

# LDX 135 LDX 150

# Live production camera

# **Maintenance Manual**

13-00145-000 2022-09-30 V1.0

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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## **Terms and Conditions**

Please read the following terms and conditions carefully. By using LDX 150 Series documentation, you agree to the following terms and conditions.

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Information in this document is subject to change without notice and does not represent a commitment on the part of Grass Valley.

Warranty information is available from the Legal Terms and Conditions section of Grass Valley's website (www.grassvalley.com).

Title	LDX 135 - 150 Maintenance Manual
Part Number	13-00145-000
Revision	2022-09-30 V1.0

# **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.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Intertek Testing Services regulations and recommendations for USA/Canada.

Intertek



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	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 A)

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.

following the provisions of:

• the RED directive 2014/53/EU

#### Note Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



#### WARNING

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

#### **Grass Valley** $( \epsilon)$ WE LOVE LIVE **EU DECLARATION OF CONFORMITY** This Declaration of Conformity is issued under the sole responsibility of the manufacturer. Grass Valley Nederland B.V. Manufacturer's Name: Manufacturer's Address: Bergschot 69, 4817PA, Breda, The Netherlands Trade/Brand Name: Grass Valley LDX150 -C01-100.docx Document Number: LDX 150 Device Name : (1-0200100-0000) 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 EN 301 489-1 V2.2.3, EN 301 489-3 V2.1.1 and EN 301 489-19 V2.1.1. EMC testing; 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. ulin Remaind Julien Renaud, Sr. Compliance Specialist Montreal, Quebec, Canada - Issued on October 5, 2020

#### **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  $\Omega$  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.

Notices

#### 1-0200200-0000 - LDX150 CAMERA (Left)

List of Field Replacable Units (FRUs):

_				
Pos	Part Number	Description	Quantity	
4	4-000000049-00	FRU kit COVER LEFT ASSY	1	
12	94-00017-000	HOT SHOE MODULE	1	
13	4-00000030-00	FRU KIT DUSTCAP	50	
15	91-00100-000	SHOULDERPAD ASSY	1	Old version of Shoulderpad
15	91-00100-001	SHOULDERPAD ASSY	1	New version of Shoulderpad
791	4-00000020-00	FRU KIT COMBI SCR PAN STL ST M3X6	50	
991	90-00104-000	PCBA U23HP Main Processor Board	1	
993	90-00106-000	PCBA FLEX U23HP SSB2MPB	1	
998	522-00096-01	PCBA System 300V Power Board	1	

4-000000051-00 FRU kit Misc parts LDX100 series

#### **FRU** kit contains

	Parts cannot be ordered separately		
	522-00094-01	PCBA Front Switch Panel	1
	90-00040-000	PCBA System Back Panel CTRL Board	1
	90-00064-000	PCBA Handgrip Interface Board	1
<mark>80</mark>	94-00021-000	18P POWER CABLE ASSY	1
	94-00037-000	12P LENS INTF CABLE ASSY	1

4-000000053-00 FRU kit Rotary knobs LDX100 series

#### FRU kit contains

	Parts cannot be ordered separately		
8	3922 400 11651	ROTARY KNOB	10
	3922 400 11642	VOLUME KNOB	10
	11-00218-000	VOLUME KNOB	10

4-000000054-00 FRU kit flexes LDX100 series

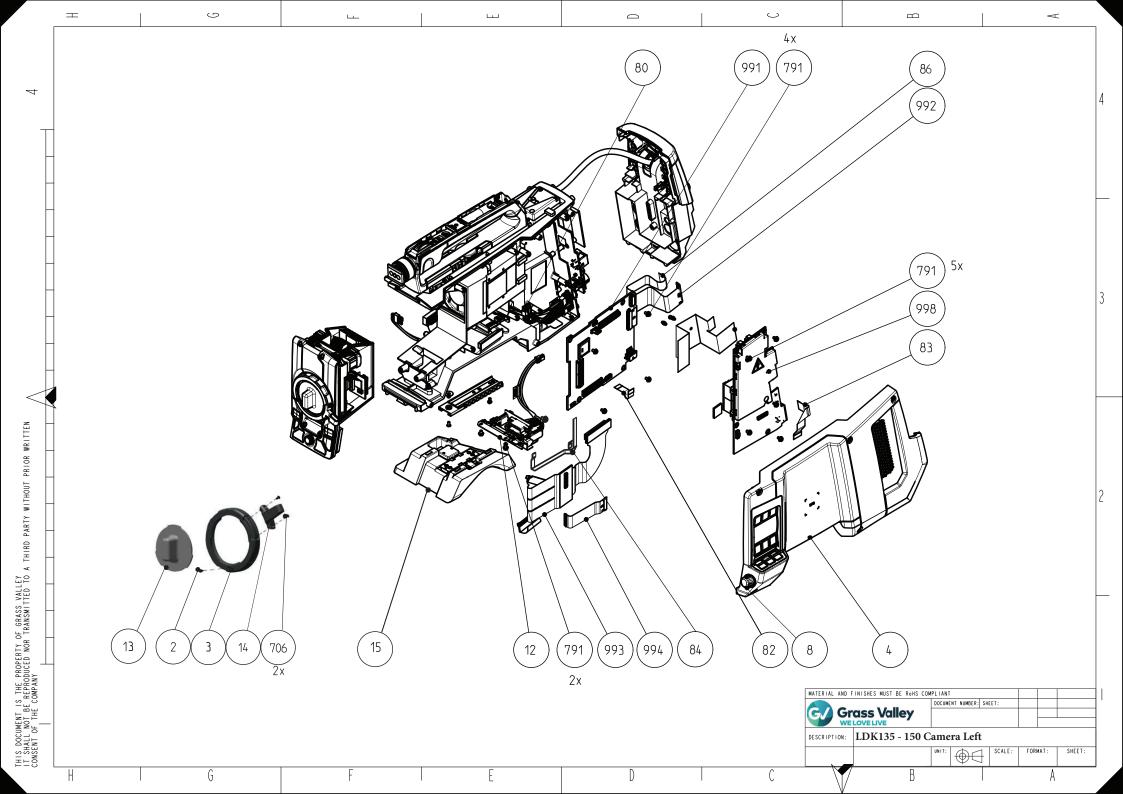
#### **FRU** kit contains

	Parts cannot be ordered separately		
	10-00041-000	PCB 02FIB Flex FWD2MP System	2
<mark>992</mark>	10-00048-000	PCB 02FIB Flex BP2MPB	2
<mark>994</mark>	94-00041-000	FFC FH40 10P SS TL45mm	2
	94-00042-000	FFC FH40 10P OS TL35mm	2
	94-00047-000	FFC FH40 10P OS TL200mm	2
<mark>82</mark>	94-00048-000	FFC FH40 20P OS TL45mm	2
<mark>86</mark>	94-00054-000	FFC FH40 30P SS TL125mm	2
<mark>83</mark>	94-00058-000	FFC FH40 30P OS TL85mm	2
<mark>84</mark>	94-00074-000	FFC FH40 10P SS TL190mm	2
	94-00075-000	FFC FH40 20P OS TL185mm	2

4-000000056-00 FRU kit Bajonet ring assy MARK II

## **FRU** kit contains

	Parts cannot	be ordered separately	
2	20-00376	CH SCR STL ST M2x3	1
3	11-00177-000	BAJONET RING B4	1
<mark>14</mark>	11-00398-000	SHARKY MARK II	1
<mark>706</mark>	2522 203 04002	CSK SCR STL ST M2x4	2



#### 1-0200200-0000 - LDX150 CAMERA (Right)

List of Field Replacable Units (FRUs):

Pos	Part Number	Description	Quantity	
5	4-000000050-00	FRU kit COVER RIGHT ASSY	1	For old version of shoulderpad
5	4-000000050-01	FRU kit COVER RIGHT ASSY	1	For new version of shoulderpad
6	94-00099-000	TRANSMISSION BRD ASSY	1	
992	90-00128-000	PCBA HDMI Board	1	
10	91-00158-000	SFP COVER ASSY LDX150	1	
10	91-00177-000	SFP COVER ASSY LDX135	1	
791	4-00000020-00	FRU KIT COMBI SCR PAN STL ST M3X6	50	
995	90-00066-000	PCBA FLEX TXB2MPB	1	
996	522-00093-01	PCBA QSFP Board	1	
997	522-00117-01	PCBA Flex TXB2RCB	1	

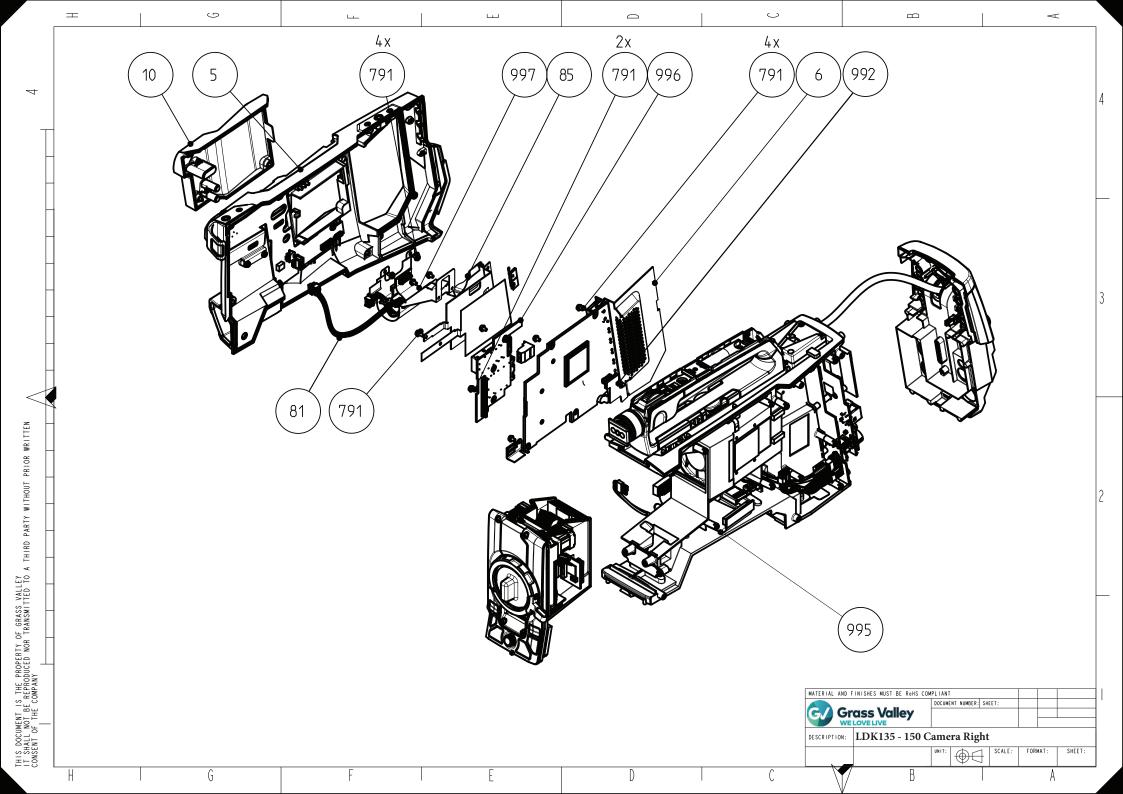
4-000000051-00 FRU kit Misc parts LDX100 series

# **FRU** kit contains

	Parts cannot be ordered separately		
	522-00094-01	PCBA Front Switch Panel	1
	90-00040-000	PCBA System Back Panel CTRL Board	1
	90-00064-000	PCBA Handgrip Interface Board	1
	94-00021-000	18P POWER CABLE ASSY	1
<mark>81</mark>	94-00037-000	12P LENS INTF CABLE ASSY	1

4-000000054-00 FRU kit flexes LDX100 series

	FRU kit contains			
	Parts cannot	be ordered separately		
	10-00041-000	PCB 02FIB Flex FWD2MP System	2	
	10-00048-000	PCB 02FIB Flex BP2MPB	2	
	94-00041-000	FFC FH40 10P SS TL45mm	2	
	94-00042-000	FFC FH40 10P OS TL35mm	2	
	94-00047-000	FFC FH40 10P OS TL200mm	2	
	94-00048-000	FFC FH40 20P OS TL45mm	2	
	94-00054-000	FFC FH40 30P SS TL125mm	2	
	94-00058-000	FFC FH40 30P OS TL85mm	2	
	94-00074-000	FFC FH40 10P SS TL190mm	2	
85	94-00075-000	FFC FH40 20P OS TL185mm	2	



#### 94-00022-00 - CAMERA BASE ASSY

List of Field Replacable Units (FRUs):

Pos	Part Number	Description	Quantity	
		•	Quantity	
2	3922 407 57423	V-BLOCK MACHINED	1	
3	3922 404 23994	V BRACKET LONG	1	
6	4-000000055-00	FRU kit DAMPED FAN ASSY	1	
13	3922 407 63811	QUICK MOUNT BLOCK ASSY	1	
15	4-000000057-00	FRU kit CAMERA HANDGRIP ASSY LDX150	1	For LDX150
15	4-00000058-00	FRU kit CAMERA HANDGRIP ASSY LDX135	1	For LDX135
992	522-00097-01	PCBA System Back Power/Audio Board	1	
993	522-00118-01	PCBA System Backpanel Piggyback Board	1	
791	4-00000020-00	FRU KIT COMBI SCR PAN STL ST M3X6	50	

4-000000051-00 FRU kit Misc parts LDX100 series

# **FRU** kit contains

	Parts cannot be ordered separately		
	522-00094-01	PCBA Front Switch Panel	1
<mark>994</mark>	90-00040-000	PCBA System Back Panel CTRL Board	1
<mark>995</mark>	90-00064-000	PCBA Handgrip Interface Board	1
	94-00021-000	18P POWER CABLE ASSY	1
	94-00037-000	12P LENS INTF CABLE ASSY	1

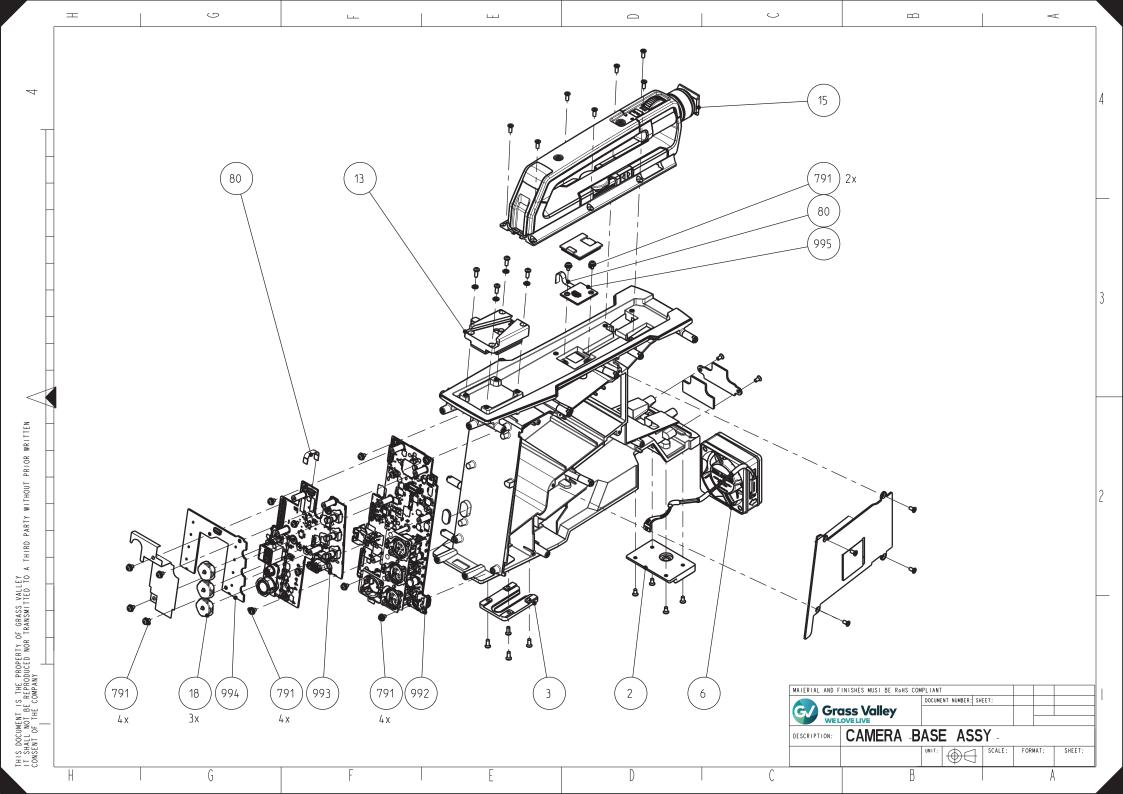
4-000000053-00 FRU kit Rotary knobs LDX100 series

	FRU kit contains				
	Parts cannot	be ordered separately			
	3922 400 11651	ROTARY KNOB	10		
	3922 400 11642	VOLUME KNOB	10		
<mark>18</mark>	11-00218-000	VOLUME KNOB	10		

4-000000054-00 FRU kit flexes LDX100 series

# **FRU** kit contains

_			
	Parts cannot be ordered separately		
	10-00041-000	PCB 02FIB Flex FWD2MP System	2
	10-00048-000	PCB 02FIB Flex BP2MPB	2
	94-00041-000	FFC FH40 10P SS TL45mm	2
<mark>80</mark>	94-00042-000	FFC FH40 10P OS TL35mm	2
	94-00047-000	FFC FH40 10P OS TL200mm	2
	94-00048-000	FFC FH40 20P OS TL45mm	2
	94-00054-000	FFC FH40 30P SS TL125mm	2
	94-00058-000	FFC FH40 30P OS TL85mm	2
	94-00074-000	FFC FH40 10P SS TL190mm	2
	94-00075-000	FFC FH40 20P OS TL185mm	2



#### 94-00096-000 - FRONT PLATE ASSY

List of Field Replacable Units (FRUs):

Pos	Part Number	Description	Quantity
2	94-00097-000	FRONT MODULE CMOS 4KU23HP	1
791	4-00000020-00	FRU KIT COMBI SCR PAN STL ST M3X6	50
792	4-00000021-00	FRU kit COMBI SCR PAN STL ST M3X8	200

4-000000051-00 FRU kit Misc parts LDX100 series

#### FRU kit contains

	Parts cannot be ordered separately		
<mark>991</mark>	522-00094-01	PCBA Front Switch Panel	1
	90-00040-000	PCBA System Back Panel CTRL Board	1
	90-00064-000	PCBA Handgrip Interface Board	1
	94-00021-000	18P POWER CABLE ASSY	1
	94-00037-000	12P LENS INTF CABLE ASSY	1

4-000000052-00 FRU kit CH CAP SCR STL ST BLACK M3x12

L

		FRU kit contains	
	Parts cannot	be ordered separately	
<mark>646</mark>	20-00349	WASH STL ST CH BLACK M3 ISO 7092	<mark>50</mark>
<mark>647</mark>	20-00350	SPR WASH STL ST BLACK M3 DIN 7980	50
<mark>682</mark>	11-00241-000	CH CAP SCR STL ST BLACK M3x12	<mark>50</mark>

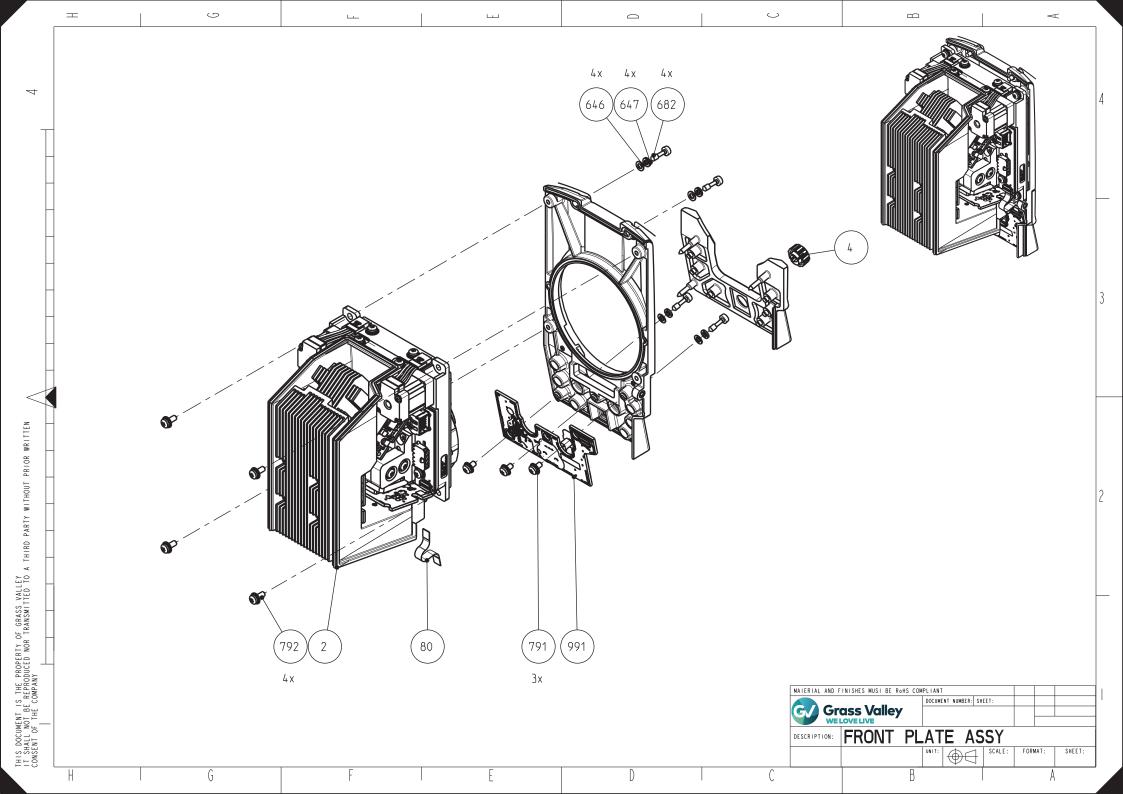
4-000000053-00 FRU kit Rotary knobs LDX100 series

# FRU kit contains Parts cannot be ordered separately

	3922 400 11651	ROTARY KNOB	10
4	3922 400 11642	VOLUME KNOB	10
	11-00218-000	VOLUME KNOB	10

4-000000054-00 FRU kit flexes LDX100 series

#### FRU kit contains Parts cannot be ordered separately 10-00041-000 PCB 02FIB Flex FWD2MP System 2 2 10-00048-000 PCB 02FIB Flex BP2MPB 2 80 94-00041-000 FFC FH40 10P SS TL45mm 2 94-00042-000 FFC FH40 10P OS TL35mm 2 2 2 94-00047-000 FFC FH40 10P OS TL200mm 94-00048-000 FFC FH40 20P OS TL45mm 94-00054-000 FFC FH40 30P SS TL125mm 2 94-00058-000 FFC FH40 30P OS TL85mm 2 94-00074-000 FFC FH40 10P SS TL190mm 2 94-00075-000 FFC FH40 20P OS TL185mm



#### 94-00024-000 - BACK PLATE ASSY

List of Field Replacable Units (FRUs):

Pos	Part Number	Description	Quantity
80	94-00038-000	LEMO FIBER CABLE ASSY	1
791	4-00000020-00	FRU KIT COMBI SCR PAN STL ST M3X6	50

4-000000052-00 FRU kit CH CAP SCR STL ST BLACK M3x12

# FRU kit contains

Parts cannot be ordered separately			
<mark>646</mark>	20-00349	WASH STL ST CH BLACK M3 ISO 7092	50
<mark>647</mark>	20-00350	SPR WASH STL ST BLACK M3 DIN 7980	50
<mark>682</mark>	11-00241-000	CH CAP SCR STL ST BLACK M3x12	50

