



MAVO MARK2 LF OPERATION MANUAL

For KineOS 7.1

MAVO mark2 LF INTRODUCTION

KINEFINITY Inc. has been committed to the research and development of FPGA, software, circuit, optics and industrial design. Its core product is digital cinema camera for shooting creative content such as movies, TV serials and commercials.

The large-format MAVO mark2 LF is equipped with a 3:2 full-frame 6K imaging sensor with superb image quality and a greatly upgraded image processing system, which provides a cleaner imagery, wider viewing angle, shallower depth of field and other large-format aesthetic performance. It can output 6K 2.4:1 at 75fps, 3K 2.4:1 at 195fps, or 2K 2.4:1 at 270fps, and can directly record ProRes for a smooth post-production workflow.

- Full frame 3:2 6K CMOS imaging sensor;
- **Dual Native ISO:** 800/5120, low noise level and high latitude image at both settings;
- **ProRes:** In-camera ProRes 422HQ, ProRes 4444, ProRes 4444XQ recording at full resolution, in-camera oversampling 4K;
- **High Frame Rate:** 75@6K 2.4:1, 140@4K 2.4:1, 290@1.9K 2.4:1;
- **Low Rolling Effect:** Fast CMOS imaging sensor readout speed, barely suffer any rolling shutter effect;
- **14+ Stops with KineLOG3:** Preserve highlight and shadow perfectly, provide maximum room in post production;
- **KineMAG Nano 1TB/2TB:** Fully optimized NVMe-based M.2 SSD;
- **Custom LUT:** Support third-party 3D LUT in both shooting and post production;
- **Broad Mount Choices** (Interchangeable mounting system): Active E Mount, Active PL Mount, Native KineMOUNT that supports PL/EF/ARRI LPL Mounting Adapters;
- **Video Outputs:** proprietary Video Port x2, 3G/1.5G SDI Port x2.

MAVO mark2 LF keeps the very compact camera body and is compatible with some many accessories such as KineMON Monitor, KineEVF Viewfinder and other mounting adapters. Its industrial standard electrical ports have effectively reduced the cost of pre-shooting and post-production.

FOR YOUR SAFETY

Before use, please read all instructions in this manual carefully:

- Pay attention to the **CAUTION** and **NOTICE**;
- Avoid near water use in case of water droplets splashing on the camera;
- Protect the camera from severe vibration;
- Avoid using the camera under direct sunlight; the operating temperature should be from 0 °C to 40°C;
- Protect the camera from strong magnetic field, dirt, moisture, or lightning storm environments;
- Avoid condensation during transportation or transition;
- Never block the air intake/vent, or the camera will be damaged for the overheat;
- Avoid exposing the LCD/OLED screen to harsh direct sunlight, and squeezing or hitting the monitor;
- Only use accessories recommended by KINEFINITY.

While using the camera, please:

- Turn off the camera when attaching or detaching a Lens Mount;
- Avoid touching the OLPF when attaching or detaching a lens mount, as the optical element is fragile;
- Make sure the EF lens is aligned pogo-pin contact inside of the EF mount;
- Hold the lens while detaching it from the lens mount, to prevent it from accident.

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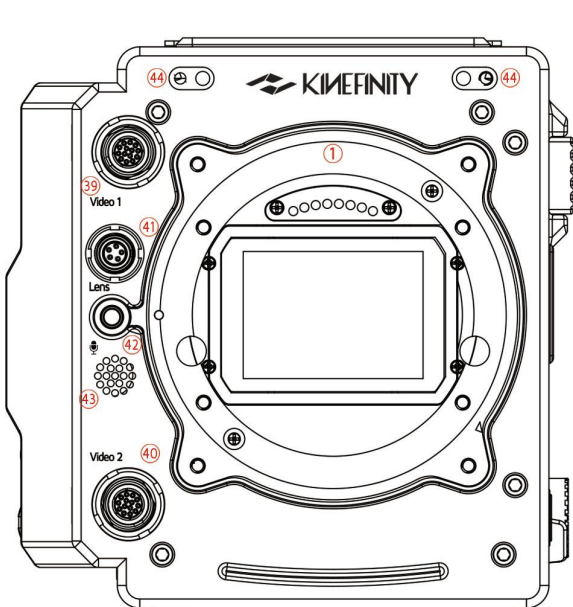
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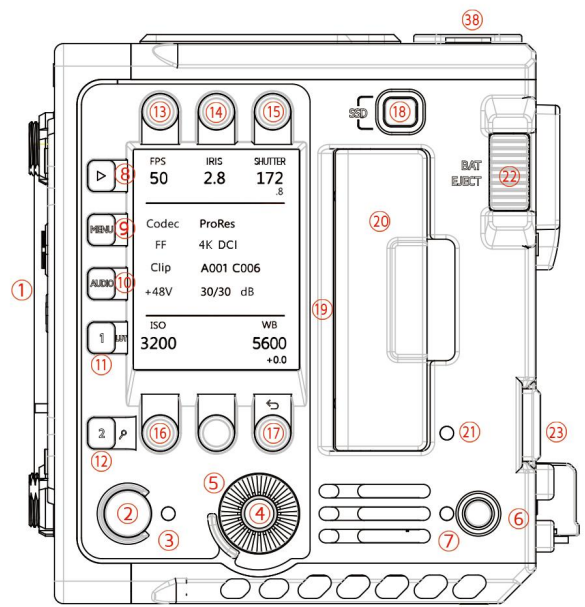
1. CAMERA OVERVIEW

1.1 Interfaces and Buttons

MAVO mark2 LF is compatible with three types of native mount: KineMOUNT, Active E mount and Active PL Mount. With the universal KineMOUNT mounted on the camera, a mounting adapter is required to attach a corresponding camera lens, or you can attach the lens with KM rear part. While the camera is provided with Active E Mount or Active PL Mount, E mount and PL mount lenses can connect with the camera directly, which is convenient and secure.



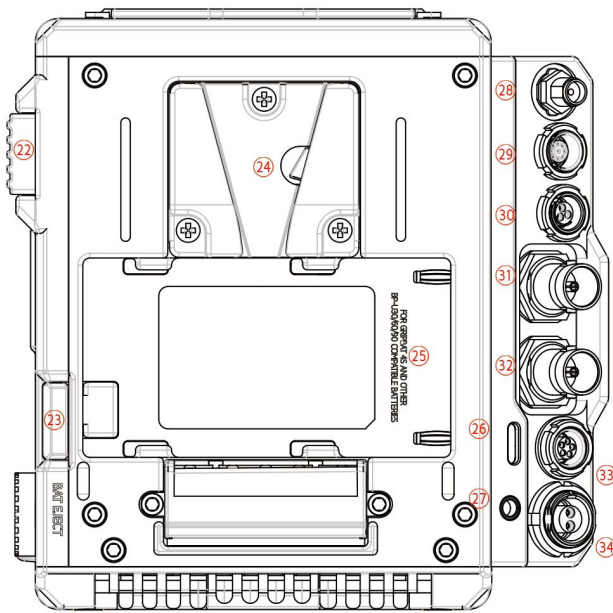
Camera Front (None Adapter)



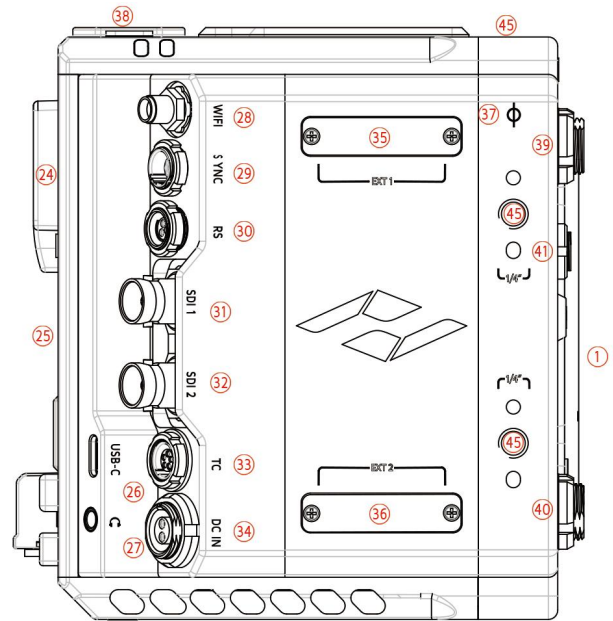
Camera Left (None Adapter)

#	Name	#	Name	#	Name
1	KineMOUNT	10	AUDIO Button	19	SSD Door
2	Record Button	11	LUT/Presets List	20	SSD Card
3	Tally	12	Zoom Button	21	SSD A Status LED
4	Knob Button	13	FPS	22	V-Mount Battery Release Button
5	Knob	14	Iris	23	BP-U Battery Release Button
6	Power Button	15	Shutter	24	V-Mount Plate
7	Power/Camera Status LED	16	ISO	25	BP-U Compartment
8	Playback Mode	17	WB/Back Button	26	USB-C Port
9	MENU Button	18	SSD Button	27	3.5mm Headphone Jack

CAUTION The bottom of the camera body has an air intake vent, while the top has an air exhaust vent. These vents should not be blocked in any way.



Camera Back



Camera Right (None Adapter)

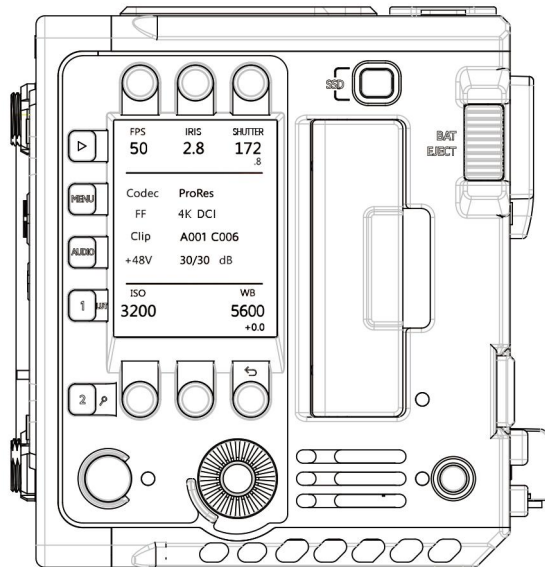
#	Name	#	名称	#	名称
28	WiFi Antenna Port*	34	DC Power Input	40	Video Port 2
29	SYNC Port	35	EXT 1	41	LENS Port
30	RS Port	36	EXT 2	42	3.5mm MIC Port
31	3G-SDI Port 1	37	Optical Indicator	43	In-camera MIC
32	3G-SDI Port 2	38	XLR Port x2	44	KineMON Mounting Holes (M3 x2)
33	TC Port	39	Video Port 1	46	1/4" Mounting Hole

* The WiFi port is RP-SMA-K and the antenna is RP-SMA-J featured with 5dBi and supports WiFi frequency band.

For the definition of ports, please refer to [4.2 Connectors](#). SYNC and Video are proprietary protocol ports.

1.2 Functions of Buttons

In Live View mode, parameters can be selected and confirmed quickly and conveniently using the buttons and Knob. In Playback mode, you can quickly browse and select the captured footage using the Knob and its



buttons [1] and [2]. Refer to the table below for specific functions and explanations:

Operation	Rotation		Note
Knob Rotation	Set Iris or ND/Quick Select		In Playback mode, fast forward and fast reverse the clip using the knob.
Operation	Press	Press and Hold for 1 sec	Note
Knob Button	Waveform/Confirm Operation	E Mount Lens Info	Switching horizontal/vertical orientation while Zooming
FPS	Set FPS		Shooting (CMOS imaging sensor) FPS
IRIS	Set Iris		Support EF/E lenses in the Whitelist
SHUTTER	Set Shutter	Shutter Fine-tuning	Shutter Angle or Speed
ISO	Set ISO/EI	Adjust ISO Highlight	
ND	Set ND (When e-ND adapter is mounted)		
WB	Set Color Temp	Set Tint	Set complete list by menu
▶	Play/Pause (In Playback mode)	Playback/Live View mode	
MENU	System settings		
AUDIO	Gain Adjustment	Audio Setting	Set Audio by the knob
1	Switch LUT	Preset List	In Playback Mode, previous clip
2	Zoom		In Playback Mode, next clip
●	Record		Switch from Playback to Live View

	Power on/off	Force Power-off (Hold for 5 secs)	
SSD	Check SSD Status		

1.3 Interface and Parameters

After booting up, the camera enters Live View mode: parameters of the current scene display on the screen.



#	Name	#	Name
1	CMOS Imaging Sensor FPS	18	Camera Index
2	Shutter Speed/Shutter Angle	19	USB Indicator
3	Exposure Mode	20	WIFI Indicator (When WIFI is connected)
4	ISO/EI ASA	21	CH1/2 Audio XLR Indicator
5	ISO Hightlight	22	CH3/4 BI/3.5mm MIC Indicator
6	Iris Number (If applicable)	23	CH1/2 VU Meter
7	ND Value (Only with e-ND adapter mounted)	24	CH3/4 VU Meter
8	Color Temperature	25	Roll Number
9	Tint	26	Clip Number
10	Monitoring LUT	27	Record Indicator
11	Image Format	28	Digital Horizon
12	Record Resolution	29	SSD Indicator
13	Codec	30	SSD Status/Capacity
14	Real-time Power Voltage	31	Time Code
15	KineBAT Remaining Capacity	32	Waveform
16	UPS Indicator	33	Focal Length
17	Real-time Core Temperature	34	Focus Distance

NOTICE CMOS Imaging Sensor FPS is the actual capturing FPS of the CMOS imaging sensor; It can be set using FPS Button and Knob, or directly quick adjusted it on the touch screen of KineMON-5U2 and KineMON-7U2. **Project FPS** is the playback frame rate of the footage in post-production, and can be set in [MENU]-[Recording]-[Project]-[Project FPS]

NOTICE EF/E Iris control is usable for EF/E lenses on the camera compatibility white list; other lenses might not be recognized.

1.4 Default Settings

The list below shows the default settings of MAVO mark2 LF:

Type	Name	Default Value	Type	Name	Default Value
RECORDING	Project FPS	25fps	AUDIO	Headphone Source	CH1/2
	Shutter Mode: Angle	1/50s		CH1 Phantom 48V	On
	ISO/EI	ISO 800		CH2 Phantom 48V	On
	WB Temperature	5600K		CH1/2 Record	CH1/2
	ND	Clear		CH3/4 Source	Built-in MIC
	LUT	KC_NEUTM		CH1 Level (48V)	30dB
	Default Codec	ProRes 422HQ		CH2 Level (48V)	30dB
	Image Format	FF		CH3/CH4 Level	30dB
	Rec Resolution	4K HD (3840x2160)		Headphone Volume	0dB
	Project FPS	25fps		SETTING	Save Preset List
	Next Reel#	001	Digital Horizon		On
	Camera Index	A	Clip End		Loop
	Camera Prefix	R	Playback at		×1
	Anamorphic Ratio	None	Tally Lamp		On
	TimeCode	Free Run	Beeper		On
	Sensitivity Mode	ISO Mode	Recording Beeper		On
	ISO Highlight Stops	6.0	Active Adapter		Enhanced
	SSD File System	HFS	Knob Ctrl		EF Iris
	SSD remain space	Time	ND tuning	0.03	
MONITORING	WB Temp List	Simple	SYSTEM	Power Threshold (V)	12V
	Blanking	None		Low Voltage Shutdown	On
	Zebra	None		Fan Speed	30%
	Waveform Based	LUT		Fan Control	Rec Low
	Waveform Size	Short		WiFi	Off
	Shutter Mode	Time		Stream	Off
	Zoom Ratio	100%: On		Bit Rate	Regular
	SDI Overlays	On		Language	English
	SDI LUT	KC_NEUTM			
	SDI FPS	25fps			

Restore to factory settings by:

[Menu→ SYSTEM→System Settings→Factory Reset]

NOTICE If you start up the camera with a USB flash drive (any USB flash drive or smartphone) inserted, the user settings will be erased and the camera will be restored to its factory settings.

NOTICE Before perform factory reset, user settings can be exported from the camera. After the reset is

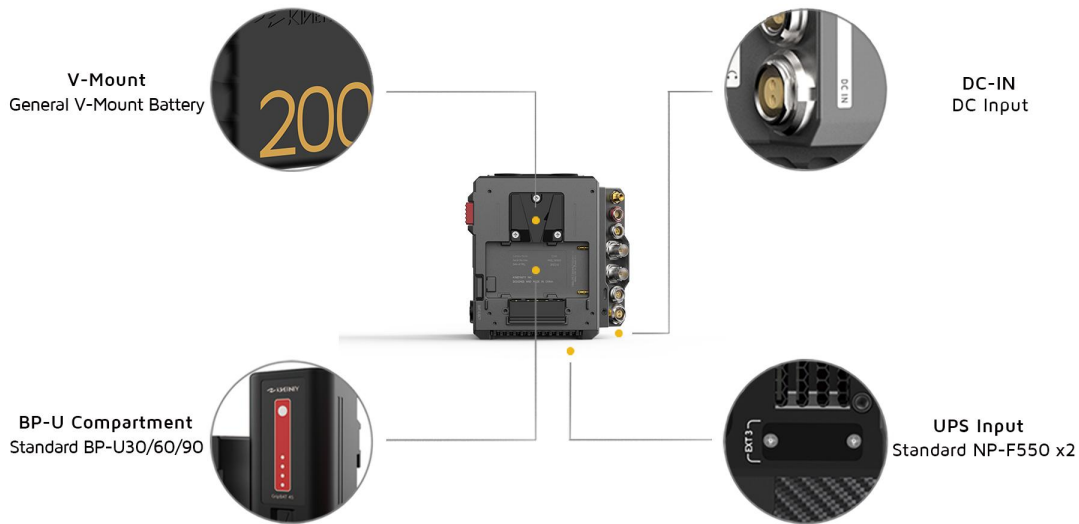
done, user settings can be imported to the camera again.

[MENU→SYSTEM→ System Settings→Export/Import User Settings]

2. QUICK GUIDE

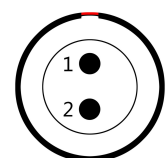
2.1 Power Supply

MAVO mark2 LF allows different types of power supply:



- **PD KineBAT 99/200** (Compatible with V-mount batteries) fits V-Mount hybrid battery plate on the camera back. A single PD KineBAT 99/200 can provide up to 2.5/5 hours of usage time for the camera.
- **GripBAT 4S** (Compatible with BP-U30) can be installed on the BP-U compartment on the back of MAVO mark2 LF. With a higher capacity up to 52Wh, the GripBAT 4S still enables a power supply about 60 mins even mounting KineMON-5U2 Ultra-Bright Monitor on the camera. It has a capacity of up to 52Wh and can power the KineMON-5U2 Ultra-Bright Monitor for about 60 minutes continuously.
- **GripBAT 2S:** MAVO mark2 LF sports with special designed UPS power contacts at the bottom. While the camera is connected with the Movcam UPS Baseplate, MAVO mark2 LF can be uninterrupted powered by two NP-F550 compatible batteries. Users can replace the V-mount battery without turning off the camera. (GripBAT 2S is highly recommended as it features larger capacity, higher working current and longer duration)

DC IN Definition



1. VDD

2. Ground

- **Power Cords:** Connect different power cords to the 2-pin DC IN port of the camera body:
 - **D-Tap Power Cord:** Connect the D-Tap plug to the D-Tap socket of battery/battery plate, and connect 2-pin push-pull connector to the 2-pin power socket of the camera body;
 - **XLR Power Cord:** Connect the 4-pin standard XLR connector to the XLR socket on the storage battery (11~26V), and connect the 2-pin push-pull connector to the 2-pin power port on the camera body;
 - **100W Power Cord:** One end has a USB-C plug, which can be used with the 65W PD power adapter; the other end has a push-pull self-locking plug, which is connected to the camera's two pins power port for quick power supply.

CAUTION Acceptable voltage range: 11V~26V. DO NOT use external power supply over 26V, otherwise the camera may get burnt out.

CAUTION Please heed the direction of the 2-pin DC IN port on the camera body while plugging/unplugging the power cords. The red dot/notch indicates the direction in which the power cable is inserted. Please pay attention to the positive and negative poles of the D-Tap port.

NOTICE A V-mount to Anton-Bauer Plate Adapter is required if you use Anton-Bauer (Gold Mount) broadcast batteries.

NOTICE When two of the four power supplies are available at the same time, the camera automatically chooses the source with higher voltage, and allows hot-swap of batteries.

NOTICE To save power, use an independently powered monitor and turn off WIFI.

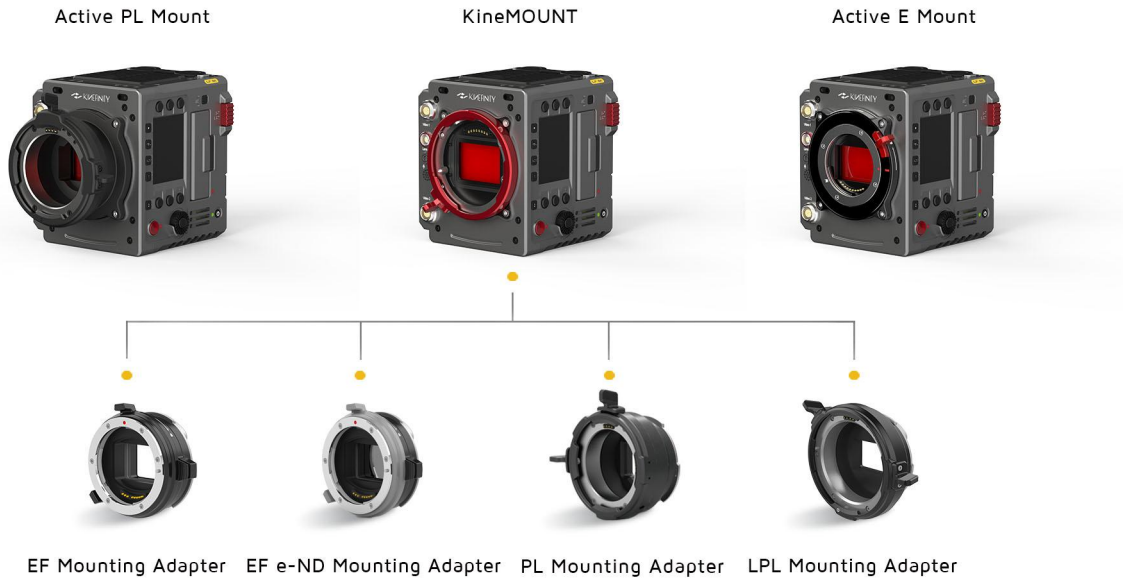
NOTICE If the voltage detected is too low to continue shooting, the camera will automatically stop recording to avoid damage to the clip.

2.2 Mount

MAVO mark2 LF can choose from KineMOUNT, Active E Mount to Active PL Mount as native camera mount.

Native KineMOUNT needs a mounting adapter to attach the lens to the camera. The available adapters include EF Mounting Adapter, PL Mounting Adapter, and also ARRI LPL Mounting Adapter.

With Active E mount or Active PL Mount, the camera does not need a mounting adapter while attaching the E mount lens or PL mount lens.



Only three steps are required to install mounting adapters to the KineMOUNT. Here we take EF adapter as an example to illustrate how to install the mounting adapters to the KineMOUNT. Shut down the camera and then:

1. **Release:** Rotate the locking ring of the KineMOUNT counter-clockwise, then take off the KineMOUNT cover;
2. **Install:** There is an arc-shaped locating slot above the electronic contacts of the KineMOUNT, please align the arc-shaped protrusion on the back of EF adapter with the locating slot of KineMOUNT when attaching the mounting adapter to the camera;
3. **Lock:** Rotate the locking ring of KineMOUNT clockwise to fasten the adapter to KineMOUNT firmly.

Boot up the camera after the adapter is mounted. Press [MENU] button and check the bottom of the menu. If the *EF sys 10* (EF subsystem version number, version number 10 may be another number) is displayed, it means the adapter is mounted successfully.

CAUTION KineMOUNT has electronic contacts. When changing the mounting adapters, the camera must be turned off first, otherwise the camera may be damaged.

CAUTION The flange distance of the KineMOUNT is very short. Be careful when disassembling the adapter to avoid touching the CMOS image sensor and causing artificial damage.

Here we take Active E Mount as an example to illustrate how to install the Active Mount to the MAVO mark2 LF.

1. If the camera is attached with the Mount Cover or the Active PL Mount, first remove the 4 screws that secure the native mount to the camera body, and then remove the Mount Cover or the Active PL Mount;
2. If the camera has a KineMOUNT installed, first remove the four screws that fix the native camera mount, loosen the four screws that fix the KineMOUNT, then remove KineMOUNT and the shims between the KineMOUNT and the camera body.
3. Place the Active E Mount vertically in the front of the camera body, and be aware of the upright position of the adapter, and tighten the four fixing screws.

Boot up the camera after the Active Mount is attached. Press [MENU] button and check the bottom of the menu. If the *Active E Mount* is displayed, that means the Active Mount is attached successfully.

CAUTION Do not remove the location pins under the native camera mount.

CAUTION Do not remove the red locking ring while detaching the KineMOUNT.

CAUTION The KineMOUNT is secured with M3 x 6mm screws, the Active PL Mount and the Active E Mount are secured with M3 x 8mm screws.

CAUTION The two black sleeves on the KineMOUNT should also be removed and the sleeves and shims should be properly stored

2.3 Lens

Based on active locking mount as EF Mounting Adapter II, the whole-new EF 3 Mounting Adapter is designed in accordance with the traditional DSLR lens rotation method and has been much improved. Compared to the previous version, EF 3 Mounting Adapter not only possesses the traditional way to rotate the lens clockwise, but also keeps active locking to fasten the lens, thus the EF lens can be installed quickly and locked clockwise as the PL lens, which is suitable for the utilization of Follow Focus when shooting.

Steps of attaching EF lens to new EF 3 mount:

1. **Unlock:** Rotate the locking ring of the EF 3 mount counterclockwise till it stops; (Rotate the adapter cover counterclockwise, and remove the anti-dust cover from the lens);
2. **Install:** Align the red dot on the lens and the dot on the adapter flange face. And make sure that the pin on the mount matches the hole of the lens; rotate the EF lens clockwise till the release button up;
3. **Lock:** Rotate the locking ring of the EF 3 mount clockwise as the arrow direction until fastened firmly.

Steps of detaching EF lens from new EF 3 mount:

1. **Unlock:** Rotate the locking ring of the EF 3 mount counterclockwise till it stops;
2. **Detach EF lens:** Press the release button on the right side of the EF 3 mount and rotate the EF lens counter-clockwise.

Steps to attach EF lenses by EF II adapter:

1. **Release:** Rotate the locking ring of the EF mount clockwise, take off the KineMOUNT cover and the lens cover;
2. **Install:** Align the "red dot" on the lens with the "red dot" on the mounting adapter. Make sure that the pin on the mount engages with the hole in the mount of the lens. For the EF-S lens, align the white square mark on the lens with the one on the mount adapter.
3. **Lock:** Install the lens to the camera, rotate the locking ring (NOT the lens) counterclockwise (Follow the arrow of "lock sign" on the mount) until it is fastened firmly.

CAUTION

The mounting adapter might be burned if a lens/adapter with all-metal rear is attached directly to the camera body. In this case, please keep electronic iris control off:

[MENU→SETTINGS→ ADAPTER & ND→Active Adapter→Disable].

2.4 Monitoring

Please use an appropriate EVF or monitor (with proprietary Video Port or general 3G-SDI Port), and connect the input port of EVF or monitor to the output port of the camera body with a high quality cable. Various monitoring ways are supported according to monitoring target;



- **KineMON-5U2 Ultra-Bright Monitor:** With the proprietary high-quality self-locking Kine Video Cord, our monitor gets both power supply and video signal through the same cable. It is easy to mount it on the camera body firmly by using appropriate accessories for different needs.
- **KineMON-7U2 Ultra-Bright Monitor:** Use the same proprietary high-quality self-locking Kine Video Cord as KineMON-5U2 to get both power supply and video signal.
- **KineEVF2 Full-HD OLED Viewfinder:** Use the same Kine Video Cord to connect the camera body (Video port) and KineEVF2, and could be mounted on the camera with the proprietary KineEVF Bracket.
- **SDI monitor:** can be used as director monitor or DIT monitor with 3G-SDI.

With the KineMON-5U2 and KineMON-7U2, the latency is lower than 100ms; with KineEVF, the latency is lower than 80ms.

CAUTION Do not hot swap the video cable when booting up the camera or when the mains power is on, as it may burn out the monitor or camera.

Functions of Buttons on KineMON-5U2 and KineMON-7U2

KineMON-5U2 and KineMON-7U2 are added with Tally Light, Record Button and Playback Button to trigger all the camera functions with the touch screen.

Liveview Mode

- **Power Button:** Push up or down Power Button at the side to turn on or off the monitor quickly. Tally light turns green after the camera boots up.
- **Record Button:** Short press the Record Button to record/stop. Tally light turns red while recording.
- **Playback Button:**
 - **Menu:** Short press Playback button to enter the camera main menu;
 - **Playback:** Press and hold the Playback button for three seconds to enter the playback mode.
- **Knob:**
 - **Waveform:** Short press Knob to show the waveform;
 - **Monitor brightness and monitor rotation:** Press and hold the Knob for three seconds to adjust monitor brightness and set monitor rotation. Rotating the wheel to change the brightness of monitor at 10% step while 60% brightness in default; the monitor can be set rotation 180 deg manually or auto rotation based on rotation angle of monitor itself.
- **Button 1:**
 - **RGB Histogram:** Short press Button 1 to to show histogram at the left corner of screen;
 - **False color:** Press and hold the Button 1 for three seconds to show the ARRI like false color.
- **Button 2:**
 - **Zoom:** Short press Button 2 to zoom the liveview and to indicate the image focus;
 - **Peaking focus:** Press and hold the Button 2 for three seconds to enter peaking focus. Peaking focus shows peaking with red line, assisting cameraman on image focus, with the default being Normal.

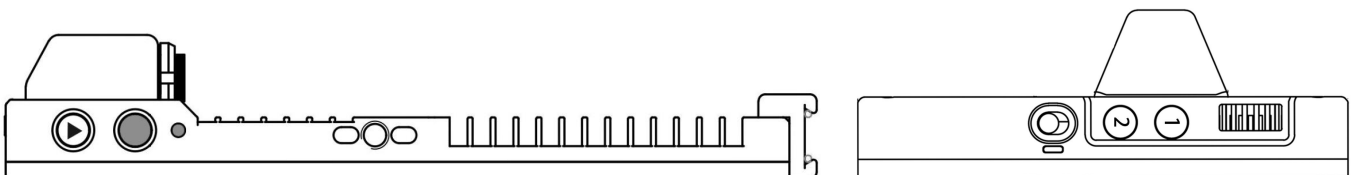
Liveview Mode (Zooming)

- **Knob:** Short press to switch from horizontal and vertical orientation.

Playback Mode:

In playback mode, all the buttons except the Power Button are provided with new functions:

- **Record Button:** Press Record Button to enter liveview mode.
- **Playback Button:**
 - **Play or pause:** Press Playback Button to play or pause current clip;
 - **Liveview:** Press and hold Playback Button for three seconds to enter liveview mode.
- **Knob:**
 - **Speed or back:** Rotate Knob to speed or back the current clip.
 - **Waveform:** Short press Knob to show the waveform;
 - **Monitor brightness and monitor rotation:** Press and hold the Knob for three seconds to adjust monitor brightness and set monitor rotation. Rotating wheel to change the brightness of monitor at 10% step while 60% brightness in default; the monitor can be set rotation 180 deg manually or auto rotation based on rotation angle of monitor itself.
- **Button 1:**
 - **Previous clip:** Short press Button 1 to switch to the previous clip;
 - **False color on input video:** Press and hold the Button 1 for three seconds to show false color which IRE based on Arri False Color scale.
- **Button 2:**
 - **Next clip:** Press Button 1 to switch to the next clip;
 - **Peaking focus and peaking focus sensitivity:** Press and hold the Button 2 for three seconds to enter peaking focus. Peaking focus shows peaking with red line or not, assist cameraman on image focus, the default sensitivity is Normal.

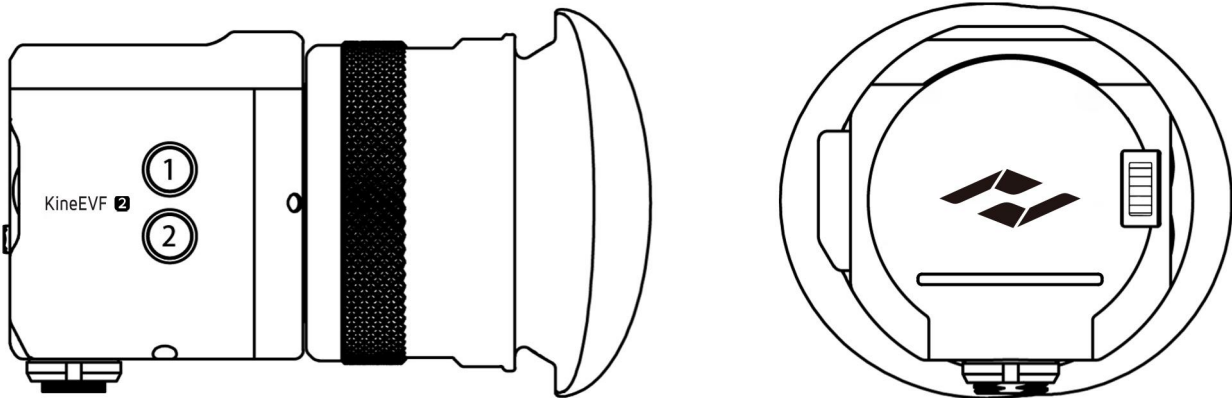


Function of Buttons on KineEVF2

Liveview Mode

- **Power Button:** Push up or down Power Button at the side to turn on or off the monitor. The Tally indicator light up after the camera boot up.
- **Record:** Short press the Record button to record/stop. The Tally indicator turns red while recording.
- **Knob:**
 - Short press to adjust brightness of KineEVF. The default is medium brightness, scroll the Knob up and down to increase and decrease monitoring brightness;
 - Press the Knob for three seconds to turn on/off Proximity Sensor.
- **Diopter Adjustment:** Set from -6 to +2 diopters to adapt the viewfinder image to your visual acuity (from 600 degrees of myopia to 200 degrees of hyperopia).
- **Button 1:**
 - **RGB Histogram:** Short press Button 1, display the histogram to indicate the focus status;
 - **False color on input video:** Long press Button 1 for three seconds to show the ARRI like false color.
- **Button 2:**
 - **Zoom:** Short press Button 2 to zoom the Live View;
 - **Peaking focus sensitivity:** Long press Button 2 for three seconds to enter setting of sensitivity of peaking function.

Liveview Mode (Zooming)



NOTICE: The peaking focus function can only work on KineMON-5U2/7U2, KineEVF2. It is not available on third-party monitor.

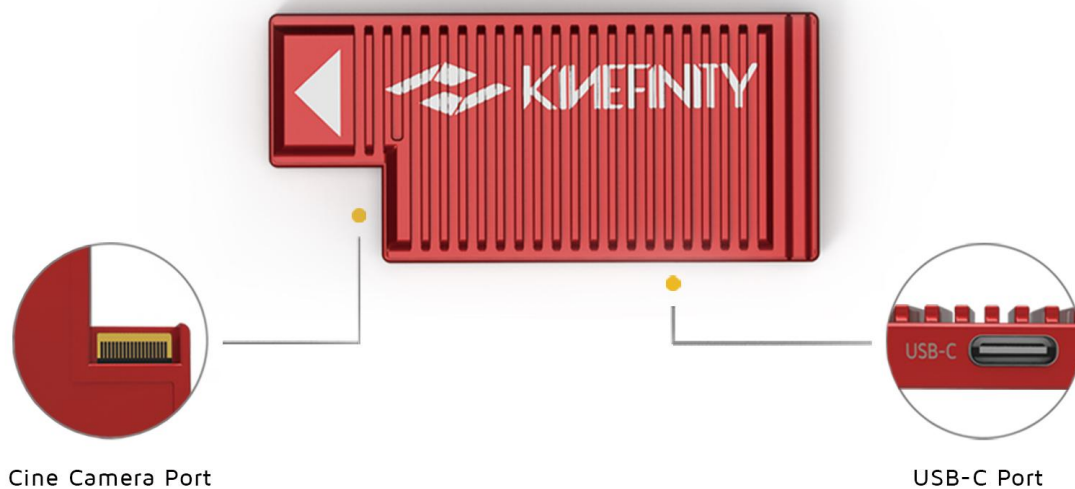
2.5 Recording Media SSD

Different from MAVO Edge cameras that have dual SSD slots, MAVO mark2 LF is designed to have only one card slot. MAVO mark2 LF continue to use a solid-state drive based on the NVMe M.2 interface, just like MAVO Edge cameras, which is smaller in size and has a higher read and write speed.

2.5.1 KineMAG Nano Introduction

KineMAG Nano SSD is composed of KineMAG Nano body and M.2 NVMe based internal 2280 SSD, which has the read and write speed up to 10Gbps. The card body itself is equipped with two high-speed ports:

- **Camera port:** Designed for the PCIe interface card slot of the MAVO mark2 LF camera;
- **Universal USB-C port:** The USB-C port supports the USB3.1 Gen2 protocol. No card reader is needed, and just one Type-C cable that supports USB3.1 Gen2 can quickly transfer the contents of the memory card to a Windows-based PC workstation/notebook or Mac. The card write can write at speeds of up to 10Gbps.



More importantly, KineMAG Nano SSD has a specially optimized built-in NVMe M.2 SSD, which provides KineMAG Nano with two major safety features: Read-only and RAID 5 array, so that whether you are copying the card or the card being written at high speed in the camera, the safety and robustness are greatly guaranteed. You do not need to worry about the SSD safety.

2.5.2 KineMAG Nano instructions

KineMAG Nano SSD card is very easy to use. Open the SSD door and insert the KineMAG Nano into the slot before boot up the camera. The SSD card slot is equipped with a built-in magnet door. Above the SSD card

slot is the SSD function button which manages the SSD in the slot; on the right side is the SSD indicator that indicate the status of the SSD in the slot.

Status of SSD indicator (A, B):

- **Red:** KineMAG Nano in the slot is recording/playing the clip;
- **Green:** KineMAG Nano in the slot is selected;
- **Orange:** KineMAG Nano in the slot is not selected;
- **Grey:** KineMAG Nano is not in the slot.

Use the SSD Button on the camera to select SSD to record/playback.

The SSD status can be viewed on the monitor:

- **Yellow [STBY] flickering:** When there is no SSD in the slot, the SSD indicator does not light up, the camera can not record. Insert the SSD and reboot the camera;
- **Yellow [STBY] flickering:** There is SSD in the slot but it is not displayed on the screen, the SSD indicator is yellow at this time. It could be that the file system is wrong or there is a problem with the SSD card data, and the camera can not record. Proceed with following steps:
 - **First:** Ensure the data security;
 - **Second:** Format the SSD by [MENU→RECORDING→SSD →Format SSD]. After the SSD formatting, the camera will automatically load the SSD. Then, the monitor will display the SSD remaining time, roll number and footage serial number.
- **Green [STBY]:** The monitor will display the remaining time, the roll number and the footage serial number of the SSD. At this time, the SSD indicator of the relevant card is green, and you can record the footage into the SSD.
- **Red [•REC]:** The camera is recording. The SSD indicator is red while recording.

CAUTION The footage can not be recovered after the SSD is formatted, so please backup all the data before formatting.

NOTICE Please insert the SSD before the camera is booted up, or the SSD can not be loaded successfully.

NOTICE We only recommend use KineMAG Nano SSD. The performance of 3rd-party SSD can not be guaranteed. We will not provide technical support on recording issues like frame drop or data loss for 3rd-party SSD.

NOTICE Please prepare backup SSD cards in case of on set emergency.

2.6 Audio

Compared with the first generation MAVO LF, MAVO mark2 LF integrates many KineBACK-W connection ports and functions into the camera body such as the XLR port. There are three audio recording interfaces that support four audio tracks recording simultaneously :

- **In-camera MIC (CH3/4):** Record audio by in-camera MIC even if there is no microphone connected;
- **3.5mm Audio Jack (CH3/4):** Suited for 3.5mm MIC;
- **Dual XLR ports with Phantom 48V (CH1/2):** The audio module supports high-quality Phantom 48V in-put. It features with dual XLR inputs, dual channels and supports 48V phantom microphone.

Adjust volume gain and set audio function using [AUDIO] button:

- Press [AUDIO] button: Set Gain level and headphone volume of CH1/2 and CH3/4;
- Long press [AUDIO] button:
 - **Headphone Source:** Choose CH1/2 or CH3/4 as the headphone source;
 - **CH1 Phantom 48V:** Choose CH1 or CH2 Phantom 48V input on/off;
 - **CH2 Phantom 48V:** Choose CH1 or CH2 Phantom 48V input on/off;
 - **CH1/2 Record:** Choose to record CH1/2 simultaneously or record CH1 or CH2 separately;
 - **CH3/4 Source:** Choose in-camera MIC or 3.5mm MIC as the source of CH3/4.

Audio input with In-camera MIC and 3.5mm MIC audio socket

- To use the in-camera MIC for audio recording, long press the [AUDIO] button, set [AUDIO Button→Headphone Source→CH3/4], then select [CH3/4 source→In-camera MIC]. The audio will be recorded by In-camera MIC.
- To use 3.5mm audio jack to connect an external microphone for audio recording, long press the [AUDIO] button, set [AUDIO Button→Headphone Source→CH3/4], then select [CH3/4 source→3.5MM]. The audio will be recorded by 3.5mm MIC.

Phantom 48V audio input

To use a microphone that needs phantom power, long press the [Audio] button, set [AUDIO→Headphone Source→CH1/2]

In addition, the channel can also be set in three modes:

- **Two audio channels as CH1:** Left Channel = Right Channel = CH1;
- **Two audio channels as CH2:** Right Channel = Left Channel = CH2;
- **Stereo:** Left Channel = CH1, Right Channel = CH2 (Default).

Generally, the camera audio can be set as one input if just using one MIC.

3.5mm Headphone Jack

To use a 3.5mm headphone for audio checking, the channel can be selected to CH1/2 or CH3/4: Press and hold the [Audio] button for one sec, set

[AUDIO button→Headphone Source→CH1/2]

CAUTION When using microphones that don't need Phantom power, please turn off the Phantom 48V.

NOTICE The audio will be packed into the ProRes mov file only when the project FPS is the same as CMOS imaging sensor FPS, or it will be recorded into a separate wav file. For example, if the project FPS is 25.000, when the CMOS imaging sensor FPS is set to 30.000, it will show yellow **30.000** on the UI, which indicates the audio is recorded into a separate wav file.

2.7 Playback

To enter the Playback mode, you can press and hold the [Playback] button for one sec in Live View mode, and then you are able to trigger play/pause of the current clip by pressing the [Playback] button again.

Loop playback

The way to play a clip in a loop is to set by [MENU→SETTINGS→Playback→Clip End: Loop]. Playback continues from the beginning of the same clip again in accordance with project fps.

Clip switching

Press the shortcut button [1] to switch to the previous clip; press shortcut button [2] to switch to the next clip. Fast forward and fast reverse are available by the Knob. Please note the parameters in Playback mode are different from the ones in Live View Mode.

Playback speed

To change the playback speed in the menu, press [MENU→SETTINGS→Playback→Playback at: ×1]. There are seven speed choices: ×1/4, ×1/2, ×1, ×2, ×4, ×8, ×16.

Switch back to Live View mode

Press [REC] button or press and hold [Playback] button for one sec to switch back to Live View mode.

2.8 Codec

The camera comes with ProRes codecs, set the default codec by:

[MENU→RECORDING→Recording Codec→ProRes (.mov)]

MAVO mark2 LF supports in-camera ProRes recording at all resolution and frame rates: 6K/5K/4K/2K. MAVO mark2 LF supports ProRes codecs from ProRes422HQ to ProRes4444/XQ, and keeps all dynamic range of ProRes clips with KineLOG3, while the monitoring LUT will not be applied into the footage.

Duration Reference

Settings	Duration @KineMAG Nano 1TB
3K@25fps ProRes422LT(.mov)	10 hours 47 mins
3K@25fps ProRes422HQ(.mov)	5 hours
3K@25fps ProRes4444(.mov)	3 hour 20 mins
4K@25fps ProRes422LT(.mov)	6 hours 12 mins
4K@25fps ProRes422HQ(.mov)	2 hour 52 mins
4K@25fps ProRes4444(.mov)	1 hour 55 mins
5K@25fps ProRes422LT(.mov)	3 hours 43 mins
5K@25fps ProRes422HQ(.mov)	1 hour 43 mins
5K@25fps ProRes4444(.mov)	1 hour 09 mins
6K@25fps ProRes422LT(.mov)	2 hour 45 mins
6K@25fps ProRes422HQ(.mov)	1 hour 16 mins
6K@25fps ProRes4444(.mov)	51 mins

2.9 Oversampling and Cropping Mode

Oversampling/Downscale

Oversampling/Downscale: It means that the actual sampling resolution is larger(greater) than the recording (output) resolution, and the image formats are the same. As all effective area of the sensor is used, oversampling/downscale brings lower noise level and sharper image. Oversampling at FF is 4K. For normal frame rates, shooting on downscaling 4K ProRes at Full Frame is recommended.

Cropping Mode

Cropping means that the CMOS image sensor only utilizes a center part of the image as effective sampling area. **Cropping mode boosts frame rate higher than full resolution sampling:**

- Output 6K 2.4:1 full resolution sampling, up to 75fps;
- Cropping Mode, 3K 2.4:1 Wide (M4/3), up to 195fps;
- Cropping Mode, 1.9K 2.4:1 Wide (S16), up to 290fps.

MAVO Edge camera support in-camera oversampling and cropping at the same time, leading to various resolution choices:

Select Cropping Mode by:

Press and hold Button [1] for one sec or [MENU→RECORDING→Image Format]

2.10 Access clips on PC/MAC

Access KineMAG Nano on PC/MAC

To access Clips from KineMAG Nano on PC/MAC, you only need a USB-C cable to connect the SSD to workstation:

- MAC platform (MacOS Sierra or higher version) can access KineMAG Nano with HFS/NTFS file format;
- Windows platform can access KineMAG Nano with NTFS file format. Windows platform installing software such as HFS+ or MacDrive can access HFS file format.

NOTICE Switch the film format via [MENU]→[RECORDING]→[SSD]→[SSD Film System]

NOTICE HFS for Read-only, NTFS can be read and written.

Play ProRes Clips on PC/MAC

All dynamic range of KineLOG3 is retained in the ProRes clips, and monitoring LUTs will not be burned into the footage. Therefore, the clips checked in post production is the one retains the full dynamic range and low contract. While playing back the footage at a computer, access the LUT to recover the monitoring image.

When working on Windows platform, you need to install [Quicktime7](#) to access ProRes MOV file.

Clip Folder

Each clip is saved in the SSD as a folder. The name of the folder is the same with the name of the clip, eg: A003C027_20210421_91B2 (for the meaning of the clip' s name, see [3.1 Footage and Projects Information](#)).

The folder includes:

- A003C027_20210421_91B2.mov: ProRes mov file;
- A003C027_20210421_91B2-CH1.wav, A003C027_20210421_91B2-CH2.wav, A003C027_20210421_91B2-CH3.wav and A003C027_20210421_91B2-CH4.wav: audio files of CH1, CH2, CH3 and CH4;
- *.cube and *.look: the monitoring LUT, cube or look format;
- A003C027_20210421_91B2_snapshot.bmp: the snapshot of the clip' s first frame, 1/2x1/2 of the recording resolution;
- A003C027_20210421_91B2-slate.txt: contains most of the information when shooting the clip, like shutter speed, ISO, highlight, white balance, etc;
- 0.mt: recording camera status information.

Please send xxx-slate.txt and 0.mt to KINEFINITY if an exception is encountered.

NOTICE If Project FPS is the same as CMOS Sensor FPS (Shooting FPS), audio is embedded into ProRes mov file, else the audio will be embedded into the four wav files. That is to say the audio

will be saved into the four wav files while shooting slow-mo and quick-mo.

NOTICE

To quickly import mov files into your editing software, you can use the search function in the import dialog box. For example, enter “.mov” , then you can use CTRL+A or ⌘ +A to select all the mov files and drag them into your editing software.

3. ADVANCED OPERATIONS AND SETTINGS

3.1 Footage and Slate

When starting a new project, please make sure:

- **Project FPS:** the final playback FPS, same with the frame rates of the editing clips or delivery matches up with the project FPS of the camera. For example: 24fps for feature movie and 25fps for TV (PAL). Project FPS should not be changed after the project kicks off;
- **Project information:** set clip name, director's name, DP's name, etc. of the project. You can find all the information in slate.txt;
- **Codec:** choose in-camera ProRes;
- **Blanking:** choose from classical 2.4:1, 2:1, 17:9, 16:9, 4:3 to 1:1 for Instagram, and 9:16, 1:2 for smartphone. Blanking is also applicable for anamorphic shooting.

Choose the codec based on the project and post-production workflow:

- **Apple ProRes:** most of the projects can be shot under ProRes 422HQ (visually lossless compression), or in-camera oversampling 4K ProRes with high image quality, efficiency and reliability.

Set the project FPS and project information in [MENU], such as Project Name, DP's Name, Roll Num., Take Num. and so on:

- Set Project FPS: [MENU→RECORDING→Project→Project FPS]
- Set Slate: [MENU→RECORDING→Project→Project & Slate]
- Set Blanking: [MENU→MONITORING→Monitoring Setting→Blanking]

Use the knob and Button [1] to set the information. All the information will be displayed in the Slate and the SSD Roll Name, see the example on the right:

Before starting a new project, we suggest setting Scene Num., Roll Num. and Take Num. as "1". After formatting each SSD in camera, the Roll Number of the SSD will be automatically added to 1. You can also modify the Roll Number manually when formatting the SSD. When DIT backs up the footages, the files in the SSD can be archived into the corresponding catalogues to easily view the roll numbers.

NOTICE Project Blanking only acts as a monitoring reference, the camera will record the full active image.

Menu Operation

Change Project FPS

[MENU→RECORDING

→Project FPS]

Menu Operation

Set Project Information

[MENU→RECORDING→Slate]

Clip Name

A003C027_20210421_91B2

- A: Camera Index;
- 003: Take Num.;
- C: Abb. Of Clip;
- 027: Clip Num.;
- 20210421: Date;
- 91B2: Random numbers.

SSD Roll Name

A003_6D09B6

- A: Camera Index;
- 002: Roll Num.;
- 6D09: First Four Digits of Serial Number;
- B6: Random numbers.

3.2 SDI Monitoring

MAVO mark2 LF camera supports HD-SDI and 3G-SDI output, with transfer rates up to 1.485Gb/s @3G-SDI and 2.97Gb/s @3G-SDI. The output resolution is 1080P.

SDI supports pure SDI image output and overlay information SDI image output:

3.2.1 SDI Overlays

SDI supports to output pure image and image with overlays:

- **Pure SDI image:** Pure SDI image output enables users to see the full-screen clean image without status overlays.
- **SDI Overlays:** When SDI overlays is switched on, camera parameters and MENU settings can be viewed and changed on the screen, through which users can be aware of the camera status while the real time shooting. The Record/Stop status display and the image blanking function are also added.

Menu Operation

Change SDI Overlays

[MENU→MONITORING→SDI→SDI Overlays]

3.2.2 SDI LUT

The SDI output can burn separate SDI LUT into the image, which is independent of the setting LUT. Third party LUTs are also accepted for SDI output. (see 3.5 for details)

Menu Operation

Change SDI LUT

[MENU→MONITORING→SDI→SDI LUT]

3.2.3 SDI FPS

SDI FPS settings can be divided into Preset SDI FPS and following project FPS.

1. **Preset SDI FPS:** Currently MAVO mark2 LF supports SDI FPS of 24p, 25p, 30p, 50p and 60p. The camera output HD-SDI signal when the SDI FPS is 24p, 25p and 30p, and output 3G-SDI signal when the SDI FPS is 50p and 60p.
2. **Following Project FPS:** Under this option, the SDI FPS is equal to current project FPS when the project FPS is 24p, 25p, 30p, 50p or 60p; if the setting project FPS is other frame rates, the SDI FPS is the Preset SDI FPS that differs least from the current setting project FPS.

Menu Operation

Change SDI FPS

[MENU→MONITORING→SDI→SDI FPS]

3.2.3 SDI Record/Stop

With the metadata support, currently the camera can record/stop through SDI accessories, supporting Nbox cloud playback function and SDI monitor recorder. The workflow has been optimized to a great extent.

3.3 Exposure and White Balance

Exposure is reflected by the light input from the CMOS image sensor; color temperature is achieved by adjusting the relative gain of the R/G/B channels, rather than applying a color lookup table (LUT). Therefore, although the RAW data can be adjusted in post-production to change the color temperature and brightness, but all the adjustments are set basing on the shooting materials. The post-production adjustment may not generate a satisfactory image. Using the most accurate color temperature and exposure while shooting can minimize the post-production distortion.

3.3.1 Color Temperature List

The camera has two types of color temperature lists for white balance: Simple List and Complete List.

- Simple List:** With typical color temperatures such as 2800K, 3200K, 4300K, 5500K, 5600K, 6400K and UserWB. UserWB is user-defined value, automatically generated while doing the Auto WB.
- Complete List:** A fairly complete list based on color temperature (steps value as 100K) and lighting type. Just select one of them to get a better suited white balance value with the shooting environment.

Change the Color Temperature List according to direction on the right.

The Tint value can be changed by long pressing the shortcut button [WB] for one sec. When the number is green, set the Tint value by rotating the Knob.

Menu Operation

Change Color Temperature List
 [MENU→MONITORING→
 Monitoring Setting
 →WB Temp List]

3.3.2 Auto White Balance

If the color temperatures listed can not meet the complex shooting lighting conditions, use a gray card or white card to conduct Auto WB to achieve a specific color temperature.

To conduct the Auto WB:

- Put a gray/white card in front of the camera;
- Make the gray/white color covers the whole monitoring image by zooming;
- Choose: [MENU→Liveview→ Custom White Balance]

The camera will perform the white balance correction and write the color temperature value to the UserWB. Once the UserWB is set, it can be used anytime until the custom color temperature is set again.

Menu Operation

Auto White Balance
 [MENU→MONITORING→
 WB Auto]

3.3.3 Waveforms

Waveforms, zebra and histogram help cinematographers to check the exposure of images. Waveform indicates the brightness of images over the horizontal direction. Understanding the fundamentals of waveforms helps photographers get the best exposure for the images.

The Waveform matches the images by default and shows the image with the neutral LUT NeutM. Waveform will change under the different LUT. The camera also offers to view the waveform of the original RAW image of KineLOG3.

You can choose different origins for waveforms:

- **LUT:** The waveform is based on the image applied the monitoring LUT.
- **LOG:** The waveform is based on the original RAW with KineLOG3.

You can also choose a short waveform or complete waveform on the screen.

NOTICE When choosing the RAW waveform, if the waveform touches the top, the image is definitely overexposed and can not be recovered.

When choosing the LUT waveform, even if the waveform exceeds 100%, it may not be overexposed because the LUT is applied.

NOTICE Use the waveform to check the underexposure: the exposure of subject part needs to be more than 50%, the background part also need to have moderate exposure, avoiding excessive noise on post-production.

NOTICE The waveform remains when you use the [Zoom] button to check the exposure or use other functions. Use [Zoom] button to check the exposure.

Menu Operation

Switch between different sources

[MENU→MONITORING

→Monitoring Setting

→Waveform Based]

Menu Operation

Switch Size

[MENU→MONITORING

→Monitoring Setting

→Waveform Size]

3.3.4 Zebra Pattern

Zebra pattern is a very straightforward feature to show the overexposed area in an image.

For Kine cameras, the zebra pattern is based on RAW data: When a zebra bar appears, it means that there is data that exceeds the threshold and the RAW data may be overexposed, once the RAW data is overexposed, it is "dead white" in post. A threshold level can be set by pressing:

[MENU→MONITORING→Monitoring Setting→Zebra Pattern].

When the default threshold level is 90%, the zebra pattern will display when the light exceeds 90% of the maximum range.

Menu Operation

Set Zebra Threshold

[MENU→MONITORING

→Monitoring Setting

→Zebra Pattern]

3.3.5 Digital Horizon

With digital horizontal guidance on the UI, cameramen can judge the image level precisely and quickly when shooting on shoulder or in handheld.

After firmware upgrading, the camera should be placed on a horizontal place to complete the digital horizon calibration, see the detailed steps in [3.7.3 Digital Horizon Cal.](#)

Menu Operation

Open Digital Horizon
[MENU→SETTINGS→
Digital Horizon: on]

3.3.6 e-ND

The e-ND, or electronic ND, is a cutting-edge ND technology that is currently being developed. This electronic variable ND is based on modern electronic liquid crystal materials and optical technology, allowing for seamless adjustment of light reduction (0.6~2.4). It is completely different from traditional mechanical variable ND filters based on polarizing filters, and is free of any of their drawbacks.

The use of an e-ND mounting adapter delivers sharp images while automatic in-camera correction ensures color consistency. The ability to continuously adjust the ND level means that more precise light control can be achieved beyond what is possible with optical NDs. The default 0.1 stops precision is almost continuous, and can also be set to the traditional 1-stop precision if needed.

Menu Operation

Set e-ND
[MENU→SETTINGS→
Adapters & ND→
ND: 0.03' / 0.3]

NOTICE Without internal e-ND on camera body, the camera needs to work with e-ND mounting adapter to achieve seamless adjustment.

3.4 Slow-Mo and Quick-Mo

3.4.1 Two Types of FPS

CMOS Imaging Sensor fps: The capturing fps of the CMOS imaging sensor, shown on the top of UI as well as in the spec table. It can be set with the button [FPS].

Project fps: The frame rate for footage playback and editing. Project fps can be chosen from 23.976、24.000、25.000、29.970、30.000, and you can select one of them based on your need. Set the Project fps according to the instruction on the right.

When the Project fps is 25fps, whatever the CMOS imaging sensor fps is, the clips will be played at 25fps in post-production or in-camera playback. For example: action movies usually choose 22 Sensor fps for shooting, but 25 Project fps for playback, which makes the action seems faster.

The default setting of project fps is 25fps.

Shortcut List

Change Sensor FPS

Press short button [FPS]

Menu Operation

Change Project FPS

[MENU→RECORDING

→Project FPS]

3.4.2 User-defined CMOS Imaging Sensor FPS

Regular frame rates, like 24, 25, 30, 48, 50, 96, 200, are available in the FPS Shortcut List; you may also customize other fps in the menu.

You can define three customized frame rates to any value between minimum frame rate (7fps) and the maximum possible frame rate with accuracy 0.001fps, but only the effective frame rate will be listed in the shortcut list.

- When defining the CMOS imaging sensor fps to 22fps, there will be a 22fps option in the CMOS imaging sensor shortcut list at any resolutions;
- When defining the CMOS imaging sensor fps to 119fps, the 119fps option would not appear at S35 4K DCI resolution, but will appear in the Sensor fps menu at S35 3.8K 2.4:1 Wide resolution.

You can delete the customized Sensor fps by modifying it to 24 fps.

NOTICE When shooting slow-mo or fast-mo (CMOS Imaging Sensor FPS is different from Project FPS), the audio track will not be packaged into the mov file if the recording codec is ProRes mov, but instead two uncompressed audio files are in the clip folder.

Menu Operation

Custom Sensor FPS

[MENU→RECORDING

→Exposure & Customs

→Custom Sensor FPS]

3.5 Custom LUT

The camera supports customized 3D LUT, which integrates pre-production and post-production steps, giving more freedom for creativity.

LUT stands for Look-Up Table. It can convert colors and details in a source file to a new destination state, for example, from the low contrast LOG to ITU Rec709 color space.

The camera has one in-camera preset LUT: KC_NeutM. KC_NeutM has more accurate highlights and shadow details than the original Kine709, and recover the balanced tone with normal saturation and contrast of the image.

You can import your personal LUT to the camera, and switch different LUT/Look instantly when monitoring on set. The 3D LUT will not be encoded into the ProRes file while recording.

Any third party 3D LUT can be imported in the camera (no number limitation): support up to 33x33x33 3D LUT Cube, SCRATCH and DaVinci Resolve can both output cube LUT directly.

3.5.1 Import Custom LUT

Custom LUT can be imported with three simple steps:

1. Export the LUT from DI software, rename it as four English characters, like CAN1.cube;
2. Copy the LUT into the root folder of the USB-C disk as exFAT/FAT32;
3. Import the LUT to the camera: insert the USB disk to the USB-C port on KINEFINITY camera, and then load the Custom LUT with the menu.

Menu Operation

Load Custom LUT

[MENU→MONITORING

→LUT→Import Custom LUT]

Reboot the camera, and the new LUT will be shown in the LUT shortcut list by pressing the shortcut button [1].

NOTICE The LUT will be overwritten automatically if the name is same.

The LUT name should have no blank and no more than four characters.

3.5.2 Delete Custom LUT

Delete the uploaded custom LUT by:

[MENU→LUT→Clean Custom LUT]

Menu Operation

Erase custom LUT

[MENU→MONITORING→

→LUT→Delete Custom LUT]

Then all custom LUTs will be deleted after a few seconds, leaving the native KC_NeutM only.

3.6 Firmware Update

KINEFINITY camera is constantly introducing new features, most of which are done by firmware upgrades. Changing the firmware version is easy and quick, both for upgrading forward and downgrading to past firmware version.

The firmware version is shown at the bottom of MENU, for example, firmware: KineOS V7.1(00), means the KineOS version is 7.1 with a building number 7100. Upgrade the firmware as the following steps:

1. **Download:** Remove the attached lens before the updating. Download and copy the latest firmware to the root folder of an exFAT/FAT32 USB disk; Connect the USB-C disk to the camera;
2. **Update:** Choose Update Firmware in the System menu, and then confirm to update. When the successful message appears on the display, it means the update is completed (approx. 30 mins);
3. **Reboot:** Power down the camera, and remove the USB-C disk. Reboot the camera, and the new firmware is updated successfully.

Downgrading the firmware to the previous version is also available to perform, which is identical to the steps of firmware update.

CAUTION Do NOT take any other operation, and never lose power while firmware updating, else it may lead to a update failure, and the camera will have to be back for repair in severe cases. If exception occurs, you can try to update the firmware under calibration mode, refer to [3.7.2.Update/Downgrade the Firmware.](#)

CAUTION Remove any lenses before updating the firmware.

NOTICE Before updating the firmware, the user settings can be exported from the camera. After the update is done, the user settings can be imported to the camera by:

[MENU→System→Export/Import User Settings]

Menu Operation

Update Firmware

[MENU→SYSTEM

→Update Firmware]

3.7 Calibration Mode

The camera can conduct the operations like black balancing, downgrading the firmware under this mode. Please reboot the camera after the foregoing operations are done.

3.7.1 Black Balancing

Every KINEFINITY camera has been subjected black balancing under Calibration Mode before leaving the factory. After a long period of usage, the camera can have a black balancing again to gain more accurate black balance. Factory reset would not change the balancing data.

Menu Operation

Black Balancing
[MENU→CALIBRATION
→Black Balancing]

Please proceed as following:

1. **Enter into Calibration Mode:** hold the [MENU] button for three seconds while booting up the camera, then release the [MENU] button;
2. **Calibration:** put on the lens cover or mount cover to make sure the liveview is all black, then choose [Black Balancing] in the menu, and wait about 5 mins until the calibration is done;
3. **Factory Reset:** by [MENU→SYSTEM→System Settings→Factory Reset], then reboot the camera.

NOTICE After black balancing, dead pixel will not display in the normal ISO range, but red/green/blue spots may still appear when ISO is extremely high.

NOTICE If there are white dots in some frames, it may be due to the cosmic rays, not the malfunction of the CMOS imaging sensor.

3.7.2 Update/Downgrade the Firmware

If the camera is powered down during the firmware updating, it may suffer a system damage and can not boot up again and need to send back for repair. Please try to boot up the camera under Calibration Mode first:

Menu Operation

Update Firmware
[MENU→SYSTEM→Update Firmware]

1. **Enter the Calibration Mode:** hold the [MENU] button and press the power button, after three seconds, release the [MENU] button. The camera will enter the calibration mode after about 20 seconds;
2. **Update:** Choose Update Firmware in the System menu, and then confirm to update. When the successful message appears on the display, the update is completed (approx. 30 mins);

3. **Reboot:** Turn off the camera, and remove USB disk. Boot up the camera, and then the new firmware takes effect.

NOTICE After the update is completed, please do the factory reset.

3.7.3 Digital Horizon Cal

After updating the firmware, the camera need to be placed on a horizontal position to proceed the digital horizon calibration.

Please do as following:

1. **Enter into Calibration Mode:** When the camera is off, hold the [MENU] button and press the power button, after three seconds, release the [MENU] button. The camera will enter the calibration mode after about 20 seconds;
2. **Calibration:** place the camera in a horizontal position, enter the System menu to select CALIBRATION, and then confirm to do Digital Horizon Cal and wait until the calibration is done;
3. **Factory Reset:** by [MENU→SYSTEM→System Settings→Factory Reset], then reboot the camera.

Menu Operation

Black Balancing

[MENU→CALIBRATION

→Digital Horizon Cal]

3.8 TimeCode and SYNC

Timecode is one of the key features of cinema camera. Same to other cinema cameras MAVO mark2 LF shows time code in Live View and Playback state. Timecode is stored into recorded clips. For ProRes codec, the mov file contains a single timecode track.

The camera enables four types of timecodes:

- **Free run:** timecode runs all the time, independently from recording.
Record run: timecode increments only during recording. We recommend set timecode to 00: 00: 00: 00 when start a new project.
- **External TC:** the camera can synchronize timecode to an external Timecode generator like Ambient NanoLockit as timecode of camera: using a special cable to connect a timecode generator to the TC port, then set timecode mode as External in the menu.
- **Jam TC Sync:** The camera can set to Jam TC Sync mode that samples the timecode value once from external timecode generator that support Jam input, like Ambient NanoLockit. The timecode generator can be disconnected from the camera after jamming.

Menu Operation

Set the TimeCode
[MENU→RECORDING
→TimeCode
→TC Mode/TC Start]

To set the timecode, please follow the operation on the right.

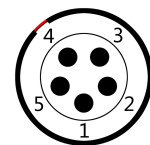
3.8.1 TC port and TC cord

The TC port is 0B 5-pin push-pull socket. It is compatible with the ARRI Alexa camera TC port for LTC IN and OUT.

Timecode generator based on Ambient timecode system, such as NanoLockit, is also a 0B 5-pin socket. You can check the TC cord on the KINEFINITY official website or contact sales@kinefinity.com.

In addition, the camera can output timecode to other devices: connect the TC input port of the device to the TC output port of the camera by a special TC cord.

Port Definition



1. NC
2. NC
3. LTC IN
4. GND
5. LTC OUT

NOTICE When the camera is set to External Timecode mode, the Jam TC input Mode of the timecode generator is not supported.

3.8.2 External TC

External TC setting is related to Project FPS, Sensor FPS and External FPS of TC generator. While using the External TC mode, Sensor FPS should be integral multiple of the External FPS.

Green Timecode icon indicates the timecode source is successfully connected. Yellow Timecode icon indicates that there is no external timecode signal, and the timecode will automatically switch to the Free Run mode. If the timecode icon blinks in green/red/yellow, please check:

- Frame rates settings;
- Cable connection;
- Power supply of external timecode generator;
- Special settings needed for external timecode generator. For example, NanoLockit TC output needs to be activated by long press the green button.

3.8.3 Beeper and Tally

The beeper has two usages:

- It makes a tone of 1KHz and 2KHz respectively when the camera is triggered on/off record as a R/S signal. You can disable the beeper following the right operating guide.
- The 1KHz beginning tone and the 2KHz end tone can be recorded into the clip to synchronize the video and the sound. Enable the function following the right operating guide.

Menu Operation

Set recording of Beeper

[MENU→SETTINGS

→SYNC→Rec Beeper: on/off]

The KINEFINITY camera has a built-in Tally light:

- The Tally light will either light up or not when shooting starts or stops. You can disable the Tally by the operation on the right.

Menu Operation

Set recording of Tally

[MENU→SETTINGS→

→SYNC→Tally: on/off]

3.9 Configure the Camera

You can save these settings to the camera: preset list, body fan speed, EI/ISO mode, shutter mode, etc. When booting up with a USB-C stick, the camera will be restored to factory default.

3.9.1 Preset

In-Camera Presets are a set of parameters for recording and shooting:

Image Format; Resolution; Aspect; FPS; Shutter Speed; Record Format

MAVO mark2 LF camera offers an in-camera preset list with six choices, and provides quick switch for these presets: in Liveview mode, press and hold the button [1] for one sec to pop up the Preset list.

These in-camera presets can be custom defined and saved. After setting these parameters in Liveview state, you can save the Preset following the rightside guide. Then the preset you save will display on the list.

NOTICE User settings can be exported or imported out/in the camera with the following steps:

[MENU→SYSTEM→System Settings→Export/Import User Settings].

3.9.2 Shutter Display Mode

The shutter shows the exposure time with two mode: Shutter Speed and Shutter Angle.

Calculation between Speed and Angle as following: if Shutter Speed is 1/50s, and fps is 25, the shutter angle is:

$$25 \times 360 \times (1/50) = 180 \text{ Degree.}$$

The Shutter Angle ranges from 0.7~358 Degree; the Shutter Speed has min value of 1/2000, and the max value depends on the FPS.

Besides, Shutter Speed List does NOT match Shutter Angle List.

Set the appropriate Custom Shutter to avoid flickering:

NOTICE Set the appropriate Custom Shutter to avoid strobing with the following steps:

[MENU→RECORDING→Exposure & Custom→Custom Shutter].

Menu Operation

Change Presets

[MENU→SETTINGS

→Save Preset List]

Menu Operation

Change Shutter Display

[MENU→MONITORING

→Monitoring Setting

→Shutter Mode:
Time/Angle]

Menu Operation

Custom Shutter

[MENU→RECORDING→

Exposure→Custom
Shutter]

3.9.3 Camera Fan and Core Temperature

Core Temperature is the real-time temperature of the core processor. It is shown on the UI with full parameters. When the core temperature reaches up to 80 degrees, the camera will be cooled down automatically by the fan at full speed until the core temperature is down to 70 degrees and under, and the fan speed will return to its normal setting.

You can adjust the fan speed (Default: 30%) from 25% to 100% or even turn it off.

Camera fan has the default [Rec Low], the fan speed will slow down while recording in case there will be less noise; the fan will return to normal speed automatically when the camera stops recording.

Menu Operation

Change Fan Speed
[MENU→SYSTEM
→BAT & Fan→Fan
Speed]

Manu Operation

Stop Fan
[MENU→
SYSTEM→BAT & Fan
→Fan Ctrl: Rec Low]

3.9.4 ISO/EI

EI/ISO is a group of settings to capture light on the CMOS imaging sensor. MAVO mark2 LF supports both ISO and EI mode, which displays at the top of the screen.

ISO Mode

The nominal value of ISO is ISO ASA, which takes effect on the RAW data, applying different gain on the CMOS imaging sensor. The default mode is ISO mode, ISO 800; the highlight level (Highlight means stops from 18% gray to ADC Clip) is 6.0 stops.

Highlight Stops

As the name suggests, more highlight stops means less shadows details but more noise. If you want to retain more highlight details, recommend setting 6.0 stops and above or using EI mode. Changing ISO will not change highlight stop.

The highlight stop is able to change from 4.3 to 7.3 stops in the menu. For different highlight stops, the camera has a minimum ISO value, for example: when the highlight stop is 6.0, minimum ISO is 500; while for 5.0 stops, minimum ISO is 250.

EI Mode

The nominal EI value is similar to the settings in traditional Cine Camera. The highlight stop follows the change of EI value, but image brightness adjusted by digital gain while analog gain of the CMOS imaging sensor remains unchanged. Changing EI will change highlight stop and image brightness, while sensitivity and dynamic range are unchanged. The highlight of EI 800 is 6.6 stops and EI 5120 is 7.0 stops. You can switch between EI/ISO by the operation on the right.

Menu Operation

Set Highlight
[MENU→RECORDING
→Exposure & Custom
→ISO Highlight]

Menu Operation

Change Sensitivity Mode
[MENU→RECORDING
→Exposure & Custom
→ Sensitivity Mode]

Difference between ISO and EI mode:

In ISO mode, changing the ISO value means using analog gain on the camera, which changes the sensitivity of CMOS imaging sensor, but the highlight stop remains unchanged.

In EI mode, changing the EI value doesn't change the sensitivity of the CMOS imaging sensor, but using digital gain on the camera changes highlight as a result.

NOTICE In Live View, 18% gray matches EI value to maintain the same brightness for shooting and post work.

NOTICE Recommend shoot in ISO mode if you don't fully understand the EI and ISO.

Dual ISO

MAVO mark2 LF supports Dual Native ISO: 800/5120, allowing it to capture low-noise image with high dynamic range in regular or low-light environment. When highlight level is 6.0, the native ISO from 500 to 2560 is 800, and from 3200 to higher is 5120. For EI mode, the native ISO from 100 to 2000 is 800, and from 2560 to higher is 5120.

3.10 Anamorphic Recording

Anamorphic used to be a technical choice for filming, but now it is an aesthetic preference. As more anamorphic lenses become available, MAVO mark2 LF, MAVO mark2 S35, MAVO Edge 8K, MAVO Edge 6K are all good choices for anamorphic shooting, since they all have 3:2 CMOS imaging sensors.

The 36x24mm full frame CMOS imaging sensor of MAVO mark2 LF is like a huge canvas, allowing creators to easily achieve various anamorphic shots on it:

- S35 anamorphic;
- Full frame anamorphic, obtaining a view field equivalent to 65mm;
- Open Gate: 6016x3984. All pixels of the CMOS imaging sensor are captured, leaving maximum space for post processing.

The camera supports 2x, 1.8x, 1.75x, 1.5x, 1.33x, 1.25x, 0.5x, 0.67x anamorphic shooting, which falls into almost all anamorphic lenses on the market.

When use 2x anamorphic lens:

Format	Resolution	FPS	De-Squeezed
FF 6K 3:2 OG	6016x3984	48	12032x3984
FF 4.6K 6:5 Ana	4608x3700	50	9216x3700
S35 3.6K 4:3 Ana	3172x2700	70	6344x2700

Menu Operation

Set Anamorphic Lens
 [MENU→RECORDING
 →Project
 →Anamorphic Ratio]

When shooting at 4:3 with anamorphic lens, you can de-squeeze the images on the monitor into normal image by setting anamorphic lens factor in MENU. For example, when anamorphic lens factor is 2, set the factor in camera to 2, then you can get 2.66:1 instead of normal view of 4:3.

To set the ratio, see the operation on the right.

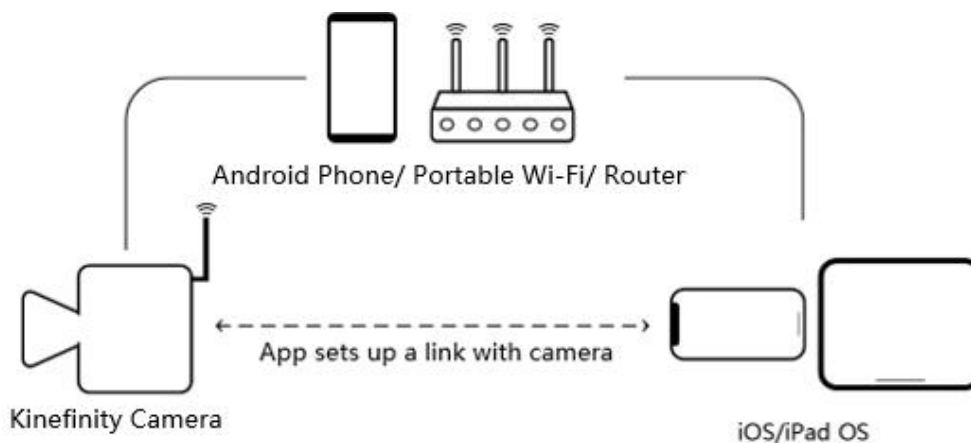
NOTICE The recorded clips are 4:3 instead of de-squeezed images. The monitoring images depend on the ratio you set. You can see a normal image while monitoring, but the actual clips are still 4:3.

3.11 Kinefinity App Instruction

Kinefinity App which is re-designed thoroughly works with MAVO mark2 LF. The App can tune the shooting parameters or get the status of cinema cameras responsively. The brilliant thing is that the App displays the video stream from cameras in real time with super low latency, if the iOS devices and camera work in stable and good WIFI environment

Preparation before running Kinefinity APP:

1. Make sure a high-gain dual-band internal-pin Wi-Fi antenna is mounted to the camera (The WIFI port is manufactured with internal-pin and internal-bore; the antenna is SMA male pin and female head with 5dBi and supports WIFI frequency band).
2. The cinema camera works as WIFI Client mode, so it needs an external wireless AP (access point), which could be Android or iPhone12 hotspot (do not recommend iPhone 11 or below as hotspot for this application) or wireless router, dual band preferred.



Take Android hotspot and iPad with Kinefinity App as the example:

1. **Set the camera:**

[MENU→SYSTEM→Network→WIFI: on]

[MENU→SYSTEM→Network→Stream: on]

2. **Prepare WIFI QR code:** Generate the code by [QR Code Generation website](#) or WIFI hotspot code by Android Phone;
3. **iPad access to WIFI:** Set iPad WIFI or use iOS camera to recognize the WIFI code to access to the WIFI;
4. **Camera access to WIFI by scanning the QR code:**

[MENU→SYSTEM→Network→Connect to Newwork...]

The camera scans the Wi-Fi QR code, obtains the SSID name and password, and connects to the Wi-Fi network; if it is successful, the camera accesses the Wi-Fi network and assigns an IP address;

5. **Set iPad App:** open KINEFINITY App, click:

[Configuration icon on the UI→Set up→Camera Server→IP address]

Input IP address of the camera, then the App will automatically connect to the camera.

Then you are able to use three mode/pages:

1. **Video mode:** real-time video and key parameters. Users is capable of changing the key parameters by simply touching the UI;
2. **Panel mode:** key parameters only;
3. **Setup mode:** or menu/configuration mode. Input slate information and project information very easily.

NOTE

1. The performance of camera may be affected if number of active links is over six at the same time;
2. Kinefinity App is available to iPhone with iOS10 or above. But if as WIFI hotspot, strongly recommend iPhone 12;
3. QR code from some Android Phones may not be recognized by the camera. In this way, please generate the code by:
QR code generation website: <https://qifi.org/>;
Operation: fill in the SSID and Key on the website and generate the QR code to use;
4. Kine cameras enables to record same WIFI information, no need to have extra setting in next time boot up;
5. The IP address of the camera depends on the WIFI. As the WIFI changes, the camera IP address will change.

4. TECH & SPEC AND CONNECTORS

4.1 Technical Specifications

4.1.1 MAVO mark2 LF SPEC

The following are typical settings.

Camera Type	Large Format Digital Cinema Camera		
Imaging Sensor	6K 3:2 Full Frame CMOS Imaging Sensor		Active Area: 36x24mm, \varnothing 43.3mm
Lens Mount	Active E Mount / Active PL Mount: connect with E / PL mount lens Native KineMOUNT as omni mount: to be PL/EF/ ARRI LPL by solid mounting adapters		*PL *EF *ARRI LPL
Dual Base ISO	Dual Base ISO		Max
	5120 (from 3200)	800 (below 3200)	32000
Latitude	>14 stops		Highlight Level (default)
Full Frame	FF 6K OG	6016x3984, 0.2~48fps	Active Area: 36x24mm, \varnothing 43.3mm
	FF 6K 17:9	6016x3172, 0.2~60fps	Active Area: 36x19.1mm, \varnothing 41.0mm
	FF 6K 2.4:1	6016x2520, 0.2~75fps	Active Area: 36x15.2mm, \varnothing 39.1mm
	FF 5.7K 3:2	5760x3700, 0.2~50fps	Active Area: 34.5x22.2mm, \varnothing 41.0mm
	FF 6K UHD	5760x3240, 0.2~58fps	Active Area: 34.5x19.4mm, \varnothing 39.6 mm
	FF 5.7K 2.4:1	5760x2400, 0.2~75fps	Active Area: 34.5x14.4mm, \varnothing 37.4mm
	FF 5K 4:3	5120x3700, 0.2~50fps	Active Area: 30.6x22.3mm, \varnothing 37.9mm
	FF 5K DCI	5120x2700, 0.2~70fps	Active Area: 30.6x16.2mm, \varnothing 34.6mm
	FF 5K 2.4:1	5120x2160, 0.2~86fps	Active Area: 30.6x12.9mm, \varnothing 33.2mm
	FF 4.6K 6:5	4608x3700, 0.2~50fps	Active Area: 27.6x22.3mm, \varnothing 35.5mm
	FF 3.8K 3:2 (Oversampling)	3840x2460, 0.2~50fps	Active Area: 34.5x22.2mm, \varnothing 41.0mm
	FF 4K UHD (Oversampling)	3840x2160, 0.2~58fps	Active Area: 34.5x19.4mm, \varnothing 39.6 mm
	FF 3.8K 2.4:1 (Oversampling)	3840x1600, 0.2~75fps	Active Area: 34.5x14.4mm, \varnothing 37.4mm
	FF 3.4K 4:3 (Oversampling)	3456x2460, 0.2~50fps	Active Area: 31.0x22.1mm, \varnothing 38.1mm
	FF 3K 6:5 (Oversampling)	3072x2460, 0.2~50fps	Active Area: 27.6x22.1mm, \varnothing 35.3mm
S35	S35 4K 3:2	4096x2700, 0.2~70fps	Active Area: 24.5x16.1mm, \varnothing 29.3mm
	S35 4K DCI	4096x2160, 0.2~112fps	Active Area: 24.5x12.9mm, \varnothing 27.7mm
	S35 4K 2.4:1	4096x1720, 0.2~140fps	Active Area: 24.5x10.3mm, \varnothing 26.6mm
	S35 4K UHD	3840x2160, 0.2~112fps	Active Area: 23.0x12.9mm, \varnothing 26.4mm
	S35 3.8K 2.4:1	3840x1600, 0.2~150fps	Active Area: 23.0x9.6mm, \varnothing 24.9mm
	S35 3.6K 4:3	3712x2700, 0.2~70fps	Active Area: 22.2x16.1mm, \varnothing 27.4mm
	S35 3.2K 6:5	3328x2700, 0.2~70fps	Active Area: 19.9x16.1mm, \varnothing 25.6mm
	S35 2.7K 1:1	2688x2688, 0.2~70fps	Active Area: 16.1x16.1mm, \varnothing 22.8mm
	S35 2K DCI (Oversampling)	2048x1080, 0.2~112fps	Active Area: 24.5x12.9mm, \varnothing 27.7mm
	S35 2K 2.4:1 (Oversampling)	2048x860, 0.2~140fps	Active Area: 24.5x10.3mm, \varnothing 26.6mm
S35 2K FHD (Oversampling)	1920x1080, 0.2~112fps	Active Area: 23.0x12.9mm, \varnothing 26.4mm	

	S35 1.9K 2.4:1 (Oversampling)	1920x800, 0.2~140fps	Active Area: 23.0x9.6mm, ø 24.9mm
Other Cropping	3K DCI	3072x1620, 0.2~144fps	
	3K 2.4:1	3072x1200, 0.2~195fps	
	3K HD	2944x1620, 0.2~145fps	
	3K HD 2.4:1	2944x1200, 0.2~195fps	
	2K DCI	2048x1080, 0.2~200fps	
	2K 2.4:1	2048x860, 0.2~270fps	
	2K FHD	1920x1080, 0.2~220fps	
	1.9K 2.4:1	1920x800, 0.2~290fps	

	Codec Type	Encapsulation Format	Bit Depth	Notes
Record Codec	ProRes4444XQ	Quicktime mov	12bits	
	ProRes4444	Quicktime mov	12bits	
	ProRes422HQ/422/LT	Quicktime mov	10bits	
Shutter Angle	0.7°~358° Rolling Shutter			
Monitoring	Video Port x2	SDI x2		
SYNC	RS Port, Lens Port, SYNC Port, TC Timecode Port			
LUT	Preset: KineLOG3, Neutral (Rec 709), Support Custom 3D LUT			
Audio Capture	In-cam MIC; 3.5mm MIC-IN; 48V Phantom Power Input x2 (regular XLR)			
Record Media	Single Media Slot, for KineMAG Nano SSD based on NVMe M.2 SSD			
Power Source	Power in		Consumption	
	DC IN (1B2P), 11~26V/Integrated V-mount battery plate, UPS EXT 3 (for pogo-pin, 2x5 contacts)		27W	
Body Material	Aluminum Alloy			
Body Weight	3.02lb/1.37kg			*Only camera body
Size	4.1×4.8×4.2"/106x124x107 mm			*W/o projections, WxHxL
Operating Temp	0°C ~ 40°C			

All specifications shown are preliminary and subject to change without notice.

4.1.2 MAVO mark2 LF Frame Rates and FPS

The following chart contains resolution, frame rate and codecs.

Image Format	Format	Resolution	Max	Codec
FF	FF 6K OG	6016x3984	48	ProRes
	FF 6K 17:9	6016x3172	60	ProRes
	FF 6K 2.4:1	6016x2520	75	ProRes
	FF 5.7K 3:2	5760x3700	50	ProRes
	FF 6K UHD	5760x3240	58	ProRes
	FF 5.7K 2.4:1	5760x2400	75	ProRes
	FF 5K 4:3	5120x3700	50	ProRes
	FF 5K DCI	5120x2700	70	ProRes
	FF 5K 2.4:1	5120x2160	86	ProRes
	FF 4.6K 6:5	4608x3700	50	ProRes
	FF 3.8K 3:2 (Oversampling)	3840x2460	50	ProRes
	FF 4K UHD (Oversampling)	3840x2160	58	ProRes
	FF 3.8K 2.4:1 (Oversampling)	3840x1600	75	ProRes
	FF 3.4K 4:3 (Oversampling)	3456x2460	50	ProRes
	FF 3K 6:5 (Oversampling)	3072x2460	50	ProRes
S35	S35 4K 3:2	4096x2700	70	ProRes
	S35 4K DCI	4096x2160	112	ProRes
	S35 4K 2.4:1	4096x1720	140	ProRes
	S35 4K UHD	3840x2160	112	ProRes
	S35 3.8K 2.4:1	3840x1600	150	ProRes
	S35 3.6K 4:3	3712x2700	70	ProRes
	S35 3.2K 6:5	3328x2700	70	ProRes
	S35 2.7K 1:1	2688x2688	70	ProRes
	S35 2K DCI (Oversampling)	2048x1080	112	ProRes
	S35 2K 2.4:1 (Oversampling)	2048x860	140	ProRes
	S35 2K FHD (Oversampling)	1920x1080	112	ProRes
	S35 1.9K 2.4:1 (Oversampling)	1920x800	140	ProRes
Other Cropping	3K DCI	3072x1620	144	ProRes
	3K 2.4:1	3072x1200	195	ProRes
	3K HD	2944x1620	145	ProRes
	3K HD 2.4:1	2944x1200	195	ProRes
	2K DCI	2048x1080	200	ProRes
	2K 2.4:1	2048x860	270	ProRes
	2K FHD	1920x1080	220	ProRes
	1.9K 2.4:1	1920x800	290	ProRes

NOTICE The oversampling images are sharper and have less noise.

NOTICE Any frame rate can be defined between the minimum fps (0.2fps, with the current firmware) and the maximum CMOS imaging sensor fps of the current resolution, with an accuracy of 0.001fps.

4.2 Connectors

MAVO mark2 LF brings multiple ports:

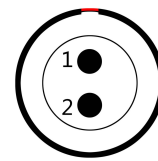
- Universal ports:** video output (SDI), phantom 48V power input (Standard XLR port), audio input (3.5mm stereo MIC), audio output (3.5mm stereo headphone), USB-C port.
- Proprietary ports:** power input (DC IN), LENS port, SYNC port, TC input and output (TC), video output (Video), high speed extension (EXT1&EXT2), bottom UPS power (EXT3), record trigger (RS).

4.2.1 DC IN

DC IN is located at the back right of the camera body, a 1B 2-pin push-pull socket. The recommended input voltage of DC is 11V~26V. Please notice the following for a stable workflow:

- Max current of external power is 5A;
- Max consumption of camera body is 27W;
- Max consumption of camera body with KineMON-5U is 35W.

NOTICE Red dot and groove on the socket should match pin #1.

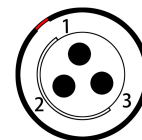


#	Definition
1	VDD
2	GND

4.2.2 RS

RS is a 3-pin Fischer push-pull connector for run/stop trigger on MAVO mark2 LF.

- Pin 3: VBAT output is equal to camera body power input (voltage as 11V~26V), max current up to 4A.
- Pin 1: Record on/off input signal, input voltage up to 3.3V.
- Shorten Pin 2 and Pin 1 can trigger on/off.



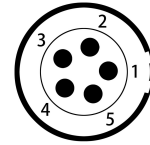
#	Definition
1	RS
2	GND
3	VBAT

NOTICE A combined power output of RS connector and VBAT on D-Tap is not over 3A.

NOTICE The input voltage of RS connector cannot exceed 3.3V. Otherwise the camera will be damaged and be sent to the factory.

4.2.3 LENS

The control port (LENS) is located at the front of the camera body, a 0B 5-pin push-pull socket.



- Pin 2 and pin 3: standard voltage of RS232 connector (-15V~+15V).
- Pin 5: VBAT output is equal to camera body power input (voltage as 11V~26V), max current up to 6A.

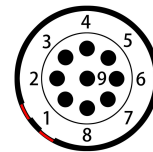
NOTICE The VBAT is only available on compatible accessories. Please confirm with KINEFINITY when you use this port or customize third-party accessories.

NOTICE The input voltage of RS connector cannot exceed 3.3V. Otherwise the camera will be damaged and sent to the factory.

#	Definition
1	DET
2	RS232_1
3	RS232_2
4	GND
6	VBAT

4.2.4 SYNC

SYNC is a 0B 9-pin push-pull socket on MAVO mark2 LF.



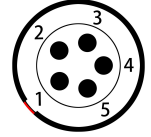
- Pin 2 and Pin 3: Voltage range, 0~3.3V.
- Pin 4, Pin 5, Pin 6 and Pin 7: standard voltage of RS232 connector, -15V~+15V.

NOTICE The VBAT is only available on compatible accessories. Please confirm with KINEFINITY when you use this port or customize third-party accessories.

#	Definition
1	VBAT
2	Sync CAN_H-
3	Sync CAN_H-
4	RS422_TX+
5	RS422_TX-
6	RS422_RX-
7	RS422_RX+
8	DEC
9	GND

4.2.5 TC

The TC port is a 0B 5-pin push-pull socket for timecode input or output. For different timecode generators, such as Ambient timecode generator Nano Lockit, or SoundDevice recorder which has a TC system, the physical spec and definition are the same.



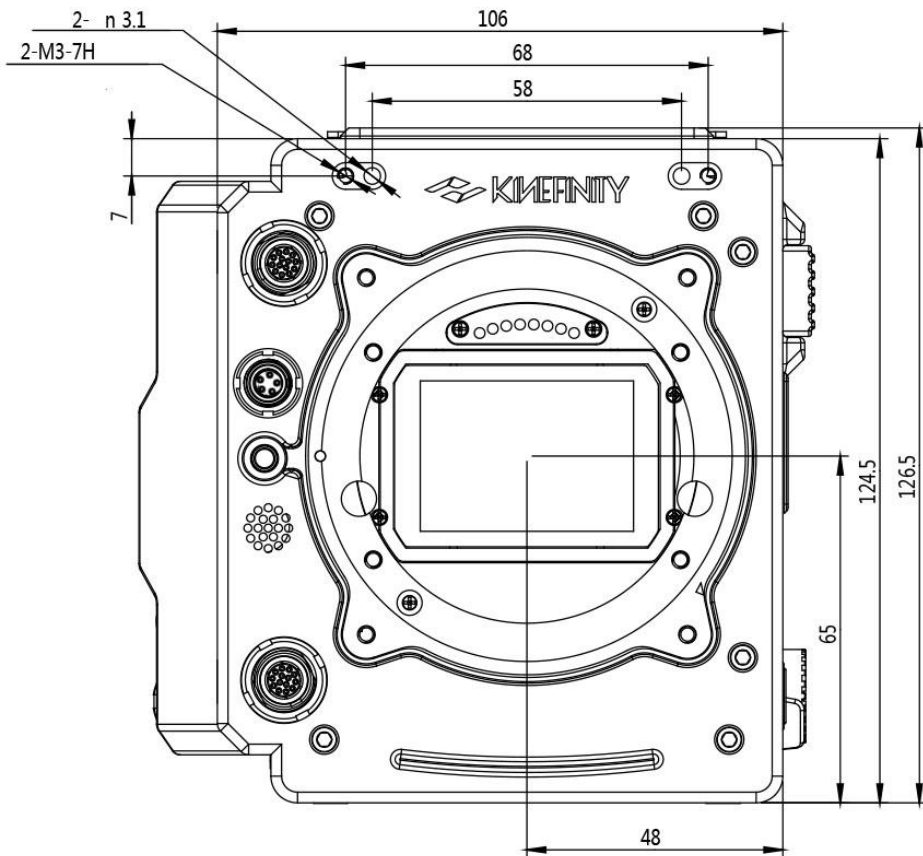
#	Definition
1	GND
2	LTC OUT
3	NC, unused
4	NC, unused
5	LTC IN

4.3 Mechanical Drawings

4.3.1 MAVO mark2 LF Body with KineMOUNT

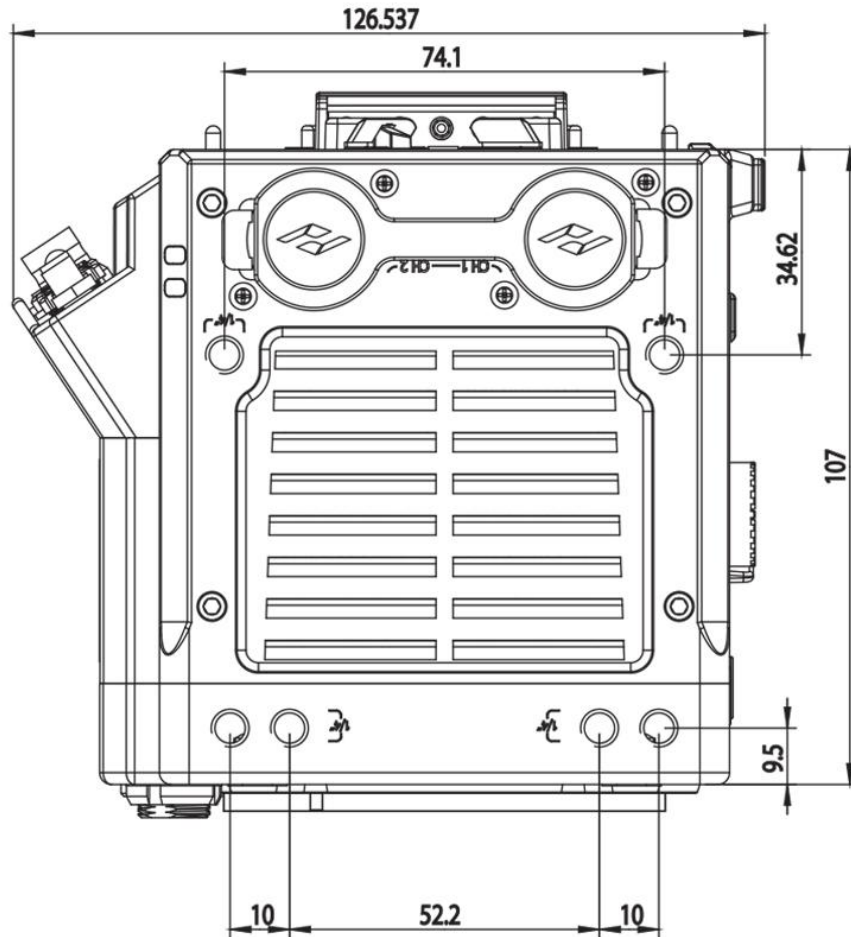
Front View

Dimensions are shown in mm.



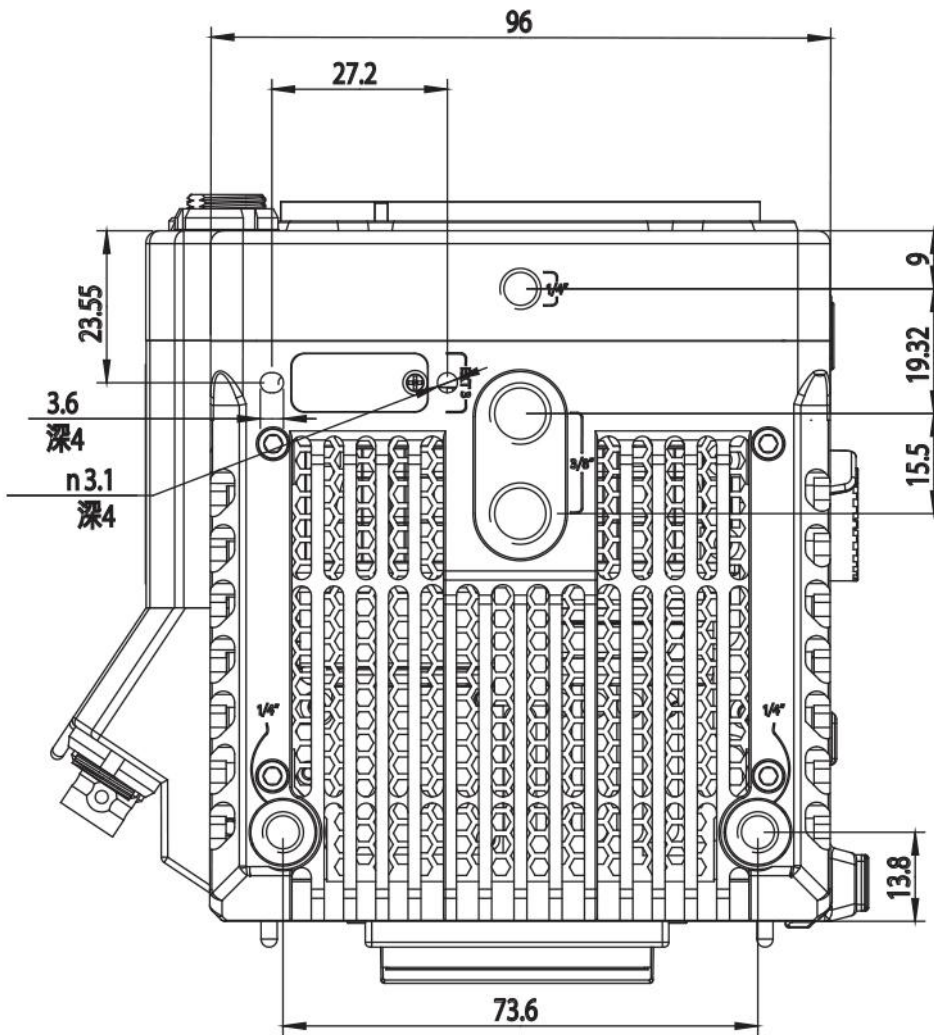
Top View

Dimensions are shown in mm.



Bottom View

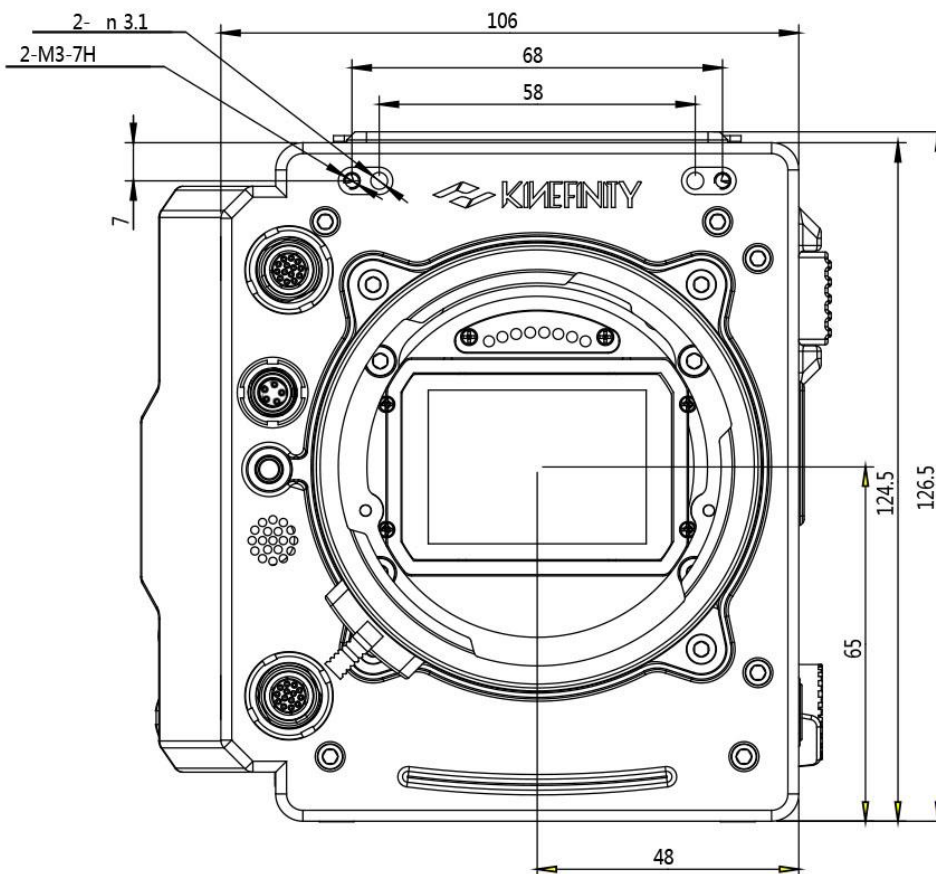
Dimensions are shown in mm.



4.3.2 MAVO mark2 LF Body with KineMOUNT

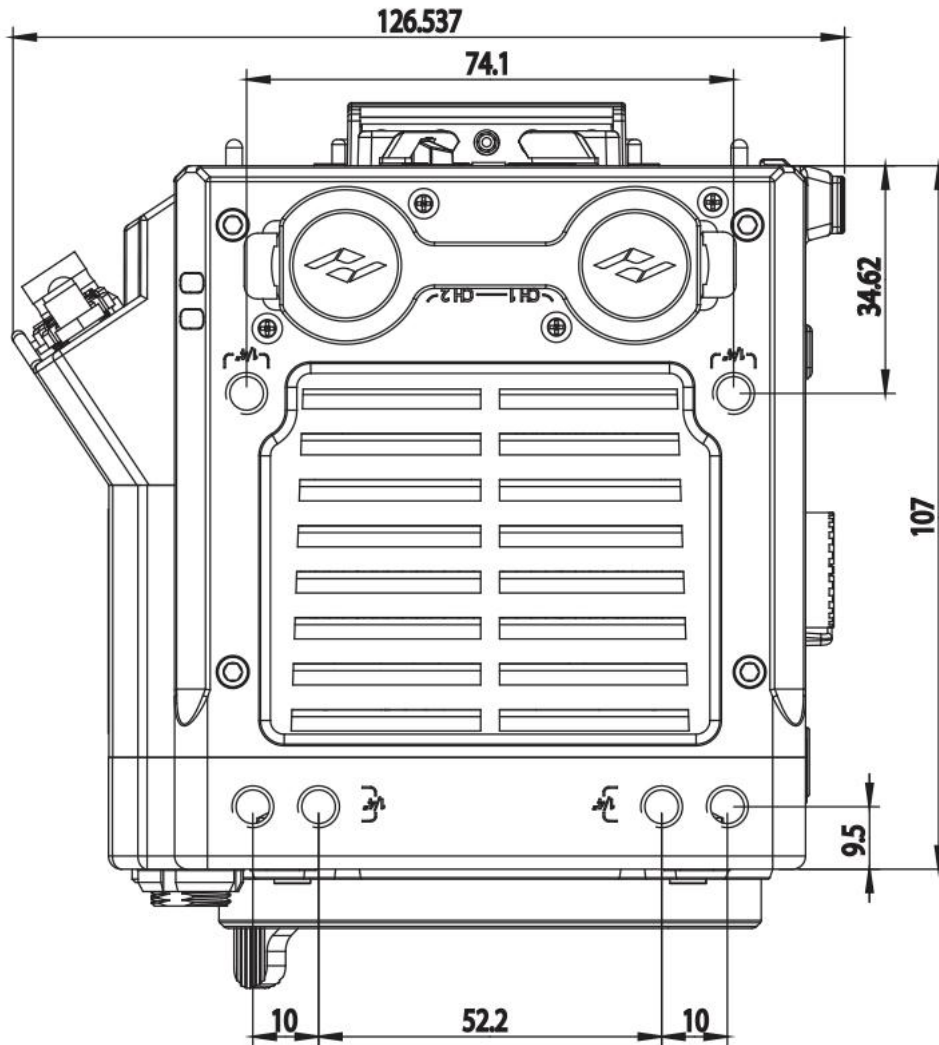
Front View

Dimensions are shown in mm.



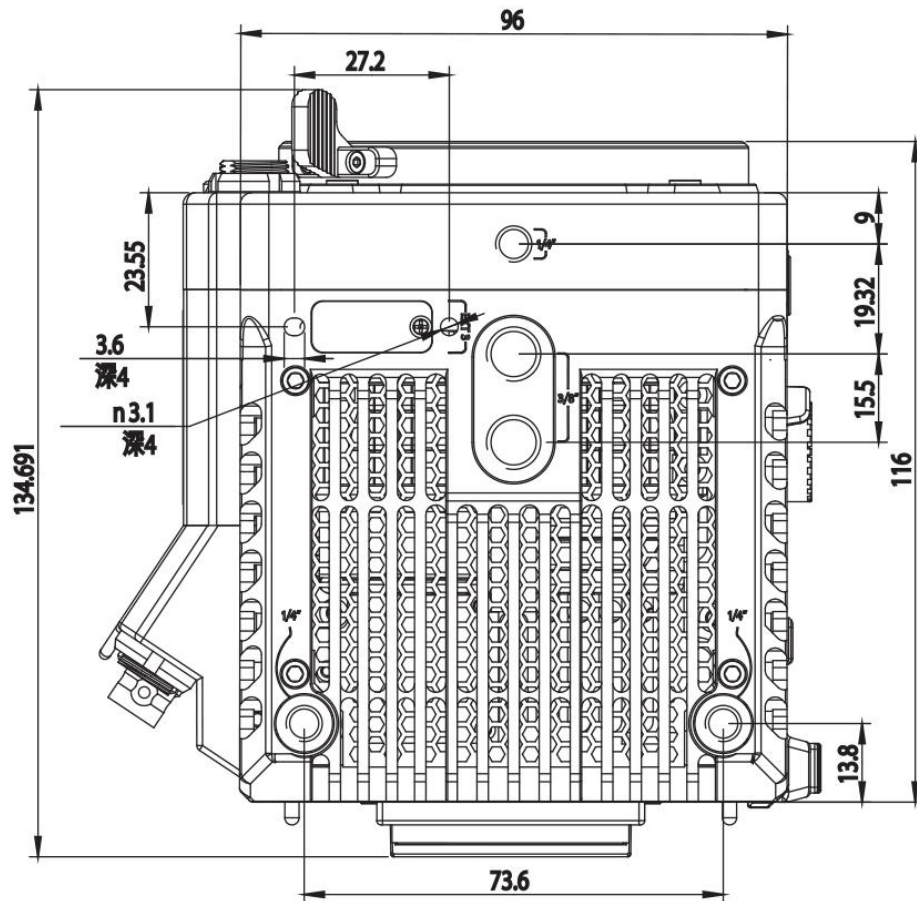
Top View

Dimensions are shown in mm.



Bottom View

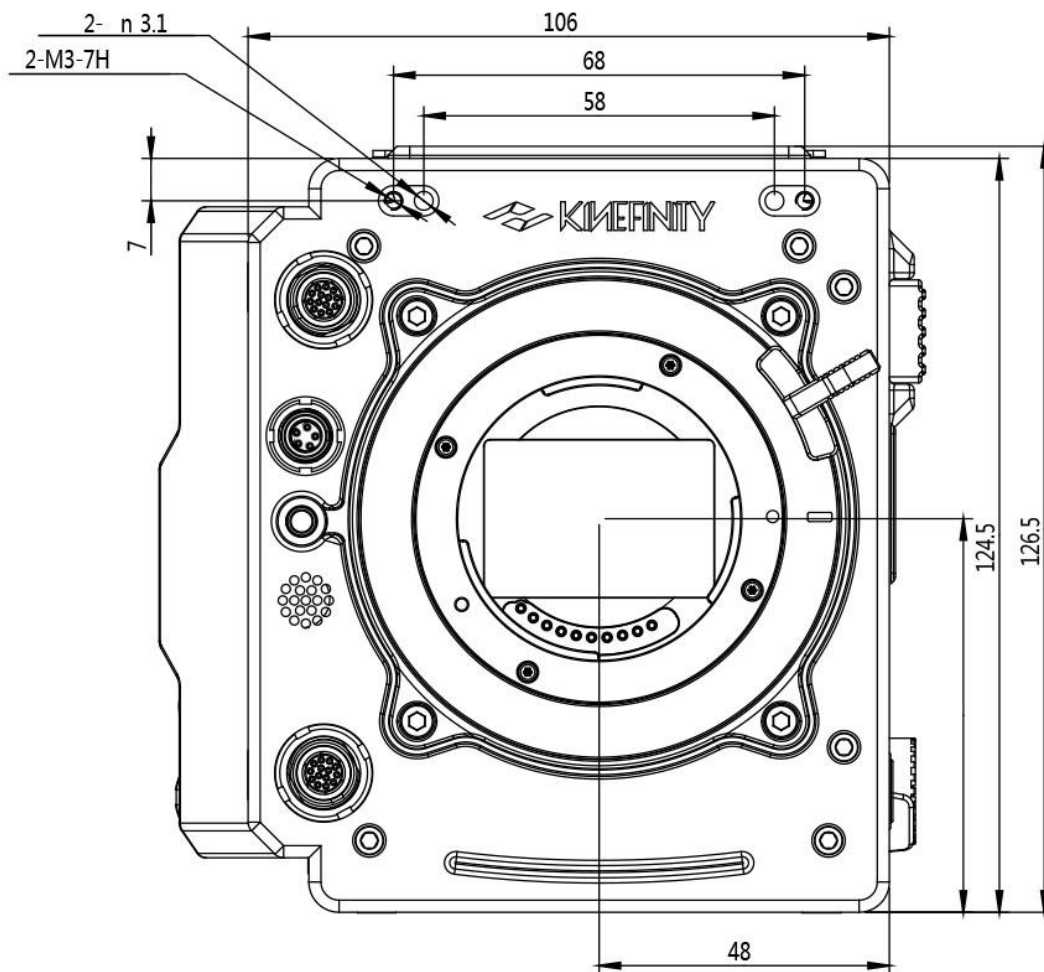
Dimensions are shown in mm.



4.3.3 MAVO mark2 LF Body with Active E Mount

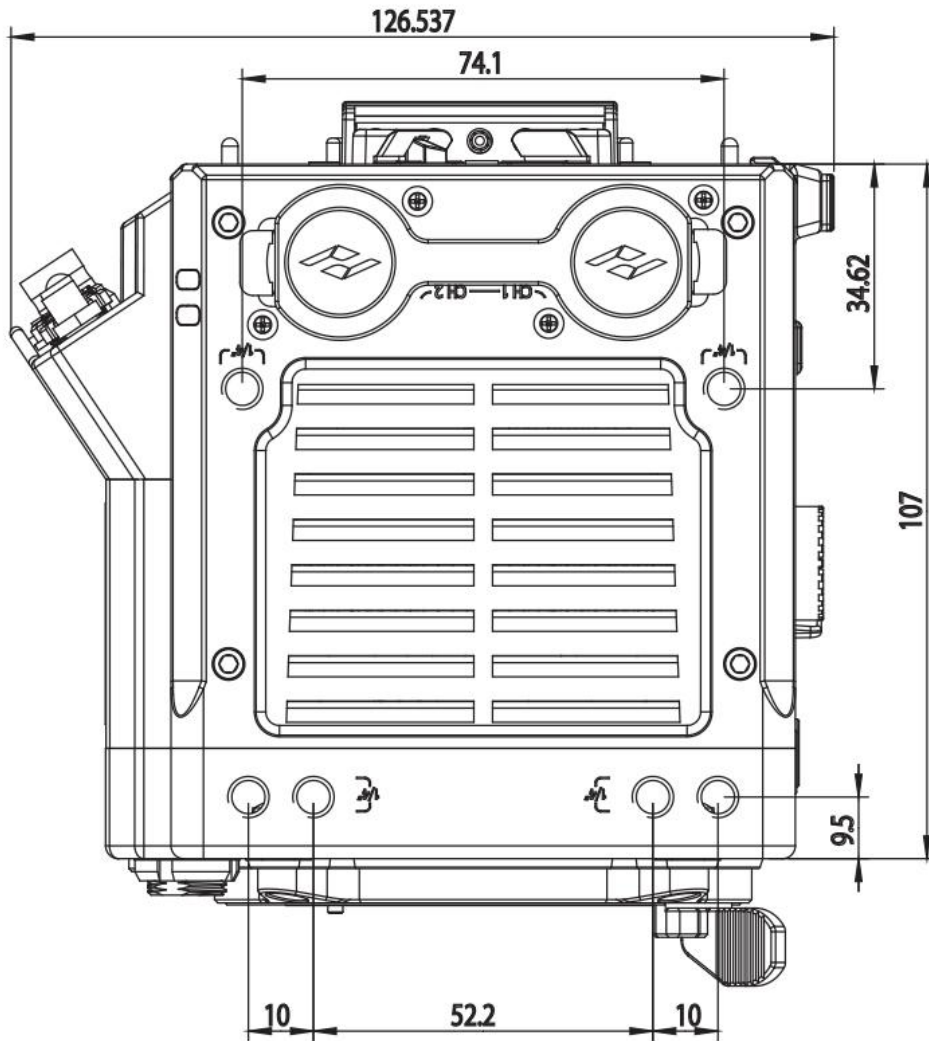
Front View

Dimensions are shown in mm.



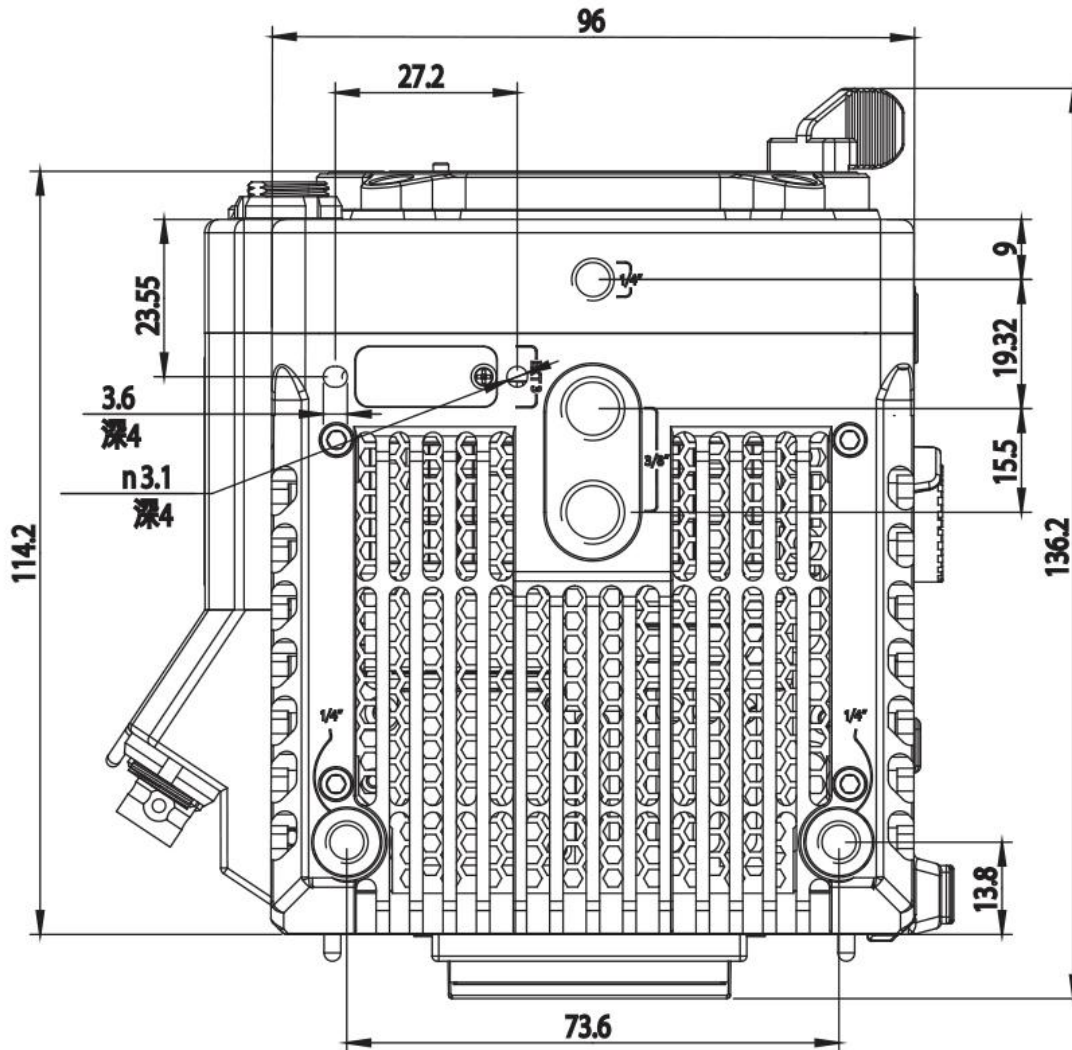
Top View

Dimensions are shown in mm.



Bottom View

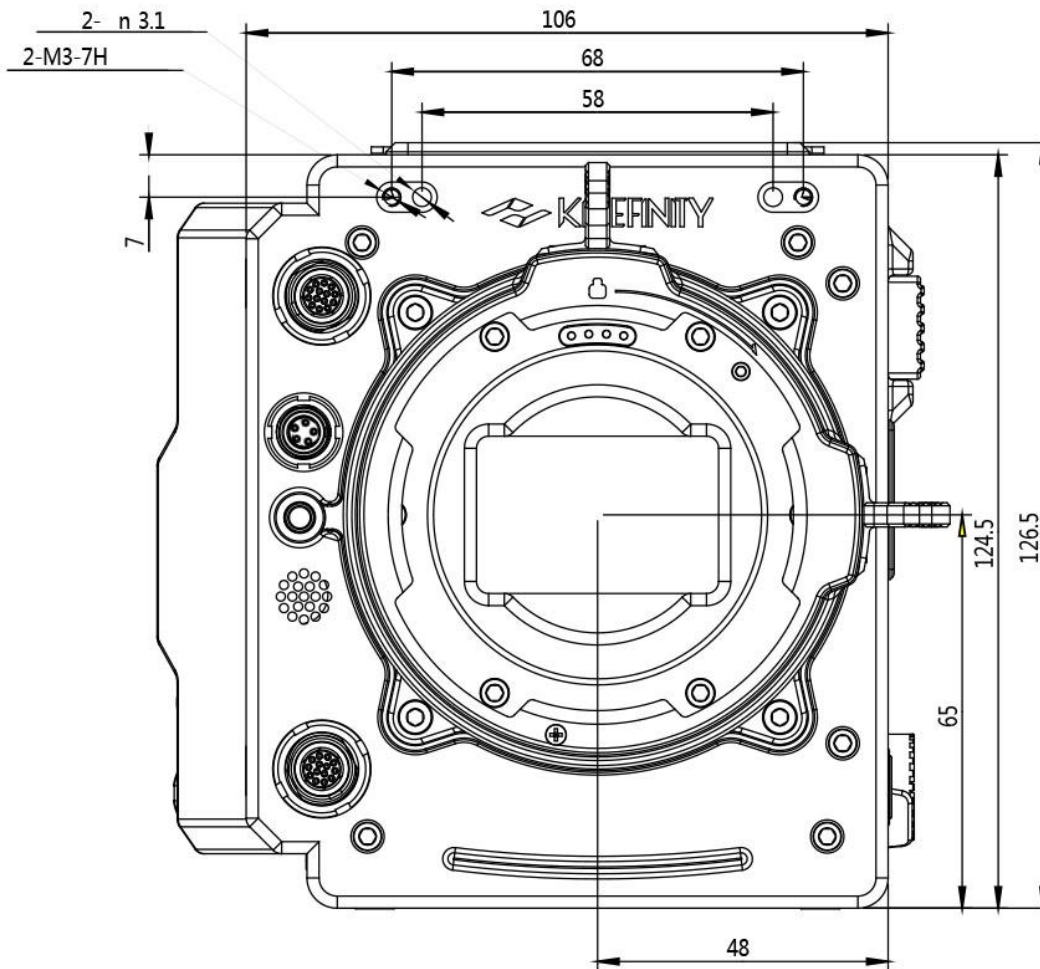
Dimensions are shown in mm.



4.3.4 MAVO mark2 LF Body with Active PL Mount

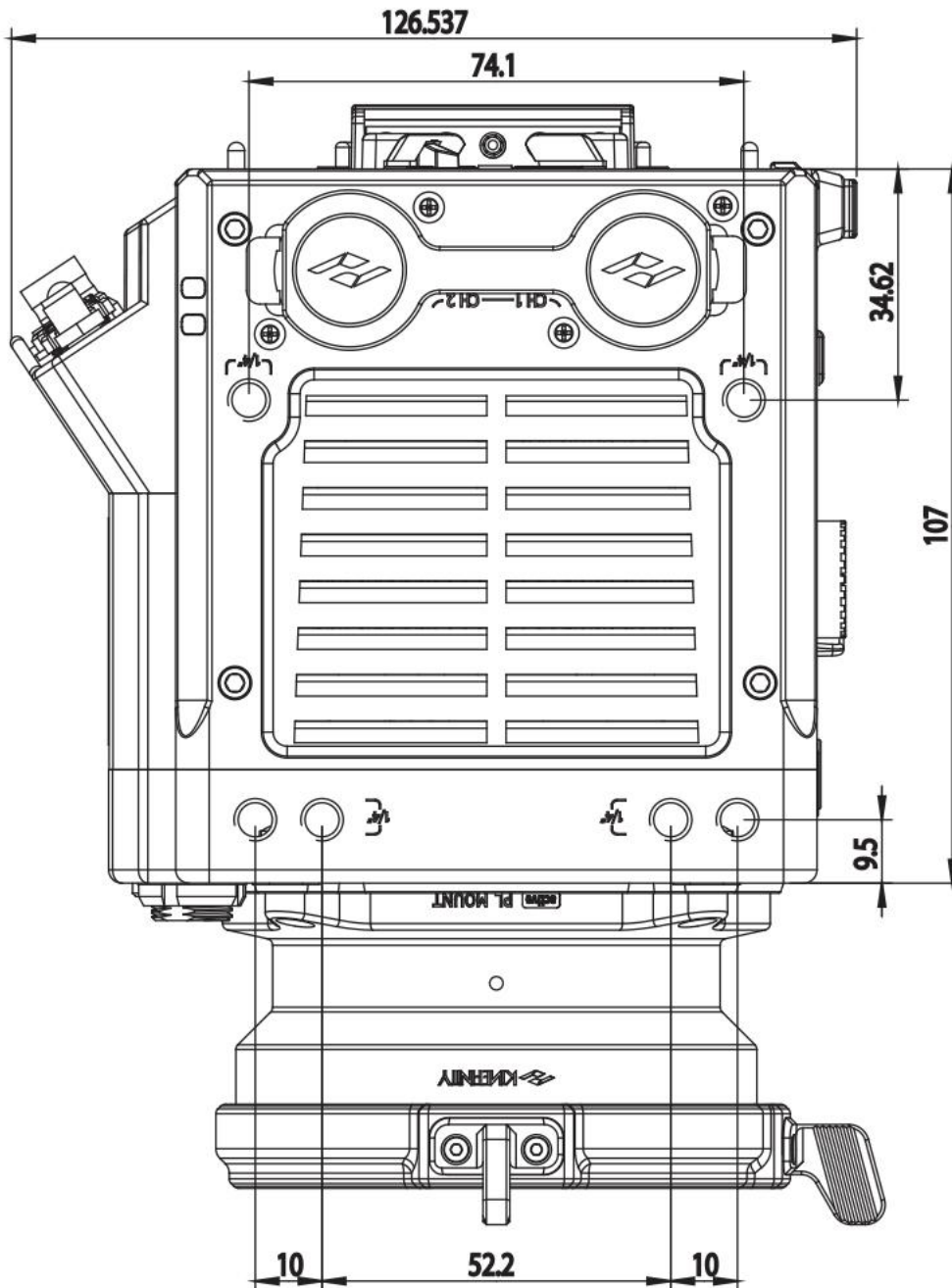
Front View

Dimensions are shown in mm.



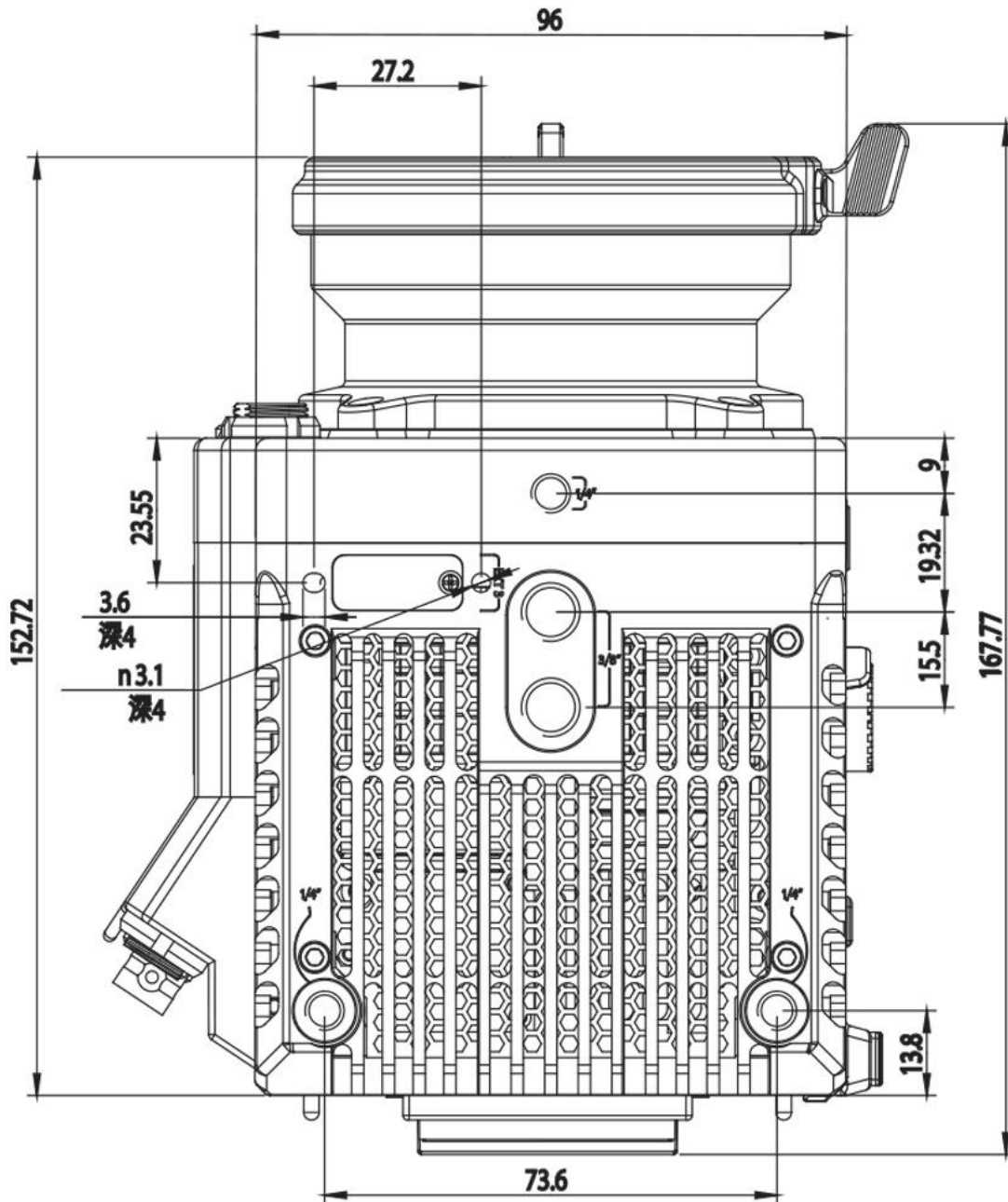
Top View

Dimensions are shown in mm.



Bottom View

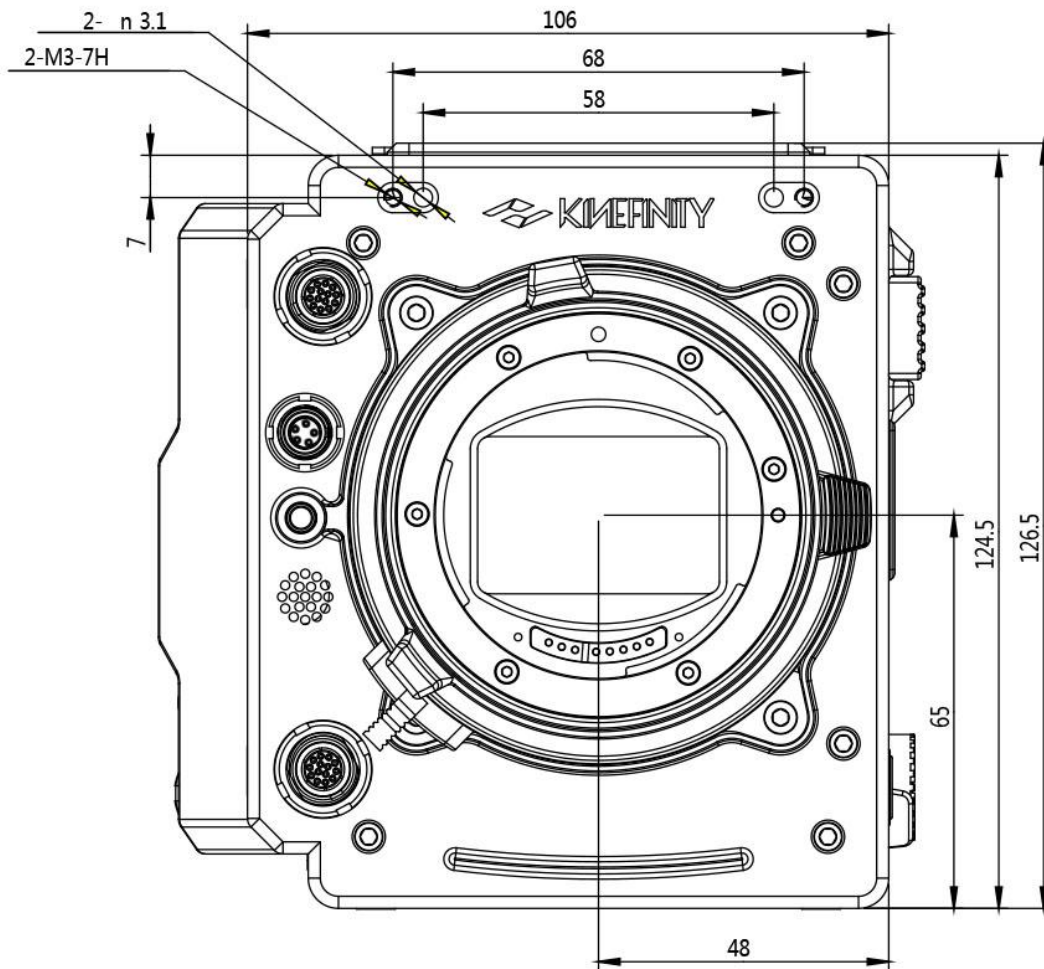
Dimensions are shown in mm.



4.3.5 MAVO mark2 LF Body with KineMOUNT and EF mounting adapter

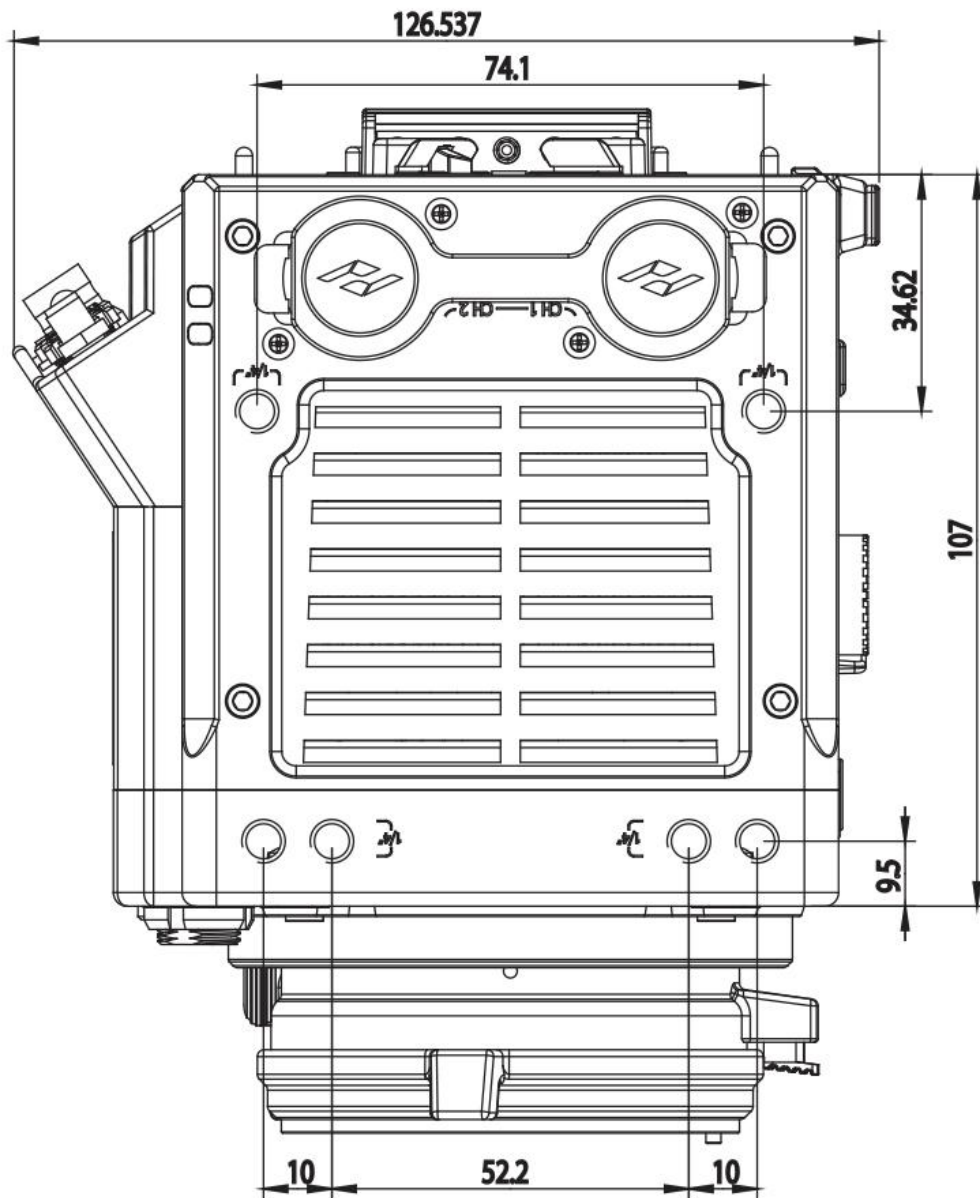
Front View

Dimensions are shown in mm.



Top View

Dimensions are shown in mm.



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