manuals.

### 8.3. Eye protection against dust

Protective goggles and dust masks should be worn during work that produces large amount of dust, especially when drilling holes in ceilings in order to fix enclosure bodies of signaling device bases.

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## 9. Storage and Transport

### 9.1. Storage

SAW-6006 signaling devices should be stored in closed rooms, with no corrosive fumes or gases, at the temperature range from 0°C to +40°C, with relative humidity not exceeding 80 % at the temperature of +35 °C.

A signaling device should not be exposed to direct sunlight or heat from heating equipment during storage.

Storage time of elements in the transport packaging should not exceed 6 months.

### 9.2. Transport

SAW-6000 signaling devices should be transported in closed spaces of transport vehicles, in a packaging corresponding to the requirements of the applicable transport regulations. Transport temperature should not fall below -40 °C or exceed +70 °C and the relative humidity should not exceed 95 % at +45 °C or 80 % at +70 °C.

## Appendix A (For information purposes)

Table 1 Typical values for the maximum volume of the signaling device for different warning signal patterns. Value expressed in [dBA].

	Alarm number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Nominal volume	93	98	98	97	94	98	94	97	101	103	103	99	102	94	97	103

\*volume level is independent of signaling device power supply voltage

Table 2 Maximum current consumption of the signaling device in alarm state at 12 V (9.6 V – 16.0 V) nominal power supply for different volume levels and warning signal patterns. Value expressed in [mA].

Alarm number	Power supply 12 V (9.6 V ÷ 16.0 V)			Power supply 24 V (16.0 V ÷ 30.0 V)		
	Volume -12 dB	Volume -6 dB	Nominal Volume	Volume -12 dB	Volume -6 dB	Nominal Volume
1	6,5	8	20	4	5,5	12
2	7	10	24,5	4	6	15
3	6,5	8,5	17	4	5	10
4	6,5	8,5	17	4	5	10
5	6,5	9	19,5	4	5,5	12
6	7	10	26	4,5	7	16
7	6,5	8,5	17,5	4	5	10
8	7	10	25,5	4	6	15
9	7,5	13,5	42	5	8	26
10	8,5	19	75,5	5,5	12	44
11	<b>9</b>	<b>22</b>	<b>100</b>	<b>6</b>	<b>14</b>	<b>50</b>
12	7,5	12	43	4,5	8	24
13	7	10,5	30	4,5	6,5	17
14	6,5	8,5	15,5	4	5	9
15	7	9,5	22,5	4	5,5	13
16	7	10,5	30	4,5	6,5	17

\* If the signaling device emits a warning signal only (with no voice message), e.g. SAW-6001, maximum signaling device current can be read directly from the above table, taking supply voltage into account.

\*\* If the signaling device emits one of the standard programmed warning sequences, Appendix B may be used to determine the maximum current consumption.

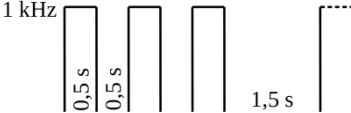
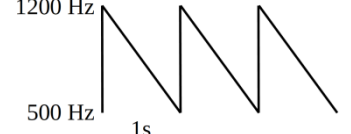
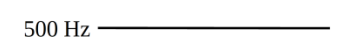
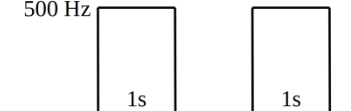

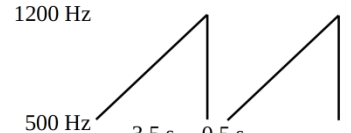

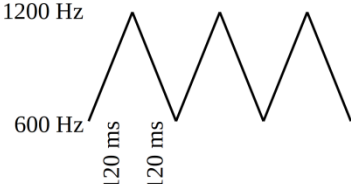
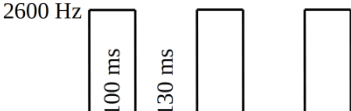
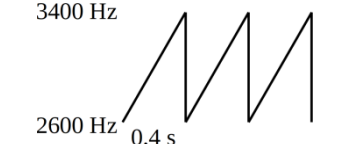
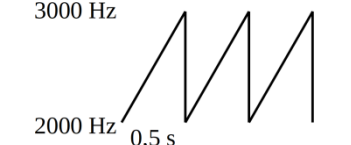
\*\*\* If the signaling device has been programmed with a non-standard voice message, maximum current consumption should be independently measured or the following values should be assumed:

- With nominal 12 V supply
  - 9.0 mA, when the signaling device operates at a nominal volume of –12 dB
  - 22.0 mA, when the signaling device operates at a nominal volume of –6 dB
  - 100.0 mA, when the signaling device operates at a nominal volume

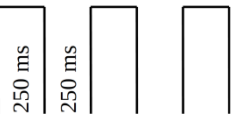
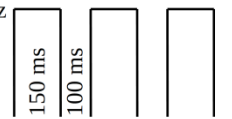


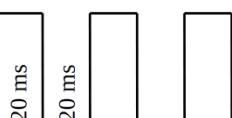
- With nominal 24 V supply
  - 6.0 mA, when the signaling device operates at a nominal volume of –12 dB
  - 14.0 mA, when the signaling device operates at a nominal volume of –6 dB
  - 50.0 mA, when the signaling device operates at a nominal volume

## Appendix B (for information purposes)

Table3. Standard alarm sequences

Nr	Sound pattern	Sound level according to PN-EN 54-3 for nominal volume	
1	Intermittent tone, Evacuation signal according to ISO 8201		> 93 dB
2	A "sawtooth" tone descending, unified alarm signal according to DIN 33404-3		> 98 dB
3	Fixed frequency, evacuation signal according to BS 5839-1		> 98 dB
4	Intermittent tone, alarm signal according to BS 5839-1		> 97 dB
5	Step change of frequency, evacuation signal according to NF S32-001		> 94 dB
6	A "sawtooth" tone rising, evacuation signal according to NEN 2575		> 98 dB
7	Intermittent tone, warning signal according to SS 03 17 11		> 94 dB
8	"Triangular" tone, the frequency increases and decreases cyclically, modified "DOG MODULATION"		> 97 dB
9	Intermittent tone with a frequency of 2600 Hz		> 101 dB
10	A rising "sawtooth" tone		> 103 dB
11	A rising "sawtooth" tone		> 103 dB



12	Intermittent tone with a frequency of 2500 Hz	2500 Hz 	> 99 dB
13	Intermittent tone with a frequency of 3300 Hz	3300 Hz 	> 102 dB
14	"Telephone" tone	800 Hz 	> 94 dB
15	Tone with a constant frequency of 800 Hz	800 Hz 	> 97 dB
16	Pack of 13 pulses 20 ms/20 ms with a frequency of 2500 Hz, pause 0.5 sec	2500 Hz 	> 103 dB

## Appendix B (for information purposes)

Table 4 - Standard alarm sequences in English for the voice signaling device:

Sequence number	Alarm signal	Voice message content	Current consumption	Sound level according to EN 54-3 for nominal volume
1	Quick 2.6 kHz pulses every 0.13 s	"Attention, Attention! I declare a fire alarm. Follow the evacuation plan."	50 mA	>93 dB
2	Step frequency change between two 554/440 Hz tones every 0.5 s	"Attention, Attention! Fire has been detected in the building. Follow fire safety procedure."	50 mA	>87 dB
3	Frequency change up from 2.0 kHz to 3 kHz	none	50 mA	>96 dB

### NOTE

Sequences 4 – 16 are not programmed as standard in the signaling device memory and if they are set, the signaling device will emit an error signal (alarm number 1).



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