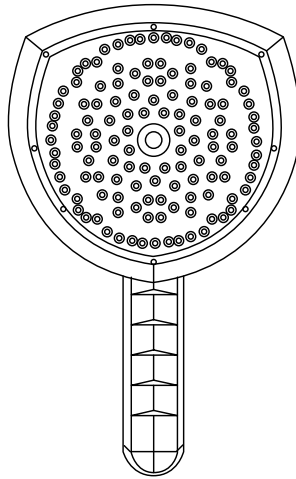




# SOUND DETECTOR USER MANUAL

PLEASE READ THIS MANUAL BEFORE SWITCHING THE UNIT ON.  
IMPORTANT SAFETY INFORMATION INSIDE.



ICI cameras fall under US Federal Law and Export Control.

## Revision History

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07.2022-001 Document created

## Contents

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<b>1. Disclaimers</b>	<b>6</b>
1-1 Terms and Conditions	6
1-2 U.S. Government Regulations	6
1-3 Copyright	6
1-4 Quality Assurance	6
1-5 Customer Help	6
<b>2. User Notice</b>	<b>7</b>
2-1 Calibration	7
2-2 Accuracy	7
2-3 Cybersecurity	7
2-4 Disposal of Electronic Waste	7
2-5 Intended Use	8
2-6 Manual Update	8
2-7 Scope of Application	8
2-8 Authoritative Versions	8
2-9 Training	9
<b>3. Safety Information</b>	<b>10</b>
<b>4. Technical Specifications</b>	<b>12</b>
<b>5. Package Includes</b>	<b>14</b>
5-1 Package 1: Battery Bay	14
5-2 Package 2: Battery Pack	15
<b>6. Structure</b>	<b>16</b>
6-1 Appearance and Definitions of Interface: Package 1	16
6-2 Appearance and Definitions of Interface: Package 2	17
<b>7. Quick Start Instructions</b>	<b>19</b>
7-1 Package 1	19
7-1-1 Set Up	19
7-1-2 Battery Installation	20
7-1-3 Charging Instructions: Battery	23
7-2 Package 2	25
7-2-1 Set Up	25
7-2-2 Charging Instructions: Battery Pack	27
7-2-3 Connect Battery Pack to the device	29
7-3 Memory	30
<b>8. Operation Instructions</b>	<b>31</b>
8-1 Charging Instructions	31
8-1-1 How to Charge the Battery	31
8-1-2 How to Charge the Battery Pack	32
8-1-2-1 Battery Pack Charge Gauge	33
8-2 Power On/Off the device	33
8-2-1 Package 1	33

8-2-2	Package 2 .....	34
<b>8-3</b>	<b>User Interface.....</b>	<b>35</b>
8-3-1	Device Setup Wizard.....	35
8-3-2	Open the main menu .....	35
8-3-3	Close the main menu.....	36
<b>8-4</b>	<b>Digital Zoom.....</b>	<b>36</b>
<b>8-5</b>	<b>Media Management.....</b>	<b>36</b>
8-5-1	Capture an Image .....	36
8-5-2	Record a Video .....	36
8-5-3	Add Annotations to Media .....	37
8-5-4	Review Media .....	37
8-5-5	Export Media .....	38
8-5-5-1	USB Drive .....	38
8-5-5-2	Direct Data Transfer.....	38
8-5-5-3	Cloud Storage.....	39
8-5-6	Delete Media .....	39
<b>8-6</b>	<b>Application Modes .....</b>	<b>39</b>
8-6-1	Switching Application Modes.....	40
8-6-2	Application Heatmaps .....	40
<b>8-7</b>	<b>Source Modes.....</b>	<b>41</b>
8-7-1	Switching Source Modes .....	41
<b>8-8</b>	<b>Real-time Acoustic Analysis .....</b>	<b>42</b>
8-8-1	Air Leak Detection .....	42
8-8-1-1	Filters for Air Leaks .....	42
8-8-1-2	Distance.....	43
8-8-1-3	Leak Unit .....	43
8-8-1-4	Currency.....	44
8-8-1-5	Energy Cost.....	45
8-8-1-5-1	Enable Energy Cost.....	45
8-8-1-5-2	Adjust Energy Cost .....	45
8-8-1-6	Ambient Temperature .....	46
8-8-1-6-1	Change Temperature Units .....	46
8-8-1-6-2	Adjust Ambient Temperature.....	46
8-8-1-7	Humidity.....	47
8-8-1-8	Leak Correction .....	47
8-8-1-9	Specific Power .....	48
8-8-2	Partial Discharge Detection .....	48
8-8-2-1	Filters for Partial Discharge .....	48
<b>8-9</b>	<b>Settings.....</b>	<b>49</b>
8-9-1	Distance Units.....	49
8-9-2	Time Settings .....	49
8-9-3	Display Brightness Settings.....	49
8-9-4	Connection Services .....	50

	8-9-4-1	Location Settings.....	50
	8-9-4-2	Device Registration.....	50
	8-9-4-3	Enable/Disable Wi-Fi Settings .....	51
	8-9-5	Language Settings.....	52
	8-9-6	Advanced Filter Settings.....	52
	8-9-7	Factory Reset the device .....	53
	8-9-8	Remove All Data.....	53
	8-9-9	Device Information.....	54
	8-9-10	Device Software Upgrade .....	54
	8-9-10-1	Remote Update .....	54
	8-9-10-2	Remote Update.....	54
<b>9.</b>	<b>Device Usage Techniques</b>		<b>55</b>
	9-1	General Usage.....	55
	9-2	Inspection Techniques.....	55
	9-2-1	Frequency Filters.....	55
	9-2-2	Weak and Strong Sounds .....	56
	9-2-3	Actual versus Reflected Sound .....	56
	9-2-4	Directional Sound.....	57
	9-2-5	Sound Saving.....	57
	9-2-6	Recommended Distance .....	57
<b>10.</b>	<b>Cleaning and Maintenance</b>		<b>58</b>
	10-1	Cleaning the device .....	58
	10-2	Disinfecting the Camera Surface .....	58
	10-3	Device Calibration .....	58
	10-4	Maintenance .....	58
	10-5	Storage.....	59
<b>11.</b>	<b>Troubleshooting</b>		<b>60</b>
	11-1	Device does not power on .....	60
	11-2	Device shuts off unexpectedly.....	60
	11-3	No image.....	60
	11-4	Unclear or dark visible images.....	60
	11-5	Camera out of focus .....	60
	11-6	Data is missing or has strange readings .....	61
	11-6	Memory error.....	61
<b>12.</b>	<b>About ICI</b>		<b>62</b>

## 1. Disclaimers

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### 1-1 Terms and Conditions

Warranty Terms and Condition of Sale are made available online at:

<https://infraredcameras.com/support/terms-and-conditions-of-sale/>

### 1-2 U.S. Government Regulations

This product may be subject to U.S. Export Regulations. Please send any inquiries to [support@infraredcameras.com](mailto:support@infraredcameras.com)

### 1-3 Copyright

© 2022, Infrared Cameras, Inc. All rights reserved worldwide. No parts of the software including source code may be reproduced, transmitted, transcribed or translated into any language or computer language in any form or by any means, electronic, magnetic, optical, manual or otherwise, without the prior written permission of Infrared Cameras, Inc.

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### 1-4 Quality Assurance

Infrared Cameras, Inc. is committed to a policy of continuous development; therefore we reserve the right to make changes and improvements on any of the products without prior notice.

### 1-5 Customer Help

For customer help, visit:

<https://infraredcameras.com/support/>

E-mail:

[support@infraredcameras.com](mailto:support@infraredcameras.com)

## 2. User Notice

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### 2-1 Calibration

Annual calibration to the thermal camera is recommended. Contact customer service to schedule maintenance.

### 2-2 Accuracy

For very accurate results, we recommend that you wait a minimum of 5 minutes after you have started the camera before measuring a temperature.

### 2-3 Cybersecurity

After the products are connected to the Internet, they may face risks including but not limited to network attacks, hacker attacks, virus infections, etc. The company will not be responsible for the abnormal operation of the products and any loss or liability caused therefrom shall be at your own risk.

### 2-4 Disposal of Electronic Waste

Electrical and electronic equipment (EEE) contains materials, components and substances that may be hazardous and present a risk to human health and the environment when waste electrical and electronic equipment (WEEE) is not handled correctly.

Equipment marked with the below crossed-out wheeled bin is electrical and electronic equipment. The crossed-out wheeled bin symbol indicates that waste electrical and electronic equipment should not be discarded together with unseparated household waste, but must be collected separately.

All local authorities have established collection schemes under which residents can dispose of equipment at a recycling center or other collection points, or WEEE will be collected directly from households. More detailed information is available from the administration of the relevant local authority. Always dispose of waste in accordance with local, state, and federal regulations.



## 2-5 Intended Use

The Sound DetectAI is a standalone system for localizing sound sources and acoustic analysis. It uses 124 microphones to locate acoustic sounds and visualizes them on a 5" color touchscreen.

The device is not a measurement instrument for precise acoustic or other measurements. The dB readings produced by the device are not guaranteed to correspond to absolute sound pressure levels.

Environment of use: industrial and petrochemical buildings, electrical plants, environments with potential gas leaks, science labs, animal reserves as well as environmental conservatories, among others.

You agree that this product is for civilian use only, and shall not use applications that may infringe the rights of third parties, medical and safety devices or other applications where product failure may lead to life-threatening or personal injury, as well as weapons of mass destruction, chemical and biological weapons, nuclear explosions, unsafe use of nuclear energy, dangerous or humanitarian purposes. Any loss or liability caused therefrom shall be at the your own risk.

## 2-6 Manual Update

The user manual will be updated from time to time. To access the latest manuals, translations of manuals, and notifications, go to:

<https://infraredcameras.com/product-resources/>

The manufacturer reserves the right to alter the specifications of the product without prior notification. The manufacturer allows himself the right to modify without any preliminary opinion the technical specifications of the product.

## 2-7 Scope of Application

Infrared Cameras, Inc. issues generic manuals that cover several cameras within a model line.

This means that this manual may contain descriptions and explanations that do not apply to your particular camera model. This manual may contain technical inaccuracies or typographical errors.

## 2-8 Authoritative Versions

The authoritative version of this publication is English. In the event of divergences due to translation errors, the English text has precedence.

Any late changes are first implemented in English. Other languages may or may not be available.



## 2-9 Training

To read about infrared training, visit:

<https://infraredtraininginstitute.com/>

### 3. Safety Information

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- Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- Do not disassemble or modify the device.
- The heat sinks will become hot when the device is on or has been on. Beware of touching them. Long term contact may cause burns.
- The top heatsink will get hot when using the device. It is recommended that any USB peripherals are connected directly after starting the device, as attempting to export the results after prolonged use might be problematic due to the hot heatsink.
- Do not pull by the cord or use any kind of pliers or tools to disconnect the cable.
- Consult company safety officer about using the device and the carrying bag with the strap in the facility or working environment. The strap is rigid and does not have a separate safety release mechanism, so special care should be used around heavy machinery.
- Do not use any damaged device, battery or cords.
- The device is not intended to be used while the battery is being charged. Charge the battery only when disconnected from the device.
- Always charge the battery in the special temperature range. The temperature range to charge the battery is 0 °C to 40 °C (32 °F to 104 °F). Charging the battery at temperatures outside this range can cause the battery to become hot or to explode. It can also decrease the performance or the life cycle of the battery.
- Do not continue to charge the battery if it does not become charged in the specified charging time. If you continue to charge the battery, it can become hot and cause an explosion or ignition. Injury to persons can occur.
- Do not attach the batteries directly to a car's cigarette lighter socket. Using the incorrect equipment can cause the battery to become hot or cause an explosion.
- Only use the correct equipment to discharge the battery. Using the incorrect equipment can decrease the performance or the life cycle of the battery. Using the incorrect equipment can cause the battery to become hot or cause an explosion.
- Do not connect the positive terminal and the negative terminal of the battery to each other with a metal object (such as wire). Damage to the batteries can occur.
- The battery contains safety and protection devices which, if they become damaged, can cause the battery to become hot, or cause an explosion or an ignition.
- Do not put holes in the battery with objects. Damage to the battery may occur.

- Do not hit the battery with a hammer or apply strong impacts or electric shocks to it. Damage to the battery may occur.
- Do not put the battery in or near a fire, stove or other high-temperature locations. Damage or ignition of the battery may occur.
- Do not put the battery in direct sunlight or other high-temperature locations. Damage or ignition of the battery may occur.
- Do not solder directly onto the battery. Damage to the battery may occur.
- Do not get water or salt water on the battery or device or permit the device or battery to get wet. Damage to the battery may occur.
- Remove any water or moisture on the battery before you install it. Damage to the battery may occur.
- If there is a leak from the battery and the fluid gets into the eyes, do not rub the eyes. Flush well with water and immediately get medical care.
- Always dispose of battery in accordance with local, state and federal regulations.
- Do not use the battery if, when used, charged, or placed in storage, there is an unusual smell from the battery, the battery feels hot, changes color, changes shape, or is in an unusual condition. Speak with a sales office if one or more of these problems occurs.
- Protect the camera lens and the microphone array from any kind of foreign objects, dust or liquids.
- Clean the case with a damp cloth and a weak soap solution. Do not use abrasives, isopropyl alcohol, or solvents to clean the case or lens/screen.
- Be careful when cleaning the camera lens. Do not clean the camera lens too vigorously. This can damage the lens.
- Avoid condensation. Taking the imager from cold to hot environments will cause condensation. To protect the device, power on the device and wait until it becomes warm enough for the condensation to evaporate.
- Keep device out of reach of children.
- Storage: If you do not use the imager for a long period of time, put the device in a cool and dry environment. Batteries should be stored in an ambient temperature of -20 °C to 20 °C (-4 °F to 67.9 °F). Lithium batteries will discharge time and should be fully charged before storage. It is recommended to fully recharge the batteries every 3 months to prevent damage. Store the device in an ambient temperature of -40 °C to 70 °C (-40 °F to 158 °F).

**THE ENCAPSULATION RATING IS ONLY APPLICABLE WHEN ALL THE OPENINGS ON THE CAMERA ARE SEALED WITH THEIR CORRECT COVERS, HATCHES, OR CAPS. THIS INCLUDES THE COMPARTMENTS FOR DATA STORAGE, BATTERIES, AND CONNECTORS.**

## 4. Technical Specifications

<b>Acoustic Measurement</b>	124 low-noise MEMS microphones
<b>Dynamic Range</b>	Low limit: < -15 dB High limit: > 120 dB
<b>Bandwidth</b>	2 kHz to 35 kHz, settings dependent
<b>Bandwidth Air Leak Mode</b>	20 kHz to 35 kHz
<b>Bandwidth Power Mode</b>	10 kHz to 35 kHz
<b>Distance</b>	0.3 m (1.0 ft), up to ~130 m (430')
<b>Operation Range</b>	-10 °C to 50 °C (14 °F to 122 °F)
<b>Storage Range</b>	-10 °C to 50 °C (14 °F to 122 °F)
<b>Humidity</b>	10% to 90%, relative
<b>Dimensions</b>	273 mm x 170 mm x 125 mm (L x W x D ± 0.5 mm) (10.7" x 6.7" x 4.9" (L x W x H ± 0.02"))
<b>Weight</b>	980 g (2.2 lbs), including accessories: 2.9 kg (6.4lbs)
<b>Power</b>	15V DC, 2.5A
<b>Battery</b>	Li-ion, 6 W
<b>Operation Time</b>	6 hours (conditions dependent)
<b>Charging Time</b>	4-6 hours
<b>External Battery Tracer</b>	LiFePO4, 12V, 7A, 84 W, 985 g (2.2 lbs), 90 mm x 145 mm x 65 mm (3.5" x 5.7" x 2.6"), IP64
<b>Battery Charger Tracer</b>	Input 100-240V - 50/60Hz, 1.3-1.5A; Max output 13.8-14.6V, 4.0A (charger dependent, see charger documentation or charger ID-plate)
<b>Battery Cord Length</b>	0.9 m (3.0'), extended 2 m (6.6')
<b>Interface</b>	USB
<b>Video Frame Rate:</b>	25 fps (max)
<b>Image Resolution</b>	800 x 480
<b>Storage</b>	Internal: 32 GB SD, non-removable External: 8 GB USB
<b>Screen</b>	5" color touchscreen, 800 x 480
<b>Brightness</b>	Adjustable
<b>Zoom</b>	2x
<b>IP Rating</b>	IP51
<b>Wireless Data Transfer</b>	2.4 GHz and 5 GHz IEEE 802.11b/g/n/ac secured wireless LAN
<b>Cloud services</b>	
<b>Real-time sound visualization</b>	

## **SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE**

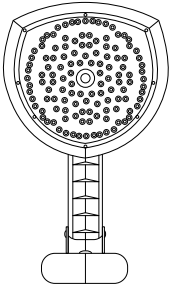
Specifications subject to change without further notice. Models and accessories subject to regional market considerations. License procedures may apply. Products described herein may be subject to US Export Regulations. Please refer to [support@infraredcameras.com](mailto:support@infraredcameras.com) with any questions.

## 5. Package Includes

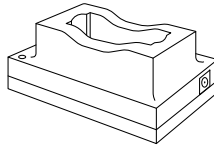
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### 5-1 Package 1: Battery Bay

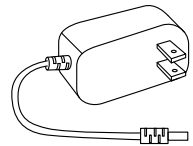
**THERE ARE MULTIPLE PACKAGE OPTIONS AVAILABLE. SEE PAGES 19-24 FOR PACKAGE 1 INSTRUCTIONS.**



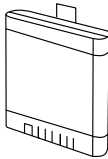
Sound DetectAI device



Battery Charger



Power Adapter



Battery x2

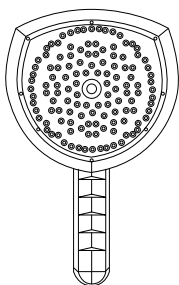


USB Drive

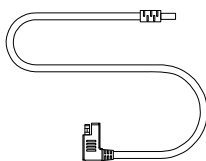
**ENSURE ALL SYSTEM EQUIPMENT AND COMPONENT ITEMS ARE PRESENT BEFORE CONTINUING.**

## 5-2 Package 2: Battery Pack

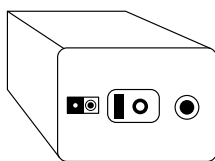
**THERE ARE MULTIPLE PACKAGE OPTIONS AVAILABLE. SEE PAGES 20-29 FOR PACKAGE 2 INSTRUCTIONS.**



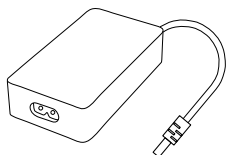
Sound DetectAI device



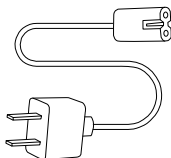
Battery cable



Battery Pack



Power Adapter



Power Cord

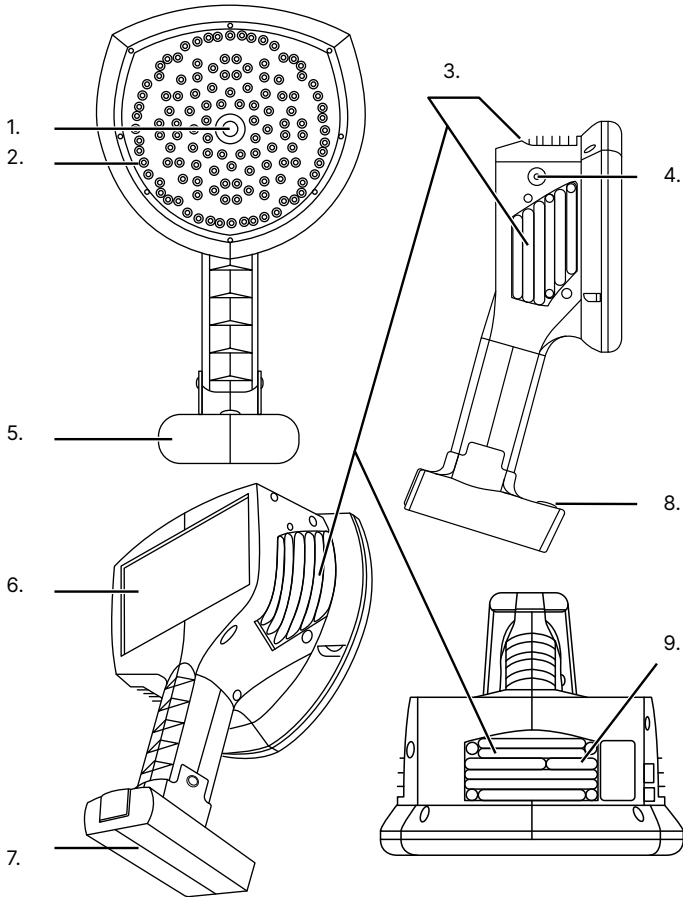


USB Drive

**ENSURE ALL SYSTEM EQUIPMENT AND COMPONENT ITEMS ARE PRESENT BEFORE CONTINUING.**

## 6. Structure

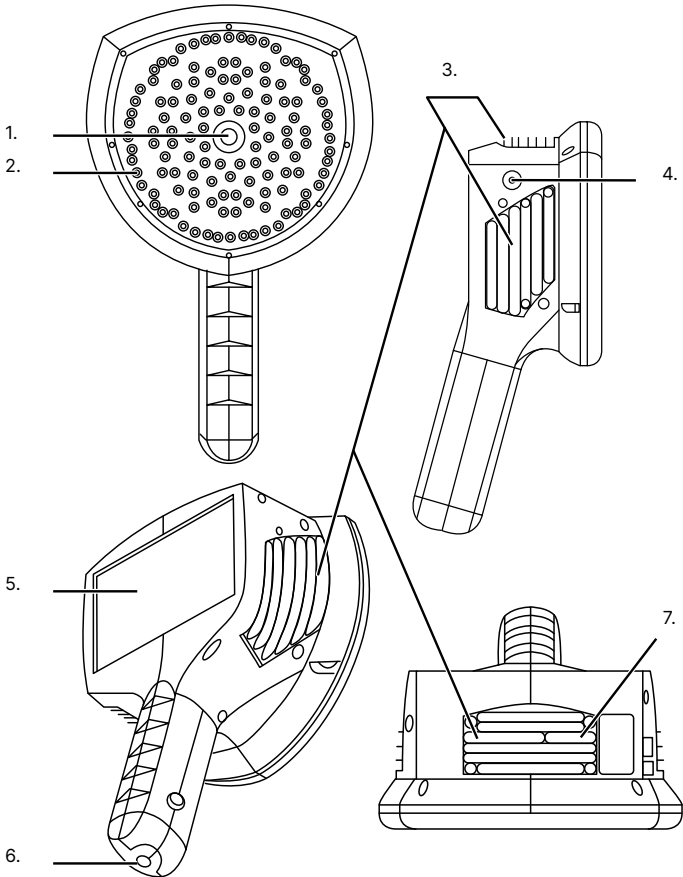
### 6-1 Appearance and Definitions of Interface: Package 1



- |                     |                |
|---------------------|----------------|
| 1. Video Camera     | 6. Touchscreen |
| 2. Microphone Array | 7. Battery Bay |
| 3. Heat Sinks       | 8. Power       |
| 4. Power LED        | 9. USB Slot    |
| 5. Battery Housing  |                |

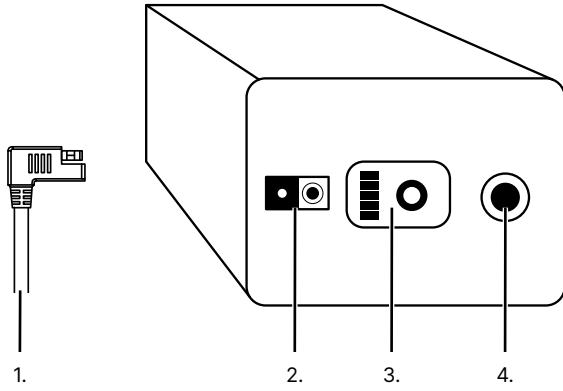
**THE HEAT SINKS WILL BECOME HOT WHILE USING THE DEVICE. BEWARE OF TOUCHING THEM. LONG TERM CONTACT MAY CAUSE BURNS.**



**6-2 Appearance and Definitions of Interface: Package 2**

- |    |                    |    |             |
|----|--------------------|----|-------------|
| 1. | Video Camera       | 5. | Power LED   |
| 2. | Microphone Array   | 6. | Touchscreen |
| 3. | Heat Sinks         | 7. | USB Slot    |
| 4. | Battery Cable Slot |    |             |

**THE HEAT SINKS WILL BECOME HOT WHILE USING THE DEVICE. BEWARE OF TOUCHING THEM. LONG TERM CONTACT MAY CAUSE BURNS.**



1. Battery Cable Head
2. Output Slot
3. Charge Gauge
4. Power Adapter Slot

## 7. Quick Start Instructions

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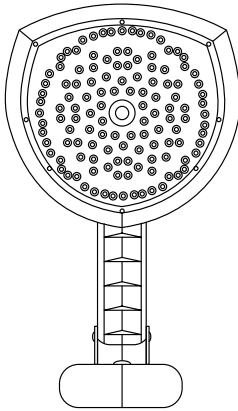
### 7-1 Package 1

#### 7-1-1 Set Up

**THE SETUP INSTRUCTIONS ONLY APPLY TO PACKAGE 1 SEEN ON PAGE 14.**

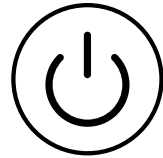
**A.**

The Sound DetectAI is used as a handheld device.



**B.**

Power on device.



**POWER ON THE DEVICE BY PRESSING THE POWER BUTTON. PRESS THE POWER BUTTON AGAIN TO POWER OFF THE DEVICE.**

**THE SYSTEM STARTS IN APPROXIMATELY 10-15 SECONDS. WAIT UNTIL THE USER INTERFACE LOADS BEFORE ATTEMPTING AN ACOUSTIC INSPECTION.**

**THE ACOUSTIC IMAGER NEEDS SUFFICIENT WARM-UP TIME FOR THE MOST ACCURATE MEASUREMENTS AND BEST IMAGE QUALITY. THIS TIME CAN OFTEN VARY BY ENVIRONMENTAL CONDITIONS. IT IS BEST TO WAIT A MINIMUM OF 10 MINUTES FOR THE DEVICE TO COMPLETELY WARM-UP.**

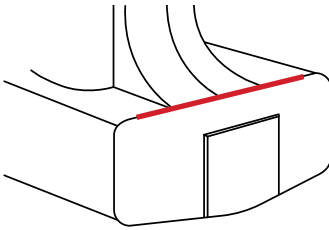
## 7-1-2 Battery Installation

**THE BATTERY CHARGING INSTRUCTION ONLY APPLY TO PACKAGE 1 SEEN ON PAGE 14.**

**MAKE SURE TO HOLD THE CAMERA FIRMLY IN BOTH HANDS WHEN REMOVING OR REPLACING BATTERY OR ATTACHING OR REMOVING THE BATTERY BAY COVER.**

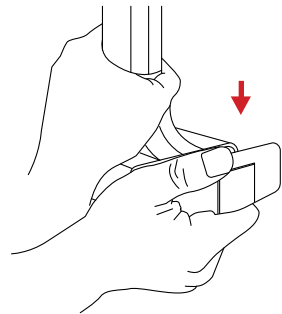
**A.**

Hold the camera firmly in both hands placing a thumb on the grip line.



**B.**

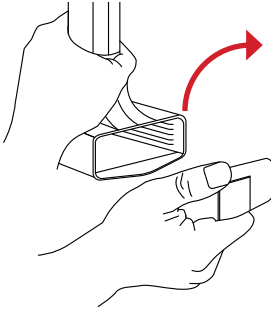
Press the grip line firmly to create a gap.



**DO NOT TRY TO FORCIBLY REMOVE THE BATTERY BAY COVER. IF USER FEELS SIGNIFICANT RESISTANCE REMOVE THE BATTERY AND ENSURE METAL CONTACTS ARE ALIGNED BEFORE TRYING TO PLACE BATTERY INTO THE BATTERY BAY.**

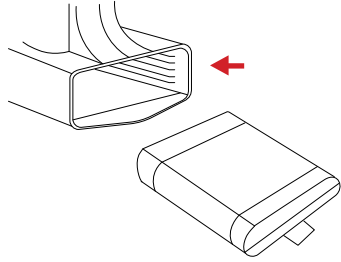
C.

Keep pressing the grip line and pull battery bay cover up and away to remove the battery bay cover.



D.

Ensure metal contacts are aligned; then, push battery into battery bay.

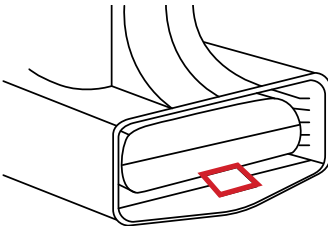


**DO NOT FORCE THE BATTERY INTO THE BATTERY BAY. IF USER FEELS SIGNIFICANT RESISTANCE REMOVE THE BATTERY AND ENSURE METAL CONTACTS ARE ALIGNED BEFORE TRYING TO PLACE BATTERY INTO THE BATTERY BAY.**

**MAKE SURE TO HOLD THE CAMERA FIRMLY IN BOTH HANDS WHEN REMOVING OR REPLACING BATTERY OR ATTACHING OR REMOVING THE BATTERY BAY COVER.**

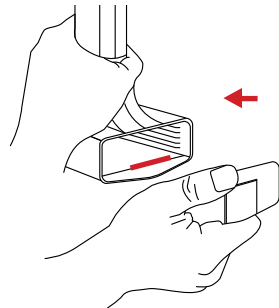
E.

To replace a battery held in the battery pull the battery tab.



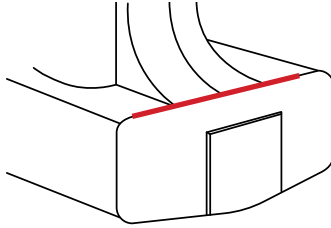
F.

Pressing the grip line, align the bottom of the battery cover inside the slot of the battery bay; then, press the cover toward the device.



## G.

Close gap by releasing the battery bay cover.



**ENSURE BATTERY COVER IS PROPERLY ATTACHED. IMPROPER ATTACHMENT OF BATTERY COVER MAY EXPOSE THE BATTERY AND INTERNAL ELECTRONICS TO ELEMENTAL DAMAGE.**

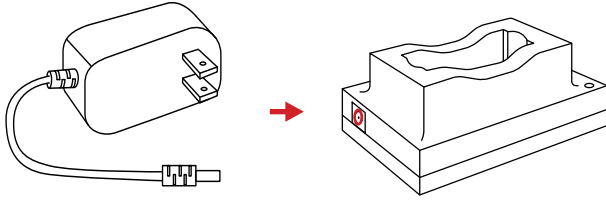
### 7-1-3 Charging Instructions: Battery

**THE BATTERY CHARGING INSTRUCTIONS ONLY APPLY TO PACKAGE 1 SEEN ON PAGE 14.**

**THE BATTERY CANNOT BE CHARGED INSIDE THE DEVICE. REMOVE THE BATTERY IN ORDER TO CHARGE IT.**

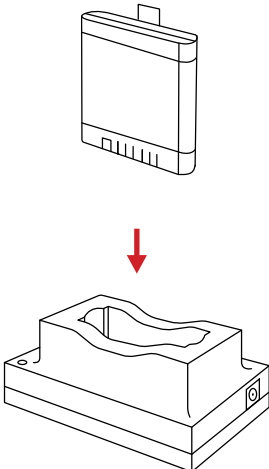
**A.**

Plug the power adapter cord into the battery charger



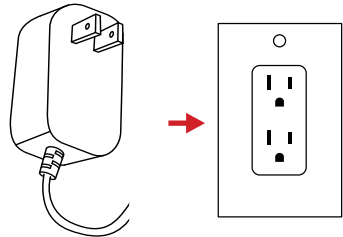
**B.**

Align the battery, and insert the battery into battery charger.



**C.**

Plug power adapter into a 110/120V electrical outlet.



**THE BATTERY CHARGING INSTRUCTIONS ONLY APPLY TO PACKAGE 1 SEEN ON PAGE 14.**

**IT TAKES 4-6 HOURS TO CHARGE AN EMPTY BATTERY TO FULL.**

**WHEN THE STATUS LED OF THE CHARGER IS RED THE BATTERY IS BEING CHARGED. THE CHARGER LED TURNS GREEN WHEN CHARGING IS COMPLETE.**

**ENSURE THE BATTERY IS NEAR ROOM TEMPERATURE BEFORE CHARGING. DO NOT CHARGE THE BATTERY IN EXTREMELY HOT OR COLD AREAS. THE BATTERY CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.**

**DO NOT STORE THE DEVICE WITH THE BATTERY INSTALLED TO PREVENT DAMAGE TO THE BATTERY OR THE DEVICE. REMOVE THE BATTERY FROM THE DEVICE BEFORE STORING.**

**IF YOU DO NOT USE THE IMAGER FOR A LONG PERIOD OF TIME, PUT THE DEVICE IN A COOL AND DRY ENVIRONMENT. THE BATTERY WILL DISCHARGE OVER TIME; THEREFORE, THE IMAGER SHOULD BE CHARGED OCCASIONALLY TO PREVENT DAMAGE TO THE BATTERY OR THE DEVICE.**



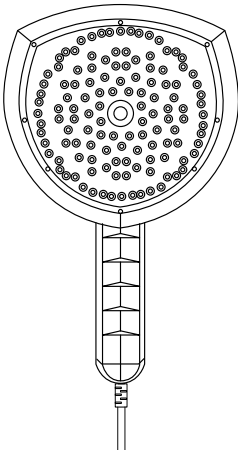
## 7-2 Package 2

### 7-2-1 Set Up

**THE SETUP INSTRUCTIONS ONLY APPLY TO PACKAGE 2 SEEN ON PAGE 15.**

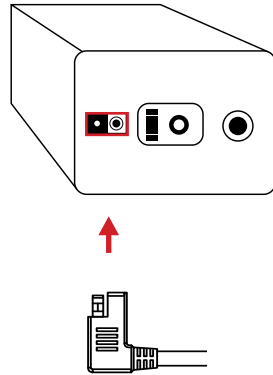
A.

The Sound DetectAI is used as a handheld device.



B.

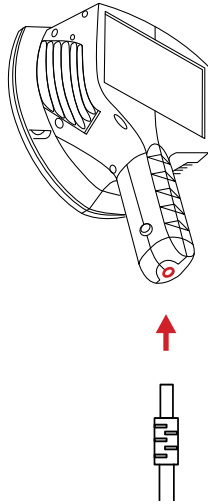
Align the battery cable; then, plug the battery cable into the battery pack.



**THE ACOUSTIC IMAGER NEEDS SUFFICIENT WARM-UP TIME FOR THE MOST ACCURATE MEASUREMENTS AND BEST IMAGE QUALITY. THIS TIME CAN OFTEN VARY BY ENVIRONMENTAL CONDITIONS. IT IS BEST TO WAIT A MINIMUM OF 10 MINUTES FOR THE DEVICE TO COMPLETELY WARM-UP.**

**C.**

Align the red orientation marking on the battery cable to the red marking on the device; then, plug the battery cable into the device until a click is heard.



**POWER IS SUPPLIED TO THE DEVICE THE MOMENT IT IS PLUGGED INTO THE BATTERY PACK.**

**THE SYSTEM STARTS IN APPROXIMATELY 10-15 SECONDS. WAIT UNTIL THE USER INTERFACE LOADS BEFORE ATTEMPTING AN ACOUSTIC INSPECTION.**

**TO POWER OFF THE DEVICE DISCONNECT THE DEVICE FROM THE BATTERY PACK. TO DISCONNECT THE BATTERY CABLE, HOLD THE BATTERY CABLE BY THE LOCK RING AND PULL. THE LOCK RING WILL SLIDE UNTIL IT RELEASES THE CONNECTION.**

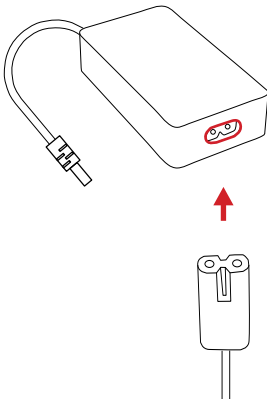
**THE DEVICE HAS AN INTERNAL BACKUP BATTERY WHICH IS CHARGED BY THE BATTERY PACK WHILE IN USE. IT IS RECOMMENDED THE DEVICE STAY POWERED BY THE BATTERY PACK AT LEAST 45 MINUTES IN ORDER TO FULLY CHARGE THE INTERNAL BACKUP BATTERY.**

## 7-2-2 Charging Instructions: Battery Pack

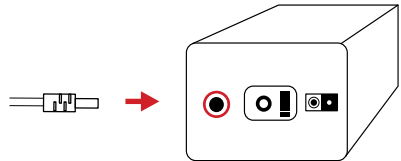
**THE BATTERY PACK INSTRUCTIONS ONLY APPLY TO PACKAGE 2 SEEN ON PAGE 15.**

**A.**

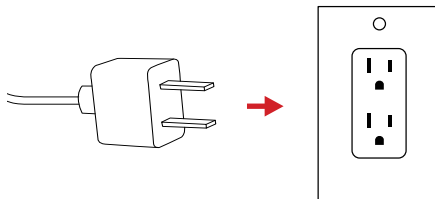
Plug the power cord into the power adapter.

**B.**

Plug the jack end of the power adapter into the battery pack.

**C.**

Plug power adapter into a 110/120V electrical outlet.



**WHEN THE BATTERY PACK IS FULL, LIGHTS ON THE SIDE OF THE DEVICE LIGHT UP.**

THE BATTERY PACK INSTRUCTIONS ONLY APPLY TO PACKAGE 2 SEEN ON PAGE 15.

IT TAKES 4-6 HOURS TO CHARGE AN EMPTY BATTERY PACK TO FULL.

WHEN THE STATUS LED OF THE CHARGER IS RED OR YELLOW THE BATTERY PACK IS BEING CHARGED. WHEN THE STATUS LED OF THE BATTERY PACK IS GREEN THE CHARGE IS COMPLETE. THE STATUS LED IS GREEN WHILE THE CONNECTOR IS CONNECTED TO THE BATTERY AND WHEN THE CONNECTOR IS DISCONNECTED.

ENSURE THE BATTERY PACK IS NEAR ROOM TEMPERATURE BEFORE CHARGING. DO NOT CHARGE THE BATTERY PACK IN EXTREMELY HOT OR COLD AREAS. THE BATTERY PACK CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.

DO NOT STORE THE DEVICE WITH THE BATTERY PACK ATTACHED TO PREVENT DAMAGE TO THE BATTERY PACK OR THE DEVICE. DETACH THE BATTERY PACK FROM THE DEVICE BEFORE STORING.

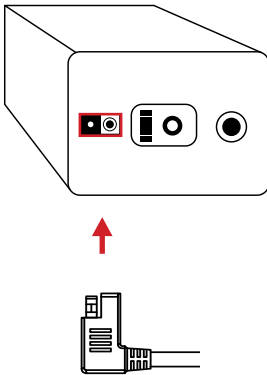
IF YOU DO NOT USE THE BATTERY PACK FOR A LONG PERIOD OF TIME, PUT THE BATTERY PACK IN A COOL AND DRY ENVIRONMENT. THE BATTERY PACK WILL DISCHARGE OVER TIME; THEREFORE, THE BATTERY PACK SHOULD BE CHARGED OCCASIONALLY TO PREVENT DAMAGE TO THE BATTERY PACK

### 7-2-3 Connect Battery Pack to the device

**THE BATTERY PACK INSTRUCTIONS ONLY APPLY TO PACKAGE 2 SEEN ON PAGE 15.**

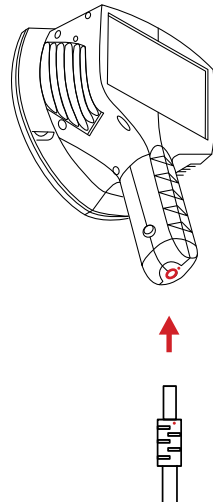
**A.**

Align the battery cable; then, plug the battery cable into the battery pack.



**B.**

Align the red orientation marking on the battery cable to the red marking on the device; then, plug the battery cable into the device until a click is heard.



**TO DISCONNECT THE BATTERY CABLE, HOLD THE BATTERY CABLE BY THE LOCK RING AND PULL. THE LOCK RING WILL SLIDE UNTIL IT RELEASES THE CONNECTION.**

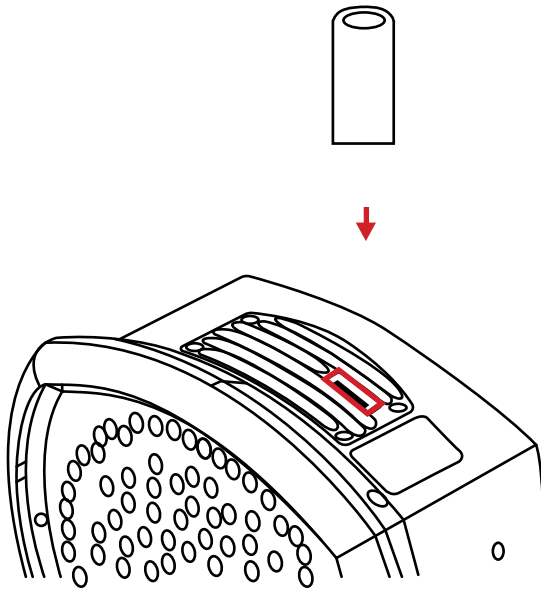
**THE DEVICE HAS AN INTERNAL BACKUP BATTERY WHICH IS CHARGED BY THE BATTERY PACK WHILE IN USE. IT IS RECOMMENDED THE DEVICE STAY POWERED BY THE BATTERY PACK AT LEAST 45 MINUTES IN ORDER TO FULLY CHARGE THE INTERNAL BACKUP BATTERY.**

### 7-3 Memory

THE USB INSTRUCTIONS APPLY TO BOTH PACKAGE 1 AND PACKAGE 2.

#### A.

Align the USB drive and insert it into the top of the device.



**DO NOT FORCE THE USB DRIVE INTO THE SLOT. THE SIDE OF THE CARD WITH CONTACT PINS MUST BE INSERTED FIRST. IF THERE IS RESISTANCE FLIP THE CARD AROUND AND TRY AGAIN. TO EJECT THE MEMORY POWER OFF THE DEVICE; THEN, PULL THE CARD FROM THE MEMORY SLOT.**

## 8. Operation Instructions

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### 8-1 Charging Instructions

Charging instructions depend on the package. See the following instructions and reference page 14-15.

**THE BATTERY CHARGING INSTRUCTIONS ONLY APPLY TO PACKAGE 1 SEEN ON PAGE 14.**

#### 8-1-1 How to Charge the Battery

The battery charging instructions only work with Package 1; see page 14.

Charge the battery for a minimum of 3 hours before using the device for the first time. It takes 4-6 hours to charge an empty battery to full.

When the battery has been depleted the device powers off automatically and without warning. Check the battery level by pressing the button on the side of the battery. Each green bar is equal to ~25%.

1. Plug the jack end of the power adapter into the battery charging base.
2. Align the battery to the battery charging base; then, insert batteries into the battery charging base.
3. Plug the power adapter cord of the battery charging base into a 110v/120V electrical outlet.

**IT TAKES 4-6 HOURS TO CHARGE AN EMPTY BATTERY TO FULL.**

**DO NOT ATTEMPT TO CHARGE THE BATTERY WHILE IT IS INSIDE THE DEVICE.**

**WHEN THE BATTERY IS NOT PLACED IN THE BATTERY CHARGING BASE THE INDICATOR LIGHT IS RED. THE LIGHT REMAINS RED WHEN THE BATTERY IS PLACED AND CHARGING. THE CHARGER LED TURNS GREEN WHEN CHARGING IS COMPLETE.**

**ENSURE THE BATTERY AND CHARGER ARE NEAR ROOM TEMPERATURE BEFORE CHARGING THE BATTERY. DO NOT CHARGE IN THE BATTERY IN EXTREMELY HOT OR COLD AREAS. THE BATTERY CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.**

**DO NOT STORE THE DEVICE WITH THE BATTERY INSTALLED TO PREVENT DAMAGE TO THE BATTERY OR THE DEVICE. REMOVE THE BATTERY FROM THE DEVICE BEFORE STORING.**

**IF YOU DO NOT USE THE IMAGER FOR A LONG PERIOD OF TIME, PUT THE DEVICE IN A COOL AND DRY ENVIRONMENT. THE BATTERY WILL DISCHARGE OVER TIME; THEREFORE, THE IMAGER SHOULD BE CHARGED OCCASIONALLY TO PREVENT DAMAGE TO THE BATTERY OR THE DEVICE.**

**THE BATTERY PACK INSTRUCTIONS ONLY APPLY TO PACKAGE 2 SEEN ON PAGE 15.**

#### **8-1-2 How to Charge the Battery Pack**

The battery pack charging instructions only work with Package 2; see page 15.

1. Plug the power adapter cord into the battery charger.
2. Plug the jack end of the power adapter into the battery pack.
3. Plug the power adapter cord into a 110v/120V electrical outlet.

**IT TAKES 4-6 HOURS TO CHARGE AN EMPTY BATTERY PACK TO FULL.**

**WHEN THE STATUS LED OF THE CHARGER IS RED OR YELLOW THE BATTERY PACK IS BEING CHARGED. WHEN THE STATUS LED OF THE BATTERY PACK IS GREEN THE CHARGE IS COMPLETE. THE STATUS LED IS GREEN WHILE THE CONNECTOR IS CONNECTED TO THE BATTERY AND WHEN THE CONNECTOR IS DISCONNECTED.**

**ENSURE THE BATTERY PACK IS NEAR ROOM TEMPERATURE BEFORE CHARGING. DO NOT CHARGE THE BATTERY PACK IN EXTREMELY HOT OR COLD AREAS. THE BATTERY PACK CAPACITY MAY BE DECREASED IF CHARGED IN AN EXTREME TEMPERATURE ENVIRONMENT.**

**DO NOT STORE THE DEVICE WITH THE BATTERY PACK ATTACHED TO PREVENT DAMAGE TO THE BATTERY PACK OR THE DEVICE. DETACH THE BATTERY PACK FROM THE DEVICE BEFORE STORING.**



**IF YOU DO NOT USE THE BATTERY PACK FOR A LONG PERIOD OF TIME, PUT THE BATTERY PACK IN A COOL AND DRY ENVIRONMENT. THE BATTERY PACK WILL DISCHARGE OVER TIME; THEREFORE, THE BATTERY PACK SHOULD BE CHARGED OCCASIONALLY TO PREVENT DAMAGE TO THE BATTERY PACK**

### 8-1-2-1 Battery Pack Charge Gauge

Press the charge gauge button to test the state of the battery charge. This is approximate only and the most accurate results are after 2 minutes of no load.

The battery yields ~6 hours of usage. Though the battery usage depends on multiple variables which may decrease the usage time.

LEDs	Remaining Charge
3 greens, 2 reds	Full
2 greens, 2 reds	Over 50%
1 green, 2 reds	Over 20%
2 reds	Less than 20%
1 red	Less than 10% (suggested recharge level)
No lights	Empty (recharge within 12 hours)

## 8-2 Power On/Off the device

### 8-2-1 Package 1

Power on the device by pressing the power button until there is an audible click. The system starts in approximately 10-15 seconds. Wait until the head-ups display loads before taking measurements.

Press the power button until there is an audible click; then, release to power off the device. After powering off the device, wait until the Power LED also powers off before attempting to power the device on again.

**AFTER POWERING OFF THE DEVICE, WAIT UNTIL THE POWER LED ALSO POWERS OFF BEFORE ATTEMPTING TO POWER THE DEVICE ON AGAIN.**

**DO NOT BAG THE DEVICE WHILE THE POWER LED IS ON.**

**DO NOT BAG THE DEVICE WHILE THE HEAT SINKS ARE HOT. BE CAREFUL WHEN TOUCHING THE HEAT SINKS AND BAGGING THE DEVICE.**

**THE DEVICE NEEDS SUFFICIENT TIME TO WARM-UP FOR THE MOST ACCURATE TEMPERATURE MEASUREMENTS AND BEST IMAGE QUALITY. THIS TIME CAN OFTEN VARY BY ENVIRONMENTAL CONDITIONS. IT IS BEST TO WAIT A MINIMUM OF 10 MINUTES FOR THE DEVICE TO COMPLETELY WARM-UP.**

### **8-2-2 Package 2**

Power on the device by connecting the battery pack to the device. Power is supplied to the device the moment it is plugged into the battery pack. The system starts in approximately 10-15 seconds. Wait until the user interface loads before taking measurements.

To power off the device disconnect the device from the battery pack. To disconnect the battery cable, hold the battery cable by the lock ring and pull. The lock ring will slide until it releases the connection.

After powering off the device, wait until the Power LED also powers off before attempting to power the device on again. Disconnecting and reconnecting the battery pack too quickly will cause the device to reboot.

The device has an internal backup battery which is charged by the battery pack while in use. It is recommended the device stay powered by the battery pack at least 45 minutes in order to fully charge the internal backup battery.

**POWER IS SUPPLIED TO THE DEVICE THE MOMENT IT IS PLUGGED INTO THE BATTERY PACK.**

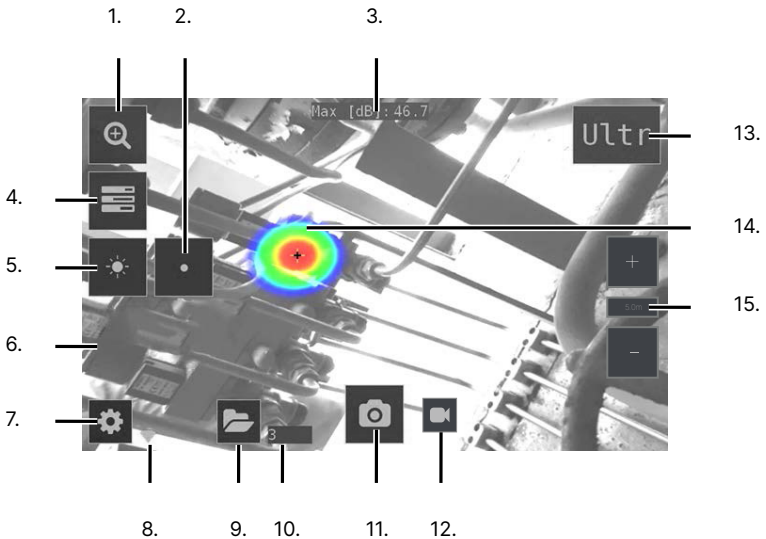
**THE SYSTEM STARTS IN APPROXIMATELY 10-15 SECONDS. WAIT UNTIL THE USER INTERFACE LOADS BEFORE ATTEMPTING AN ACOUSTIC INSPECTION.**

**TO POWER OFF THE DEVICE DISCONNECT THE DEVICE FROM THE BATTERY PACK. TO DISCONNECT THE BATTERY CABLE, HOLD THE BATTERY CABLE BY THE LOCK RING AND PULL. THE LOCK RING WILL SLIDE UNTIL IT RELEASES THE CONNECTION.**

**THE DEVICE HAS AN INTERNAL BACKUP BATTERY WHICH IS CHARGED BY THE BATTERY PACK WHILE IN USE. IT IS RECOMMENDED THE DEVICE STAY POWERED BY THE BATTERY PACK AT LEAST 45 MINUTES IN ORDER TO FULLY CHARGE THE INTERNAL BACKUP BATTERY.**

### 8-3 User Interface

The device interface appearance:



- |                     |                     |
|---------------------|---------------------|
| 1. Zoom             | 9. Gallery          |
| 2. Source Mode      | 10. No. of Captures |
| 3. Decibel Reading  | 11. Capture         |
| 4. Quick Access     | 12. Record          |
| 5. Brightness       | 13. Filter          |
| 6. Display Window   | 14. Heatmap         |
| 7. Settings         | 15. Distance        |
| 8. Network Settings |                     |

#### 8-3-1 Device Setup Wizard

The first time the Sound DetectAI is powered on, the device setup wizard is shown. The wizard assists the user in defining important settings. These settings can be changed later through the settings menu. See the appropriate section for details.

#### 8-3-2 Open the main menu

Access the main menu by tapping the Settings icon on the touchscreen.

### 8-3-3 Close the main menu

Tap ← to save settings and exit the menu.

## 8-4 Digital Zoom

The device is equipped with a 2x digital zoom, which can be used for close-up snapshots. Tap the Zoom icon to zoom in or zoom out.

## 8-5 Media Management

### 8-5-1 Capture an Image

When the user captures an image the device also records a short audio clip of the strongest sound source. The direction of the strongest sound source is shown with a crosshair.

Capture an image as follows:

1. Using the touchscreen, tap the Capture icon to freeze an image preview on the screen.
2. Tap Save to save the image. Tap the Trash Can icon to cancel saving.

### 8-5-2 Record a Video

When the user captures a video the device also records a short audio clip of the strongest sound source. The direction of the strongest sound source is shown with a crosshair.

Record a video as follows:

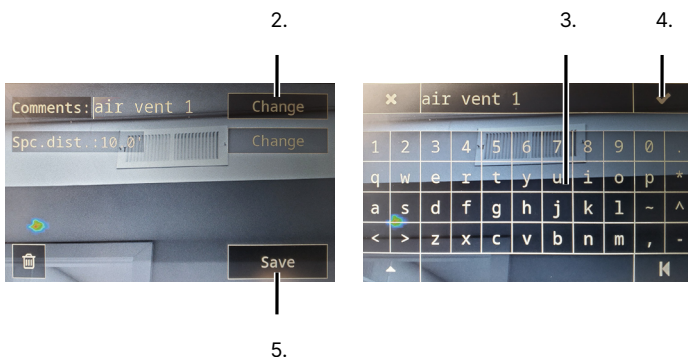
1. Using the touchscreen, tap the Record icon to begin recording video. A timer shows in the bottom left corner.
2. Tap the Stop icon to stop recording.
3. Tap Save to save the video. Tap the Trash Can icon to delete the video.

### 8-5-3 Add Annotations to Media

Annotations must be added to media before saving and cannot be added retroactively. Users can see annotations by reviewing images in the gallery.

Add annotations to an media as follows:

1. Capture an image or record a video.
2. Using the touchscreen, tap Change next to Comments. A keyboard appears.
3. Use the keyboard by tapping the touchscreen to input notes. 42 is the maximum number of characters available.
4. Tap ✓ save changes and close the keyboard. Tap ▲ to access uppercase letter and symbols. Tap X to cancel changes and close the keyboard.
5. Tap Save to save the image or video. Tap the Trash Can icon to delete the image or video.



**ANNOTATIONS MUST BE ADDED TO MEDIA BEFORE SAVING AND CANNOT BE ADDED RETROACTIVELY.**

### 8-5-4 Review Media

Media can be viewed at any time. The number of images and videos saved to the device is shown to the right of the Gallery icon. Videos cannot be played using the device.

Review media as follows:

1. Using the touchscreen, tap the Gallery icon. Press and hold the thumbnails; then, drag left or right to scroll through the gallery.
2. Tap the media to review. Media information is shown to the right.
3. Tap ← to exit the gallery.

## 8-5-5 Export Media

### 8-5-5-1 USB Drive

Use a USB drive to export media held on the internal memory of the device to a computer. Media is copied to the USB drive and deleted from the device during export and cannot be recovered using the device.

Export media as follows:

1. Power on the device.
2. Insert a USB drive into the USB slot of the device. The device should automatically detect the USB drive and show a prompt.
3. Using the touchscreen, tap Yes to export media to the USB drive. Do not remove the USB drive during export. Do not turn off the device during the export. Gallery will close automatically when export is complete. Tap No to cancel the export.

**MEDIA IS COPIED TO THE USB DRIVE AND DELETED FROM THE DEVICE DURING EXPORT AND CANNOT BE RECOVERED USING THE DEVICE. ENSURE EXPORT IS NECESSARY BEFORE EXPORTING.**

**DO NOT REMOVE THE USB DRIVE FROM THE DEVICE DURING THE EXPORT. REMOVING THE USB DRIVE FROM THE DEVICE DURING EXPORT MAY CORRUPT THE TRANSFER AND CAUSE A LOSS OF MEDIA AND/OR DATA.**

**DO NOT POWER OFF THE DEVICE DURING THE EXPORT. POWERING OFF THE DEVICE DURING EXPORT MAY CORRUPT THE TRANSFER AND CAUSE A LOSS OF MEDIA AND/OR DATA.**

**USE ONLY THE USB DRIVE PROVIDED WITH THE DEVICE. OTHER MEMORY DRIVES ARE NOT GUARANTEED TO WORK AND MAY LEAD TO LOSS OF DATA.**

### 8-5-5-2 Direct Data Transfer

In the event the USB export cannot be used for exporting the media to a computer, direct data transfer can be used to directly move media from the device to the software.

This feature uses Wi-Fi connection.

**MEDIA EXPORTED TO A USB DRIVE WILL NOT BE UPLOADED TO THE CLOUD. MEDIA CAN BE UPLOADED LATER.**

### 8-5-5-3 Cloud Storage

The user can use the SmartIR Cloud Platform to export media held on the internal memory of the device. This allows the user to transfer the images to a computer for analysis.

**COMING SOON**

**MEDIA IS COPIED TO THE CLOUD AND DELETED FROM THE DEVICE DURING EXPORT AND CANNOT BE RECOVERED USING THE DEVICE. ENSURE EXPORT IS NECESSARY BEFORE EXPORTING.**

**DO NOT POWER OFF THE DEVICE DURING THE EXPORT. POWERING OFF THE DEVICE DURING EXPORT MAY CORRUPT THE TRANSFER AND CAUSE A LOSS OF MEDIA AND/OR DATA.**

### 8-5-6 Delete Media

Media can be deleted at any time as follows:

1. Using the touchscreen, tap the Gallery icon. Press and hold the thumbnails; then, drag left or right to scroll through the gallery.
2. Tap the media to delete. Media information is shown to the right.
3. Tap the Trash Can icon.
4. Tap Yes to confirm media deletion. Tap No to cancel media deletion.
5. Tap ← to exit the gallery.

## 8-6 Application Modes

The device supports the following application modes:

- Air Mode: used for localization of compressed air leaks.
- Power Mode: used for localization and classification of high-voltage and medium-voltage partial discharges.

### 8-6-1 Switching Application Modes

By default, the device is set to Air Mode and automatically detects and localizes compressed air leaks. Change the device to Power Mode when attempting to scan for partial discharges.

Change the application mode as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap Change. The selected mode shows above.
3. Tap ← to save and exit the menu.

**THE USER SHOULD ENSURE THE PROPER MODE IS CHOSEN FOR THE USE APPLICATION. AIR MODE IS FOR FINDING COMPRESSED AIR LEAKS. POWER MODE IS FOR FINDING VOLTAGE PARTIAL DISCHARGES.**

**CHOOSE THE CORRECT SOURCE MODE AND FILTER FOR PROPER DETECTION OF AIR AND PARTIAL DISCHARGES. SETTING THE DISTANCE IS ALSO IMPORTANT FOR OBTAINING ACCURATE READINGS.**

### 8-6-2 Application Heatmaps

The display window shows the camera image with a heatmap overlay. There are two different types of color modes for displaying the heatmap:

- Location Color Mode: shows each sound source with colors ranging from red to blue. Location color mode is active in the Power application mode.
- Strength Color Mode: shows each sound source with a single color according to the intensity of the sound source. The Strength color mode is active in the Air application mode.

The heatmap also shows the location of the strongest sound source (Single-source Mode) or multiple sound sources (Multi-source Mode). The location of the strongest sound source is marked with a small crosshair.

Location Color Mode.



Strength Color Mode.





## 8-7 Source Modes

The device supports the following source modes:

- **Single-source Mode:** shows only the sound source with the highest intensity (with a crosshair on top). If there are multiple sound sources with the same or almost the same intensity, they will all be shown.
- **Multi-source Mode:** shows multiple sound sources with different intensities. The sound source with the highest intensity will be shown with a crosshair on top. Not all sound sources will be shown. For example, if there is a very strong dominant sound source, very weak sound sources will not be visible at the same time.

To see weaker sound sources (in either single-source or multi-source mode), position and rotate the camera so that stronger sound sources are outside the field of view. You can also use the zoom button to limit the field of view.

### 8-7-1 Switching Source Modes

By default, the device is set to Single-source Mode and only the sound source with the highest intensity (with a crosshair on top). Change the device to Multi-source Mode when attempting to scan multiple sound sources with different intensities.

Change the source mode as follows:

1. Using the touchscreen, tap the Quick Access icon to open the quick settings menu.
2. Tap the Source Mode icon. Single-source Mode shows as 1 dot and Multi-source Mode shows as 3 dots.
3. Tap the Quick Access icon to exit the quick settings menu.



Single-source Mode.



Multi-source Mode.



## 8-8 Real-time Acoustic Analysis

Real-time analysis results are shown at the top of the user interface. The level in decibels of sound arriving from the strongest source (shown with a crosshair) is presented. The real-time analysis also provides additional information about problems related to the specific application.

Generally, the device is used for either leak detection (locating and estimating the size of compressed air leaks) or partial discharge detection (locating and analyzing partial discharges in power grids).

### 8-8-1 Air Leak Detection

The device must be set to Air Mode to detect compressed air leaks (see Section 8-4 Application Modes)

The device detects compressed air leaks based on the sound emitted by the leak. When a leak is detected, the device will estimate the size of the leak. The estimate relies on the distance and environment settings input by the user.

The device can estimate the cost of leaks.

#### 8-8-1-1 Filters for Air Leaks

Background noise can disrupt acoustic inspections. The different filters available on the device filter out background noise in order to concentrate on the ultrasonic frequencies where the sound of a leak is typically stronger than noise.

Use the High and Ultra filters to block out audible background noise. The SLM filter emphasizes the sound from leaks by further filtering out many typical industrial noise sources. Users should test inspection areas with the different available filters to see which filter gives the best results.

Change the filter type by using the touchscreen to tap the filter button in the top right corner.



**SELECT THE APPROPRIATE AIR MODE FILTER AND DISTANCE BEFORE CAPTURING MEDIA OR PERFORMING ACOUSTIC ANALYSIS.**

**SELECT THE APPROPRIATE AIR MODE FILTER AND DISTANCE BEFORE CAPTURING MEDIA OR PERFORMING ACOUSTIC ANALYSIS.****8-8-1-2 Distance**

The intensity of sound is reduced over distance traveled; therefore, setting the distance is useful in order to counter this phenomenon and estimate the correct size of a leak.

Use the + and - buttons to select the correct distance.

**8-8-1-3 Leak Unit**

By default, the measurement unit for leaks is CFM (cubic feet per minute); however, l/min (liters per minute) is also an option. Other options are available upon request.

Change the leak unit as follows:

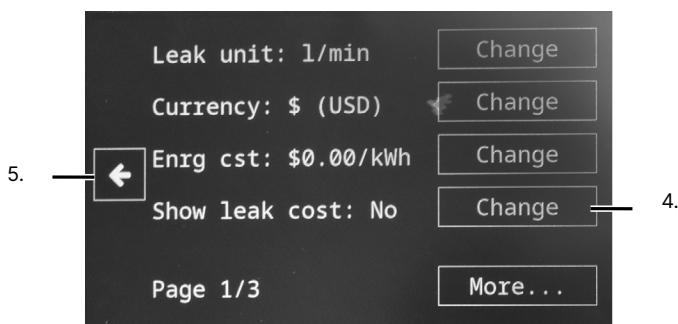
1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap the button next to Leak Unit to change the measurement: CFM (cubic feet per minute) or l/min (liters per minute).
5. Tap ← to save and exit the menu.

## 8-8-1-4 Currency

The currency in which to display the leak cost estimate can be selected from the available options. Be sure to update the energy cost to accurately reflect pricing.

Change the currency unit as follows:

- Using the touchscreen, tap the Settings icon to open the main menu.
- Tap More until Air Mode Settings appears in the menu list.
- Tap Air Mode Settings.
- Tap the button next to Currency. A list of currencies appears.
- Tap  $\uparrow$  or  $\downarrow$  to navigate the list of currencies: EUR, USD, RUB, GBP, CNY, JPY, INR, AED, AFN, ALL, AMD, ANG, AOA, ARS, AUD, AWG, AZN, BAM, BBD, BDT, BGN, BHD, BIF, BMD, BYN, BZD, CAD, CDF, CHF, CKD, CLP, COP, CRC, CUC, CUP, CVE, CZK, DJF, DKK, DOP, DZD, EGP, ERN, ETB, FJD, FKP, FOK, GEL, GGP, GHS, GIP, GMD, GNF, GTQ, FYD, HKD, HNL, HRK, HTG, HUF, IDR, ILS, IMP, IQD, IRR, ISK, JEP, JMD, JOD, KES, KGS, KHR, KID, KMF, KPW, KRW, KWD, KYD, KZT, LAK, LBP, LKR, LRD, LSL, LYD, MAD, MDL, MGA, MKD, MMK, MNT, MOP, MRU, MUR, MVR, MWK, MXN, MYR, MZN, NAD, NGN, NIO, NOK, NPR, NZD, OMR, PAB, PEN, PGK, PHP, PKR, PLN, PND, PRB, PYG, QAR, RON, RSD, RWF, SAR, SBD, SCR, SDG, SEK, SGD, SHP, SLL, SLS, SOS, SRD, SSP, STN, SYP, SZL, THB, TJS, TMT, TND, TOP, TRY, TTD, TVD, TWS, TZS, UAH, UGX, UYU, UZS, VES, VND, VUV, WST, XAF, XCD, XOF, XPF, YER, ZAR, AND ZMW..
- Tap Select next to the preferred currency.
- Tap  $\leftarrow$  to save and exit.
- Tap  $\leftarrow$  to save and exit the menu.



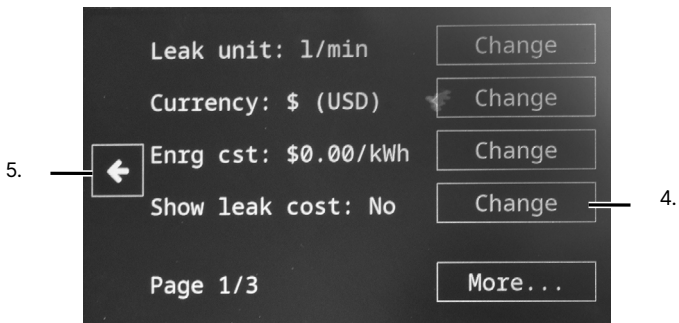
**ADJUST THE CURRENCY AND ENERGY TO DISPLAY THE LEAK COST ESTIMATE AT THE TOP OF THE DISPLAY WINDOW.**

### 8-8-1-5 Energy Cost

To estimate the cost of compressed air leaks, the energy cost must be known. Typically, this means the local price (per kWh) of electricity. Be sure the currency and energy cost are updated in tandem to obtain accurate results.

#### 8-8-1-5-1 Enable Energy Cost

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap the button next to Show Leak Cost. Yes means the cost is shown on the user interface. No means the cost is not shown on the user interface.
5. Tap ← to save and exit the menu.



#### 8-8-1-5-2 Adjust Energy Cost

Energy cost is measured via local price per kWh. Adjust the pricing as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap Change next to Energy Cost (abbreviated Enrg Cst). A keyboard appears.
5. Use the keyboard by tapping the touchscreen to input a numerical value.
6. Tap ✓ save changes and close the keyboard. Tap X to cancel changes and close the keyboard.
7. Tap ← to save and exit the menu.

### 8-8-1-6 Ambient Temperature

The ambient temperature, also called environmental temperature, affects how the sound from a leak propagates through the air. Specify the temperature in order to get as accurate a leak estimate as possible. The temperature can be entered either in °C or °F.

#### 8-8-1-6-1 Change Temperature Units

Users can change the temperature unit of the ambient temperature as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap More until the Environment Temperature (abbreviated Env. Temp). option appears in the menu list.
5. Tap the °C/°F button next to next to Env. Temp. to change the temperature unit.
6. Tap ← to save and exit the menu.

#### 8-8-1-6-2 Adjust Ambient Temperature

Change the ambient temperature as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap More until the Environment Temperature (abbreviated Env. Temp). option appears in the menu list.
5. Tap the Change button next to Env. Temp. A keyboard appears.
6. Use the keyboard by tapping the touchscreen to input a numerical value.
7. Tap ✓ save changes and close the keyboard. Tap X to cancel changes and close the keyboard.
8. Tap ← to save and exit the menu.

**SET THE AMBIENT TEMPERATURE TO OBTAIN ACCURATE ACOUSTIC MEASUREMENT RESULTS.**

### 8-8-1-7 Humidity

Humidity remains in the atmosphere even on bright days. Water of all three states can be found naturally in the atmosphere. Water in any state is an obstacle to accurate acoustic measurements. Specify the relative humidity in order to get as accurate a leak estimate as possible.

Correct for atmospheric attenuation by defining humidity as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap More until the Relative Humidity (abbreviated Rel. Humidity) appears in the menu list.
5. Tap the Change button next to Rel. Humidity. A keyboard appears.
6. Use the keyboard by tapping the touchscreen to input a numerical value.
7. Tap ✓ save changes and close the keyboard. Tap X to cancel changes and close the keyboard.
8. Tap ← to save and exit the menu.

### 8-8-1-8 Leak Correction

The leak size estimation in the device has been calibrated based on a data set from a large sample of leaks. It might, however, underestimate or overestimate leak size since measurements depend on a number of different variables. If the leak size estimate differs significantly from known observations, adjust the device by setting the leak correction factor. A leak correction less than 1.0 will produce smaller estimates, while a leak correction larger than 1.0 will produce larger estimates.

Set the leak correction as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap More until the Leak Correction (abbreviated Leak Corr.) option appears in the menu list.
5. Tap the Change button next to Leak Corr. A keyboard appears.
6. Use the keyboard by tapping the touchscreen to input a numerical value.
7. Tap ✓ save changes and close the keyboard. Tap X to cancel changes and close the keyboard.
8. Tap ← to save and exit the menu.

### 8-8-1-9 Specific Power

The specific power is a measure of how much energy is needed to produce a certain amount of compressed air. The unit is either kW/m<sup>3</sup>/min or kW/100 CFM. This option is for advanced users; leave it at the default value if you do not know the specific power of your compressed air system.

Adjust the power of compressed air as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Air Mode Settings appears in the menu list.
3. Tap Air Mode Settings.
4. Tap More until the Specific Power option appears in the menu list.
5. Tap the Change button next to Specific Power. A keyboard appears.
6. Use the keyboard by tapping the touchscreen to input a numerical value.
7. Tap ✓ save changes and close the keyboard. Tap X to cancel changes and close the keyboard.
8. Tap ← to save and exit the menu.

### 8-8-2 Partial Discharge Detection

The device must be set to Power Mode to detect compressed air leaks (see Section 8-4 Application Modes)

The device detects partial discharges based on the sound they emit and will automatically determine AC frequencies of 50 and 60 Hz. Measuring accurate discharge severity relies on the distance settings input by the user (see Section 8-7-1-2 Distance).

When a possible partial discharge has been detected, its so called PRPD (phase-resolved partial discharge) pattern will be shown on the top of the screen. By default, the pattern is shown in a small window. Press on the window to enlarge it. Press once more to make it small again.

The device can estimate the cost of leaks.

#### 8-8-2-1 Filters for Partial Discharge

Background noise can disrupt acoustic inspections. The different filters available on the device filter out background noise in order to concentrate on the ultrasonic frequencies where the sound of a leak is typically stronger than noise.

The Norm filter filters out low frequency background noise. Use the High and Ultra filters to block out audible background noise. Users should test inspection areas with the different available filters to see which filter gives the best results.

Change the filter type by using the touchscreen to tap the filter button in the top right corner.



## 8-9 Settings

### 8-9-1 Distance Units

By default the imager is set to measure temperatures in meters. Change the distance unit as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Advanced Settings appears in the menu list.
3. Tap Advanced Settings.
4. Tap the button next to Distance Unit to change the distance unit.
5. Tap ← to save and exit the menu.

**ENSURE THE PROPER DISTANCE UNIT IS SELECTED FOR YOUR APPLICATION. METERS AND FEET UNITS ARE AVAILABLE.**

### 8-9-2 Time Settings

Change the time settings as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Time Settings appears in the menu list.
3. Tap Time Settings.
4. Tap Change.
5. Tap ↑ or ↓ to navigate the list of time zones.
6. Tap Select next to the preferred time zone.
7. Tap ← to save and exit.
8. Tap ← to save and exit the menu.

### 8-9-3 Display Brightness Settings

Users can change the brightness settings as follows:

1. Using the touchscreen, tap the Quick Access icon to open the quick settings menu.
2. Tap the Screen Brightness icon.
3. Tap the Quick Access icon to exit the quick settings menu.

## 8-9-4 Connection Services

### 8-9-4-1 Location Settings

To be able to scan for and select a Wi-Fi network, you must first select the correct Wi-Fi country. If the selected

Wi-Fi country is incorrect, you may not be able to connect to Wi-Fi networks or the Wi-Fi connection might not work properly.

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Network Settings appears in the menu list.
3. Tap Network Settings.
4. Tap Location.
5. Tap ↑ or ↓ to navigate the list of locations.
6. Tap Select next to the preferred location.
7. Tap ← to save and exit.
8. Tap ← to save and exit the menu.

### 8-9-4-2 Device Registration

To be able to upload and browse snapshots with the Cloud, the device must first be registered with cloud services.

**COMING SOON**

**MEDIA IS COPIED TO THE CLOUD AND DELETED FROM THE DEVICE DURING EXPORT AND CANNOT BE RECOVERED USING THE DEVICE. ENSURE EXPORT IS NECESSARY BEFORE EXPORTING.**

**DO NOT POWER OFF THE DEVICE DURING THE EXPORT. POWERING OFF THE DEVICE DURING EXPORT MAY CORRUPT THE TRANSFER AND CAUSE A LOSS OF MEDIA AND/OR DATA.**

### 8-9-4-3 Enable/Disable Wi-Fi Settings

Enable or disable Wi-Fi as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Network Settings appears in the menu list.
3. Tap Network Settings.
4. If Wi-Fi is disabled, tap Enable Wi-Fi to connect to a network. If Wi-Fi is enabled, tap Disable Wi-Fi to disconnect from the network.
5. Tap Select Wi-Fi. The device will scan for nearby Wi-Fi networks. After the scan, a list of the found networks will be shown. Move closer to the Wi-Fi access point if the service is not working.
6. Select the desired network. A keyboard appears.
7. Use the keyboard by tapping the touchscreen to input the password.
8. Tap ✓ save changes and close the keyboard. Tap ▲ to access uppercase letter and symbols. Tap X to cancel changes and close the keyboard.
9. Tap ← to save and exit.
10. Tap ← to save and exit the menu.

Only secure Wi-Fi networks are supported. Public Wi-Fi networks are not supported. The camera accepts Wi-Fi networks that require password input (not networks that require both username and password).

An icon representing the Wi-Fi connection status and strength is shown to the right of the settings button:



Excellent Wi-Fi connection



Poor Wi-Fi connection



Good Wi-Fi connection



No Wi-Fi connection



Okay Wi-Fi connection

**IN ORDER TO ENSURE A RELIABLE WI-FI CONNECTION AND STABLE DATA TRANSMISSION, ENSURE THAT THE CONNECTION DISTANCE IS WITHIN 10 METERS (33 FEET) AND THERE ARE NO OBSTACLES, SUCH AS PARTITIONS, ETC., BETWEEN THE DEVICE AND THE TRANSMITTER.**

### 8-9-5 Language Settings

English is the default language of the device. Change the device language as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Advanced Settings appears in the menu list.
3. Tap Advanced Settings.
4. Tap Change next to Language.
5. Tap ↑ or ↓ to navigate the list of languages: English, Czech, Danish, Dutch, German, Russian, Spanish, Estonian, Finnish, French, Hungarian, Italian, Chinese, Japanese, Norwegian, Polish, Portuguese, Swedish, Turkish, Vietnamese, Thai, Korean, and Greek.
6. Tap Select next to the preferred time zone.
7. Tap ← to save and exit.
8. Tap ← to save and exit the menu.

### 8-9-6 Advanced Filter Settings

Users can expand the available filters for each mode as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Advanced Settings appears in the menu list.
3. Tap Advanced Settings.
4. Tap Change next to Language.
5. Tap More until Available Filters appears in the menu list.
6. Tap the button next to Available Filters to expand the range. Optimal means only the best filters for a specific mode will be available. Full means all filters will be available for all modes.
7. Tap ← to save and exit the menu.

The user must ensure they choose the correct filter for the mode they are using or the reading will be off. Users should test inspection areas with the different available filters to see which filter gives the best results.

Change the filter type by using the touchscreen to tap the filter button in the top right corner.

**SELECT THE APPROPRIATE MODE FILTER AND DISTANCE BEFORE CAPTURING MEDIA OR PERFORMING ACOUSTIC ANALYSIS.**

### 8-9-7 Factory Reset the device

Users can perform a factory reset of the device as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Advanced Settings appears in the menu list.
3. Tap Advanced Settings.
4. Tap Activate next to Reset Settings.
5. Tap Reset to revert to default settings. The device resets and the user must go through the device setup wizard. Tap Cancel to cancel reset.

**PERFORMING A FACTORY RESET ERASES CUSTOMIZED USER CONFIGURATIONS STORED ON THE DEVICE AND RESTORES THE ORIGINAL DEFAULT SETTINGS PROGRAMMED BY THE MANUFACTURER. THE PROCESS CANNOT BE UNDONE.**

**PERFORMING A FACTORY RESET DOES NOT ERASE IMAGES STORED TO THE INTERNAL STORAGE OF THE DEVICE. PERFORMING A FACTORY RESET DOES NOT ERASE IMAGES STORED TO THE REMOVABLE USB DRIVE.**

### 8-9-8 Remove All Data

Remove all collected data and reset the device registration as follows:

1. Using the touchscreen, tap the Settings icon to open the main menu.
2. Tap More until Advanced Settings appears in the menu list.
3. Tap Advanced Settings.
4. Tap Activate next to Remove All Data.
5. Tap OK to remove data and registration. The device resets and the user must go through the device setup wizard. Tap Cancel to cancel removal.

**PERFORMING A DATA REMOVAL ERASES CUSTOMIZED USER CONFIGURATIONS STORED ON THE DEVICE AND RESTORES THE ORIGINAL DEFAULT SETTINGS PROGRAMMED BY THE MANUFACTURER. THE PROCESS CANNOT BE UNDONE.**

**PERFORMING A DATA REMOVAL ERASES IMAGES STORED TO THE INTERNAL STORAGE OF THE DEVICE. PERFORMING A DATA REMOVAL DOES NOT ERASE IMAGES STORED TO THE REMOVABLE USB DRIVE.**

## 8-9-9 Device Information

Device informations and the current software version is visible at the bottom of the main menu.

## 8-9-10 Device Software Upgrade

The device may periodically need a software upgrade or patch. Users can update to the latest software version as follows either remotely or by using a USB drive.

### 8-9-10-1 Remote Update

When connected to the Internet via Wi-Fi, the device will attempt to automatically download software updates available in the Cloud. If an update has been downloaded, it will be applied the next time the device is started. The current software version is visible at the bottom of the main menu.

**THE UPGRADE PROCESS TAKES ABOUT 15 MINUTES. ENSURE THE DEVICE IS CHARGED BEFORE UPGRADING. IF THE DEVICE LOSES POWER DURING THE UPGRADE, THE UPGRADE WILL FAIL AND THE DEVICE MIGHT BE UNUSABLE.**

### 8-9-10-2 Remote Update

In case the remote update feature cannot be used, the device can also be updated using a USB drive.

1. Contact customer service to receive the latest software upgrade or patch.
2. Place the software update file provided by customer support in the root directory of the USB drive (i.e., not in any folder). Do not rename the file.
3. Insert a USB drive into the USB slot of the device. The device should automatically detect the USB drive and show a prompt.
4. Using the touchscreen, tap Yes to copy the update to the device. Do not remove the USB drive while the update is being copied.
5. Restart the device to apply the update.
6. Remove the USB drive.

**THE UPGRADE PROCESS TAKES ABOUT 15 MINUTES. ENSURE THE DEVICE IS CHARGED BEFORE UPGRADING. IF THE DEVICE LOSES POWER DURING THE UPGRADE, THE UPGRADE WILL FAIL AND THE DEVICE MIGHT BE UNUSABLE.**

## 9 Device Usage Techniques

### 9-1 General Usage

When using the battery pack, keep the battery pack inside the carrying bag and carry the bag with the strap over the shoulder and across the body to free up the hands for using the device.

**CONSULT YOUR SAFETY OFFICER ABOUT USING THE DEVICE AND THE CARRYING BAG WITH THE STRAP IN YOUR FACILITY OR WORKING ENVIRONMENT. THE STRAP IS RIGID AND DOES NOT HAVE A SEPARATE SAFETY RELEASE MECHANISM, SO SPECIAL CARE SHOULD BE USED AROUND HEAVY MACHINERY.**



When not in use the device should always be placed securely inside the carrying bag to prevent it from falling. Always put the device inside the carrying bag when both hands are need for other tasks, such as climbing ladders. Ensure that the camera is placed in such a way inside the bag that it does not fall out.

Use the lanyard to prevent accidentally drops. Do not carry or lift the device by the lanyard. Always carry the device by the handle or the chassis.

Always keep the USB port covered. Water must not enter the device, as this will damage the electronics inside.

Protect the microphone array at all times.

Do not touch the video camera lens or the conical microphone holes.

### 9-2 Inspection Techniques

#### 9-2-1 Frequency Filters

Filters are useful for locating different types of sound sources by limiting the frequency range of sound sources displayed on screen. Background noise, e.g. traffic or factory noise, is often dominant at low frequencies, while many interesting phenomena have higher frequencies. Typically, the higher the frequency range is, the more local the sources of interest are - even in the presence of a lot of background noise.

The device marks the highest frequency with a crosshair. It is best practice to do more in-depth analysis on the marked region as this can indicate a leak or discharge.

Users should test the inspection area with different filters to see which filter gives the best results. Change the filter type by using the touchscreen to tap the filter button in the top right corner.

For air leak detection, use the High and Ultra filters to block out audible background noise. The SLM filter emphasizes the sound from leaks by further filtering out many typical industrial noise sources.

For Partial discharge inspections, the Norm filter filters out low frequency background noise. Use the High and Ultra filters to block out audible background noise.

### **9-2-2 Weak and Strong Sounds**

In the Single-Source mode, the device shows only the strongest sound source in the field of view with a crosshair. The strongest source depends on the currently selected filter; different filters might display different sound sources.

In the Multi-Source mode, the device shows not only the strongest sound source, but also weaker sound sources. The strongest sound source is the field of view is still marked with a crosshair. Sound sources considerably weaker than the strongest source will not be shown. The multi-source mode is useful for locating weaker sound sources.

In order to see weaker sound sources in the presence of a strong sound source, move or rotate the camera so that the strong sound source is clearly outside the field of view. Users can also use the zoom feature to limit the field of view.

Always keep in mind that any analysis is derived from the location marked by the crosshair on the display.

### **9-2-3 Actual versus Reflected Sound**

The device shows not only actual physical sound sources, but also sound reflections. In order to verify a source shown on the display is an actual sound source and not a reflection, move around to look at the source from different directions. If the location of the source remains consistent, the source is an actual sound source. If the location of the source moves along a surface or completely disappears, the source is probably a reflection.

As the multi-source mode shows strong and weak sound sources, it can be useful for finding actual and reflected sound sources. By moving the device around the user may be able to tell which of the sources on screen are reflections.

If an actual sound source is large, e.g. a large vibrating surface, the source shown on the display might be smaller than the actual source. The source might in this case also move around as you move around the surface, depending on which point of the surface is closest to the device. Be sure to adjust the filters on the device to get an accurate picture of the sound source.



#### **9-2-4 Directional Sound**

It is often useful to take snapshots of interesting sound sources from several different directions. The exact location of the source is easier to determine when viewed from different angles. Sound sources can also be directional, meaning that the sound level will differ depending on the direction.

#### **9-2-5 Sound Saving**

The the capture button is pressed the sound coming from the direction of the crosshair is saved. The default is to save 2 seconds of sound, from the moment the capture button is pressed backwards. Keep the camera steady for a few seconds before taking a snapshot, in order to get a clear signal from the source of interest.

If there is a sporadic event, take a snapshot right when or right after the event is observed in order to record the signal of the event.

#### **9-2-6 Recommended Distance**

The minimum recommended sound source distance for the device is approximately 0.3 meters (1.0 ft). If the distance is shorter than this, the location of sound sources may not be accurately displayed. In addition, the optical camera will not be focused at such short distances.

There is no specific upper limit for the distance at which the device can be used. In practical cases, the distance is often limited to approximately 130 meters (430 ft), but strong sound sources in an otherwise quiet environment can be detected at even larger distances. Respectively, weak sound sources usually require closer proximity.

## 10 Cleaning and Maintenance

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**CONTACT CUSTOMER SERVICE TO SCHEDULE REGULAR MAINTENANCE.**

### 10-1 Cleaning the device

Dust, grease, and fingerprints produce harmful substances and can lead to a decline in performance, or cause scratches. However, cleaning of the microphone array is not suggested to be performed by the user, as this may damage the device. Contact customer service to schedule maintenance.

If the user decides to clean the microphone array: indirect low pressure air from a distance can be used to blow particles away from the conical holes of the microphones. No direct and/or highly compressed air should be applied to the microphone array. If the suggested method doesn't work and the microphone array is still badly soiled, contact customer service to schedule maintenance. ICI is not responsible for any damage caused by the user in an attempt to clean the microphone array.

Do not use corrosive chemicals on the device.

### 10-2 Disinfecting the Camera Surface

Do not use corrosive cleaning solutions on the optical glass components. It is recommended to disinfect the camera surface regularly with a non-corrosive sanitizing product. Follow the directions provided by the manufacturer of the cleaning solution. Adhere to the sanitation protocols and cleaning schedule set forth by the employer.

### 10-3 Device Calibration

It is recommended to have the device(s) re-calibrated annually. Contact customer service to schedule maintenance.

### 10-4 Maintenance

Do not try to repair or open the enclosure of the device or the battery. Do not use any damaged devices, batteries or cords. Protect the device and accessories from dirt, dust, impacts and liquids.

The intended usage conditions and instructions are described in this user manual. Please read and follow the instructions carefully in order to avoid damage to the device and accessories. If problems occur, contact your distributor for support.

### **10-5 Storage**

When the equipment is not in use, the device should be placed in a dust-free and moisture-free environment with a stable temperature and humidity.

**DO NOT USE CORROSIVE CLEANING SOLUTIONS ON THE OPTICAL GLASS COMPONENTS. DISINFECT THE CAMERA SURFACE REGULARLY WITH A NON-CORROSIVE SANITIZING PRODUCT.**

**CALIBRATE YOUR DEVICES ANNUALLY. CONTACT CUSTOMER SERVICE TO SCHEDULE MAINTENANCE.**

## 11 Troubleshooting

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If the user encounters any problems while using the imager, refer to the following options. If the problem persists, disconnect the power and contact the customer support department.

### 11-1 Device does not power on

- Package 1: Ensure battery is installed
- Package 1: Replace old battery
- Package 1: Charge battery
- Package 2: Ensure battery pack is properly connected
- Package 2: Replace old battery pack
- Package 2: Charge the battery pack

### 11-2 Device shuts off unexpectedly

- Package 1: Replace old battery
- Package 1: Charge battery
- Package 2: Replace old battery pack
- Package 2: Charge the battery pack

### 11-3 No image

- If lens is foggy, use professional equipment to clean the lens

### 11-4 Unclear or dark visible images

- Turn on lights in imaging area
- Use a flashlight
- If lens is foggy, use professional equipment to clean the lens

### 11-5 Camera out of focus

- Move closer to the object
- If lens is foggy, use professional equipment to clean the lens

**11-6 Data is missing or has strange readings**

- Turn off the device; then, turn it back on
- To ensure the accuracy of measurements, you are recommended to wait for 5 to 10 minutes after turning on the device before taking measurements.
- Ensure the correct mode is selected:
  - Air Mode: used for localization of compressed air leaks.
  - Power Mode: used for localization and classification of high-voltage and medium-voltage partial discharges.
- Device is at proper height
- Adjust emissivity
- Adjust ambient temperature
- Adjust humidity
- Adjust distance
- Send the device in for recalibration

**11-7 Memory error**

- Insert USB drive

## 12 About ICI

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ICI manufactures complete systems and software. We can provide complete engineering, software, and OEM solutions. Our Fortune 500 clients rely on us for infrared equipment and thermography training (which we offer through the Infrared Training Institute).

In addition to providing custom germanium, silica, and sapphire optics, we also build windows for enclosures, as well as custom pan and tilt units. We can even provide customizable explosion-proof systems.

Our knowledge and experience stems from years of using infrared imaging and temperature measurement instruments to provide solutions to: managers, engineers, scientists, inspectors and operators in space, power companies, medical, pulp and paper, food industry, research and development, and various process industries. You can see our products and services used in industrial, commercial, and government applications worldwide. Additionally, our ICI 7320 was awarded "Product of the Month" by NASA\*. Originally named Texas Infrared (still DBA), Infrared Cameras, Inc. has been in business since March, 1995.

Thank you for your dedicated and continued support.

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You may reach a customer care representative by phone or email during regular business hours: Monday – Friday 8:00AM - 5:00PM CST.

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