INTRODUCTION

1. PREPARATION

- Read this instruction carefully prior to installation.
- This instruction includes the following warning indications to provide information regarding correct usage of the product to prevent harm and damage to assets. These warning indications are described below. Ensure these precautions before reading the rest of this instructions.
Cleaning the Product
Clean the laser window using a damp cloth. A smeared laser window can limit the detection area due to the reduced laser sensitivity. In addition, heavy soiling of the window can induce detection errors.

On Safety of Laser
This product is categorized as a Class 1 product in terms of the Safety Standard:
- Average Power: Max. 0.021 mW (AEL)
- Wavelength: 905 nm
- Pulse Width: 4 ns
- Emission period: 35 μs

Class 1 of the Laser Safety Standard means that the safety of laser products belonging to this class is warranted under normal operating conditions. The product is marked to indicate that it is laser equipment. No additional safety measures are necessary.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notices No. 50, dated June 24, 2007.

Class 1 laser product
Do not expose your eyes directly to the laser beam.

CE Statement
Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. (EN 55022)

PARTS IDENTIFICATION

DETECTION AREA
Side view
Front view

INSTALLATION WORK FLOWCHART
Choose the detection area mode and installation location, (Refer to 2-1)
Change the assembly option according to the mounting type, (Refer to 2-2, 2-3)
Mounting and angle adjustment, (Refer to 3)
Wiring and Power On (Refer to 3)
Laser area confirmation (Refer to 4-3)
OK
Area setting (Refer to 3)
Configuration
Walk test and confirm the detection area, (Refer to 4-3)
OK
Completion
2 MOUNTING TYPE AND ASSEMBLY OPTIONS

2.1 MOUNTING TYPE

RLD-2020 has type A, B, C, and D to be installed. Select the correct type of assembly to match the installation.

The detection area should cover the intruder's approach.

Which detection area is appropriate, Vertical or Horizontal?

Vertical Detection Area

- Type A
  - Vertical area for ceiling mount
  - Horizontal area for wall mount

  ![Type A diagram](image)

- Type B
  - Vertical area for wall mount

  ![Type B diagram](image)

- Type C
  - Vertical area for wall mount at the left corner
  - Horizontal area for ceiling mount

  ![Type C diagram](image)

- Type D
  - Vertical area for wall mount at the right corner

  ![Type D diagram](image)

Caution >>
Fixing screw of the front cover.
For the vertical detection area to the mounting surface, be sure that the fixing screw of the front cover is placed on top.

Horizontal Detection Area

- Type A
  - Vertical area for ceiling mount
  - Horizontal area for wall mount

  ![Type A diagram](image)

- Type B
  - Vertical area for wall mount

  ![Type B diagram](image)

- Type C
  - Vertical area for wall mount at the left corner
  - Horizontal area for ceiling mount

  ![Type C diagram](image)

- Type D
  - Vertical area for wall mount at the right corner

  ![Type D diagram](image)
2.2 DISASSEMBLY

Note >>
Disassembly is not required to use type A (factory default)

Disassemble the following parts in preparation.
1. Remove the side cover caps, side cover (L) and side covers (S).

2. Loosen 3 screws and remove the base.

3. Turn over the unit and remove the screw at the center.

4. Remove the base cover.

Caution >>
Do not apply loads to the wiring.

2.3 ASSEMBLY OPTIONS

- Type A (Default)

Follow the procedure below to return to type A from other mounting types.
1. Rotate the main unit and insert the hook of the base cover into the position where the letter “A” is written on the wiring cover.

Note >>
The positions of the fixing screw and side cover are shown below.

- Side cover S
- Side cover L
- Fixing screw

Note >>
Mount the cover caps and the logo must be displayed horizontally.
- **Type B**

1. Rotate the main unit and insert the hook of the base cover into the position where the letter "B" is written on the wiring cover.

- **Type D**

1. Loosen 2 screws and remove the wiring cover.

- **Type C**

1. Rotate the main unit and insert the hook of the base cover into the slot of the wiring cover.

2. Assemble parts just as step 2 to 3 for type A.

- **Type D**

2. Rotate the wiring cover by 180 degrees and replace it.

3. Rotate the main unit and insert the hook of the base cover into the slot of the wiring cover.

4. Assemble parts just as step 2 to 3 for type A.
3  BEFORE INSTALLATION

3-1  REMOVING THE FRONT COVER

1. Loosen the screw on the front window and pull the front cover forward with a snap.

2. Pull the cover forward.

1. Loosen the screw.

Note >>
The procedure to open the front cover is required when connecting the LAN cable to the maintenance port. (refer to 5-6)

3-2  MOUNTING THE FRONT COVER

1. Snap the front cover into the main unit.

2. Tighten the screw.

Tighten the screw.

3-3  REMOVING THE LASER WINDOW

As shown in the figure below, use the supplied allen key to put out the hook upward in a leverage motion.

1. Use the allen key to remove the hook.

2. Open it slightly and then pull out upward.

Note >>
The laser window needs to be removed when pressing the reset button or replacing it.

Caution >>
Be sure to turn OFF the power supply when mounting or removing the laser window.

Note >>
Do not touch the laser window except its frame.
Do not touch inside.

3-4  MOUNTING THE LASER WINDOW

As shown in the figure below, insert the foot of the front window until it clicks.

1. Insert the hook.

2. Push the unit until it clicks.

Caution >>
Be sure to turn OFF the power supply when mounting or removing the laser window.

3-5  WIRING CABLE ENTRY

- Wiring hole on the back side

Use a screwdriver to open a knockout.

Caution >>
Be sure to open a knockout to the downward direction.

Note >>
When performing wiring on the back side, apply the supplied packing on the depression on the back side of base.

Make a slit with a cutter.
Pass the wiring through the slit of the packing.

- Wiring hole on the side

Remove the blanking caps of the wiring holes on the side using a tool such as a coin.
3. INSTALLING NETWORK CABLE

1. Disassemble the cable gland.

2. Pass the Ethernet plug with the correct order and direction. Put the seal from the side.

3. Insert the base hook in to the base cover and ensure that the fixing screw does not jam against the cover. Close the base cover, and then tighten the 3 screws to fix it.

4. INSTALLATION AND ANGLE ADJUSTMENT

4-1 WALL OR CEILING MOUNTED

Methods for ceiling mounting and wall mounting are the same.

1. Remove the mounting bracket from the base, using a tool such as flathead screwdriver.

2. Place the supplied paper template on the mounting surface and open 2 mounting holes.

3. Mount the mounting bracket to the mounting surface. Screws to fix the mounting bracket are not included.

4. Attach the base into the mounting bracket until it clicks.

5. Perform wiring. (See 5-1.)

6. Connect the base and main unit with wiring. When the LED at the side of the relay connector is ON, turn OFF the power supply before connecting them.

Caution >>
Do not supply the power for this unit during wiring.

Note >>
Make sure that the arrow points upward when mounting the detector on the wall.

Note >>
Pull the base to make sure that the base is completely attached.

Note >>
4 mm / No.8 3.5 mm max.
9.5 mm max.

Note >>
Align the markings of the base unit and main unit to be the guideline for the direction of the detection area.

4-2 ANGLE ADJUSTMENT

1. Slightly loosen 3 fixing screws.

2. Use the laser area checker to adjust the angle and then tighten 3 fixing screws.

3. Approx. 4° vertically and horizontally

± 180° horizontally

4-3 LASER AREA CONFIRMATION

It is recommended that the optional Laser Area Checker(LAC-1) is used to confirm the location of the laser plane.

- Vertical Detection Area

1. Adjust the detector's angle so that the laser beam hits the farthest position of the required area and just the bottom of the detector.

2. Check that the entire area is covered properly with laser area checker (option: LAC-1).

- Horizontal Detection Area

Check that the laser beams are targeted to the desired areas.

Tips: Two units of LAC-1 (option) can make it easier to confirm the detection area.

Note >>
For detailed instructions refer to the LAC-1 instruction manual.
5 PARTS LAYOUT INSIDE THE COVER AND THEIR FUNCTIONS

5-1 WIRING

The length of the power wire must be less than the figures listed below.

<table>
<thead>
<tr>
<th>Wire size</th>
<th>12VDC</th>
<th>24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG20 (0.52 mm²)</td>
<td>30 (100)</td>
<td>790 (2590)</td>
</tr>
<tr>
<td>AWG16 (0.83 mm²)</td>
<td>50 (190)</td>
<td>1260 (4130)</td>
</tr>
<tr>
<td>AWG14 (1.31 mm²)</td>
<td>80 (200)</td>
<td>2000 (6560)</td>
</tr>
</tbody>
</table>

Cable Pull (5.00 m) instant

Note >>>
Some PoE hubs have a limit for wattage. Connect the detectors to PoE hubs without exceeding the limit referring to the PoE hub's instructions.

5-2 PROGRAMMABLE SIGNAL OUTPUT

The three output terminals can be configured as NO/NC. They are however fixed as open when the unit is not energized. The outputs are programmable from options below.

- Alarms
  - Master alarm (MO)
  - Zone alarm (A1, A2, B1, B2)

- Troubles
  - Anti-masking (AM)
  - Anti-rotation (AR)
  - Soiling (SU)
  - Environmental disqualification (DQ)
  - Device trouble (TR)
  - Tamper output (TA)

5-3 PROGRAMMABLE SIGNAL INPUT (RLS-2020S only)

The function of the signal input can be selected from the following option.

- Area switching
- Self checking
- Initializing the detection area

The dedicated software (REDSCAN Manager) is required for settings. For details, refer to the REDSCAN Manager help.

5-4 ETHERNET PORT (PoE)

The Ethernet port inside the base is for constant connection. PoE is supported.

- Default IP address: 192.168.0.126
- Default gateway: 192.168.0.1

5-5 MAINTENANCE SECTION

Note >>>
At a maintenance port, use a light LAN cable for indoor use. (Do not use the heavy LAN cable for outdoor use.) This port is for maintenance purpose. After maintenance, re-assemble the front cover.

5-6 MAINTENANCE PORT

The Ethernet port on the maintenance section is connected only for initial setup. Do not use it for constant connection.

- Default IP address: 192.168.1.126
- Subnet mask: 255.255.255.0

5-7 POWERING ON

Startup conditions
Enter the DC power to the power supply input terminal. Or, connect PoE power supply equipment to the ethernet port (PoE).
After power on, all the indicators are turned on for approx. 60 seconds and then the status and alarm indicators are turned off.
During this period, REDSCAN mini itself performs initial settings.

5-8 INITIALIZATION TO FACTORY DEFAULT

1. Turn Off the power supply. Remove the front cover and laser window. (refer to 3-1, 3-3)
2. Power On while pressing the reset button.
3. All LEDs turn on. Red LED turns off after 50 sec, and green LED turns off after 2 sec. Then, release the reset button. Yellow LED turns off after 3 sec.
4. Turn Off the power supply. Attach the laser window and the front cover. Then, Power On.

5-9 LED INDICATOR

<table>
<thead>
<tr>
<th>Detector condition</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm-up (approx. 60 s)</td>
<td>![LED Indicator Diagram]</td>
</tr>
<tr>
<td>Stand-by</td>
<td>![LED Indicator Diagram]</td>
</tr>
</tbody>
</table>

- Alarm | ![LED Indicator Diagram] |

- Anti-masking | ![LED Indicator Diagram] |
- Anti-rotation | ![LED Indicator Diagram] |
- Soiling | ![LED Indicator Diagram] |

**Environmental disqualification (DQ)**

- Green: flashing once, yellow: flashing twice, red: flashing three times.

* According to alarm status.

<table>
<thead>
<tr>
<th>Trouble condition</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor error</td>
<td>![LED Indicator Diagram]</td>
</tr>
</tbody>
</table>

- Hardware error | ![LED Indicator Diagram] |

- Over heat | ![LED Indicator Diagram] |

- Others | ![LED Indicator Diagram] |
6 SETTING

6.1 OVERVIEW

There are two options to setup the unit with WEB browser for simple setting and
optional setup software, Redscan Manager software for advanced configuration.
This instructions mention for the setting with WEB browser. For setting with
Redscan Manager, please refer to the help of the software.

A web browser can be used to configure the Redscan mini settings.
The ethernet port on the base unit and the maintenance port on the main unit
can be used for configuration.
The main port is for the operation and settings, the maintenance port is for
settings by web browser or REDSCAN Manager.

Recommend web browser: Microsoft Internet Explorer 11 or Chrome.

< Default setting >
---
Main Ethernet port IP address : 192.168.0.126
Subnet Mask : 255.255.255.0
Default gateway : 192.168.0.1
Maintenance port IP address : 192.168.1.126
Subnet Mask : 255.255.255.0
MTU : 1500
ID : REDSCAN
Password : OPTEX
When connected, the start page appears:

Described below are menu displayed on the screen left:

- Output/Input Status
  Indicates statuses of the device output/input and REDWALL Event Code.

- Detection Configuration
  Configures detection settings.

- Network Configuration
  Configures network settings.

- Authentication
  Configures user ID and password.

- Maintenance
  To show software version and MAC address information. 
  Reboot the unit update firmware of the detection area.

6.2 DETECTION CONFIGURATION

The following setting items can be configured. Use pull-down menu or enter a
value. Items that are unavailable for setting are grayed out, depending on a model.

- Area Set
  After installation and area adjustment of laser beam, press this before starting
  the adjustment. The unit beam background and adjusts detection area.
  No human body must enter the area to be configured as a detection area.
  Otherwise the area may not be configured properly.

- Area Set Information
  To indicate the date of area setting.

- Save Config.
  Transfers and saves the setting configured on the browser. Press this button
  after configuring the setting.

- Detection Mode
  Four modes are available:

  [ Indoor mode ] (RLS-2020I and RLS-2020IS)
  For general indoor applications. (Default)
  Can make vertical detection area or horizontal detection area according to the
  mounting direction.

  [ Outdoor mode ] (RLS-2020IS only)
  This option can be selected for general outdoor applications,
  In this mode, the special algorithm works to reduce false alarms by weather
  conditions (e.g. rain, snow and fog).
  In order to reduce the false alarms under harsh environment, the environmental
  resistance function can be set as enable.

  [ Indoor high resolution mode ] (RLS-2020IS only)
  By increasing detection resolution, the unit can detect small object at longer
  distance. In regular indoor mode, the resolution is 0.25 degree.
  In this high-resolution mode, it gets 0.125 degree.
  Thus, the same size object can be detected at the double distance. But,
  fastest response time can be within 100 ms in this mode, the unit may not detect
  fast movement object. This mode shall be use for only indoor application.

  [ Indoor throw-in mode ] (RLS-2020IS only)
  By increasing detection resolution, the unit can detect the object which is thrown into the detection area.
  Response time is the minimum within 25ms.
  This mode shall be used for only indoor application.

- Detection Area
  Three options are available:

  [ Horizontal ]
  Creating a detection area in parallel with the ground, such as ceiling protection.

  [ Vertical ]
  Creating a detection area perpendicular to the ground, such as wall protection.

  [ Auto ] (Default)
  For automatic selection by a sensor direction.

- Environmental Resistance (RLS-2020IS only)
  Errornous reports under a bad environment such as a fog can be reduced when
  outdoor mode is selected.

  [ Disable ]
  Configures when a report without a delay is required for an application of
  PTZ camera linkage. 
  This setting may cause an erroneous report under a bad environment such as a
  fog or snow.

  [ Enable ] (Default)
  False alarm due to a fog or snow can be reduced with balanced high detection
  ability.

  [ Enhanced ]
  Reduction of erroneous reports due to a fog or snow can be maximized. It may
  result in a longer response time.
  In addition, detection may fall under certain environments.
• Sensitivity
  Can be set from the options, H (High), M (Medium), L (Low), or Custom (Enter required response time).
  [Indoor mode] (Default M: 150 ms, H: 75 ms, L: 500 ms)
  Custom: Can be set from 75 to 60,000 ms
  [Outdoor mode] (Default: 250 ms)
  Enter 75 to 60,000 ms

• Minimum Target Size (Width)
  Enter a width of an object to be detected.
  (Default value depends on detection mode)
  [Indoor mode] (Default: 150 mm (6 inch))
  Enter '1' to 1,000 mm (0.4 to 40 inch)
  [Outdoor mode] (Default: 250 mm (10 inch))
  Enter '1' to 1,000 mm (0.4 to 40 inch)
  [Indoor high resolution mode] (Default: 50 mm (2 inch))
  Enter '1' to 1,000 mm (0.4 to 40 inch)
  [Indoor throw-in mode] (Default: 150 mm (6 inch))
  Enter '1' to 1,000 mm (0.4 to 40 inch)

Detectable range based on a target size
When configuring a target size smaller than 200 mm (8 inch), a distance to detect an object with the size gets shorter.

<table>
<thead>
<tr>
<th>Detectable distance according to target size</th>
<th>Detectable distance according to target size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target size</td>
<td>Detectable distance</td>
</tr>
<tr>
<td>50 mm</td>
<td>within 6 m (16 ft.)</td>
</tr>
<tr>
<td>200 mm</td>
<td>within 20 m (65 ft.)</td>
</tr>
</tbody>
</table>

• Target height for vertical area: Default 250 mm (10 inch)
Enter '1' to 1,000 mm (0.4 to 40 inch)
• Non-Detection zone for vertical area
  Default: Indoor / Outdoor high resolution / Indoor throw-in mode 0.1m (0.3 ft.),
  Outdoor mode 1.5m (5 ft.)
In a vertical detection area, protruding objects on the ceiling can be excluded from the detection area by disabling the upper part of the area by a specified distance, Enter a desired length to disable.
The width is narrowed by a specified distance from the front direction from the main unit.
• Detection Range 1 Default: 20 m (65 ft.), 1 to 20 m (3.3 to 65 ft.)
  For a vertical detection area, enter a length of an area to be detected. For a horizontal detection area, enter a width of an area to be detected.
• Detection Range 2 Default: 20 m (65 ft.), 1 to 20 m (3.3 to 65 ft.)
  For a vertical detection area, enter a height of an area to be detected. For a horizontal detection area, enter a depth of an area to be detected.
• Offset Default: 100 mm (4 inch.), 0 to 1,000 mm (0 to 39 inch)
  For a vertical detection area, reflection from the ground or floor can generate noise for the detector. Also, plants and small animals can cause a false alarm.
  An offset can exclude a detection area by a specified distance from the ground or floor.

6.4 AUTHENTICATION
IDs and passwords can be changed.
Change authentication.
[New user ID] Default: REDSCAN
[New password] Default: OPTEX
To reflect the setting, press [Save Config] button to send and save the setting to the detector.
When losing the ID and password, the detector must be initialized.
(Refer to 5-8 Initialization to factory default)

6.5 MAINTENANCE
• Update software
  Can update the firmware of the unit. If necessary, click Choose File button to select the firmware file, and push Update button.
• MAC address
  Shows MAC addresses for Main Ethernet Port and Maintenance Port.
• License
  Click to show licenses of free open source software.
• Reboot
  Can reboot the unit.
6-6 REDWALL EVENT CODE

< Purpose >
RLS-2020 generates original ASCII event codes which can be used by an NVR or VMS protocol to control PTZ cameras and other devices.

< Communication methods >
REDWALL EVENT CODE can be sent to the assigned port using UDP or TCP protocol. The default port number is “1234”.

< Code format >

```
"RLS126 MO A1 A4 CC DQ AR AM TR SQ TA"
```

ID number of the RLS-2020 unit consists of 6 bytes as follows:
RLS + 3 bytes number (Default number is the last group of the host IP address.)

Position  Command  Description
Y1       MO/CL   Any alarm zone is triggered. Master alert code, "MO" code is generated. And, "CL" code is generated 10 seconds after master alarm was cleared. The time can be changed by setting software.
Y2       A1/A2   Latest alarm.
          /B1/B2
Y3       AA-BB,   It shows detected areas by 11 patterns.
          EA-EB,AL
Y4       CC       Multiple alarm. CC means that there are multiple detected areas.
Y5       DQ/dq   Environmental disqualification circuit activates.
Y6       AR/ar   Anti-rotation function activates.
Y7       AM/Am   Anti-masking function activates.
Y8       TR/tr   Trouble condition.
Y9       SQ/sq   Soiling on the laser window (Self checking function). Soiling on the roller wheel status is restored.
Y10      TA/ta   Tamper circuit activates. Tamper circuit status is restored.

* Multiple alarm

```
R.E.C.  B2  B1  A2  A1
  AA        ✓✓ ✓ ✓
  BB        ✓✓ Ea ✓ ✓
  BA        ✓✓ Eb ✓ ✓
  Bb        ✓✓ Eb ✓ ✓
  bA        ✓✓ AL ✓ ✓
  Sa        ✓✓ ✓ ✓
```

Note >>
Contact to OPTEX to get more detailed specifications of REDWALL Event Code.

8 SPECIFICATIONS

8-1 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>RLS-2020i</th>
<th>RLS-2020S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation location</td>
<td>Indoor</td>
<td>Indoor/Outdoor</td>
</tr>
<tr>
<td>Detection method</td>
<td>Infrared Laser Scan</td>
<td></td>
</tr>
<tr>
<td>Laser protection class</td>
<td>Class 1</td>
<td></td>
</tr>
<tr>
<td>Power input</td>
<td>10.5-30 VDC, PoE (IEEE 802.3af compliant)</td>
<td></td>
</tr>
<tr>
<td>Current draw</td>
<td>500 mA max, (12 VDC), 250 mA max, (24 VDC), 6 W max. (PoE)</td>
<td></td>
</tr>
<tr>
<td>Mounting method</td>
<td>Ceiling mount, Wall mount, Tripod mount, Pole mount (Option), Recess mount (Option)</td>
<td></td>
</tr>
<tr>
<td>Detection area</td>
<td>20 x 20 m (approx. 65 x 65 ft.), 95 degree</td>
<td></td>
</tr>
<tr>
<td>Detection range</td>
<td>Radius 21 m (approx. 68 ft. at 10% reflectivity</td>
<td></td>
</tr>
<tr>
<td>Detection resolution/Response time</td>
<td>0.25 degrees / within 75 ms to 1 minute</td>
<td></td>
</tr>
<tr>
<td>Mounting height (Vertical mode)</td>
<td>2 m (6.7 ft.) or higher</td>
<td></td>
</tr>
<tr>
<td>Communication port</td>
<td>10BASE-T/100BASE-TX (Auto negotiation)</td>
<td></td>
</tr>
<tr>
<td>Protocol</td>
<td>UDP, TCP/IP (REDWALL EVENT CODE), HTTP (Web setting), SNMP</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>3 outputs, 28 VDC 0.2 A max, N.O, N.C, Selectable (3 from Master alarm, Zone outputs, Trouble, Tamper)</td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Alarm period</td>
<td>Approx. 2 second delay timer</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C to 50°C degrees (-40°F to 122°F degrees)</td>
<td></td>
</tr>
<tr>
<td>IP rating</td>
<td>IP66</td>
<td></td>
</tr>
<tr>
<td>Dimensions (HxWxD)</td>
<td>145 x 160 x 160 mm (5.8 x 6.3 x 6.3 inch)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>1.9 kg (2.2 Lbs)</td>
<td></td>
</tr>
</tbody>
</table>

* Specifications and design are subject to change without prior notice.

7 DIMENSIONS

7-1 DIMENSIONS

![Dimensions Diagram]

Unit: mm (inch)
9 APPENDIX

3.1 REPAINTING

1. Remove the side cover cap, side cover L and side cover Ss. (refer to 2-2 ③)

2. Remove the front cover. (refer to 3-1)

3. Remove the base cover. (refer to 2-2 ② ③ ④)

4. Paint the following parts. (refer to ① marks as follows)
   Use the suitable paint for poly-carbonate resin.

   ![Diagram of painting parts]

Note >>
Be careful not to lose the removed washer.

Note >>
Do not paint the front cover, the laser window or the base unit.