

i-ALERT[®] Monitoring Solution



Installation, Operation, and Maintenance Manual
i-ALERT[®]3

Table of Contents

1 Introduction and Safety	2
1.1 Introduction.....	2
1.2 Inspect the package	2
1.3 Limited warranty	2
1.4 Safety	2
1.5 Safety terminology and symbols	3
1.6 Safety regulations for Ex-approved products in potentially explosive atmosphere	3
1.7 Product approval standards	4
2 Product Description	8
2.1 General description i-ALERT®3 Condition Monitor.....	8
3 Installation.....	10
3.1 Attach the i-ALERT®3 Equipment Health Monitor to the machine.....	10
3.2 Battery Pack Installation and Replacement.....	11
4 Commissioning, Startup, Operation, and Shutdown	13
4.1 Activate the i-ALERT®3 Equipment Health Monitor.....	13
4.2 i-ALERT®3 Equipment Health Monitor routine operation.....	14
5 Maintenance.....	15
5.1 Guidelines for i-ALERT®3 Equipment Health Monitor disposal	15
5.2 Cleaning instructions.....	15
6 Troubleshooting	17
6.1 i-ALERT®3 Equipment Health Monitor troubleshooting	17
Appendix A Appendix	18
A.1	18

1 Introduction and Safety

1.1 Introduction

Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



CAUTION:

Failure to observe the instructions contained in this manual could result in personal injury and/or property damage, and may void the warranty. Read this manual carefully before installing and using the product.

NOTICE:

Save this manual for future reference and keep it readily available.

1.2 Inspect the package

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. File a claim with the shipping company if anything is out of order.
If the product has been picked up at a distributor, make a claim directly to the distributor.

1.3 Limited warranty

ITT Goulds Pumps, Inc. ("Goulds") warrants to the original purchaser that your i-ALERT[®]3 Equipment Health Monitor (the "Product") shall be free from defects in materials and workmanship under normal use for a period of eighteen (18) months from the date of shipment or twelve (12) months from date of start-up, depending on which date is earliest. This Limited Warranty does not cover software embedded in the Product and the services provided by Goulds to owners of the Product.

Battery life is covered under the Limited Warranty, provided it is used under "normal operating conditions" (Refer to • [Battery life on page 8](#)). It is your responsibility to backup any data, software, or other materials you may have stored or preserved on the Product. It is likely that such data, software, or other materials will be lost or reformatted during service, and Goulds will not be responsible for any such damage or loss. Recovery and reinstallation of software programs and user data are not covered under this Limited Warranty. The Limited Warranty does not apply to any software, even if packaged or sold with the Product or embedded in the Product. We are not liable for any damage a mobile app may inflict on companion product.

1.4 Safety



WARNING:

- The operator must be aware of the pumpage and take appropriate safety precautions to prevent physical injury.
-

- Risk of death, serious personal injury, and property damage. Installing, operating, or maintaining the unit using any method not prescribed in this manual is prohibited. Prohibited methods include any modification to the equipment or use of parts not provided by ITT. If there is any uncertainty regarding the appropriate use of the equipment, please contact an ITT representative before proceeding.
- Installation, Operation and Maintenance manuals clearly identify accepted methods for disassembling units. These methods must be adhered to.

Observe all safety messages highlighted in other sections of this manual.




1.5 Safety terminology and symbols

About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product
- Product malfunction

Hazard levels

Hazard level	Indication
 DANGER:	A hazardous situation which, if not avoided, will result in death or serious injury
 WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	<ul style="list-style-type: none"> • A potential situation which, if not avoided, could result in undesirable conditions • A practice not related to personal injury

1.6 Safety regulations for Ex-approved products in potentially explosive atmosphere

Description of ATEX

The ATEX directives are a specification enforced in EU for electrical and non-electrical equipment. ATEX deals with the control of potentially explosive atmospheres and the standards of equipment and protective systems used within these atmospheres. The relevance of the ATEX requirements is not limited to Europe. You can apply these guidelines to equipment installed in any potentially explosive atmosphere.

Description of SGS

The SGS Mark is proof of product compliance to North American safety standards. Authorities Having Jurisdiction(AHJs) and code officials across the US and Canada accept the SGS Listed Mark as proof of product compliance to published industry standards.

Description of IECEx

The IECEx certificates of conformity attest that a sample of the Ex product, have been independently tested and found to comply with the International Standards. It also attests that the manufacturing site has been audited to verify that the manufacturer's quality system meets IECEx requirements.

Safety regulations regarding the Battery

Do not charge, short circuit, crush, disassemble, heat above 100°C (212°F), incinerate or expose contents to water.

Personal requirements

ITT disclaims all responsibility for work done by untrained and unauthorized personnel.

These are the personnel requirements for Ex-approved products in potentially explosive atmospheres:

- All users must know about the risks of electric current and the chemical and physical characteristics of the gas and/or vapor present in hazardous areas.
- The installation for Ex-approved products must be made in conformity to the international or national standards (IEC/EN 60079-17).

1.7 Product approval standards

<https://www.i-alert.com/support/technical-information/country-certifications/>

Radio Certifications

North America USA and Canada certifications

Standards tested to:

UL 913

UL 60079-0

UL 60079-11

CSA-C22.2 No. 157-92

CSA-C22.2 No. 60079-0:11

CSA-C22.2 No. 60079-11:14

Markings North America:

Class I, II, III; Division 1; Groups A, B, C, D, E, F, G T4

Class I; Zone 0, AEx ia IIC T4 Ga

Class I, Zone 0, Ex ia IIC T4 Ga

Ambient temperature: -20°C to 60°C | -4°F to 140°F



Figure 2: Safety Labels

Radio Certifications

Electromagnetic Compatibility Certifications (EMC)

Standards for testing i-ALERT®3 Equipment Health Monitor

Radiated Emissions

FCC 47CFR 15 Subpart B:2014

EN 61000-6-4:2007

Electro-Static Discharge Immunity Test

(EN 61000-4-2:1995 per EN 61000-6-2:2007 +AMD 1 Cor 12)

(EN 61000-4-2:2009 per ETSI EN 301 489-1 V1.9.2

(EN 61000-4-3:2002 per EN 61000-6-2:2007 +AMD 1 Cor 12)

(EN 61000-4-3:2006+A1:2008+A2:2010 per ETSI EN 301 489-1 V1.9.2

Power Frequency Magnetic Field Immunity Test

(EN 61000-4-8 1993 per EN 61000-6-2:2007 +AMD 1 Cor 12)

Standards for testing Bluetooth radio

Industry Canada, Interference-Causing Equipment Standard for Information Technology Equipment (ITE)

ICES-003 Issue 5 August 2012

Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments CENELEC EN 61000-6-2:2007 +AMD 1 Cor 12

Electromagnetic compatibility (EMC) Generic standards - Emission standard for industrial environments CENELEC EN 61000-6-4:2007

Electromagnetic Compatibility (EMC) standard for radio equipment and services;

Part 1: Common technical requirements

ETSI EN 301 489-1 V1.9.2 (2011-09)

ElectroMagnetic Compatibility (EMC) standard for radio equipment;

Part 17: Specific conditions for Broadband Data Transmission Systems

ETSI EN 301 489-17 V2.2.1 (2012-09)



Figure 3: Example Certification Label

2 Product Description

2.1 General description i-ALERT®3 Condition Monitor

Description

The i-ALERT®3 Equipment Health Monitor is a compact, battery-operated monitoring device that continuously measures the vibration and temperature of the machine. The Monitor also measures the magnetic flux of the motor driving the equipment, if present. The i-ALERT®3 Equipment Health Monitor uses a blinking red LED and wireless notification to alert the machine operator when the machine exceeds vibration and temperature limits. This allows the machine operator to make changes to the process or the machine before catastrophic failure occurs. The Equipment Health Monitor is also equipped with a single green LED to indicate when it is operational and has sufficient battery life.

The i-ALERT®3 Equipment Health Monitor also contains a Bluetooth radio that communicates to certain Bluetooth equipped devices through a mobile application.

Data is shared between the i-ALERT®3 Equipment Health Monitor, the mobile application, the gateway, and the data servers.

The i-ALERT®3 Equipment Health Monitor will communicate sensor related data (such as vibration, temperature, motor flux, runtime information, and device statistics) stored in the device to the mobile application or gateway. The mobile application or gateway will send commands to the device.

The Mobile application will back up device data as well as app usage information on the data servers.

The data servers will send the mobile application equipment technical data.

For full details about data storage and rights please review the Privacy Policy.

Alarm mode

The i-ALERT®3 Equipment Health Monitor enters alarm mode when either vibration or temperature limits are exceeded. Alarm mode is indicated with 1 (one) red flashing LED with a 5 (five) second interval.

Warning and alarm values

Measurement	Warning/Alarm Range
Temperature Alarm	-20°C - 110°C -4°F - 230°F
Temperature Warning	-20°C - 110°C -4°F - 230°F
Vibration Alarm	0.03 - 5.0 ips
Vibration Warning	0.03 - 5.0 ips

NOTICE:

Warning and Alarm thresholds are fully assignable.

Battery life

The i-ALERT®3 Equipment Health Monitor battery (PN K21912A) is replaceable. The battery life is not covered as part of the standard 5-year pump warranty, but is covered under the i-ALERT®3 Limited Warranty, provided it is used under "normal operating conditions". The following specifies the "normal operating conditions" in which the Limited Warranty is valid:

- Temperature (max sustained mounted surface temperature): 85°C | 185°F
- Dashboard connections (including trend download): Once per day (max)

- FFT and Time Waveform usage: One tri-axial request per 14 days (max)
- Operation time in Alarm: < 50% of time

3 Installation

3.1 Attach the i-ALERT[®]3 Equipment Health Monitor to the machine



CAUTION:

Always wear protective gloves. The equipment and the i-ALERT[®]3 device can be hot.

Mounting options



Figure 4: Mounting options

i-FRAME with Center Hole	i-FRAME with Adapter Mount	Drill and Tap	Epoxy with Adapter Mount ¹	Magnetic Mounting Adapter
Screw: M6x 1 x 22.23mm 1/4-28 x 0.875in	Screw 1: M6x 1 x 19.05mm 1/4-28 x 0.75in Screw 2: M6x 1 x 9.53mm 1/4-28 x 0.375in	Screw: M6x 1 x 22.23mm 1/4-28 x 0.875in Tap: M6 x 1 x 6.35mm 1/4-28 x 0.25in dp	Screw 1: M6x 1 x 9.53mm 1/4-28 x 0.375in	Screw 1: M6x 1 x 22.23mm 1/4-28 x 0.875in
Temperature: ****	Temperature: ****	Temperature: ****	Temperature: ***	Temperature: **
Vibration: ****	Vibration: ****	Vibration: ****	Vibration: ***	Vibration: **
Prep Time: ****	Prep Time: ***	Prep Time: **	Prep Time: ***	Prep Time: ****

Epoxy¹ Not included

Legend: ** = Good

*** = Better

**** = Best

Epoxy recommendation

The epoxy used should be a two-part putty in stick form (not liquid) type, which contains metallic particles in order to enhance heat transfer. Epoxy of this type is commonly found at hardware and home improvement stores. The temperature range required and specific application determine the epoxy choice. Mount i-ALERT[®]3 device to base using provided 1/4-28 cap screw. Torque screw to 6 lb-ft. using a 5/32" size Allen Head wrench prior to the application of the epoxy.

Preferred location selection

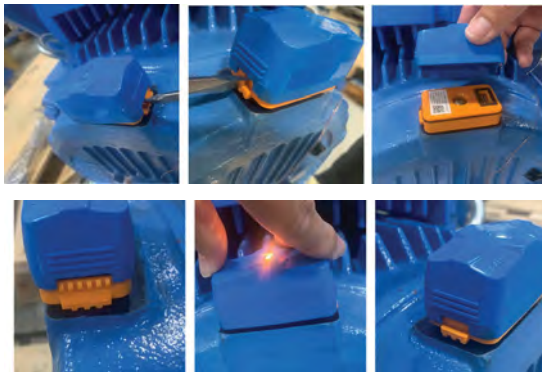
The i-ALERT[®]3 device should be mounted on pumps or other rotating equipment as shown in the first image under “Mounting Options” (above) with the LED’s aligned with the shaft in order to maintain the preferred axis orientation shown below. Care should be taken to locate the device over the bearings, and to avoid placement on compliant surfaces such as coupling guards, and other light sheet metal. It is preferable to have one device over each bearing, but if that is not possible, monitoring the drive end is essential.



Figure 5: Location selection

The temperature seen by the i-ALERT[®]3 temperature sensor may be different from the surface temperature of the object to which it is mounted. Mounting the i-ALERT[®]3 directly to the machine will give the most accurate reading. The differences are due to the temperature gradient that exists between the i-ALERT[®]3 and the machines surface. This gradient can be greater when the ambient temperature is very different from the surface temperature.

3.2 Battery Pack Installation and Replacement



Battery Pack Removal

- Insert Flat Bladed tool into Snap-fit interface and twist to disengage Snap-fit on both Ends
- Remove Battery Pack from Sensor Module

Battery Pack Installation

- Align the connector on the Battery Pack to the connector on the Sensor Module
- Firmly Press Battery Pack onto Sensor Module until it 'clicks' in place

CAUTION:

Battery Safety Guidelines

- The battery can not be replaced with anything other than the proprietary battery pack (K21912A).
- Using any other battery pack will void warranty and replacement of a battery with an incorrect type that can defeat a safeguard; would cause issues in functionality and safety risk.

- Battery disposal requirements should be attained by the local authorities. Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion is not liable by ITT Goulds Pumps Inc.
- Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas is not liable to ITT Goulds Pumps Inc.
- Battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas voids our installation requirements.

App installation and registration

For installation guidance, video links can be found at the following site: <http://www.i-ALERT.com>

Registration can be completed on the dedicated portal at <https://www.i-alert.ai>

Registration can also be completed on the Mobile App.

To download the latest App, search for " i-ALERT®3 condition monitor" in the Apple App Store.



To access the App it is necessary to create an account using a valid email in the registration tab on the login page.

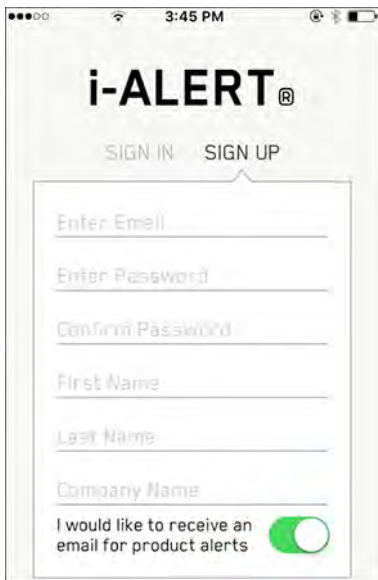


Figure 6: i-ALERT®3 registration

4 Commissioning, Startup, Operation, and Shutdown

4.1 Activate the i-ALERT[®]3 Equipment Health Monitor

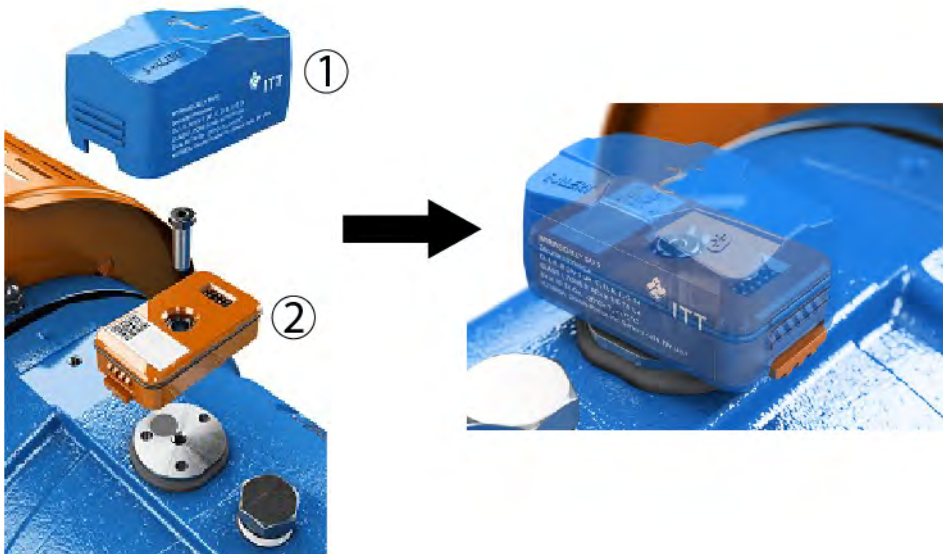


Figure 7: i-ALERT[®]3 Equipment Health Monitor activation

Steps to activate the i-ALERT[®]3 Equipment Health Monitor

1. Place the battery module (1) on the sensor module (2)
2. Once the two modules are collapsed into one the i-ALERT[®]3 will turn on
3. When activated a sequence of flashing LEDs will start to indicate that the unit is powered on.
4. At this state the unit needs to be connected by a smart device using the i-ALERT application or an i-ALERT Gateway to start condition monitoring functionalities.



WARNING:

- Contains Lithium battery.
- Do not crush or disassemble.
- Never heat the condition monitor to temperatures in excess of 100°C | 212°F. Heating to these temperatures could result in death or serious injury.

NOTICE:

Refer to [3.2 Battery Pack Installation and Replacement on page 11](#) for pro Battery Pack Replacement.



CAUTION:

Always wear protective gloves. The pump and condition monitor can be hot.

4.2 i-ALERT®3 Equipment Health Monitor routine operation

Measurement interval

The measurement interval for the condition monitor during normal and alarm operation is 5 minutes.

When the monitor measures a reading beyond the specified temperature and vibration limits, the appropriate red LED flashes. After the process or pump condition that causes the alarm is corrected, the condition monitor returns to normal mode after one normal-level measurement.

Alarm mode

The condition monitor's alarm mode is activated after a threshold is exceeded. When the alarm mode is on, you should investigate the cause of the condition and make necessary corrections in a timely manner.

Wireless integration

A Bluetooth Low Energy Radio is utilized to communicate condition monitoring information to a mobile Smart device or the I-ALERT Gateway that the operator can easily view and react to.

LED Operation

Refer to [A.1 on page 18](#) for detailed LED guide.

5 Maintenance

5.1 Guidelines for i-ALERT[®]3 Equipment Health Monitor disposal

Precautions



WARNING:

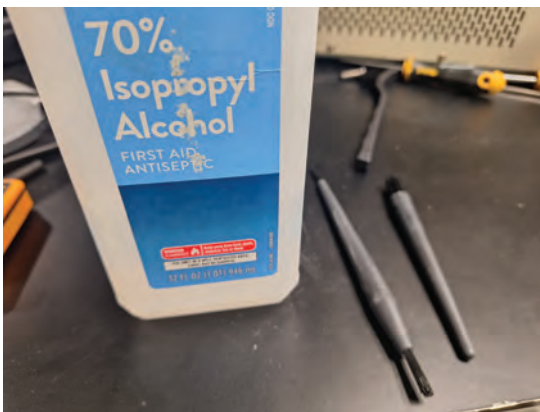
- Never heat the condition monitor to temperatures in excess of 100°C | 212°F. Heating to these temperatures could result in death or serious injury.
- Never dispose of the condition monitor in a fire. This could result in death or serious injury.

Guidelines

This Product Contains Lithium Manganese therefore the local Waste management companies can provide assistance in the disposal of the device that contain this type of battery.

5.2 Cleaning instructions

In case of ingress in an extremely dusty or dirty environment, the connector pins on both the battery module and the sensor module can be cleaned.



- Isopropyl alcohol – 70% minimum
- Electronics wipes OR Fine-toothed brush

Figure 8: Materials



Figure 9: Procedure

1. Remove the battery pack from the sensor module
2. Lightly dampen the brush or wipe with isopropyl alcohol
3. Wipe away any contaminant present on the connector pins (a brush is recommended for easy cleaning of the recessed connector on the sensor module)
4. Repeat steps 2 and 3 until contaminant is removed completely
5. Wait for the remaining isopropyl alcohol on the pins to dry
6. Reattach the battery pack to the sensor module and verify that the i-ALERT®3 Health Monitor successfully powers on

6 Troubleshooting

6.1 i-ALERT[®]3 Equipment Health Monitor troubleshooting

Symptom	Cause	Remedy
The unit is in sleep mode.	Activate the condition monitor using magnet.	
The unit is malfunctioning.	Consult your ITT representative for a warranty replacement.	
There are no red, green, or blue flashing LED.	The battery is dead.	Replace the battery pack.
	The unit is malfunctioning.	Consult your ITT representative for a warranty replacement.
The red LED is flashing, but the temperature and vibration are at acceptable levels.	The thresholds are set below normal operating limits.	Check the temperature and vibration levels and request new baseline. Or manually change alarm limits.
	The battery voltage is low.	Replace the battery pack.

For connection issues with smart devices, please visit www.i-ALERT.com

For ITT's privacy Policy, click here: <http://itt.com/privacy/>

For User SW License Agreement, click here: <https://www.i-alert.com/products/i-alert-app/app-privacy-policy/>

Appendix A Appendix

A.1

Table 1: Monitoring Status









Behavior	Display	Description
Purple, Blinking, Every 5 second		Sensor needs to connect to phone or gateway to sync. If condition persists: <ul style="list-style-type: none"> • A exempt direct connection with mobile app • If gateway only, assess range conditions (gateway may need to move or change orientation) See also: Bluetooth Connection Events
Green, Blinking, Every 5 seconds		Sensor synced; measurements will now be recorded.
Yellow, Blinking, Every 5 Seconds		Sensor entered either temperature or vibration warning. If unexpected, check warning thresholds.
Red, Blinking, Every 5 seconds		Sensor entered either temperature, vibration, or battery alarm. If unexpected, check battery level and alarm thresholds.



Table 2: Bluetooth Connection Events

Behavior	Display	Description
Blue, Blinking, Every second (Connection Established) Followed by		Sensor connected and is attempting to sync. If the purple LED does not eventually turn green, or reverts to purple unexpectedly: <ul style="list-style-type: none"> • Assess range conditions, especially if using gateway • Clean Pins • Replace with new battery pack

Behavior	Display	Description
		If sensor continues to not sync, unit is faulty
Purple, Blinking, Every 5 seconds		<p>If the purple LED does not eventually turn green, or reverts to purple unexpectedly:</p> <ul style="list-style-type: none"> • Assess range conditions, especially if using gateway • Clean Pins • Replace with new battery pack <p>If sensor continues to not sync, unit is faulty</p>
<p>Blue, Blinking, Every second (Connection Established)</p> <p>Followed by</p> <p>Green, Blinking, Every 5 seconds</p>		<p>Sensor connected and synced, no alarm or warning reached.</p> <p>Sensor is in the middle of a BLE transfer, which results from a user request initiated via app/gateway or if there is a scheduled interaction from the gateway (autonomous).</p>
<p>Blue, Blinking, Every second (Connection Established)</p> <p>Followed by</p> <p>Yellow, Blinking, Every 5 seconds</p>		<p>Sensor connected and synced while in warning status.</p> <p>Sensor is in the middle of a BLE transfer, which results from a user request initiated via app/gateway or if there is a scheduled interaction from the gateway (autonomous).</p>
<p>Blue, Blinking, Every second (Connection Established)</p> <p>Followed by</p> <p>Red, Blinking, Every 5 seconds</p>		<p>Sensor connected and synced while in alarm status.</p> <p>Sensor is in the middle of a BLE transfer, which results from a user request initiated via app/gateway or if there is a scheduled interaction from the gateway (autonomous).</p>

Behavior	Display	Description
<p>Blue, Lit for 1 second (Establishing Connection)</p> <p>Followed by</p> <p>Blue, Blinking, Every second (Connection Established)</p>	 <p>Lit for 1 Second</p>	<p>Sensor connecting to app or gateway. Will proceed</p> <p>If unexpected connection occurs while using the mobile app, sensor is connecting to a gateway or other client in the vicinity.</p>

Table 3: Sensor Update and Reset

Behavior	Display	Description
Bright White, Every 2 seconds		<p>Sensor started OTA update process and is waiting for a connection from the client (app or gateway).</p> <p>The Red LED sequence begins after connection; LED will revert to Bright White if the sensor loses connection.</p> <p>If the sensor fails to reconnect, all LED sequences will stop.</p> <ul style="list-style-type: none"> • Repower the sensor to retry the connection. • Assess range conditions if issue persists.
Red, Double Blink, Every 2 seconds		<p>Sensor connected and started OTA update transfer. This sequence happens after the Bright White sequence but will return to Bright White if the connection is lost.</p> <p>After the update is complete, the rapid bootup sequence will start and the sensor will flash purple while waiting for a sync.</p>
All colors in rapid sequence	<p>Bootup sequence after the sensor is powered or after a reset.</p> <p>Resets can be requested (factory reset, which reverts settings) or performed automatically after an update (keeps settings).</p> <p>If this happens repeatedly while:</p> <ul style="list-style-type: none"> • User did not replace battery • User did not request factory reset • OTA update did not precede bootup sequence <p>Then:</p> <ul style="list-style-type: none"> • Check and clean the pins on sensor module and repower • Replace with new battery pack if cleaning does not prevent the reset from repeatedly occurring <p>If the issue persists, then contact i-ALERT representative.</p>	

Visit our website for the latest version of this document and more information:

<https://www.i-alert.com/products/i-alert3-sensor/>



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The original instruction is in English. All non-English instructions are translations of the original instruction.