Grass Valley
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LDX 150

Live production camera

User Guide

13-00126-000
2022-02-28

www.grassvalley.com

FCC Compliance

In order to comply with FCC/CFR47: Part 15 regulations, it is necessary to use high-quality, triple-screened Media or Monitor cable assemblies with integrated ferrite suppression at both ends.

Patent Information

This product may be protected by one or more patents.

For further information, please visit: www.grassvalley.com/patents/

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Title	LDX 150 User Guide
Part Number	13-00126-000
Revision	2022-02-28, 15:09

Important Safety Information

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

Symbols and Their Meanings

Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.

Indicates that static sensitive components are present, which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA/Canada.

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The presence of this symbol in or on Grass Valley product means that it complies with all applicable European Union (CE) directives.

The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

Warnings

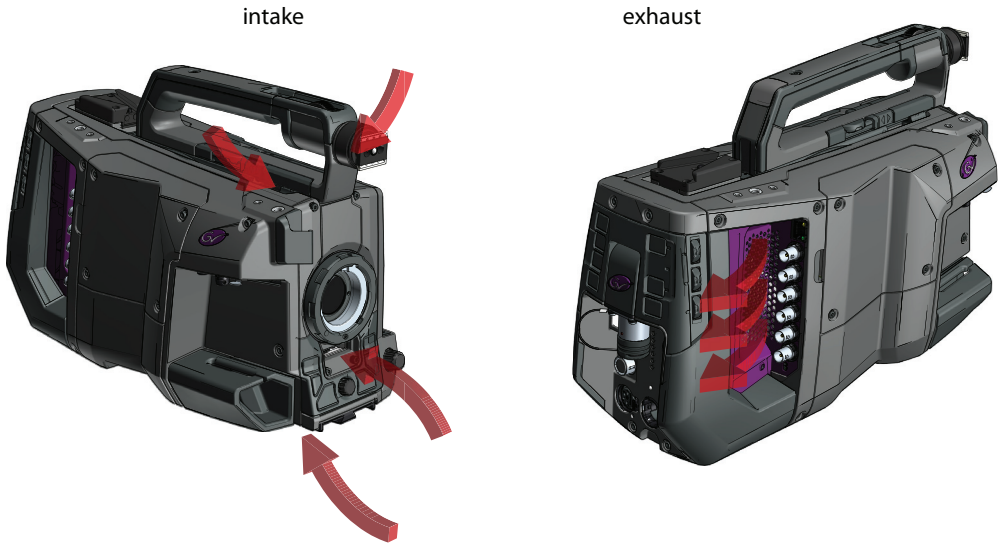
A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.
- Do not operate the equipment in wet or damp conditions. If the unit is in a wet or damp environment, a rain cover must be used to protect it for personal safety reasons.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Have qualified service personnel perform safety checks after any service.

Cautions

A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.
- Follow static precautions at all times when handling this equipment. Servicing should be done in a static-free environment.
- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions. Do not block the hot airflow coming from air outlet(s).



Precautions

To ensure continual high performance from the camera take the following precautions into consideration:

- Avoid damp places. If the environment is wet or damp a rain cover must be used to protect the camera.
- Do not subject the camera to severe shocks or vibration.
- Do not expose the camera to extremes of temperature.
- Do not leave the camera in direct sunlight or close to heating appliances for extended periods.
- Do not allow sunlight to shine into the viewfinder.
- Do not allow laser beams to shine into the lens as this could damage the imagers.
- Avoid extreme highlights as these can cause various kinds of optical reflections.
- Be careful when connecting and disconnecting fiber cables.
- Do not connect Grass Valley camera systems with other manufacturer's camera system parts.
- Make connections swiftly and firmly to avoid false error messages.

Electrostatic Discharge (ESD) Protection

Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.

- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

Environmental Information

European (CE) WEEE directive.

This symbol on the product(s) means that at the end of life disposal it should not be mixed with general waste.

Visit www.grassvalley.com for recycling information.

Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy since it is based on data received from sources outside our company. All specifications are subject to change without notice.

If you have questions about Grass Valley environmental and social involvement (WEEE, RoHS, REACH, etc.), please contact us at environment@grassvalley.com.

Laser Safety - Fiber Output SFP and QSFP Modules Warning

LASER SAFETY

The average optical output power does not exceed 0 dBm (1mW) under normal operating conditions. Unused optical outputs should be covered to prevent direct exposure to the laser beam.

Even though the power of these lasers is low, the beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fiber is connected to the board's fiber outputs before power is applied. If a fiber cable (e.g. patchcord) is already connected to an output, make sure that the cable's other end is connected, too, before powering up the board.
- **Do not** look in the end of a fiber to see if light is coming out. The laser wavelengths being used are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

Safety and EMC Standards

This equipment complies with the following standards:

Safety Standards

CE

IEC62368-1:2018

Audio/video, information and communication technology equipment: part 1

EN 62368-1:2018

EU national deviations.

EMC Standards

This unit conforms to the relevant Union harmonization legislation and the requirements of the following directive/standards:

RED 2014/53/EU

EMC testing;	EN 301 489-1 V2.2.3, EN 301 489-3 V2.1.1 and EN 301 489-19 V2.1.1. EN 62311:2020N
Radio testing;	EN 303 413 v1.1.1 (GPS)
Radio testing;	EN 300 330 v2.1.1 (NFC)

FCC / CFR 47:Part 15 (Class B)

Federal Communications Commission Rules Part 15, Subpart B

Caution to the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Note

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

EU DECLARATION OF CONFORMITY

This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

Manufacturer's Name: Grass Valley Nederland B.V.
Manufacturer's Address: Bergschot 69, 4817PA, Breda, The Netherlands

Trade/Brand Name: Grass Valley
Document Number: LDX150-C01-100
Device Name: LDX 150 **(1-0200200-0000)**
Device Description: LDX 150 broadcast camera

Year CE marking was first affixed to declared product/device: **21**

The product/device of the declaration described above is in conformity with the relevant Union harmonization legislation and the requirements of the following directive/standards:

RED 2014/53/EU

EMC testing;	EN 301 489-1 V2.2.3, EN 301 489-3 V2.1.1 and EN 301 489-19 V2.1.1. EN 62311:2020
Radio testing;	EN 303 413 v1.1.1 (GPS)
Radio testing;	EN 300 330 v2.1.1, (NFC)

Notified body Telefication BV, 0560 performed B+C assessment and issued an EU-type examination certificate RED 202140120/AA/00

Safety;	IEC 62368-1: 2018	Audio/video, information and communication technology equipment: Part 1
	EN 62368-1: 2018	EU national deviations.

Signed for and on behalf of Grass Valley Nederland B.V.

Julien Renaud, Compliance Specialist
Montreal, Quebec, Canada – Issued on October 5, 2021

EMC performance of cables and connectors

Grass Valley products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

SIGNAL/DATA PORTS

For unconnected signal/data ports on the unit, fit shielding covers. For example, fit EMI blanking covers to SFP(+) type ports and fit 75 Ω RF terminators to BNC type ports.

COAXIAL CABLES

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M and Belden 1694A (for 3Gbps).

D-TYPE CONNECTORS

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having "dimples" which improve the contact between the plug and socket shells, are recommended.

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1 Introduction

Welcome

The LDX 150 is high-end live production camera using the Grass Valley's new 2/3-inch UHD imagers.

About this guide

The purpose of this guide is to present a detailed description of how to operate an LDX 150 camera. It provides the information necessary to use the camera in different configurations and with various attachments.

This guide describes all operating features of the camera so it can be used to its full potential. This guide is so designed that it can be used as an introduction to those who are new to the camera, as a simple procedural guide to those who wish to set-up and start shooting immediately, and as a reference work to be consulted as required during the long life of the camera.

Related documents

Before proceeding, check the Grass Valley website at www.grassvalley.com for the latest version of this user's guide and additional information:

- User's guide updates, data sheets, brochures and application notes.
- Camera software package updates, release notes and installation instructions.

Technology

Work Field

The LDX 150 is designed for flexibility, with the ability to be used for both dramatic productions and live broadcasts, especially sports. The use of compact broadcast 2/3-inch lenses with a B4-mount gives you the large zoom range, speed and depth of field which is required for demanding live and many dramatic productions.

Remote production

The LDX 150 is the best choice for At-Home/REMI (REMote Integration) productions. With the implementation of Grass Valley's NativeIP transmission, the LDX 150 is the first studio system camera that is fully IP based. Thanks to NativeIP, the camera connects directly to your IP infrastructure in studio and OB-production environments.

Additionally, the LDX 150 can also operate in an existing XF transmission workflow using the XCU UXF base station.

Options

The LDX 150 basic camera functionality supports the XF transmission workflow together with the XCU UXF base station.

The following options are available for the LDX 150:

- NativeIP — IP based Media Network
- DirectIP+ — DirectIP+ operation
- UHD 1X — UHD 1X single speed video modes
- UHD 3X —UHD 3X high speed video modes
- UHD FilmB — UHD filmic broadcast video modes (25 and 29.97 frames/s)
- UHD FilmC — UHD filmic cinema video mode (23.98 frames/s)
- GPS — camera position information

Superior digital processing

The advanced video processing of the camera is done with floating point precision while all major camera functions are processed in the digital domain, including knee, gamma, detail, matrix and color correction.

To make images look their best, the LDX 150 incorporates TrueTexture™—a unique feature to preserve texture throughout all processing parameters.

Chromatic lens aberration correction (CLASS) offers impressive sharpness improvements on the outer regions of the image by canceling out shifts in color registration. This algorithm works in conjunction with lens data, using industry standard lens interface protocols.

Video contrast adjustment offers unmatched creative control over the luminance levels of the picture: shadows, midtones and highlights can be adjusted individually while natural transitions between the areas are maintained.

Key features

- New camera platform designed for extension into the future
- UHD HDR images at 3X high speed
- Simple, scalable multi-format image capture and distribution
- First camera to employ full IP network connectivity thanks to NativeIP. No separate base station is required for NativeIP. Backward compatibility is still offered with the XCU Universe UXF base station over XF transmission.
- Fastest time to deploy and configure
- Extensive operator training not required
- At-a-glance settings and diagnostics for immediate status recognition

- Software update and reconfiguration of licenses and settings (if required) in less than 7 minutes
- Field-tested rugged and reliable
- Suite of inventory management features
- Quickly align camera configuration to production requirements for superior cost management
- Field-replaceable (Q)SFP modules for different IP configurations

System components and accessories

System components and power supply options:	
XCU Universe UXF	XF Transmission Fiber Base Station
HPE-300	300 W Hybrid Power Extender with single AC mains input
HPE-300-2AC	300 W Hybrid Power Extender with dual AC mains input
LDK 4425	3G Fiber Power Converter unit
SHED-BS	SMPTE Hybrid Elimination Device (Base Station)
Camera Control components:	
CGP 500	Creative Grading Control Panel
CCS-One	Cameras Control Server
CGA	Creative Grading Application (PC tablet required)
Viewfinders:	
EC 2-100	2-inch ocular viewfinder for LDX 150 Series
VF 7-100X	7-inch native HD viewfinder for LDX 150 Series
Camera accessories:	
LDK 5031/10	Tripod Plate
LDK 4475	Reflex SuperXpander

2 Installation

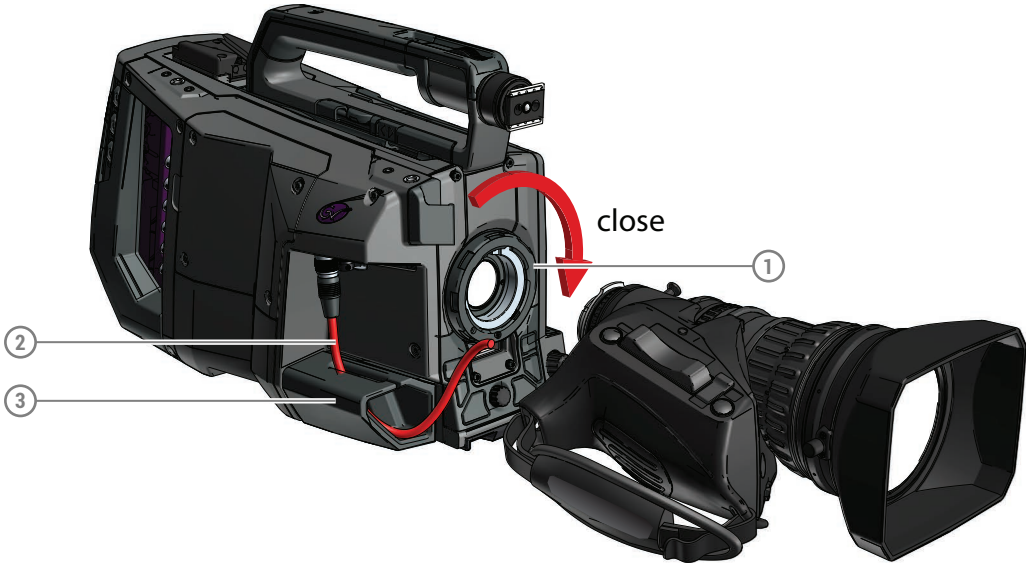
Installing a (Q)SFP module

The camera is shipped without a (Q)SFP module. Before operating the LDX 150 make sure that the right (Q)SFP module is installed that suits your transmission configuration. Refer to Appendix E for more information about how to install (or exchange) a (Q)SFP module.

Mounting a lens

To attach a lens to the camera head proceed as follows:

- Ensure that the lens locking ring (1) is in the unlocked position (turned counterclockwise).
- If present, remove the dust protection cap.
- Slot the lens into the lens mount and make sure that lens and camera are accurately aligned.
- Turn the lens locking ring (1) clockwise until the lens locks firmly into place.
- Connect the lens cable (2) to the lens connector at the right side of the camera.
- Use the cable tray (3) to stow the loop of the lens cable.



Caution

Do not attach a lens weighing more than 5 kg (11 lbs) to the camera without a proper lens support.

When a new lens is fitted to the camera it may be necessary to carry out some adjustments to optimize its use, for example, back focus or shading. For more information about these adjustments refer to the lens manufacturer's documentation.

Note

If you are using a lens with an analog interface, make sure to set the lens interface type to Analog: in the camera menu, go to the ***Configuration > Lens > Lens Settings*** menu and use the ***Lens IF Type***.

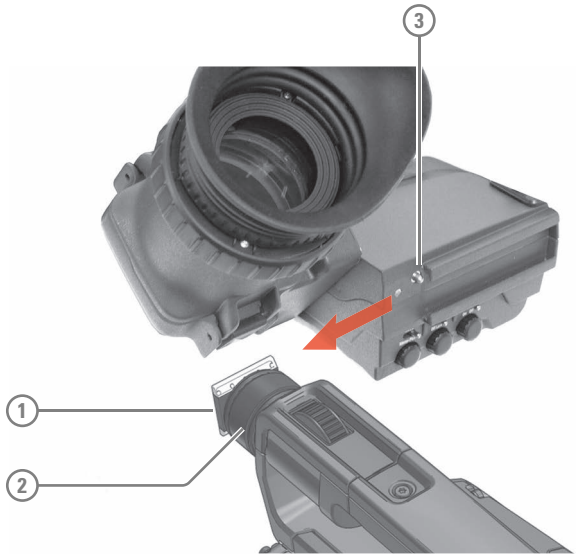
Always place the dust protection cap when the lens is not connected to the camera.

EC 2-100 viewfinder

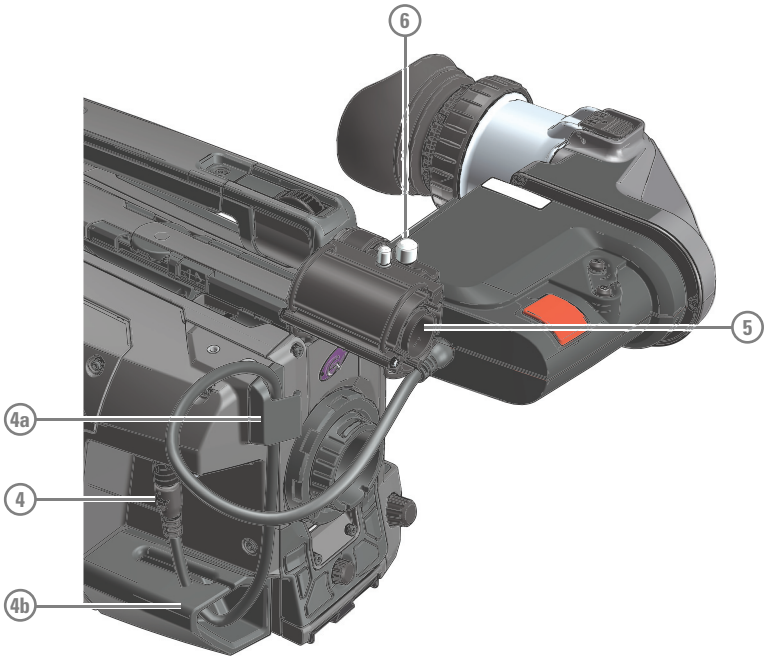
Mounting the viewfinder

To mount the viewfinder on top of the camera proceed as follows:

- Loosen locking ring **(2)** of viewfinder support bracket **(1)** at the front of the camera handgrip. (As seen from the rear of the camera, turning the locking ring counterclockwise moves it towards the handgrip.)
- Push the locking pin **(3)** in and slide the viewfinder onto the viewfinder support bracket **(1)**.
- Tighten the locking ring **(2)** by turning it clockwise (as seen from rear) so that the viewfinder is mounted securely to the support.



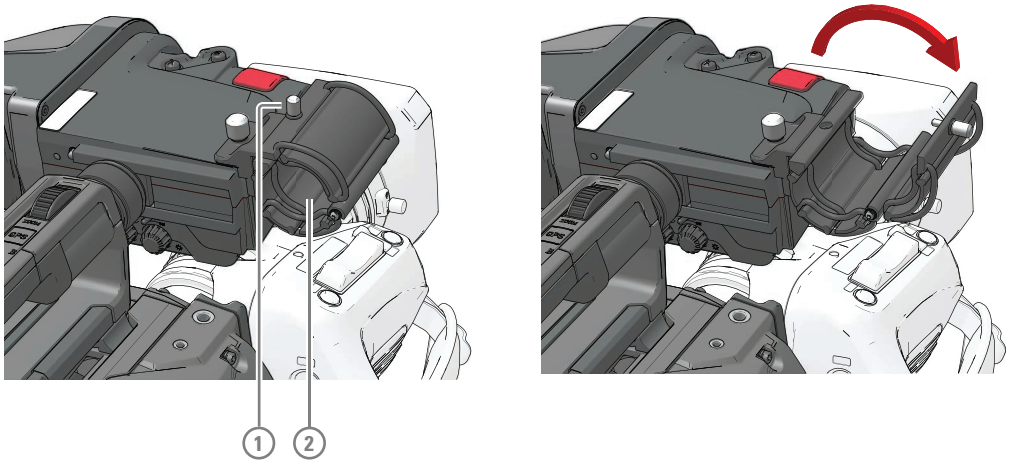
- Connect the viewfinder cable to the viewfinder connector socket **(4)** under the recess at the right side of the camera.
- Guide the cable through the upper cable clip **(4a)** and down along the cable holder **(4b)**.
- Attach the microphone holder **(5)** onto the viewfinder and secure it with the knurled screw **(6)** on top.



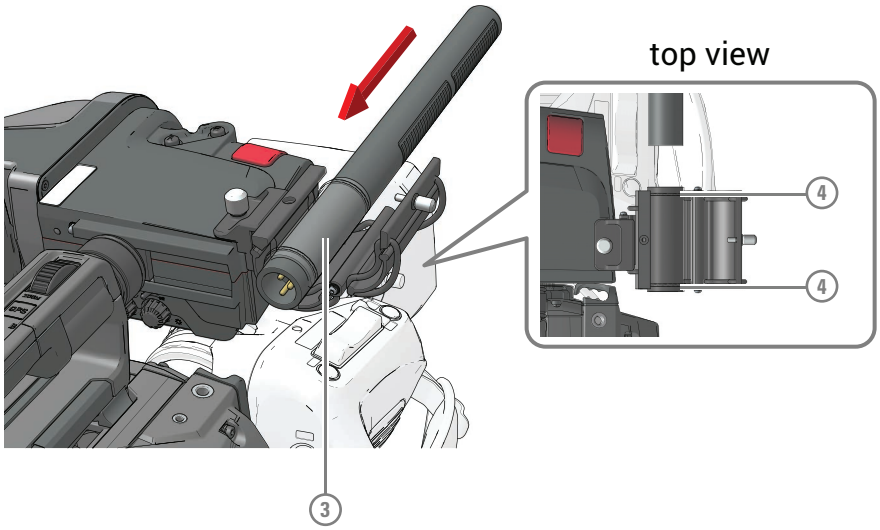
Mounting a microphone

To attach a microphone to the camera proceed as follows:

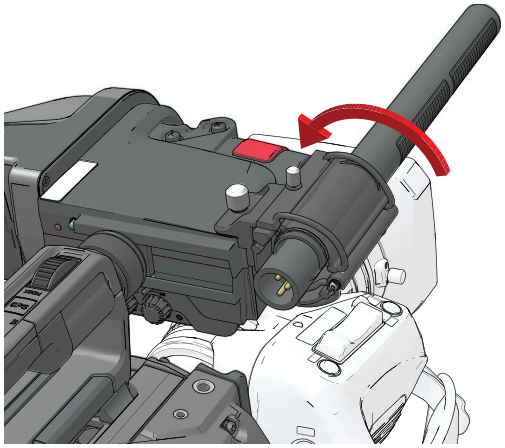
- Open the microphone holder by unscrewing the knurled screw **(1)** of the microphone support bracket **(2)** on the viewfinder and open the bracket:



- Slide the microphone into the split tube **(3)** (included with the bracket) until the back end (connector sied) of the microphone becomes visible.
- Place the tube with the microphone into the holder with the split facing upwards. Mount the microphone as straight as possible.



- Ensure that the rubber supports at the back and front of the holder fit into the rims **(4)** around the tube.
- Close the holder and tighten the knurled screw at the top. Do not allow a wind hood (when present) to touch the holder as this reduces the damping effect:



- Connect the microphone cable to the MIC audio XLR connector on the right side of the camera. To avoid mechanical pick-up, do not let the microphone cable touch the holder.

Other microphones with a diameter of 21 mm (0.83 in) can also be used, however, ensure that the sensitivity of the input that match that type of microphone are correctly selected in audio section of the camera ***Configuration*** menu.

Note

When a longer microphone is used, it may not be necessary to place it in the split tube.

Phantom power can be switched on or off for the front microphone socket in the audio section of the camera ***Configuration*** menu.

Positioning the viewfinder

Horizontally

The horizontal position of the viewfinder can be adjusted as follows to suit your preferences:

- Loosen the locking ring **(1)**. As seen from the rear of the camera, turning the locking ring counterclockwise moves it towards the handgrip.
- Slide the viewfinder horizontally along the rail to the desired position.
- Tighten the locking ring **(1)** again by turning clockwise.