RLGD-100
Remote Laser Gas Detector
User Manual
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RLGD is an FPI registered trademark.

Warranty

This equipment is sold subject to the mutual agreement that it is warranted by us free from defects of material and of construction, and that our liability shall be limited to replacing or repairing at our factory (without charge, except for transportation), or at customer plant at our option, any material or construction in which defects become apparent within 12 months from shipment date, except in cases where quotations or acknowledgements provide for a shorter period. Components manufactured by others bear the warranty of their manufacturer. This warranty does not cover defects caused by wear, accident, misuse, neglect or repairs other than those performed by FPI or an authorized service center. We assume no liability for direct or indirect damages of any kind and the purchaser by the acceptance of the equipment will assume all liability for any damage which may result from its use or misuse.

We reserve the right to employ any suitable material in the manufacture of our apparatus, and to make any alterations in the dimensions, shape or weight of any parts, in so far as such alterations do not adversely affect our warranty.

Safety Messages

Your safety and the safety of others are very important. We have provided many important safety messages in this manual. Please read these messages carefully.

A safety message alerts you to potential hazards that could hurt you or others. Each safety message is associated with a safety alert symbol. These symbols are found in the manual and inside the instrument. The definition of these symbols is described below:

⚠️ WARNING/CAUTION: Refer to the instructions for details on the specific danger. These cautions warn of specific procedures which if not followed could cause bodily injury and/or damage the instrument.

⚠️ CAUTION: LASER RADIATION HAZARD: This warning is specific to laser light emission and associated dangers. Failure to heed the warning could result in serious eye damage.

⚠️ NOTE: Additional information and comments regarding a specific component or procedure are
highlighted in the form of a note.

⚠️ CAUTION: THE EQUIPMENT SHOULD ONLY BE USED FOR THE PURPOSE AND IN THE MANNER DESCRIBED IN THIS MANUAL.

IF YOU USE THE EQUIPMENT IN A MANNER OTHER THAN THAT FOR WHICH IT WAS INTENDED, UNPREDICTABLE BEHAVIOR COULD RESULT POSSIBLY ACCOMPANIED WITH HAZARDOUS CONSEQUENCES.

This manual provides information designed to guide you through the operation and maintenance of your new equipment. Please read this manual and keep it available.

Occasionally, some instruments are customized for a particular application or features and/or options added per customer requests. Please check the front of this manual for any additional information in the form of an addendum which discusses specific information, procedures, cautions and warnings that may be peculiar to your instrument.

Manuals do get lost. Additional manuals can be obtained from FPI at the address given below. Some of our manuals are available in electronic form via the internet. Please visit our website at: www.fpi-inc.com.

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Important Notice

The customer should ensure that the principle of operating of this instrument is well understood by the operator. Misuse of this equipment in any manner, tampering with its components, or unauthorized substitution of any component may adversely impair intrinsic safety of this instrument. No user serviceable components supplied within this instrument. Should the instrument not work properly, or indicate a fault or warning, please refer to the maintenance & troubleshooting section of this manual and contact FPI or an authorized service center immediately if further assistance required.

It is the customer's responsibility to ensure the operator is qualified to perform leak detection in the areas where flammable and hazardous gases probably exist. Since the use of this instrument is beyond the control of Focused Photonics Inc. (hereinafter referred to as FPI), no responsibility by FPI, its affiliates, and agents for damage or injury from misuse or neglect of this equipment is implied or assumed.

1. Laser Radiation Hazard

WARNING: DO NOT VIEW DIRECTLY OR WITH OPTICAL INSTRUMENT INTO THE LASER BEAM. DO NOT POINT LASER BEAM INTO ANOTHER PERSON’S EYE.

In conformity with IEC60825-1.2007, a class 1 laser is equipped on this instrument as the detector and a class 2 or 3R laser used as the spotter.

1. Class 1 lasers and laser systems are considered safe and incapable of producing damaging laser radiation levels during normal operation.

2. Class 2 is low-powered lasers with an output of approx. 1 MW continuous wave. All class 2 lasers operate in the visible portion of the electromagnetic spectrum of 400-700nm. Eye protection is usually afforded by aversion response and blink reflex (0.25 seconds). However, a class 2 laser beam could be hazardous if one were to intentionally expose the eyes for longer than 0.25 seconds.

3. Class 3R lasers operate at 1-5 MW of continuous wave. Direct viewing of the Class 3R laser beam could be hazardous to the eyes.

2. General Cautions

1. When operating the instrument, if any unusual odor or smoke is emitted, fire or possible short circuit is observed, power off the instrument immediately and remove the battery. Contact FPI or its authorized service center for assistance.

2. If any liquid enters into the instrument, or damage caused to the instrument body, do not use it. Keep using it may result in electric shock, fire or irreversible damage to the instrument. Contact FPI or its authorized service center for assistance.
3. When charging the battery, if any unusual odor or smoke is emitted, fire or possible short circuit is observed, unplug the charger cable immediately and remove the battery. Contact FPI or its authorized service center for assistance.

4. Do not charge or replace the battery in flammable or explosive atmospheres.

5. Do not insert any metallic or flammable material into the charger socket.

3. **General Warnings**

1. No attempt should be made to repair the instrument or substitute its components by other than trained personnel of FPI. Unauthorized action may impair intrinsic safety of the instrument or cause irreversible damage to the instrument.

2. Do use the shoulder strap and wrist strap to ease fatigue of the personnel who carrying the instrument for continuous operation. Accidental fall may result in damage to the instrument or hurting operator in the feet.

3. An accidental fall or severe strike may cause damage to the LCD screen and leaking of corrosive/toxic liquid. Do not touch, inhale and ensure no splash of the liquid into the eyes.

4. Do not use any battery on the instrument other than the specified battery.

5. Do not short circuit the terminals of the battery. Do not store the battery with metallic or flammable materials.

6. Do not try to disassemble or heat the battery, or cast the battery in fire. If the battery not properly function, contact FPI or its authorized service center for assistance.

7. If any liquid leak from the battery, do not touch, inhale and ensure no splash of the liquid into the eyes.

8. Do not use any other than the specified AC adapter. Unplug the power cable when the battery charging finished.

4. **General Notes**

1. When the instrument is not in use, power off and remove the battery.

2. If the instrument is operated in the environment with strong electromagnetic interference or electronic noise, the detection may not properly function.

3. If the instrument is placed in the environment with high hydrogen sulfide or salinity, may shorten its life.

4. Operating temperature of this instrument is -20 ~ +50°C and relative humidity is 30-95%, not to use in condensing environment.
5. Storage temperature of this instrument is -30～+60 °C and relative humidity is ≤90%, not to store in humid or condensing environment.

6. Keep the instrument, battery, changer and other accessories always in the specified toolkit during storage, transportation or return to repair.
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</tbody>
</table>
1 Introduction

1.1. Overview

RLGD-100 the Remote Laser Gas Detector is an easy-to-operate portable device, capable of detecting methane leaks by just pointing it towards the survey areas. Utilizing proprietary technology of Tunable Diode Laser Absorption Spectroscopy (TDLAS), the RLGD-100 detects methane only with no cross-interference and will not false alarm on other gases. Featured OFFSET function further to eliminate the methane in air from affecting detection accuracy.

The RLGD-100 detects methane leak in average concentration along sight line of the laser pass from a remote distance. It enables easy access to hard-to-reach locations, and provides protection for operator and industrial applications against a wide range of potential leak sources.

Fig.1-1 Field Survey

1.2. Features

- Detects methane from a remote distance up to 30 meters
- High sensitivity and ultra-fast response down to 0.1s
- Alarm on methane leak only, no cross-interference from other gases
- Self-test and automatic calibration before start-up
- Easy to operate and maintenance free
- Satisfy a continuous operation up to 8 hours
- Visual and audible alarms
- User-friendly LCD display
- Wireless data logging
1.3. Principle of Operation

The RLGD-100 is possible to detect methane leak from a remote distance by pointing it towards the survey areas that are hard-to-reach. The methane absorbs a fraction of the laser light, the residual light is then reflected by survey objectives (like pipeline, ceiling, wall and ground, etc.) to the detector. The methane concentration is proportional to laser absorption by it thus analyzed and reported as ppm.m.

![Working Principle](image)

**Fig.1-2 Working Principle**

1.4. Main Components

The RLGD-100 main components are shown below as Fig.1-3.
1.5. Technical Data

The RLGD-100 technical datas are shown in below table.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection Method</td>
<td>Tunable Diode Laser Absorption Spectroscopy (TDLAS)</td>
</tr>
<tr>
<td>Detection Gas</td>
<td>Methane (CH₄) or Methane contained gases</td>
</tr>
<tr>
<td>Measurement Range</td>
<td>0~50,000 ppm·m</td>
</tr>
<tr>
<td>Detection Distance</td>
<td>0.5~30 m nominal, actual detection distance may vary from objectives and conditions</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>5 ppm·m at distance from 0-10m</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±10% (100~1,000) ppm·m</td>
</tr>
<tr>
<td>Response Time</td>
<td>0.1s</td>
</tr>
<tr>
<td>Alarm Range</td>
<td>1~9,999 ppm·m</td>
</tr>
<tr>
<td>Alarm Modes</td>
<td>Audible tone, visual flash and concentration reported on the display</td>
</tr>
<tr>
<td>Selftest &amp; Calibration</td>
<td>Built-in self-test and automatic calibration before startup</td>
</tr>
<tr>
<td>Laser Safety Class</td>
<td>In conformity with IEC60825-1.2007, a class 1 laser is equipped on this instrument as the detector and a class 2 or 3R laser used as the spotter</td>
</tr>
<tr>
<td>Explosion Proof</td>
<td>Ex ib IIA T3 Gb</td>
</tr>
<tr>
<td>Enclosure Protection</td>
<td>IP54</td>
</tr>
<tr>
<td>Operating Conditions</td>
<td>(-20 ~ +50)°C, (30~95)%RH (non-condensing)</td>
</tr>
<tr>
<td>Storage Conditions</td>
<td>(-30 ~ +60) °C, ≤90%RH (non-condensing)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Rechargeable lithium-ion battery</td>
</tr>
<tr>
<td>Battery Duration</td>
<td>≥8h at 25 ⁰C under screen brightness level 3 and sound volume level 2</td>
</tr>
<tr>
<td>Battery Charging Time</td>
<td>≤4h</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt;1.5kg</td>
</tr>
</tbody>
</table>
# 2 Packing List

The RLGD-100 is shipped with all components and accessories packed in a carry case. Carefully unpack the instrument case and inspect it for damage. Immediately report any damage to the shipping agent.

The RLGD-100 consists of the Main Detector and other accessories including Battery, AC Adaptor, Charger, Shoulder Strap, Wrist Strap and User Manual.

<table>
<thead>
<tr>
<th>Main Detector</th>
<th>Battery</th>
<th>AC Adaptor</th>
<th>Charger</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Main Detector" /></td>
<td><img src="image2.png" alt="Battery" /></td>
<td><img src="image3.png" alt="AC Adaptor" /></td>
<td><img src="image4.png" alt="Charger" /></td>
</tr>
<tr>
<td>Shoulder Strap</td>
<td>Wrist Strap</td>
<td>User Manual</td>
<td></td>
</tr>
<tr>
<td><img src="image5.png" alt="Shoulder Strap" /></td>
<td><img src="image6.png" alt="Wrist Strap" /></td>
<td><img src="image7.png" alt="User Manual" /></td>
<td></td>
</tr>
</tbody>
</table>
3 Accessories & Fittings

This chapter is to demonstrate fully how to use below accessories & fittings.

- Shoulder Strap
- Wrist Strap
- Battery Charging
- Lens Cover

3.1. Shoulder Strap

*Step 1:* Thread the strap through mounting hole on the top of the handle.

![Shoulder Strap Step 1](image1.png)

*Step 2:* Thread the other end through the mounting hole on the side bottom of the handle.

![Shoulder Strap Step 2](image2.png)

*Step 3:* Move the buckle to adjust the strap to a proper length.

![Shoulder Strap Step 3](image3.png)
3.2. Wrist Strap

*Step 1:* Thread the strap through mounting hole on the side bottom of the handle.

*Step 2:* Thread the other end through the mounting hole on the top of the handle.

*Step 3:* Move the buckle to adjust the strap to a proper length.
3.3. Battery Charging

*Step 1:* Lay the battery into the charger.

*Step 2:* Connect the charger to the AC adapter.

*Step 3:* Plug to get power supply.

*Step 4:* Unplug and remove the battery after the charging finished.

⚠️ CAUTION: DO NOT CHARGE THE BATTERY IN FLAMMABLE OR EXPLOSIVE ATMOSPHERES.
NOTE: The red indicator refers to under charging, the green indicator refers to charging finished.

*Step 5:* Loose the screw and open the battery compartment lid.

*Step 6:* Put the battery into the compartment at right polarity.

*Step 7:* Put the lid back and tighten the screw.
CAUTION: DO NOT LOAD OR REPLACE THE BATTERY IN FLAMMABLE OR EXPLOSIVE ATMOSPHERES.

3.4. Lens Cover

Remove the lens cover before operating the instrument.

NOTE: Keep the lens covered when the instrument is not in use.

3.5. Sight Device

Dependent to some probable conditions or if operates from a long distance where the spotter laser may not be observed, the sight device on the top, as shown below Fig.3-1, can be used to aim the detector to the objective.

Align all 3 planes (front sight, rear sight, and the target) of focus.
4 Start/Stop

4.1. Start Detection

Take off the lens cover, point the instrument towards the survey area and press detection switch (Fig. 4-1 Detection Switch). The spotter laser emitted from the instrument is used to help align to the detection target.

![Detection Switch](image)

Fig. 4-1. Detection Switch

⚠️ NOTE: Detection value in white digits represents detection successfully finished, while the detection value in grey digits is only for reference due to low laser intensity cannot ensure a high accuracy.

4.2. Stop Detection

Press detection switch again, the spotter laser is off and the instrument enters to standby mode.

⚠️ NOTE: Detection value and maximum value displayed every 0.5s, when detection stopped, last values displayed. The 4 panel buttons are deactivated during operation status, and again will be activated when detection stopped.

4.3. Power off

Press button about 3s, soon after heard of the beep tone, the instrument will power off.
NOTES:

1. A few factors that could possibly affect the detection: 1) extremely low methane may not able to be detected; 2) Meteorological conditions (like strong wind or high temp) may cause quick dissipation of the leak that not able to detect; 3) Condensated droplets on the lens due to severe temp difference may impact the capability of detection.
2. Make sure that the survey objective is able to reflect infrared light.
3. Make sure that the alarm limit is set to meet safety detection needs.
4. Try to set offset value as close as possible to actual ambient methane, to minimize its influence.
5. An over-reflective objective may cause false alarm, check if light intensity is too strong, according to which adjust detection angle to avoid over reflection.
6. The instrument may false alarm on the pipeline that is too thin (<10mm) possibly being penetrated and detected actually the gas passing inside.
7. Please check if the time display right during every power-on of the instrument.

Tips:

1. Move steadily and scan smoothly, manage a relative slow moving rate.
2. Use adaptive scanning paths for specific survey areas. Scan known areas (like pipelines, or locations where fixed gas detector employed) in ‘S’ path and unknown areas in ‘X’ path.
3. How to locate precisely the leak point? Survey the suspect area at a best possible position, if alarms, do it repeatedly, meanwhile minish scanning scope and scan around till locate the point where alarm continues.
5 Operation

The RLGD-100 is an easy-to-operate device that can be fully controlled all through the front panel. This chapter provides the information on how to work with the menu, set the parameters and enable functions of the instrument.

5.1. Front Panel

The front panel consists of 4 Buttons, LCD Screen and an Alarm Indicator as shown in Fig.5-1.

![Fig.5-1 Front Panel](image)

<table>
<thead>
<tr>
<th>BUTTON</th>
<th>NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC</td>
<td>Power on/off ESC</td>
<td>Long press 3 seconds to power on/off, or press to exit. Press to switch from graphical to numeric display on main page.</td>
</tr>
<tr>
<td>Up</td>
<td>Up</td>
<td>Press to scroll up the menu options or press to increase a value.</td>
</tr>
<tr>
<td>Down</td>
<td>Down</td>
<td>Press to scroll down the menu options or press to decrease a value.</td>
</tr>
<tr>
<td>MENU</td>
<td>MENU/ENTER</td>
<td>Press to enter ‘setting’ page or press to save input or setting.</td>
</tr>
</tbody>
</table>
5.2. Start-up

Press ① button to power on, the system will enter into start-up mode and then perform self-test. The procedure takes about 1 minute, as shown in below Fig.5-2.

![Start-up Page](image)

Fig.5-2. Start-up Page

5.3. Main Interface

After self-test completed, the system enters into its main interface, as shown in below Fig.5-3, which displays detection value, graph, other operational parameters and used as an access to ‘setting’ pages.

![Main Interface](image)

Fig.5-3 Main Interface
<table>
<thead>
<tr>
<th>MAIN PAGE</th>
<th>NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Bar</td>
<td>Wireless</td>
<td>Indicates WiFi on/off by enabling or disabling the function.</td>
</tr>
<tr>
<td>(4 icons)</td>
<td>Sound</td>
<td>Sound volume. Configurable among mute, low, medium and high.</td>
</tr>
<tr>
<td></td>
<td>Battery</td>
<td>Indicates remaining capacity of the battery. If low battery&lt;5%, the system will power off automatically in 30s.</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>Current time hh/mm.</td>
</tr>
<tr>
<td>Display Panel</td>
<td>Light Intensity</td>
<td>&lt;3 grids, indicates laser too low. The more grids, the higher laser intensity.</td>
</tr>
<tr>
<td>(7 items)</td>
<td>Dynamic Graph</td>
<td>Indicates latest 200 detection value, refreshed every 0.5s. Detection value exceeding alarm value displayed in red curve, while not, shown in green. The previous graph will be deleted every time press the detection switch.</td>
</tr>
<tr>
<td></td>
<td>Detection Value</td>
<td>Light intensity&gt;3 grids, displayed in white digits that indicates accuracy is high. Light intensity&lt;3 grids, shown in grey digits that indicates accuracy is low. The previous detection value will be deleted every time press the detection switch.</td>
</tr>
<tr>
<td></td>
<td>Laser</td>
<td>Indicates LASER on/off when start/stop detection.</td>
</tr>
<tr>
<td></td>
<td>Offset</td>
<td>Indicates OFFSET being non-zero (on) or zero (off).</td>
</tr>
<tr>
<td></td>
<td>Maximum Value</td>
<td>Maximum value within current detection period. The previous maximum value will be deleted every time press the detection switch.</td>
</tr>
<tr>
<td></td>
<td>Alarm Level</td>
<td>Set by operator. Trigger sound-light alarm when detection value exceeds the alarm value.</td>
</tr>
</tbody>
</table>

### 5.4. System Menu

The RLGD-100 system menu is shown in below Fig.5-4.

![System Menu Diagram](image-url)
5.5. **Alarm Level**

Scroll down to ‘Alarm Level’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to increase or decrease the value. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.

![Fig. 5.5 Alarm Level Setting Menu](image)

5.6. **Offset Value**

Scroll down to ‘Offset Value’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to increase or decrease the value. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.

![Fig. 5.6 Offset Value Setting Menu](image)
NOTE: Set ‘offset’ = (1-100), the offset indicator is on, set ‘offset’ = 0, the offset indicator is off. Restarting system will not change the offset value.

5.7. Sound & Light

Scroll down to ‘Sound & Light’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to select sound volume among mute, low, medium and high. Press ‘ENTER’ to continue setting ‘Alarm LED’, tick the selections to Enable or Disable. Press ‘ENTER’ to save the settings, or press ‘ESC’ to cancel.

![Fig.5-7 Sound & Light Setting Menu](image)

NOTE: if set ‘sound volume’ = mute, or disable ‘alarm LED’, no sound or light alarm available when methane leak detected.

5.8. Brightness

Scroll down to ‘Brightness’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to increase or decrease the value. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.
5.9. System Settings

Scroll down to ‘System Set.’, press ‘ENTER’, it shows the secondary menu comprising Date & Time, Screen Standby, Language, Wireless, Data Storage and Status.

5.9.1 Date & Time

Enter into ‘Data & Time’, press ‘ENTER’ to edit, then use ‘▲’or ‘▼’ to increase or decrease the value. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.
Press ‘ENTER’ to enter submenu
Press ‘ENTER’ to start edit, then press ‘▲’ or ‘▼’ to increase or decrease the value

Fig. 5-10 Data & Time Setting Menu

NOTE: After a long shut-off or pulling-out of the battery, please reset data & time.

5.9.2 Screen Standby
Scroll down to ‘Screen Standby’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to select standby time. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.

Press ‘ENTER’ to enter submenu
Press ‘▲’ or ‘▼’ to select standby time

Fig. 5-11 Screen Standby Setting Menu
5.9.3 Language
Scroll down to ‘Language’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to select language. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.

5.9.4 Wireless
Scroll down to ‘Wireless’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to enable or disable wireless function. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.
NOTE: The wireless symbol will display on status bar when its enabled, and indicates ID, IP and Port number after setting succeeded.

5.9.5 Data storage
Scroll down to ‘Data Storage’, press ‘ENTER’, then use ‘▲’ or ‘▼’ to enable or disable the function. Press ‘ENTER’ to save the setting, or press ‘ESC’ to cancel.

![Data Storage Setting Menu](image)

Press ‘ENTER’ to enter submenu
Press ‘▲’ or ‘▼’ to enable or disable

NOTE: All detection data will be stored in the instrument when data storage enabled, and can be read through the client software provided by FPI.

5.9.6 Status
Scroll down to ‘Status’, press ‘ENTER’ to check operation status, instrument ID and version.
5.10. Others

5.10.1 Low Battery
If the battery symbol turns to yellow, is to remind low battery only to last another 15 mins. Up to the indication ‘Low Battery’, as shown in below Fig.5-16, the instrument will power off automatically in 30s.
6 Maintenance & Troubleshooting

The advanced design of the RLGD-100 makes it one of the most reliable leak survey instruments available. However, should you experience problems with the instrument or suspect that the instrument is not operating properly, do not use the instrument for leak survey work until the problem is resolved.

Only a qualified RLGD-100 repair technician should attempt to repair or adjust the instrument. There are no user serviceable components within the instrument that can be repaired or replaced.

6.1. General Maintenance

Preventive maintenance of the RLGD-100 is limited to:

- Please use soft wet cloth to clean dirt or contaminates from the lens, no organic solvent should be used for cleaning.
- Please always keep the lens covered when the instrument is not in use.
- Please remove the battery when the instrument is not in use, and store the battery in a proper manner.
- Do not point the laser directly to sunlight to avoid possible damage to internal components.

6.2. Troubleshooting

The following table provides a list of common problems and solution. Should you have a problem not listed or the solution doesn’t work, please contact FPI for further assistance.

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to power on</td>
<td>Try to press again the detection switch about 3 seconds till heard of the beep tone. Check if out of battery? (refer to section 3.3 ‘Battery Charging’ in this manual.)</td>
</tr>
<tr>
<td>No detection tone</td>
<td>Check if the sound volume is on? (refer to section 5.7 ‘Sound &amp; Light’ in this manual.)</td>
</tr>
<tr>
<td>No alarm sound</td>
<td>Check if the alarm limit is too high? (refer to section 5.5 ‘Alarm Level’ in this manual.) Check if the sound volume is on? (refer to section 5.7 ‘Sound &amp; Light’ in this manual.)</td>
</tr>
<tr>
<td>Unable to charge the battery</td>
<td>Check if the battery laid in right polarity? Check if the charger, adapter and power supply properly connected? Check if the charger red indicator is on? (refer to section 3.3 ‘Battery Charging’ in this manual.)</td>
</tr>
</tbody>
</table>
Should you request information or assistance not included in this manual, please contact FPI or its authorized service center.

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