

PROSIDIO



**LS-Series HD All-in-One  
Endoscopy Camera Systems**  
15.6-inch & 24-inch Models

**User Manual**

[prosidio.com](http://prosidio.com)

This manual is intended to serve as an aid in the proper installation, connection, and operation of the LS-Series HD All-in-One Endoscopy Camera Systems. All the necessary details and actions are clearly explained. We therefore ask that you read this manual carefully before proceeding to work with the instrument. Keep this manual available for easy reference.

**WARNING:** Prosidio medical devices are not cleaned and disinfected when delivered. These hygiene measures must be performed before the first use/ set-up. Cleaning/ disinfection of the surfaces is part of the ongoing disinfection measures.

Prosidio is continuously working on the further development of all products. Please appreciate that changes to the scope of supply in form, equipment and technology are possible for this reason. Therefore, no claims may be derived from the information, figures and descriptions in this manual.

| <b>Item No.</b> | <b>Prosidio Model</b> | <b>Configuration</b>       | <b>HDMI Input</b> | <b>Flexible compatibility</b> |
|-----------------|-----------------------|----------------------------|-------------------|-------------------------------|
| 1               | <b>PLS15HD1*</b>      | 15.6" HD Standard          | –                 | –                             |
| 2               | <b>PLS15HDLAB1</b>    | 15.6" HD with HDMI Input   | Yes               | –                             |
| 3               | <b>PLS15HDFLX1</b>    | 15.6" HD Distal-Chip-Ready | Yes               | Yes                           |
| 4               | <b>PLS24HD1</b>       | 24" HD Standard            | Yes               | –                             |
| 5               | <b>PLS24HDFLX1</b>    | 24" HD Distal-Chip-Ready   | Yes               | Yes                           |

\*This configuration is retired / no longer being sold.

## Manufactured by

### Prosidio

168B Irving Ave, Suite 302C  
 Port Chester, NY 10573  
 United States  
 Phone: +1 (914) 510-2314  
 Email: support@prosidio.com  
 Website: <https://prosidio.com>

**Caution: Federal law restricts this device to sale by or on the order of a physician.**

**Carefully read all instructions prior to use.**

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**FDA Listing Number:** D445182

**Device Classification:** Class I, 510(k) Exempt

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# 1. Introduction & Intended Use

## 1.1 Introduction

This manual provides instructions for the safe and effective setup, operation, cleaning, and maintenance of the LS-Series HD All-in-One Endoscopy Camera Systems. These systems integrate a camera control unit (CCU), HD camera head, LED cold light source, internal storage, and medical-grade display (15.6-inch or 24-inch) into a single unit for endoscopic visualization.

This IFU applies to the following models: PLS15HD1, PLS15HDLAB1, PLS15HDFLX1, PLS24HD1, and PLS24HDFLX1. Read this manual thoroughly before operating the equipment. Retain this manual for future reference.

## 1.2 Intended Use

The LS-Series HD All-in-One Endoscopy Camera System is intended to be used by trained healthcare professionals in clinical institutions during endoscopic procedures for image acquisition, processing, storage, and display of the field of view within human body cavities, hollow organs, and canals. The system connects to compatible optical rigid endoscopes and, for models PLS15HDFLX1 and PLS24HDFLX1, compatible distal chip endoscopes, to capture, process, store (via USB and internal storage), illuminate, and display high-definition (HD 1080p) endoscopic images.

The system provides illumination via an integrated LED cold light source transmitted through a fiber optic light guide cable to the endoscope. The camera head interfaces with the endoscope via a C-mount optical coupler; the light source interfaces via a fiber optic light guide cable. Neither the camera head nor light cable are intended for direct patient contact.

## 1.3 User Profile

This device is intended for use only by trained medical professionals (e.g., physicians, surgeons, nurses) familiar with endoscopic procedures and the operation of endoscopic camera systems. Users must have the necessary qualifications and comply with relevant healthcare regulations and institutional policies.

## 1.4 Expected Service Life

The expected service life of this system is 5 years from the date of manufacture, when used, maintained, cleaned, and stored in accordance with this manual. LED light source operational life: 30,000 hours. Display panel: 50,000 hours MTBF.

# 2. Symbols Glossary

The following symbols may appear on the device, packaging, or in this manual:

## 2.1 Symbols

| Symbol                                                                              | Meaning                                                                                                 | Standard Reference       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------|
|    | <b>DC Power</b><br>Direct current power input                                                           | IEC 60417-5031           |
|    | <b>Type BF Applied Part</b><br>Body-contact floating applied part;<br>protection against electric shock | IEC 60417-5840           |
| <b>IPX6</b>                                                                         | Protection against powerful water jets                                                                  | IEC 60529                |
| <b>IPX0</b>                                                                         | No protection against water ingress                                                                     | IEC 60529                |
|    | <b>Class I Equipment</b><br>Equipment with protective earth connection                                  | IEC 60417-5019           |
|    | <b>Equipotential Terminal</b><br>Functional earth/equipotential bonding terminal                        | IEC 60417-5021           |
|    | <b>Caution</b><br>Refer to accompanying documents;<br>risk of danger                                    | ISO 7010-W001            |
|    | <b>ON/OFF (Power)</b><br>Mains power switch                                                             | IEC 60417-5010           |
| <b>Standby</b>                                                                      | Standby mode                                                                                            | IEC 60417-5009           |
|   | <b>Fragile/Keep Dry/This Way Up</b><br>Shipping handling symbols                                        | ISO 780                  |
|  | <b>WEEE</b><br>Separate collection for electronic waste                                                 | Directive 2012/19/EU     |
|  | <b>Manufacturer</b><br>Identifies the legal manufacturer                                                | ISO 15223-1              |
|  | <b>Date of Manufacture</b><br>Year and month of manufacture                                             | ISO 15223-1              |
|  | <b>Serial Number</b><br>Unique device identifier                                                        | ISO 15223-1              |
|  | <b>Consult IFU</b><br>Read Instructions for Use before operating                                        | ISO 15223-1              |
| <b>Rx Only</b>                                                                      | <b>Rx Only</b><br>Federal law restricts to sale by/on order of physician                                | 21 CFR 801.109           |
|  | <b>Catalogue/Model Number</b><br>Catalogue, reference, or model number                                  | ISO 15223-1              |
|  | <b>CE Marking</b><br>European conformity marking, if present on product labeling                        | Regulation (EU) 2017/745 |

## 3. Warnings and Precautions

Please read and understand all warnings and precautions before operating the LS-Series HD system. Failure to do so may result in injury to the patient or user, or damage to the equipment.

### 3.1 Warnings

#### (Situations that could lead to serious injury or death)



**Electrical Shock Hazard:** This equipment must only be connected to a supply mains with protective earth. This is Class I Equipment. Do not remove the grounding conductor from the power cord/adaptor. Do not use extension cords or adapters that defeat the grounding connection. Connect the potential equalization conductor if required by local regulations or facility protocol.



**Modification Hazard:** Do not modify this equipment without authorization from the manufacturer. Unauthorized modifications may compromise safety and performance and will void the warranty.



**Explosion Hazard:** This equipment is NOT classified as AP or APG. Do NOT use in the presence of flammable anesthetics (mixtures with air, oxygen, or nitrous oxide) or in oxygen-rich environments. An explosion hazard exists under these conditions.



**High-Frequency (HF) Surgical Equipment:** When using High-Frequency (HF) surgical equipment concurrently, be aware of potential hazards:

- Ensure the patient return electrode is properly applied according to the HF equipment manufacturer's instructions to prevent burns.
- Keep active HF accessories away from the endoscope tip and other conductive parts of the system when activated.
- Use the lowest effective power setting on the HF generator.
- This system's camera head is classified as a Type BF Applied Part, offering protection against electric shock, particularly leakage currents. However, it does not provide specific HF isolation for the endoscope itself. Use only endoscopes and accessories rated for use with HF surgical equipment. Refer to HF equipment IFU for specific precautions.
- Potential for RF interference exists. If interference occurs, reposition equipment or consult the EMC guidance (**Section 14**).



**Laser Safety:** If used with laser equipment, follow all safety precautions specified by the laser manufacturer, including appropriate eye protection. Ensure compatibility between the laser, endoscope, and camera system.



**Thermal Hazard:** The light output port and the distal tip of the connected endoscope can become hot. Avoid prolonged tissue contact, especially at high brightness, to prevent thermal injury. Use the lowest clinically acceptable light intensity.



**Incorrect Connections:** Ensure correct alignment before connecting camera heads, light guides, video cables, or power cords. Do not force connectors. Incorrect connections can damage equipment or pose a hazard.



**Patient Monitoring:** The endoscopic image is an adjunct to, not a replacement for, appropriate patient monitoring.



**Real-Time Image:** Always verify the displayed image is live and not frozen or recorded before proceeding. Check image orientation.



**Service:** Refer servicing to qualified personnel authorized by Prosidio. There are no user-serviceable parts inside the main unit or camera head. Fuses are located within the external power adapter and are not user-replaceable. Opening the unit may expose hazardous voltages.

## 3.2 Precautions

### (Situations that could lead to minor injury or equipment damage)

-  **Compatibility:** Use only accessories, endoscopes, light guide cables, and other equipment specified as compatible by Prosidio. Use of incompatible accessories may degrade performance or damage the system.
-  **Inspection:** Before each use, inspect all components (camera head, cables, main unit, endoscope, light guide) for damage (cracks, dents, frayed cables, damaged connectors). Do not use damaged equipment.
-  **Environment:** Operate only within specified environmental conditions (See **Section 6.3**: +5°C to +35°C, 10%~80% RH, 87~106 kPa). Avoid direct sunlight, excessive dust, or moisture.
-  **Ventilation:** Ensure adequate ventilation (at least 10 cm/4 inches clearance) around the unit. Do not block vents to prevent overheating.
-  **Power Source:** Connect only to a stable power source meeting adapter specifications (~100–240V AC, 50/60 Hz). Use only the provided power adapter (Model: LXCP150-1201250) and cord or an identical replacement approved by Prosidio.
-  **Electromagnetic Interference (EMI):** Maintain recommended separation distances from RF sources (See **Section 14**). Strong fields may cause interference.
-  **Cleaning & Disinfection:** Follow procedures in **Section 9** precisely. Use only recommended agents. Improper cleaning can cause damage. Power off and disconnect before cleaning.
-  **Liquid Ingress:** The main unit is rated IPX0 (no protection). Avoid spills. The camera head is rated IPX6 (protected against powerful jets) but is NOT immersible unless explicitly stated otherwise for a specific model.
-  **Handling:** Handle camera head and cables carefully. Avoid sharp bends, kinking, or excessive force on connectors. Do not drop.
-  **White Balance:** Perform before each procedure or if components change for accurate color.
-  **Storage:** Store in a clean, dry environment within specified limits (See **Section 12**). Protect connectors and optics.
-  **Storage Media:** Use high-quality USB devices. The system also has internal 256 GB storage. Data loss may occur if USB is removed during recording or if devices are faulty/incompatible. Formatting erases all data. Backup important data.
-  **Transport:** Use original or equivalent protective packaging.

## 4. Contraindications

This device is contraindicated for use in patients for whom endoscopic procedures are medically contraindicated.

# 5. Product Description

## 5.1 System Components

The LS-Series HD All-in-One Endoscopy Camera System typically includes:

| Component             | Description                                                                                       | SKU                              |
|-----------------------|---------------------------------------------------------------------------------------------------|----------------------------------|
| Main Unit             | Integrated CCU, LED light source, video processing, 256 GB SSD, display (15.6" or 24" HD IPS LCD) | See model table on <b>Page 3</b> |
| HD Camera Head        | Sony 1/1.8" CMOS, 2.1 MP effective, 1920 x 1080, integral cable (~2.8 m)                          | LSHDIPX8CMRH                     |
| Optical Coupler (F20) | C-mount adapter, 20 mm focal length (standard)                                                    | LSCPL20mm                        |
| Light Guide Cable     | Fiber optic, 3 m length                                                                           | LSCLEDLCReg                      |
| Power Adapter         | LXCP150-1201250; 100-240V AC in, 12V DC 12.5 A out                                                | LSPWRCBLR                        |
| HDMI Cable            | Video output cable                                                                                | LSCBHDMI                         |
| USB Drive (32 GB)     | USB 2.0, NTFS                                                                                     | LSCUSB32GB                       |
| Instructions for Use  | This document                                                                                     | --                               |

**NOTE:** Models PLS15HDFLX1 and PLS24HDFLX1 include a Distal Chip Camera Input Port.

## 5.2 15.6" Models (PLS15HD1, PLS15HDLAB1, PLS15HDFLX1)

All 15.6" models share a similar main unit structure with variations in connectivity.

### Flexible Scope Options

| Scope Type                     | Connection                                 | Camera Settings              |
|--------------------------------|--------------------------------------------|------------------------------|
| Distal chip flexible endoscope | Connects to flexible scope port            | Standard mode                |
| Fiberoptic flexible scope      | Attaches to camera head through rigid port | Flexiscope mode <sup>1</sup> |

<sup>1</sup>When using a fiberoptic scope, press and hold the UP button to activate Flexiscope mode and reduce the moiré effect.

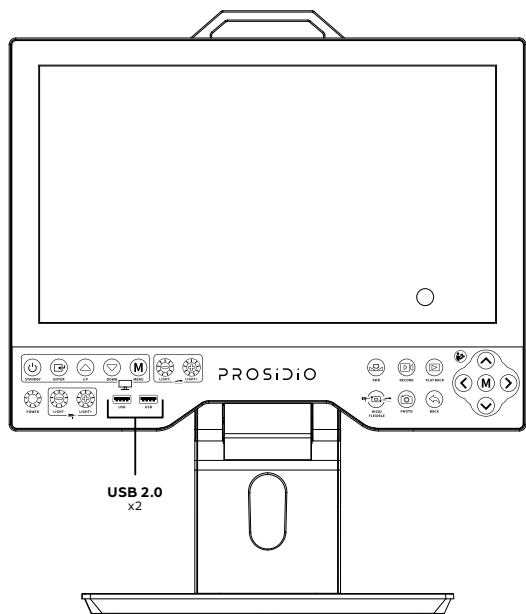


Figure 1: LS 15.6" HD HDMI System – Front Panel

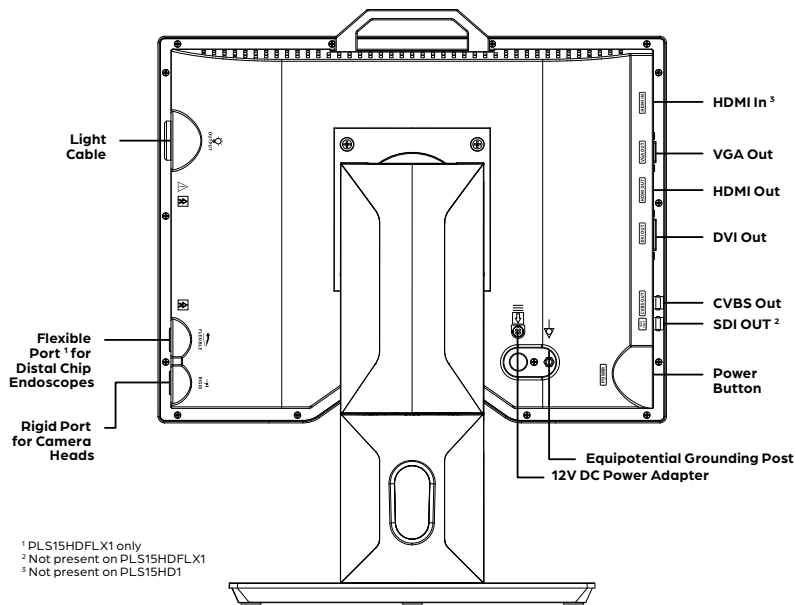
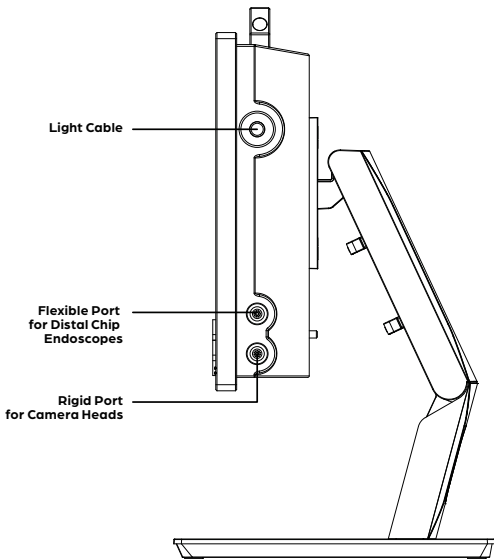
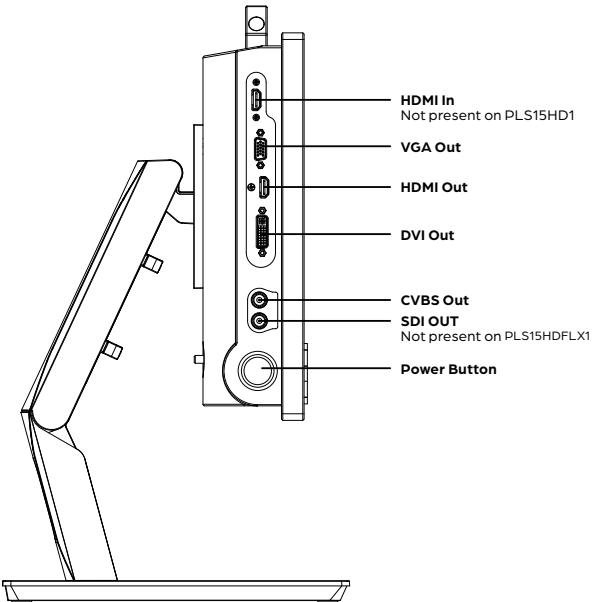


Figure 2: LS 15.6" HD HDMI System – Back Panel



**Figure 3:** LS 15.6" HD HDMI System – Right Panel



**Figure 4:** LS 15.6" HD HDMI System – Left Panel

### 5.3 24" Models (PLS24HD1, PLS24HDFLX1)

All 24" models share a similar main unit structure with variations in connectivity.

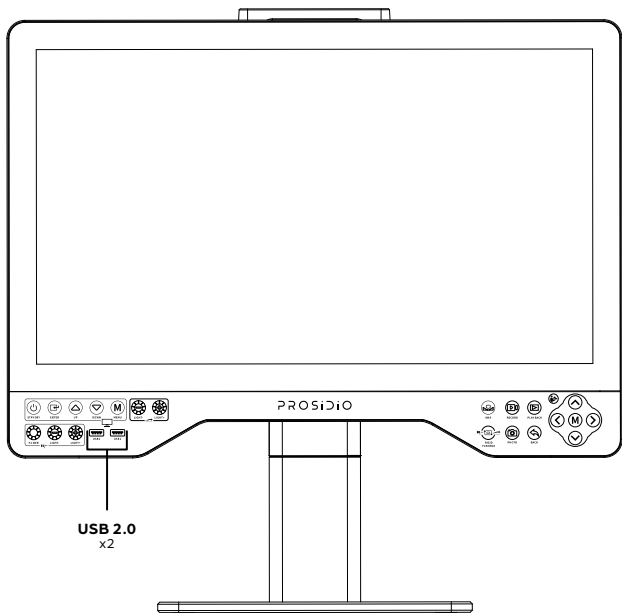
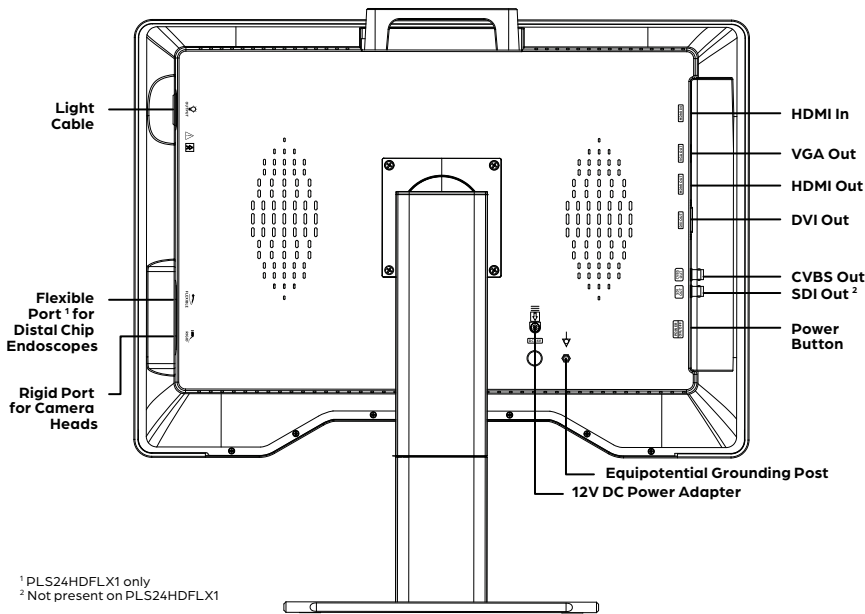
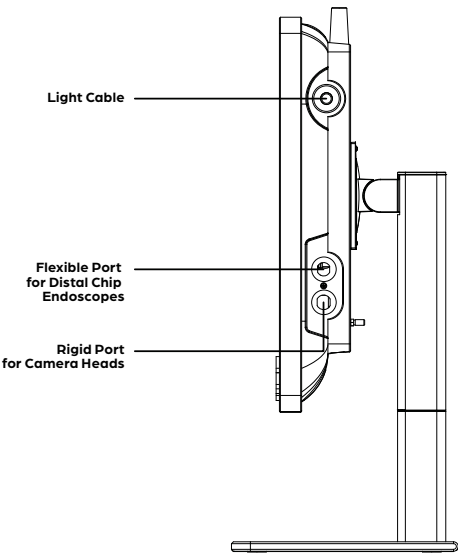


Figure 5: LS 24" HD HDMI System – Front Panel

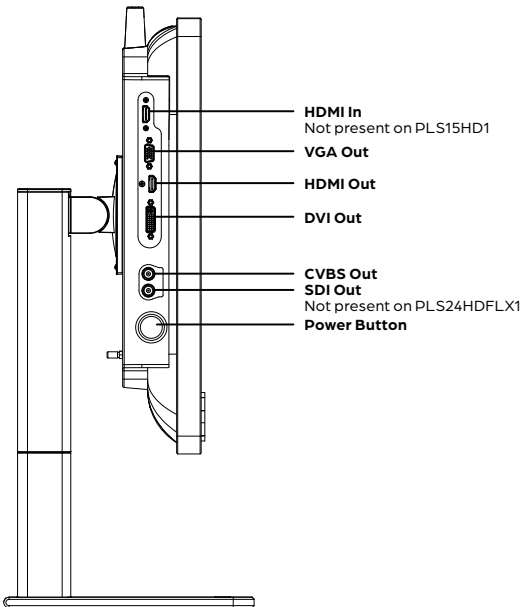


<sup>1</sup> PLS24HDFLX1 only  
<sup>2</sup> Not present on PLS24HDFLX1

Figure 6: LS 24" HD HDMI System – Back Panel



**Figure 7:** LS 24" HD HDMI System – Right Panel



**Figure 8:** LS 24" HD HDMI System – Left Panel

5.4 HD Camera Head

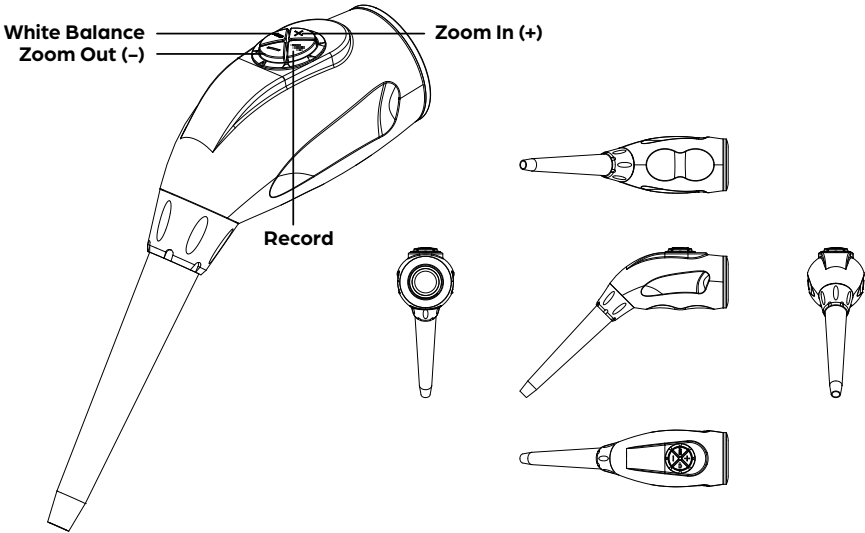


Figure 9: HD Camera Head — Model LSHDIPX8CMRH

Camera Head Features:

| Feature                     | Detail                                                               |
|-----------------------------|----------------------------------------------------------------------|
| Optical Interface           | C-Mount thread                                                       |
| Control Buttons             | AWB, Record, Zoom In (+), Zoom Out (-)                               |
| Cable                       | Integral cable (~2.8 m), not detachable                              |
| Applied Part Classification | Type BF                                                              |
| Ingress Protection          | IPX6 (jet-protected; NOT immersible)                                 |
| Photo/Video recording       | Via front panel buttons or distal chip scope controls or camera head |

5.5 Distal Chip Ready Port  
(PLS15HDFLX1/PLS24HDFLX1 Only)

These models feature a dedicated input port for compatible distal chip flexible endoscopes. Use only manufacturer-specified compatible endoscopes.

## 5.6 Panel Controls

### Front Panel Controls – Left Side (Monitor Controls):

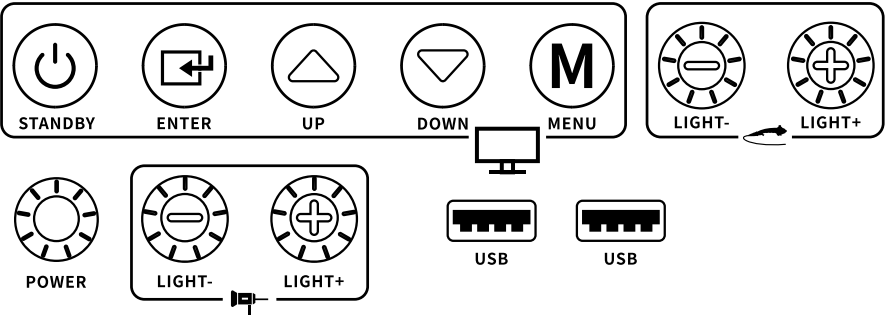


Figure 10: Left Panel Control Buttons

| Button                                                                              | Function               |                                                                                           |
|-------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------|
|    | Standby                | Toggles between powered-on and standby modes                                              |
|    | Menu                   | Opens Monitor OSD (Left Menu). In submenu, steps back one level.                          |
|    | Up/Down                | Scrolls menu items or adjusts setting values                                              |
|    | Enter                  | Confirms highlighted option or toggles a setting. In submenu, steps back one level/exits. |
|   | Light +/- <sup>1</sup> | Adjust LED light intensity of an attached distal-chip flexible endoscope                  |
|  | Power Light +/-        | Adjusts intensity of integrated light source on/off                                       |
|  | Power                  | Toggles integrated light source on/off                                                    |
|                                                                                     | USB 1 & 2              | USB data/storage ports                                                                    |

<sup>1</sup> PLS15HDFLX1/PLS24HDFLX1 Only

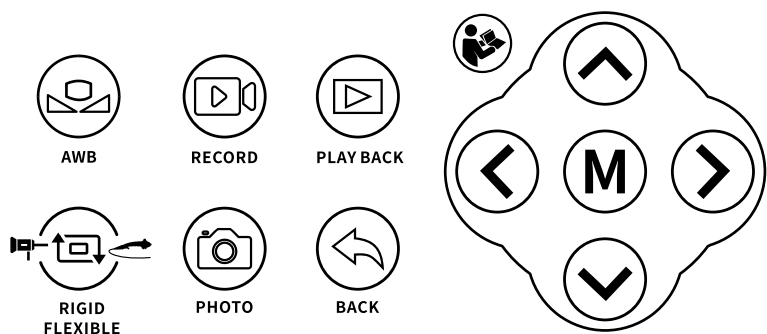


Figure 11: Right Panel Control Buttons

| Button/Port                                                                         | Function       |                                                                              |
|-------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------|
|    | AWB            | One-touch Auto White Balance                                                 |
|    | Record         | Starts/stops video recording (REC indicator on screen)                       |
|    | Playback       | Opens Playback Manager for internal/USB files                                |
|    | Rigid Flexible | Switches between rigid and flexible modes (PLS15HDFLX1/PLS24HDFLX1 Only)     |
|    | Photo          | Captures a still screenshot (JPG)                                            |
|    | Back           | Returns to previous screen or cancels operation                              |
|   | Menu           | Opens Camera Menu (Right Menu)                                               |
|  | Direction Keys | <b>UP/DOWN:</b> scroll.<br><b>LEFT/RIGHT:</b> adjust values or switch panes. |

Side/Rear Panel Connections:

| Port/Connection | Specification                                                                                                                                                                      |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Video Outputs   | HDMI Out x1 (HD)<br>(Not present at PLS15HDLAB1 and PLS24HDLAB1),<br>DVI Out x1 (1080P),<br>VGA Out x1 (1080P),<br>SDI Out x1 (1080P) (Not present at PLS15HDFLX1),<br>CVBS Out x1 |
| Video Input     | HDMI In x1<br>(Not present at PLS15HD1)                                                                                                                                            |

| <b>Port/Connection</b>     | <b>Specification</b>                       |
|----------------------------|--------------------------------------------|
| <b>Camera Input</b>        | Standard HD Camera Input ×1 (all models)   |
| <b>Distal Chip Input</b>   | ×1 (PLS15HDFLX1/PLS24HDFLX1 Only)          |
| <b>Light Source Output</b> | ×1                                         |
| <b>Power</b>               | DC Input Socket ×1, Main Power Switch, 12V |
| <b>Other</b>               | Equipotential Grounding Post ×1            |

## 6. Technical Specifications

### 6.1 Performance Specifications

| <b>Parameter</b>             | <b>Specification</b>                                                                                                                                                               |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Camera Sensor</b>         | Sony 1/1.8" CMOS                                                                                                                                                                   |
| <b>Effective Pixels</b>      | 2.1 Megapixels                                                                                                                                                                     |
| <b>Output Resolution</b>     | 1920 x 1080 (Full HD)                                                                                                                                                              |
| <b>Frame Rate</b>            | 1080p at 50/60 Hz (selectable)                                                                                                                                                     |
| <b>Horizontal Resolution</b> | ≥ 800 TV lines                                                                                                                                                                     |
| <b>Minimum Illumination</b>  | < 3 Lux                                                                                                                                                                            |
| <b>Signal-to-Noise Ratio</b> | ≥ 38 dB (nominal, -20% tolerance)                                                                                                                                                  |
| <b>Digital Zoom</b>          | 1x to 8x (9 steps: 00-08)                                                                                                                                                          |
| <b>Display (15.6")</b>       | 15.6" IPS LCD, 1920 x 1080, 16:9                                                                                                                                                   |
| <b>Display (24")</b>         | 24" IPS LCD, 1920 x 1080, 16:9 Wide/4:3 selectable                                                                                                                                 |
| <b>LED Light Source</b>      | Integrated LED cold light                                                                                                                                                          |
| <b>Total Luminous Flux</b>   | 1,200 lm nominal                                                                                                                                                                   |
| <b>CRI</b>                   | ≥ Ra 90                                                                                                                                                                            |
| <b>Color Temperature</b>     | 3,000 K to 7,000 K                                                                                                                                                                 |
| <b>LED Life</b>              | 30,000 hours (rated)                                                                                                                                                               |
| <b>Internal Storage</b>      | 256 GB SSD                                                                                                                                                                         |
| <b>USB Storage</b>           | USB 2.0 x2; NTFS; max 1 TB                                                                                                                                                         |
| <b>Recording</b>             | Video: MP4; Photo: JPG; max 2 GB/file (auto-split)                                                                                                                                 |
| <b>Video Outputs</b>         | HDMI Out ×1 (HD)<br>(Not present at PLS15HDLAB1 and PLS24HDLAB1),<br>DVI Out ×1 (1080P),<br>VGA Out ×1 (1080P),<br>SDI Out ×1 (1080P) (Not present at PLS15HDFLX1),<br>CVBS Out ×1 |
| <b>Video Input</b>           | HDMI In<br>(Not present at PLS15HD1)                                                                                                                                               |
| <b>Software</b>              | Refer to the menu for the current software version.                                                                                                                                |

| <i><b>Parameter</b></i> | <i><b>Specification</b></i>                                                                    |
|-------------------------|------------------------------------------------------------------------------------------------|
| Noise Level             | <= 55 dB(A)                                                                                    |
| Endoscope Presets       | E.N.T./Laparoscopy/Arthroscopy/Diskoscope/Fiberscope/<br>Uteroscope/Cystoscope/Custom1/Custom2 |

## 6.2 Electrical Safety and Classification

| <i><b>Parameter</b></i>   | <i><b>Classification/Value</b></i>  |
|---------------------------|-------------------------------------|
| Protection (Equipment)    | Class I (requires protective earth) |
| Protection (Applied Part) | Type BF Applied Part (camera head)  |
| Mode of Operation         | Continuous                          |
| Flammable Anesthetics     | Non-AP/APG (NOT suitable)           |
| Power Adapter Input       | 100–240V AC, 50/60 Hz, 2.5 A Max    |
| Power Adapter Output      | 12V DC, 12.5 A (150W max)           |
| Adapter Model             | LXCP150-1201250 (SKU: LSPWRCBLR)    |
| EMC Classification        | Group 1, Class A                    |
| IP Rating – Main Unit     | IPX0                                |
| IP Rating – Camera Head   | IPX6                                |

## 6.3 Environmental Conditions

| <i><b>Condition</b></i> | <i><b>Operating</b></i>         | <i><b>Storage and Transport</b></i> |
|-------------------------|---------------------------------|-------------------------------------|
| Temperature             | +5°C to +35°C<br>(41°F to 95°F) | –20°C to +55°C<br>(–4°F to +131°F)  |
| Relative Humidity       | 10% to 80%<br>(non-condensing)  | 10% to 80%<br>(non-condensing)      |
| Atmospheric Pressure    | 87 kPa to 106 kPa               | 87 kPa to 106 kPa                   |
| Maximum Altitude        | 2,000 m (6,562 ft)              | N/A                                 |

## 6.4 Physical Specifications

| <i><b>Parameter</b></i>                            | <i><b>15.6" Models</b></i>            | <i><b>24" Models</b></i>            |
|----------------------------------------------------|---------------------------------------|-------------------------------------|
| Models                                             | PLS15HD1, PLS15HDLAB1,<br>PLS15HDFLX1 | PLS24HD1,<br>PLS24HDFLX1            |
| Display Size                                       | 15.6 inches                           | 24 inches                           |
| Weight (with base)                                 | 11.5 kg (25.4 lbs)                    | 17.3 kg (38.1 lbs)                  |
| Mounting                                           | Desktop stand;<br>VESA 100x100 (M4)   | Desktop stand;<br>VESA 100x100 (M4) |
| Overall dimensions including the stand (W × H × D) | 390 × 436 × 265 mm                    | 586 × 565 × 240 mm                  |
| Base dimensions (W × H × D)                        | 279 × 16 × 265 mm                     | 300 × 6 × 240 mm                    |

## 7. Installation and Setup

### 7.1 Unpacking and Inspection

1. Carefully unpack all components.
2. Inspect for shipping damage. Contact Prosidio if damage is found.  
Do not use damaged equipment.
3. Verify all components from **Section 5.1** and packing list are present.
4. Retain original packaging for future transport.

### 7.2 Mounting (15.6" Models)

1. **Desktop:** Place unit (~11.5 kg) on stable surface with  $\geq 10$  cm clearance for ventilation.
2. **VESA (Optional):** VESA 100x100 mm. M4 screws. Ensure mount supports 11.5 kg plus accessories.

### 7.3 Mounting (24" Models)

1. **Desktop:** Place unit (~17.3 kg) on stable surface with  $\geq 10$  cm clearance for ventilation.
2. **VESA (Optional):** VESA 100x100 mm. M4 screws. Ensure mount supports 17.3 kg plus accessories.

### 7.4 Connecting Power

**WARNING:** Ensure main power switch (side panel) and front **POWER** button are OFF before connecting.

1. Connect DC output plug from adapter (LXCP150-1201250) to DC Input Socket on main unit.
2. Connect AC power cord to the adapter.
3. Plug AC cord into a grounded hospital-grade outlet (100-240V AC, 50/60 Hz).
4. Connect equipotential grounding post to facility busbar if required.

**WARNING:** Use only the supplied adapter (SKU: LSPWRCBLR) or identical Prosidio-approved replacement.

### 7.5 Connecting Video Outputs

Connect HDMI Out, DVI-D Out, or VGA Out to compatible medical-grade monitors using shielded cables.

## 7.6 Connecting External Systems (HDMI Input)

**NOTE:** Available only on PLSI5HDLABI, PLSI5HDFLX1, PLS24HD1, and PLS24HDFLX1. Not available on PLSI5HD1.

The HDMI Input port accepts an external video feed (for example, a navigation system, ultrasound, or computer) and displays that feed on the integrated monitor. The HDMI Input is independent of the camera head: the live endoscopic image comes from the camera head connected to the Camera Input Port, while the HDMI Input carries an unrelated external video signal.

### To display an external feed:

1. Ensure Camera head is connected to Main unit before turning the power on (Refer to **Section 7.7**).
2. Power on the LS-Series unit and the external source.
3. Connect a high-speed HDMI cable from the external source's HDMI output to the HDMI Input port on the LS-Series unit.
4. Open Display Settings (Left Menu) and use the Source/INPUT SELECT control to choose the input where the external cable is connected (HDMI 1 or VGA on HD models; HDMI 2 is the default and corresponds to the internal camera feed).
5. To return to the camera image, set INPUT SELECT back to the default (HDMI 2).

**NOTE:** The HDMI Input is for monitor display only. The system does not record the HDMI Input feed, does not route it to the HDMI/DVI/VGA/SDI/ CVBS outputs, and does not otherwise process the external feed beyond displaying it on the integrated monitor. Recording and external-output routing capture the camera head image only.

**WARNING:** if the input source is changed, when no external video source is connected. the monitor will show a blank screen AND the input menu will not be shown when you press the **MENU** button on the left panel. If you encounter a blank screen, when the system is on, press this sequence of buttons: **ENTER -> DOWN -> ENTER**.

## 7.7 Connecting HD Camera Head

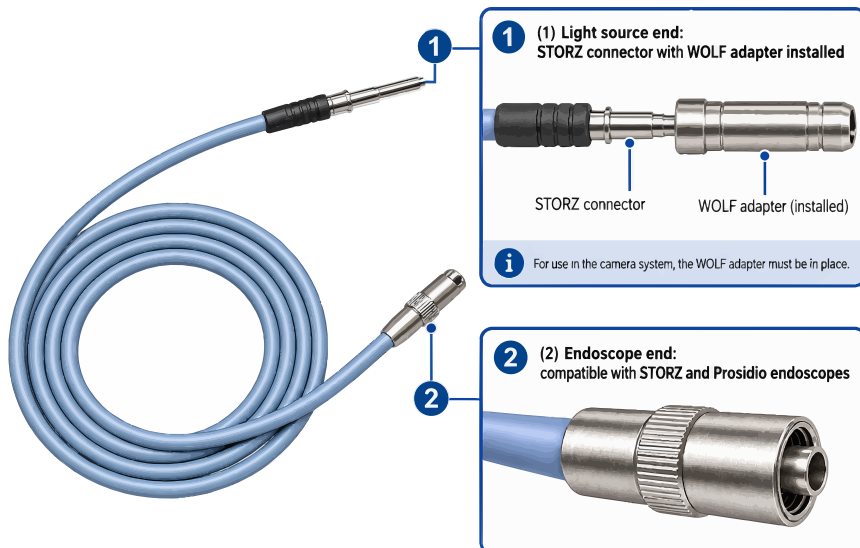
**WARNING:** Power off before connecting or disconnecting the camera head.

1. Align connector key (red dot) with Camera Input Port mark.
2. Push straight in until it clicks. Do not force.
3. To disconnect: Power off, grasp connector, retract lock, pull straight out.



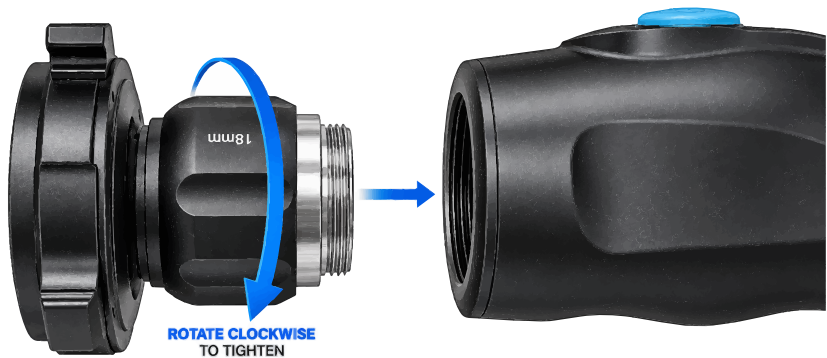
## 7.8 Connecting Light Guide Cable

Insert instrument end into endoscope light post. Insert light source end into Light Source Output Port.



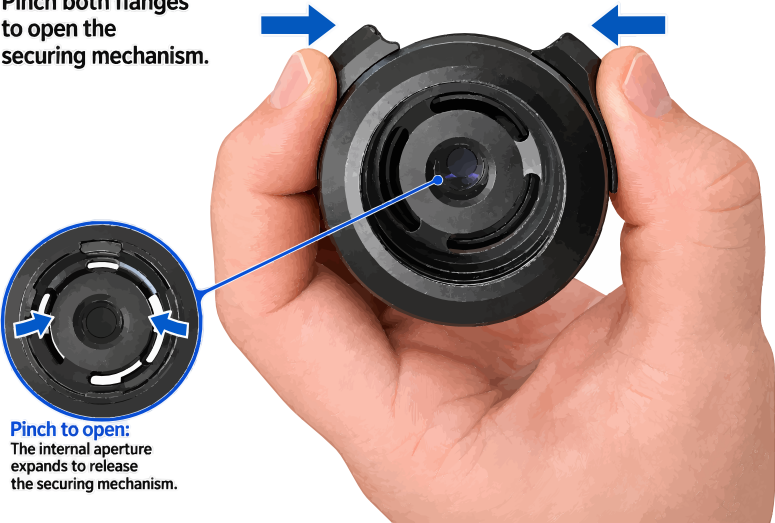
## 7.9 Connecting an Endoscope

1. First attach the coupler to the camera head as shown:



2. Attach optical coupler to camera head (C-mount, clockwise). Clean eyepiece. Insert endoscope into coupler and lock.

Pinch both flanges to open the securing mechanism.



## 7.10 Connecting Distal Chip Endoscope (PLS15HDFLX1/PLS24HDFLX1)

Use only compatible distal chip endoscopes. Align and push into Distal Chip Input Port until locked.

### Compatible distal chip endoscopes (PLS15HDFLX1/PLS24HDFLX1):

- PLSHSF930 — Prosidio flexible Nasopharyngoscope
- PLSHSFD930 — Prosidio flexible Nasopharyngoscope

Distal chip camera interface: 8-pin aviation connector (2B series), MIPI CSI-2 (4-lane), 720p@60 fps. Brightness adjustment for flexible scopes uses a 4-step scale (0–3) via the dedicated front-panel control.

# 8. Operating Instructions

## 8.1 Powering On/Off

- **Power On:** Ensure connections secure. Turn on external monitors. Turn on side power switch. Press front **POWER** button. LED turns green. System boots, live image appears.
- **Power Off:** Stop any recording. Press front **POWER** button. Turn off side power switch. Disconnect AC for extended storage.

**NOTE:** There are two power buttons: one for the system and one for the monitor.

## 8.2 Pre-Use Checks

1. Verify all connections secure
2. Confirm clear stable image on all displays
3. Verify correct image orientation
4. Verify light source functions
5. Perform White Balance (**Section 8.3**)
6. Test camera head buttons
7. Verify sufficient storage space

## 8.3 Performing White Balance

1. System on with camera, endoscope, coupler, and light active.
2. Point endoscope at clean white surface (sterile gauze), fill entire view.
3. Adjust light brightness (avoid glare).
4. Press **AWB** button (camera head or front panel).
5. "WB SETTING..." appears. Wait until "WB OK" appears; calibration is then complete.
6. Verify color accuracy.

### 8.4 Camera Head Controls

See Section 5.4 for illustrations.

| Button        | Function                                                                 |
|---------------|--------------------------------------------------------------------------|
| WB            | Initiates manual white balance                                           |
| Record        | Starts/stops video recording (hold 1s); quick press: capture photo (JPG) |
| Zoom + (Up)   | Digital zoom in (1x to 8x)                                               |
| Zoom - (Down) | Digital zoom out                                                         |

**NOTE:** Photo/video recording is via **FRONT PANEL** buttons or distal chip scope controls or **CAMERA HEAD** buttons.

**NOTE:** **CAMERA HEAD** button functions can be reassigned via SYSTEM > SHORTCUT KEY menu (**Section 8.6**).

### 8.5 Display Settings - Left Menu (Monitor OSD)

The Left Menu controls the integrated display panel settings. Access via the dedicated **DISPLAY** buttons on the left side of the front panel (Menu, Up, Down, Enter, Standby). These settings adjust the monitor panel properties independently of the camera image processing.

**LEFT MENU STRUCTURE:**

| Menu Category         | Setting                | Values/Range                          |
|-----------------------|------------------------|---------------------------------------|
| <b>1. LUMINANCE</b>   | BRIGHTNESS             | 0 - 100                               |
|                       | CONTRAST               | 0 - 100                               |
|                       | BLACKLEVEL             | 0 - 100                               |
|                       | ECO MODE               | STANDARD/INTERNET/MOVIE/ GAME/FPS/RTS |
|                       | DCR (Dynamic Contrast) | ON/OFF                                |
|                       | OD (Overdrive)         | ON/OFF                                |
| <b>2. IMAGE SETUP</b> | H.POSITION*            | 0 - 100                               |
|                       | V.POSITION*            | 0 - 100                               |
|                       | CLOCK*                 | 0 - 100                               |
|                       | PHASE*                 | 0 - 100                               |
|                       | IMAGE RATIO            | WIDE/4:3                              |
| <b>3. COLOR SETUP</b> | COLOR TEMP             | USER/5400K/6500K/9300K                |
|                       | RED                    | 0 - 100                               |
|                       | GREEN                  | 0 - 100                               |
|                       | BLUE                   | 0 - 100                               |
|                       | LOW BLUE MODE          | OFF/STRONG/MEDIUM/WEAK                |

| <b>Menu Category</b>               | <b>Setting</b> | <b>Values/Range</b>                        |
|------------------------------------|----------------|--------------------------------------------|
| <b>4. OSD SETUP</b>                | LANGUAGE       | ENGLISH and others                         |
|                                    | H.POSITION     | 0 – 100                                    |
|                                    | V.POSITION     | 0 – 100                                    |
|                                    | TIMEOUT        | 0 – 100                                    |
|                                    | TRANSPARENCY   | 0 – 100                                    |
| <b>5. RESET</b>                    | AUTO CONFIG*   | Triggers automatic configuration           |
|                                    | AUTO COLOR*    | Triggers automatic color calibration       |
|                                    | RESET          | Factory reset all display settings         |
| <b>6. EXTRA</b>                    | INPUT SELECT   | HDMI 1/HDMI 2/VGA optional/<br>USB upgrade |
|                                    | SHARPNESS**    | 0 – 100                                    |
|                                    | VOLUME         | 0 – 100                                    |
|                                    | MUTE           | ON/OFF                                     |
|                                    | AUDIO INPUT*   | DIGITAL/Analog                             |
|                                    | FREESYNC*      | ON/OFF                                     |
| *Not present on 15.6 inch versions |                |                                            |
| **Not present on PLS15HDFLX1       |                |                                            |

**NOTE:** INPUT SELECT options vary by model. Models without HDMI In (PLS15HD1) will show fewer input options. The CLOCK and PHASE settings apply to VGA input only.

**NOTE:** Source input selection: Press **ENTER** on the left panel to access input options. Available inputs: HDMI 1/HDMI 2. Default input: HDMI 2 (internal camera feed).

## 8.6 Camera Settings - Right Menu (Camera OSD)

The Right Menu controls camera image processing settings. Access via the **MENU (M)** button and navigation buttons (**UP/DOWN/LEFT/RIGHT**) on the right side of the front panel. These settings directly affect the endoscopic camera image.

| <b>Menu Item</b>     | <b>Setting</b>   | <b>Values/Range</b>                                                                                                        | <b>Description</b>                                  |
|----------------------|------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>1. ENDOSCOPE</b>  | Mode Preset      | E.N.T./<br>LAPAROSCOPY/<br>ARTHROSCOPY/<br>DISKOSCOPE/<br>FIBERSCOPE/<br>UTEROSCOPE/<br>CYSTOSCOPE/<br>CUSTOM1/<br>CUSTOM2 | Each preset stores optimized defaults for items 2–8 |
| <b>2. BRIGHTNESS</b> | Image brightness | 0 – 30 (30 steps)                                                                                                          | Adjusts overall image brightness                    |
| <b>3. SHARPNESS</b>  | Edge enhancement | 0 – 40 (40 steps)                                                                                                          | Adjusts image edge sharpness/clarity                |

| <b>Menu Item</b>     | <b>Setting</b>       | <b>Values/Range</b>                            | <b>Description</b>                            |
|----------------------|----------------------|------------------------------------------------|-----------------------------------------------|
| <b>4. COLOR GAIN</b> | Color saturation     | 0 – 30 (30 steps)                              | Adjusts color intensity/concentration         |
| <b>5. BACKLIGHT</b>  | Compensation mode    | CENTRAL PEAK 1/<br>CENTRAL PEAK 2/<br>FULL AVG | Backlight compensation algorithm selection    |
| <b>6. GAMMA</b>      | Contrast curve       | 0.45/0.55/0.65/0.75                            | 4 selectable gamma correction values          |
| <b>7a. DEHAZE</b>    | Smoke/haze reduction | ON/OFF                                         | Reduces image degradation from surgical smoke |
| <b>7b. DEMESH</b>    | Mesh/moiré reduction | ON/OFF                                         | Reduces digital mesh artifacts                |
| <b>8. VASL ENHAN</b> | Vascular enhancement | ON/OFF                                         | Enhances vein/vascular structure visibility   |

## SYSTEM Submenu (within Right Menu)

| <b>Setting</b>                | <b>Values/Range</b>                                                                                                                                                                                                                                                                                   | <b>Description</b>                           |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>FRAME RATE</b>             | 1080P_60/1080P_50                                                                                                                                                                                                                                                                                     | Output frame rate selection                  |
| <b>LANGUAGE</b>               | ENGLISH/CHN/JPN/KOR/GER                                                                                                                                                                                                                                                                               | OSD language selection                       |
| <b>HORIZONTAL</b>             | -7 to +7                                                                                                                                                                                                                                                                                              | Image horizontal position adjustment         |
| <b>VERTICAL</b>               | -7 to +7                                                                                                                                                                                                                                                                                              | Image vertical position adjustment           |
| <b>COLOR ADJ (submenu)</b>    | R GAIN/G GAIN/B GAIN/Y GAIN (0-255 each); R HUE/G HUE/B HUE/Y HUE (0-255 each)                                                                                                                                                                                                                        | Advanced color channel adjustment            |
| <b>SHORTCUT KEY (submenu)</b> | <b>UP KEY:</b> Photo/Video/OFF/DZoom+/<br>Brightness+/Color Gain+<br><b>DOWN KEY:</b> Freeze (default)/DZoom-/<br>Brightness-/Color Gain-/Endoscope-<br><b>LEFT KEY:</b> AWB/Endoscope-/Color Gain-/<br>Freeze<br><b>RIGHT KEY:</b> Photo/Video/OFF/Brightness+/<br>Color Gain+/Freeze/AWB/Endoscope- | Reassign <b>CAMERA HEAD</b> button functions |
| <b>RESET</b>                  | ON                                                                                                                                                                                                                                                                                                    | Factory reset all camera settings            |
| <b>SAVE</b>                   | —                                                                                                                                                                                                                                                                                                     | Save current settings                        |
| <b>EXIT</b>                   | —                                                                                                                                                                                                                                                                                                     | Exit System submenu                          |
| <b>ABOUT &gt; NAME</b>        | PROSIDIO                                                                                                                                                                                                                                                                                              | Device name                                  |

| Setting            | Values/Range     | Description      |
|--------------------|------------------|------------------|
| ABOUT ><br>VERSION | V1.0.4 (example) | Firmware version |

**NOTE:** Hidden shortcut: Press and hold **MENU UP** button for 3 seconds, then release to switch to Fiberscope mode. Press and hold **MENU DOWN** button for 3 seconds to toggle Freeze.

## 8.7 Advanced Settings in Service Menu

A hidden service menu can be accessed by pressing and holding the **M** button on the right side of the front panel for 5 seconds.

The Service Menu provides access to:

- **Main Menu options:** Info, Upgrade, Play, Exit
- **Info page displays:** GuideTime (system date/time), ShowTime (on/off), Language, Disk Info (internal storage capacity), USB Info (connected USB status).

**NOTE:** The Service Menu is intended for advanced configuration and service use. Changes made here may affect system operation. Contact Prosidio before modifying settings.

### To open the Service Menu:

1. Power on the system and wait for the live camera image.
2. On the right-hand navigation D-Pad, press and hold the **M (MENU)** button for approximately 5 seconds. The Service Menu overlay will appear on screen.
3. Use the **UP/DOWN** arrows to navigate, the **RIGHT** arrow or **M** button to enter a setting, and the **LEFT** arrow/**BACK** button to exit. Pressing **BACK** from the top level closes the Service Menu and returns to the live image.

**WARNING:** Time Setting, Time ON/OFF, and Language may be adjusted by qualified end users. Firmware Upgrade is for authorized service use **ONLY**; incorrect firmware changes may impair system performance or safety. Do not perform a firmware upgrade without guidance from Prosidio service.

### Setting the date and time:

The system date and time stamp recorded files (JPEG and MP4) and appear on screen when the timestamp overlay is enabled. Set the date and time on first use, after a long unpowered storage period, or after a Factory Reset, as follows:

1. Open the **Service Menu** (hold the **M** button on the right-hand navigation D-Pad for approximately 5 seconds).
2. From the System Info pane of the **Main Menu**, select **Time Setting**.
3. Use the **UP/DOWN** arrows to change each field (Y/M/D/H/M/S – Year, Month, Day, Hour, Minute, Second) and the **LEFT/RIGHT** arrows to move between fields.
4. Press **M** (or **SAVE**) to apply, then select **Quit** to return to the live image.

**Time ON/OFF:** The Time ON/OFF entry controls whether the date/time stamp is displayed and recorded with images and video. Set Time ON/OFF to **ON** to enable the timestamp overlay, or **OFF** to disable it.

**NOTE:** The system retains date and time settings across power cycles via an internal real-time clock. Verify the displayed date and time annually and after extended storage.

**Main Menu layout:**

The Main Menu has a left-hand navigation pane and a right-hand settings pane. The left pane lists the menu sections, and the right pane shows the fields for the selected section.

**Left-hand navigation pane (sections):**

| Section     | Description                                                                                |
|-------------|--------------------------------------------------------------------------------------------|
| System Info | System settings (Time Setting, Time ON/OFF, Language) and storage status (Hard Disk, USB). |
| Upgrade     | Firmware update via USB (authorized service use only).                                     |
| Playback    | Opens the Playback Manager for reviewing recorded files (see Section 8.10).                |
| Quit        | Closes the Main Menu and returns to the live camera image.                                 |

**NOTE:** Internal playback will not be applicable if an external storage device such as a USB drive is connected.

**System Info pane (settings shown when System Info is selected):**

| Menu Item    | Description                                                                                                                                                                               |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time Setting | System date and time, with separate fields for Year (Y), Month (M), Day (D), Hour (H), Minute (M), and Second (S). Used for file timestamps and the on-screen clock. See procedure above. |
| Time ON/OFF  | Enables (ON) or disables (OFF) the date/time stamp overlay on recorded images and video and the on-screen clock.                                                                          |
| Language     | Selects the on-screen menu language (English shown).                                                                                                                                      |
| Hard Disk    | Displays the available free space on the internal 256 GB storage.                                                                                                                         |
| USB          | Displays the available free space on the connected USB storage device, or 0 GB if no device is connected.                                                                                 |
| Quit         | Closes the System Info pane and returns to the Main Menu top level.                                                                                                                       |

**Info page displays:** Guide Time (system date/time), ShowTime (open/close), Language (ENGLISH), Disk Info (internal storage capacity, e.g. Left Cap223G), USB Info (connected USB status).

**NOTE:** The Service Menu is intended for advanced configuration and service use. Changes made here may affect system operation. Contact Prosidio before modifying settings.

## 8.8 Flexible Scope Mode

### (PLS24HDFLEX1 and PLS15HDFLX1 Only)

When a compatible distal chip flexible endoscope is connected to the Distal Chip Camera Input Port, the system can be switched to Flexible Scope Mode.

1. Connect the distal chip endoscope to the Distal Chip Camera Input Port (ensure system is OFF before connecting).
2. Power on the system.
3. Navigate to the Camera Settings Right Menu.
4. Press the **RIGID/FLEXIBLE** button on the front panel.
5. The display will switch to the distal chip endoscope image.
6. Flexible scope image is processed at 720p@60 fps via 8-pin aviation connector (2B series), MIPI CSI-2 (4-lane), 720p@60 fps.

When a compatible flexible distal chip endoscope is connected to the PLS24HDFLEX1, the Camera Menu (Right Menu) automatically switches to a simplified interface optimized for flexible scope operation.

### Compatible flexible endoscopes:

- PLSHSF930 — Flex Nasopharyngoscope, Reusable
- PLSHSFD930 — Flex Nasopharyngoscope, Disposable

### Flexible Scope Camera Menu

| <b>Menu Item</b>     | <b>Setting</b>          | <b>Values/Range</b>   | <b>Description</b>                       |
|----------------------|-------------------------|-----------------------|------------------------------------------|
| <b>1. BRIGHTNESS</b> | Image brightness        | 0–20                  | Adjusts overall image brightness         |
| <b>2. SHARPNESS</b>  | Edge enhancement        | 0–10                  | Adjusts image edge sharpness/clarity     |
| <b>3. COLOR GAIN</b> | Color saturation        | 0–20                  | Adjusts color intensity/saturation       |
| <b>4. GAMMA</b>      | Contrast curve          | auto, manual, presets | Sets the gamma correction value          |
| <b>5. AWB</b>        | Automatic white balance | PRESET                | Applies the preset white balance setting |
| <b>6. SYSTEM</b>     | System settings         | Submenu               | Opens the System submenu                 |
| <b>7. RATIO</b>      | Display ratio           | MODE1                 | Sets the display ratio mode              |
| <b>8. EXIT</b>       | Menu command            | —                     | Closes the camera menu                   |

### System Submenu — Flexible Scope Mode

| <b>Menu Item</b>     | <b>Setting</b>      | <b>Values/Range</b> | <b>Description</b>                       |
|----------------------|---------------------|---------------------|------------------------------------------|
| <b>1. FRAME RATE</b> | Video output format | 720P 60             | Sets the video resolution and frame rate |
| <b>2. LANGUAGE</b>   | Menu language       | ENG                 | Sets the menu language to English        |
| <b>3. COLOR ADJ</b>  | Color adjustment    | Submenu             | Opens the color adjustment submenu       |

| Menu Item     | Setting                  | Values/Range    | Description                                        |
|---------------|--------------------------|-----------------|----------------------------------------------------|
| 4. EDGE FRAME | Edge enhancement level   | 0               | Sets the edge enhancement level                    |
| 5. RESET      | Restore default settings | ON              | Resets the system settings                         |
| 6. MEDIC ID   | Medical ID               | 0000-0000-00-00 | Displays or sets the medical identification number |
| 7. ABOUT      | Device information       | Submenu         | Opens the device information screen                |
| 8. RETURN     | Menu command             | —               | Returns to the previous menu                       |

About Screen

| Menu Item  | Setting          | Values/Range | Description                             |
|------------|------------------|--------------|-----------------------------------------|
| 1. NAME    | Device name      | PROSIDIO-A10 | Displays the device name                |
| 2. VERSION | Software version | V1.0.3       | Displays the installed software version |

**NOTE:** Light brightness in flexible scope mode is controlled in 4 steps (0–3) instead of 0–100.

8.9 Recording Images and Video

- **Storage Priority:** Internal 256 GB SSD by default. If USB inserted, system prioritizes USB.
- **Capture Image:** Press **PHOTO** button on front panel to capture an image. Saved as JPG.
- **Record Video:** Press **RECORD** button on front panel to record a video. Indicator appears. Saved as MP4.
- **Stop Recording:** Press the **RECORD** button again. Wait until saving is complete.

**CAUTION:** Do not remove USB during/after recording. Files > 2 GB auto-split.

8.10 Video Playback

1. Press **PLAYBACK** button.
2. System shows files from active storage (USB if present, else internal).

PLAYBACK NAVIGATION NOTES:

- Default view shows recordings from today's date only.
- Use Search to change the start date/time and end date to filter recordings from other dates.
- Press the **RIGHT** direction button to delete the selected recording.
- Press **M** to select/confirm the highlighted item.

3. Navigate and select file with **UP/DOWN/LEFT/RIGHT**.

4. Press **ENTER/M** to play video or view image.
  5. Use menu for playback controls, Search, Backup, Format, Exit.
- Use **PLAYBACK** button to access the Playback Manager, **BACK** to return to live view

### Playback Manager Navigation:

- **UP/DOWN:** Scroll through video and photo entries.
- **LEFT/RIGHT:** Switch between internal storage (HDD) and USB panes. USB pane appears only when a drive is inserted.
- **ENTER/M:** Play or pause a video, or view an image full-screen.
- **BACK:** Return to live camera view.
- **Modify Submenu:** Highlight "Modify" in the Playback Manager, then press **ENTER** to access:
  - **Search:** Filter file list by date or filename pattern.
  - **Export to USB:** Copy selected files to the USB drive.
  - **Format:** Erase and re-initialise the selected storage device.
  - **Quit:** Close the Modify window without changes.

### Renaming Recordings:

- **Keyboard workflow:** Press **PLAYBACK**. Press **LEFT/RIGHT** to focus HDD or USB pane. Highlight target file, press **DOWN** to highlight Modify, then press **M** to confirm. Connect a USB keyboard, type the new filename, and press **M** to save.
- **Mouse workflow:** Right-click to open the context menu. Click Playback, then Modify. Select file, type new name, click OK.

**WARNING:** Format permanently erases ALL data on selected storage.

## 9. Cleaning, Disinfection, and Sterilization

### 9.1 General Guidelines

**WARNING:** Disconnect power before cleaning and disinfection.

**WARNING:** Prevent any liquid ingress into the Main Unit (IPX0).

**CAUTION:** Use only compatible cleaning agents. Avoid abrasives, solvents, and corrosive chemicals.

**CAUTION:** Camera Head (IPX6) is jet-protected but NOT immersible.

This device is supplied non-sterile and does not contact the patient directly.

## 9.2 Main Unit Cleaning and Disinfection

### Cleaning (after each use):

- Power off and disconnect from AC power.
- Wipe exterior and screen with soft lint-free cloth lightly dampened with mild detergent or 70% isopropyl alcohol.
- Wipe with water-dampened cloth to remove residue.
- Dry thoroughly. Ensure vents are clear.
- Do not spray or pour liquid directly onto the unit.

### Disinfection (per institutional protocol):

- **After cleaning, wipe with compatible intermediate-level disinfectant:**
  - 70% Isopropyl Alcohol wipe, or Quaternary ammonium compound wipe.
  - Verify compatibility with ABS, polycarbonate, and metal surfaces.
  - Follow disinfectant instructions for contact time. Rinse if required. Air dry.

## 9.3 Camera Head and Cable Cleaning and Disinfection

### Cleaning (after each use):

- Disconnect camera head (system powered off). Remove coupler.
- Wipe body and cable with enzymatic cleaner or mild detergent.
- Soft brush for crevices. Rinse by wiping with water-dampened cloth.
- Clean optical window with lens cleaning solution and lint-free tissue.
- Dry thoroughly, especially the connector.

### Disinfection (after cleaning):

- Wipe with compatible intermediate or high-level disinfectant (Glutaraldehyde, OPA, accelerated hydrogen peroxide).
- **AVOID:** Alcohol immersion, phenolics, iodine, bleach unless validated by Prosidio.
- Follow agent instructions for concentration, contact time, rinsing.
- Dry thoroughly with sterile lint-free materials.

## 9.4 Sterilization

Main Unit and standard HD Camera Head are NOT suitable for steam autoclave or EtO sterilization.

For sterilization needs, contact Prosidio for validated low-temperature methods (e.g., STERRAD, V-PRO hydrogen peroxide gas plasma).

## 9.5 Optical Coupler and Light Guide Cable

### Optical Coupler:

1. Remove the coupler from the camera head.
2. Clean with an enzymatic detergent solution and rinse with water.
3. Disinfect with 70% IPA or a high-level disinfectant per the manufacturer's instructions.
4. Autoclavable couplers may be steam sterilized per the coupler's own IFU — verify compatibility before autoclaving.
5. Inspect optical surfaces for scratches or damage; replace if damaged.

**Light Guide Cable:**

- 1. Disconnect from both the main unit and the endoscope.
- 2. Clean with an enzymatic detergent and rinse.
- 3. Disinfect or sterilize per the light guide cable’s IFU.
- 4. Inspect the fiber-bundle ends for broken fibers (dark spots when illuminated); replace if more than 30% of fibers are broken.

Always follow the specific manufacturer’s instructions for the coupler and light guide cable in use.

**10. Maintenance**

**WARNING:** Refer servicing only to qualified Prosidio-authorized personnel. Disconnect power before maintenance.

**10.1 Routine Checks**

- 1. Perform pre-use checks (**Section 8.2**) before each procedure.
- 2. Visually inspect all components regularly for damage.
- 3. Keep equipment clean (**Section 9**) and vents unobstructed.

**10.2 Periodic Maintenance**

| <i><b>Interval</b></i> | <i><b>Activity</b></i>                                                                      |
|------------------------|---------------------------------------------------------------------------------------------|
| <b>Annually</b>        | Professional inspection and electrical safety testing by qualified service personnel        |
| <b>As needed</b>       | LED light source: Contact Prosidio if significant dimming occurs. Rated life: 30,000 hours. |
| <b>As available</b>    | Software updates: Contact Prosidio. Current version: V1.1.0.                                |
| <b>Monthly</b>         | Clean all external surfaces thoroughly per <b>Section 9.2</b>                               |

**10.3 Fuse Information**

No user-replaceable fuses. Fuses are sealed within the power adapter (LXCP150-1201250). Contact Prosidio for adapter replacement.

**10.4 Service Contact**

**Prosidio Service Department**  
**Phone:** 914-510-2314  
**Email:** [service@prosidio.com](mailto:service@prosidio.com)  
**Web:** <https://prosidio.com>

Have device model number and serial number ready.

# 11. Troubleshooting

If problems persist after recommended actions, discontinue use and contact Prosidio (Section 10.4).

| <i><b>Symptom</b></i>           | <i><b>Possible Cause</b></i>                                                                                                                                            | <i><b>Action</b></i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>No power/<br/>LED off</b>    | Power cord disconnected;<br>switch off; adapter fault.<br><br>Wrong power adapter<br>fitted — HD and 4K<br>adapters are not<br>interchangeable.                         | Check all connections and switches.<br>Try different outlet.<br><br>Confirm the adapter matches the unit<br>before powering on. 15.6-inch and 24-inch<br>HD units use 12 V DC . 24-inch and 32-inch<br>4K units use 24 V DC . Do not mix adapters<br>between HD and 4K units. If the adapter is<br>mismatched or suspect, contact Prosidio<br>(Section 10.4) — fuses are sealed in the<br>adapter and are not user-replaceable.                                                                                                                                                                                                                                                                  |
| <b>No image on<br/>display</b>  | Camera not connected;<br>input source wrong.<br><br>Dirty or intermittent<br>camera-head connector<br>pins.<br><br>Display input silently<br>switched (e.g. to HDMI 2). | First Attach an HDMI cable between<br>the HDMI in and out, if the image is not<br>restored then move on to press <b>ENTER</b> ,<br>press the <b>DOWN ARROW</b> button, and<br>then press <b>ENTER</b> again to select the<br>correct input source.<br><br>Power off and inspect the camera-head<br>connector for debris, moisture, or bent<br>pins. Clean the pins, ensure they are<br>dry, reseal with red-dot alignment, and<br>restart.<br><br>Toggle the input in the Monitor (Left)<br>Menu — switch to HDMI 2 and then back to<br>HDMI 1.<br><br>If no image is restored, test with a known-<br>good camera head; if the screen still reads<br>No Signal, contact Prosidio (Section 10.4). |
| <b>Dark/dim<br/>image</b>       | Light source off or low; light<br>guide loose                                                                                                                           | Turn on light, increase intensity, check<br>cable seating.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Poor color</b>               | White balance not<br>performed                                                                                                                                          | Perform white balance (Section 8.3).<br>Clean optics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Image flicker/<br/>noise</b> | EMI; loose cables                                                                                                                                                       | Increase distance from RF sources. Check<br>cables.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Frozen image</b>             | <b>FREEZE</b> button active;<br>system error.<br><br>Camera-head button<br>reassigned to the freeze<br>function.                                                        | Press <b>FREEZE</b> to return to live.<br>Restart if needed.<br><br>If the image freezes when the camera-<br>head photo/video button is pressed<br>and unfreezes when pressed again, the<br>button assignment has changed. Verify<br>SHORTCUT KEY assignments in the<br>Camera (Right) Menu. If the assignments<br>cannot be corrected, contact Prosidio<br>(Section 10.4).<br><br>Report any freeze that recurs after<br>restart, including freezes that occur while<br>the light source is not in use.                                                                                                                                                                                         |

| <b>Symptom</b>                                                          | <b>Possible Cause</b>                                                                                                                                                                                                                                                                                           | <b>Action</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cannot record</b>                                                    | Storage full;<br>incompatible USB device.<br><br>USB drive left inserted — when a USB drive is connected the system records to the USB drive and internal Playback is disabled.                                                                                                                                 | Check space. Try different USB (NTFS, USB 2.0).<br><br>To use internal Playback, remove the USB drive first, then press <b>PLAYBACK</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>External monitor blank</b>                                           | Wrong cable; wrong input                                                                                                                                                                                                                                                                                        | Verify cable type, check monitor input setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Light not illuminating</b>                                           | Light off; LED end of life                                                                                                                                                                                                                                                                                      | Press <b>LIGHT ON/OFF</b> . Contact service if persistent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Overheating</b>                                                      | Vents blocked; ambient too hot                                                                                                                                                                                                                                                                                  | Clear vents. Verify temp within +5°C to +35°C. Power off and cool.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Halo, overexposure, or washed-out highlights</b>                     | Light intensity too high; Camera BRIGHTNESS too high; Dirty or damaged distal lens, coupler, or light guide endfaces; White balance not performed or stale; Focus not set; Incompatible coupler or scope.<br><br>Fluid or blood on the distal scope tip creating optical glare.<br><br>Faulty or foggy coupler. | Lower the light intensity (0–100 steps in rigid mode; 0–3 in flexible mode). Reduce camera BRIGHTNESS in the Camera Settings Right Menu. Clean the distal lens, coupler, and both ends of the light guide with a lint-free optical wipe and 70% IPA. Perform White Balance. Verify focus on the coupler/camera. Verify a Prosidio-approved coupler and scope are in use (Appendix A). If halo persists, contact Prosidio service ( <b>Section 10.4</b> ).<br><br>Reduce front light intensity to approximately 20–40 (rigid mode).<br><br>Wipe blood and fluid from the distal scope tip; repeat during the procedure as needed.<br><br>If halo persists, perform a Factory Reset from the Monitor (Left) Menu and then re-adjust BRIGHTNESS.<br><br>Swap in a known-good coupler. If the halo clears with the second coupler, replace the original coupler. |
| <b>Recorded video will not play back from a USB drive on a computer</b> | LS HD systems record in AVI, which cannot be played back from the USB drive.<br><br>USB drive not formatted NTFS                                                                                                                                                                                                | Use internal Playback on the system with the USB drive removed.<br><br>Format the USB drive as NTFS before use.<br><br><b>Note:</b> LS 4K systems record in MP4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Recording splits into multiple files, or stops unexpectedly</b>      | File-size limit reached — recordings split at the FAT32 4 GB boundary.<br><br>USB drive removed during or immediately after recording.                                                                                                                                                                          | Format the USB drive as NTFS to avoid splitting.<br><br>Do not remove the USB drive during recording or immediately after stopping. Wait for the write to complete.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| <b>Symptom</b>                                                                                         | <b>Possible Cause</b>                                                                                                                      | <b>Action</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pixelated or grainy image</b>                                                                       | Camera head not fully mated, or a camera head other than the one supplied with the system is fitted.                                       | <p>Disconnect and reconnect the camera head, confirming red-dot alignment.</p> <p>Confirm the camera head supplied with the system is the one in use. If the image does not clear with the original head, contact Prosidio (<b>Section 10.4</b>).</p>                                                                                                                                                                                                                       |
| <b>Image sits too high, off-centre, or the top of the image is cut off</b>                             | Broken or misaligned coupler holding the endoscope.                                                                                        | <p>Do not attempt to compensate using preset or position settings — if setting changes do not fully centre the image, the coupler is the likely cause.</p> <p>Swap in a known-good coupler. If the image centres correctly with the second coupler, replace the original coupler.</p> <p>If the image is still off-centre with a known-good coupler, contact Prosidio (<b>Section 10.4</b>).</p>                                                                            |
| <b>Image brightness drops when blood enters the field of view</b>                                      | Auto-brightness metering area too large — the camera meters on the darker blood in the field and reduces overall brightness.               | <p>Change Central Peak from 1 (larger metering area) to 2 (smaller metering area) in the Camera (Right) Menu.</p> <p>Wipe blood and fluid from the distal scope tip.</p> <p>If brightness still drops, contact Prosidio (<b>Section 10.4</b>).</p>                                                                                                                                                                                                                          |
| <b>Camera-head buttons do not capture a photo or video, do not zoom, or perform the wrong function</b> | <p>SHORTCUT KEY assignments changed.</p> <p>Camera head not matched to the system (version mismatch).</p> <p>Cable or connector fault.</p> | <p>Check the camera-head connection.</p> <p>Verify SHORTCUT KEY assignments in the Camera (Right) Menu against the defaults: UP = AWB, DOWN = Photo/Video, LEFT = Digital Zoom –, RIGHT = Digital Zoom +.</p> <p>Confirm the camera head supplied with the system is the one in use.</p> <p>If the buttons still do not respond correctly, contact Prosidio (<b>Section 10.4</b>).</p> <p>Do not attempt to reconfigure button functions outside the SHORTCUT KEY menu.</p> |
| <b>White balance has to be redone at every power-on</b>                                                | White balance calibration not retained — camera calibration or sensor fault.                                                               | <p>Perform white balance (<b>Section 8.3</b>) using the AWB key.</p> <p>White balance is expected to persist across power cycles. If it must be repeated at every power-on, the unit requires service — contact Prosidio (<b>Section 10.4</b>).</p>                                                                                                                                                                                                                         |
| <b>Menu or on-screen display in the wrong language</b>                                                 | Language setting changed or not set to English.                                                                                            | <p>Set the language in the Monitor (Left) Menu under OSD &gt; General &gt; Language.</p> <p>If the recording interface remains in the wrong language after the monitor language is corrected, contact Prosidio (<b>Section 10.4</b>).</p>                                                                                                                                                                                                                                   |

| Symptom                                  | Possible Cause                                   | Action                                                                                                                                                                                                                                          |
|------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Image mirrored, inverted, or upside down | Flip Mode set for a different scope orientation. | Set Flip Mode (Vertical / Horizontal / Both) in the Monitor (Left) Menu to match the scope orientation in use.<br><br><b>Note:</b> OSD Rotation rotates only the menu overlay, not the live image — do not use it to correct image orientation. |

**NOTE:** When a USB drive is connected to the device, recordings are saved to it, but simultaneous video playback is unavailable.

**NOTE:** Video playback is only available for recordings saved to a USB drive. Videos will not save to device hard drive.

# 12. Storage and Transport

## 12.1 Storage

| Condition            | Limit                           |
|----------------------|---------------------------------|
| Temperature          | -20°C to +55°C (-4°F to +131°F) |
| Relative Humidity    | 10% to 80% (non-condensing)     |
| Atmospheric Pressure | 87 kPa to 106 kPa               |

- Disconnect all cables. Protect connectors and optics.
- Avoid direct sunlight, heat sources, shock.
- Store in original packaging or Prosidio Pelican case.

## 12.2 Transport

- Use original or equivalent protective packaging.
- Transport within storage environmental limits.
- Handle per markings: Fragile, This Way Up, Keep Dry.



- Allow acclimation to room temperature before powering on.

# 13. Disposal



This device bears the WEEE symbol. Do not dispose with unsorted municipal waste. Dispose per local, state, and federal electronic waste regulations. Contact Prosidio for take-back information.

# 14. Electromagnetic Compatibility (EMC)

**WARNING:** Use of accessories or cables other than those specified by Prosidio could result in increased emissions or decreased immunity.

**WARNING:** Avoid use adjacent to or stacked with other equipment. If necessary, observe both devices for normal operation.

**WARNING:** Portable RF communications equipment should be used no closer than 30 cm (12 in) to any part of the system.

This system complies with IEC 60601-1-2 (tested per YY 9706.102-2021) and IEC 60601-2-18 EMC sections (tested per GB 9706.218-2021). Test Report: CHTM23110368.

**Table 14-1: Electromagnetic Emissions**

| <b>Test</b>               | <b>Compliance</b> | <b>Guidance</b>                                           |
|---------------------------|-------------------|-----------------------------------------------------------|
| RF Emissions (CISPR 11)   | Group 1           | RF energy for internal function only. Very low emissions. |
| RF Emissions (CISPR 11)   | Class A           | Suitable for all establishments other than domestic.      |
| Harmonics (IEC 61000-3-2) | Class A           | Compliant                                                 |
| Flicker (IEC 61000-3-3)   | Compliant         | Compliant                                                 |

**Table 14-2: Electromagnetic Immunity**

| <b>Test</b>               | <b>Test Level</b>                                              | <b>Compliance</b> | <b>Guidance</b>                                    |
|---------------------------|----------------------------------------------------------------|-------------------|----------------------------------------------------|
| ESD (61000-4-2)           | ±8kV contact;<br>±15kV air                                     | Compliant         | Wood/concrete/ceramic floors; if synthetic, RH>30% |
| EFT/Burst (61000-4-4)     | ±2kV power;<br>±1kV I/O                                        | Compliant         | Typical commercial/hospital mains quality          |
| Surge (61000-4-5)         | ±1kV diff;<br>±2kV CM                                          | Compliant         | Typical commercial/hospital mains quality          |
| Voltage Dips (61000-4-11) | 0% for 0.5/1 cycle;<br>70% for 25 cycles;<br>0% for 250 cycles | Compliant         | Use UPS for critical applications                  |
| PF Magnetic (61000-4-8)   | 30 A/m                                                         | Compliant         | Typical hospital environment                       |
| Conducted RF (61000-4-6)  | 3Vrms; 6Vrms ISM                                               | Compliant         | Maintain recommended separation distances          |
| Radiated RF (61000-4-3)   | 3V/m, 80MHz-2.7GHz                                             | Compliant         | Maintain recommended separation distances          |

**Table 14-3: Recommended Separation Distances**

| <b>Transmitter Power (W)</b> | <b>150kHz-80MHz (m)</b> | <b>80MHz-800MHz (m)</b> | <b>800MHz-2.7GHz (m)</b> |
|------------------------------|-------------------------|-------------------------|--------------------------|
| 0.01                         | 0.12                    | 0.12                    | 0.23                     |
| 0.1                          | 0.38                    | 0.38                    | 0.73                     |
| 1                            | 1.2                     | 1.2                     | 2.3                      |
| 10                           | 3.8                     | 3.8                     | 7.3                      |
| 100                          | 12                      | 12                      | 23                       |

**Table 14-4: Immunity to RF Wireless Communications Equipment**

The following table lists test levels for proximity fields from RF wireless communications equipment per IEC 60601-1-2:2014+A1:2020, Table 9.

| Test Frequency (MHz)             | Service/ Band                                                   | Max Power (W) | Immunity Test Level (V/m) | Distance (m) |
|----------------------------------|-----------------------------------------------------------------|---------------|---------------------------|--------------|
| 385 MHz                          | TETRA 400                                                       | 1.8 W         | 27 V/m                    | 0.3 m        |
| 450 MHz                          | GMRS 460, FRS 460                                               | 2 W           | 28 V/m                    | 0.3 m        |
| 710 MHz<br>745 MHz<br>780 MHz    | LTE Band 13, 17                                                 | 0.2 W         | 9 V/m                     | 0.3 m        |
| 810 MHz<br>870 MHz<br>930 MHz    | GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5          | 2 W           | 28 V/m                    | 0.3 m        |
| 1720 MHz<br>1845 MHz<br>1970 MHz | GSM 1800, CDMA 1900, GSM 1900, DECT, LTE Band 1, 3, 4, 25, UMTS | 2 W           | 28 V/m                    | 0.3 m        |
| 2450 MHz                         | Bluetooth, WLAN, 802.11 b/g/n                                   | 2 W           | 28 V/m                    | 0.3 m        |
| 5240 MHz<br>5500 MHz<br>5785 MHz | WLAN 802.11 a/n                                                 | 0.2 W         | 9 V/m                     | 0.3 m        |

# 15. Cybersecurity and Data Security

**Security measures:**

- Root account access restricted; shell login disabled
- USB debug mode disabled in production firmware
- No network connectivity (no Wi-Fi, Ethernet, or Bluetooth)

**CAUTION:** USB ports are physically accessible. Follow institutional policies for removable media. Format internal storage before transferring system to another institution or returning for service.

## 16. Adverse Event Reporting

### Report device-related adverse events to:

#### 1. Prosidio, Inc.

Phone: 914-510-2314

Email: [service@prosidio.com](mailto:service@prosidio.com)

#### 2. FDA MedWatch

Online: [www.fda.gov/medwatch](http://www.fda.gov/medwatch)

Phone: 1-800-FDA-1088

Fax: 1-800-FDA-0178

Include device name, model, serial number, event description, and relevant patient information.

## 17. Warranty and Service Information

### 17.1 Warranty

Prosidio warrants this product against defects in materials and workmanship for one (1) year from original purchase. The warranty is limited to repair/replacement at Prosidio's discretion.

**Excludes:** misuse, abuse, neglect, accident, improper installation/maintenance, unauthorized modification, normal wear, incompatible accessories, use outside specified conditions.

### 17.2 Service

#### Prosidio Service Department

Phone: 914-510-2314

Email: [service@prosidio.com](mailto:service@prosidio.com)

Web: <https://prosidio.com>

## 18. Manufacturer Information

#### Prosidio, Inc.

168B Irving Ave, Suite 302C

Port Chester, NY 10573

United States

Phone: 914-510-2314

Email: [service@prosidio.com](mailto:service@prosidio.com)

Web: <https://prosidio.com>

FDA Establishment Registration:  
3019110366

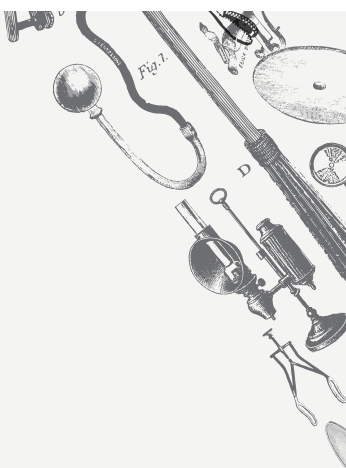
FDA Listing Number: D445182

# Appendix A: Compatible Accessories

| Accessory                      | SKU          | Description                                         |
|--------------------------------|--------------|-----------------------------------------------------|
| HD Camera Head                 | LSHDIPX8CMRH | Sony 1/1.8" CMOS, IPX6, 2.1MP, integral 2.8 m cable |
| Optical Coupler F16            | --           | C-mount, 16 mm focal length                         |
| Optical Coupler F18            | --           | C-mount, 18 mm focal length                         |
| Optical Coupler F20 (standard) | LSCPL20mm    | C-mount, 20 mm focal length (included)              |
| Optical Coupler F22            | --           | C-mount, 22 mm focal length                         |
| Optical Coupler F25            | --           | C-mount, 25 mm focal length                         |
| Optical Coupler F28            | --           | C-mount, 28 mm focal length                         |
| Optical Coupler F32            | --           | C-mount, 32 mm focal length                         |
| Light Guide Cable              | LSCLEDLCReg  | Fiber optic, 3 m                                    |
| Power Adapter                  | LSPWRCBLR    | LXCP150-1201250; 100-240V to 12V 12.5 A             |
| HDMI Cable                     | LSCBHDMI     | HDMI output cable                                   |
| USB Drive (32 GB)              | LSCUSB32GB   | USB 2.0, 32 GB, NTFS                                |
| Pelican Case (15.6")           | LSCPELICAN15 | Protective carrying case for 15.6" models           |
| Pelican Case (24")             | LSCPELICAN24 | Protective carrying case for 24" models             |

**CAUTION:** Use only Prosidio-specified accessories.





# PROSiDiO

**PROSIDIO, Inc**  
sales@prosidio.com  
support@prosidio.com  
**prosidio.com**

