FOR.A®

4K ULTRA SLOW-MOTION CAMERA
FT-ONE-SS4K

Realize unprecedented brightness with FOR-A's new imaging system


4K × 2/3inch × 1000fps

With the adoption of our "Dual Optical Processing System", we've developed a 2/3-inch sensor that makes it possible to shoot with more brightness than ever before. Our 4K ultra slow-motion camera, fully compatible with a 2/3-inch B4 mount incorporates this new technology. With no compromise in depth-of-field zoom and focus speed, the camera is ideally for sports production. Image capture without the need for a PL-B4 lens converter makes it possible to capture approximately six times brighter (2.5 stops) images than PL mount super slow motion cameras.

The camera's base station is a compact 2RU size, providing camera operation up to 2-km range on Hybrid Fiber cable (up to 20 km when camera head is powered locally).

This ultra slow-motion camera combines a rich feature set in a cost-effective package.
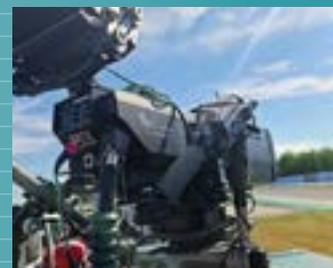
A new imaging solution – our Dual Optical Processing System (equipped with a 2/3-inch CMOS sensor/prism)

A revolutionary new technology (patented), our "Dual Optical Processing System" achieves higher sensitivity, at higher frame rates, with high pixel density through 4K. The system uses 2/3-inch CMOS sensors to capture high resolution 4K images. The 4K ultra slow motion camera with 2/3-inch CMOS sensor has a compact form factor and produces the same image quality as various system cameras currently in use.

▶ 2/3-inch CMOS sensor/prism
Based on this new patented technology, a unique optimized image sensor block and prism is used.
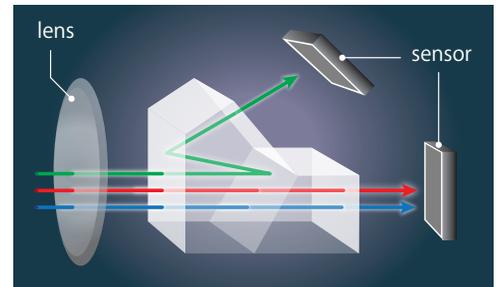
Directly attach 2/3-inch B4 mount lenses

Use your current broadcast lenses as-is

- Operate with the same 2/3-inch B4 mount lenses currently in use, with the full zoom and focus performance offered by the lens needed in sports production. Only FOR-A has achieved this in a 4K ultra slow-motion camera system
- Box-type super-telephoto zoom lenses can be used
- Because a PL-B4 lens converter isn't required, there is no light attenuation

<Brightness comparison>

2/3 B4 lens + Conversion lens + FT-ONE-OPT → 2/3 B4 lens + FT-ONE-SS4K

*When attaching an actual box lens, remove viewfinder attachments

Color matching with cameras from other companies

Integrates easily into a production using standard speed cameras from other manufacturers, through pre-configured FOR-A color matching presets.

FOR-A mode   Company A mode   Company B mode
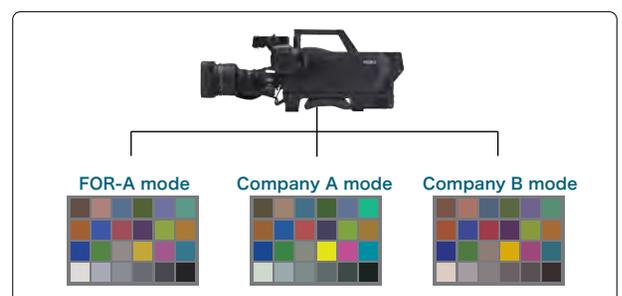
Shoots up to 1000 frames per second (fps) in 4K

- Shoots up to 1000 frames per second (fps) in 2/3-inch 4K UHD
- In motorsports, capture high-definition slow-motion of not just a car movements, but also the mechanical motions and events of individual parts
- In ball sports, capture a variety of slow-motion shots, not just of player movements but also close-ups of the ball
- Use for line call shots in tennis and other sports judgement calls

Image is for illustration purpose

Optional flicker correction function (FT-ONE-SS4K-FC)

Corrects image flicker under artificial light conditions in real time.
With FOR-A's proprietary technology, correction is possible even with
varying levels of lighting . Delivering cleaner images than normal cameras
by suppressing more of the flicker characteristic seen in live broadcast replays,
due to variable speed playback of the captured images.

Shoot, record, and output slow-motion video from the camera head's internal memory

■ While shooting live and recording slow-motion video, playback slow-motion replays of scenes captured in earlier,
using the camera head's internal memory
■ Slow-motion playback without a separate slow-motion server
■ Improved compatibility with existing slow-motion server systems
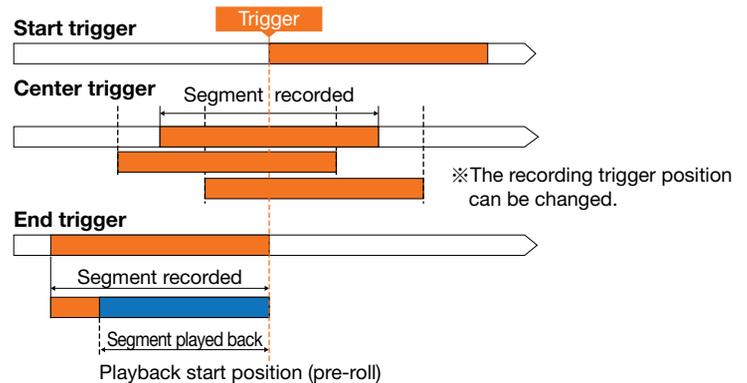
Storage partitioning

- The internal memory can be used as a single partition
  or divided into 2 to 16 partitions for simultaneous
  recording or playback.
- In continuous recording, material can be left intact
  before recording the next segment. Partitioning allows
  you to record new scenes while playing back scenes
  already stored in other partition.

1
Unpartitioned (16.3 sec. recording in one partition*)

1	2
2 partitions (8.15 sec. recording in each partition*)

1	2	3	4
4 partitions (4.07 sec. recording in each partition*)

1	2	3	4	5	6	7	8
8 partitions (2.03 sec. recording in each partition*)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
16 partitions (1.01 sec. recording in each partition*)

*Maximum recording time at 1000 fps

Versatile trigger support

- Pressing a trigger that can be set to record from the start, center or
  end of the event to be captured, starts recording to internal memory.
  Choose the optimal recording trigger depending on timing of event.
- With the pre-roll function, playback starts from the specified
  position, keeping playback focused on required segments.

Start trigger — Trigger

Center trigger — Segment recorded

※The recording trigger position can be changed.

End trigger

Segment recorded

Segment played back

Playback start position (pre-roll)

* Constantly records during shooting

Equipped with a high-speed global shutter system

Shoots distortion-free video using a high-speed global shutter system.
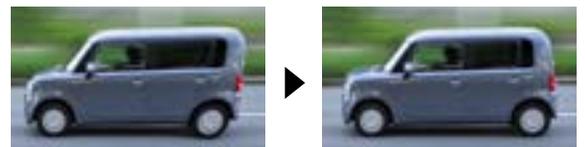
Images are for illustration purpose

Other features / Optional functions

＜Other features＞
- Independent live 4K output
- 12G-SDI/Quad link 3G-SDI outputs
- Supports HDR and WCG
- 24-axis color correction
- Improved portability thanks to a compact, lightweight design

＜Option＞
- Equip with monitor mount

*For recommendations on the optimal tripod base plate and
 viewfinder, please contact your local FOR-A office.

Configuration / Workflow

Base station / Remote control

Base station

■ Compact 2RU size
■ Camera head separates from the body, offering exceptional mobility with up to 20-km (2-km power supply included) range of the optical connection
■ Equipped with intercom function (supports 4-wire, 2-wire, Clear-Com.)
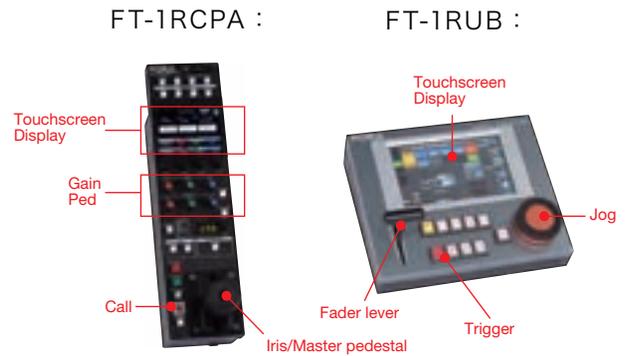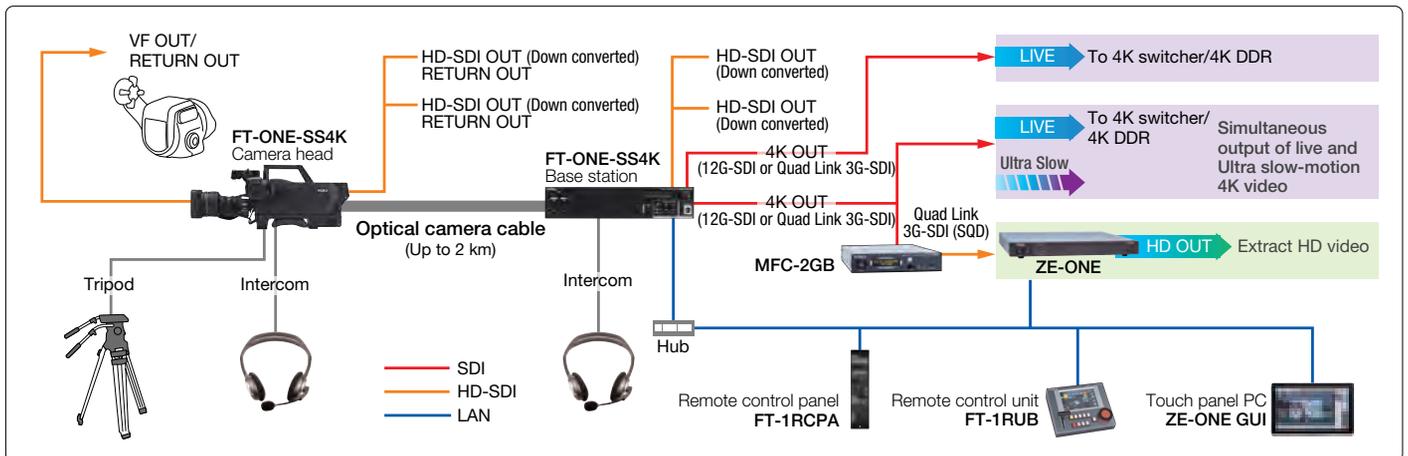
Remote control (optional)

【 FT-1RCPA 】
■ Remote panel required for real-time adjustment of color and image quality for the FT-ONE series
■ Intuitive control of iris, pedestal, gain and more via dedicated buttons and dials, equipped with a touch panel for fine adjustment functionality
【 FT-1RUB 】
■ Equipped with dedicated buttons, a jog dial and a fader for recording and playback control, and intuitive touch panel for a wide range of settings
■ Easy camera setup and playback of recorded video

FT-1RCPA :

Touchscreen Display

Gain
Ped

Call

FT-1RUB :

Touchscreen Display

Jog

Fader lever

Trigger

Iris/Master pedestal

Standard system diagram

VF OUT/
RETURN OUT

HD-SDI OUT (Down converted)
RETURN OUT

HD-SDI OUT
(Down converted)

LIVE To 4K switcher/4K DDR

FT-ONE-SS4K
Camera head

HD-SDI OUT (Down converted)
RETURN OUT

HD-SDI OUT
(Down converted)

LIVE To 4K switcher/
4K DDR

Ultra Slow

Simultaneous output of live and Ultra slow-motion 4K video

FT-ONE-SS4K
Base station

4K OUT
(12G-SDI or Quad Link 3G-SDI)

4K OUT
(12G-SDI or Quad Link 3G-SDI)

Quad Link
3G-SDI (SQD)

Optical camera cable
(Up to 2 km)

MFC-2GB

ZE-ONE

HD OUT Extract HD video

Tripod

Intercom

Intercom

Hub

SDI
HD-SDI
LAN

Remote control panel
FT-1RCPA

Remote control unit
FT-1RUB

Touch panel PC
ZE-ONE GUI

Remote production (WAN/IP)

Easily set up remote production over the internet (WAP/IP).

Remote operation overview

UK headquarters - England

Color control
Replay control

Internet

Color control
Replay control

Live/Replay video

Live/Replay video

Live video

Color control
Replay control

Live/Replay video
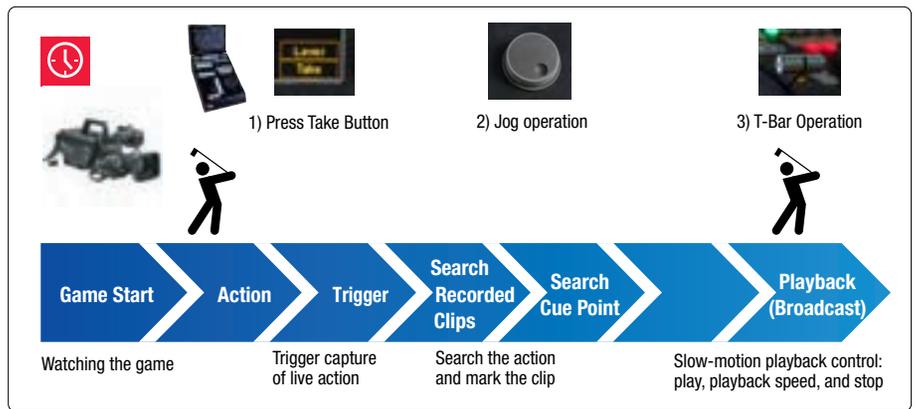
Broadcasting center - Spain
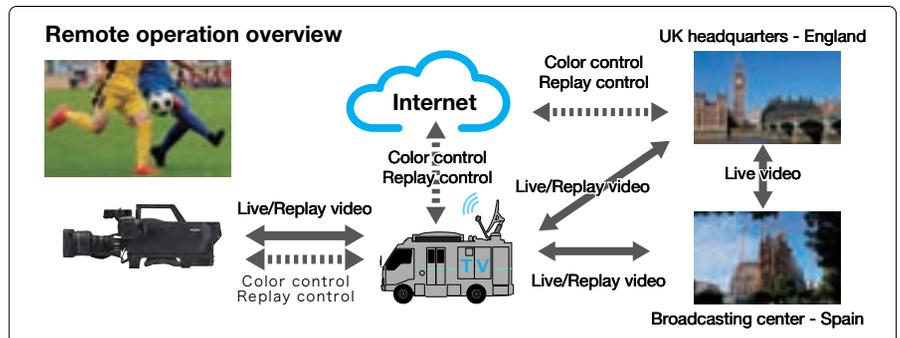
EVS integration system diagram

The remote controls' UI is compatible with EVS products. Integrates easily with EVS's high-end production servers for intuitive operation by EVS operators.

4K UHD

FT-ONE-SS4K

CH A
CH B

Live
INSTANT REPLAY (max.x20) or Live
Live
12G-SDI / Quad Link 3G-SDI
INSTANT REPLAY (max.x20) or Live
12G-SDI / Quad Link 3G-SDI

Vision Mixer

CCU
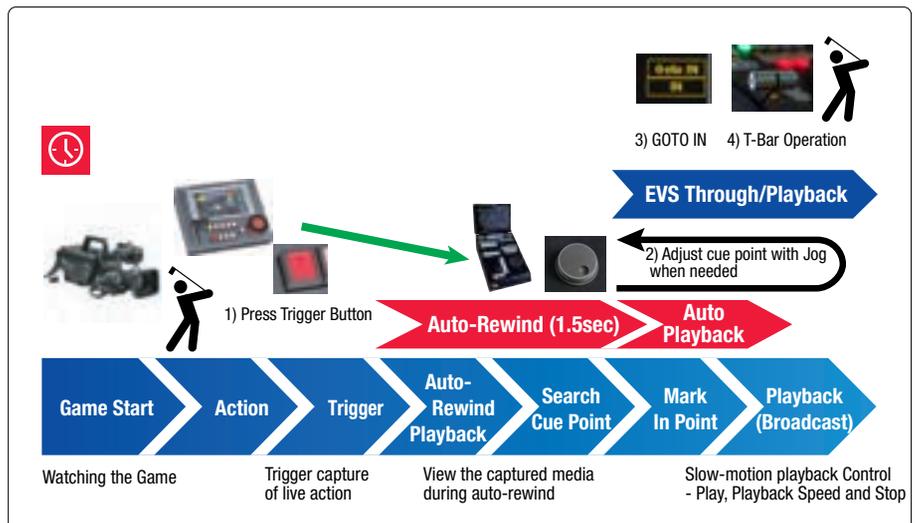CCU
Live
Live

Standard Cameras
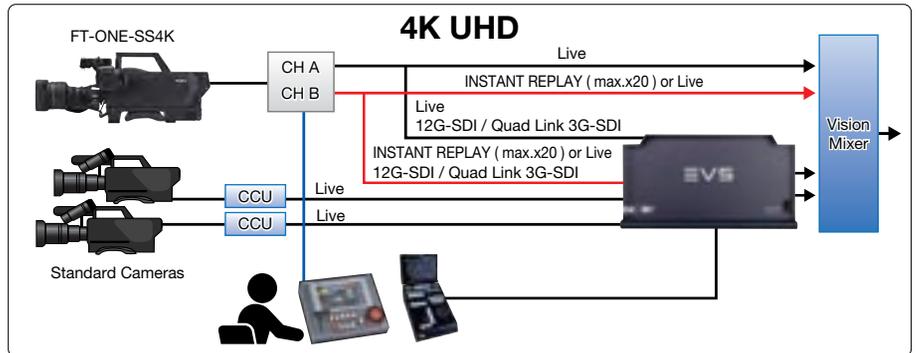
FT-ONE-SS4K is available with EVS hypermotion mode

Interactive workflows with EVS and other slow-motion replay systems.
Hypermotion camera control directly from EVS LSM controller.

1) Press Take Button   2) Jog operation   3) T-Bar Operation

Game Start → Action → Trigger → Search Recorded Clips → Search Cue Point → Playback (Broadcast)

Watching the game   Trigger capture of live action   Search the action and mark the clip   Slow-motion playback control: play, playback speed, and stop

Automatic Assist Function
- Integration between FT-ONE-SS4K and EVS

New workflows are available that are familiar to EVS and other slow motion operators.
New stream lined workflow with replay system.

3) GOTO IN   4) T-Bar Operation

EVS Through/Playback

1) Press Trigger Button

2) Adjust cue point with Jog when needed

Auto-Rewind (1.5sec)   Auto Playback

Game Start → Action → Trigger → Auto-Rewind Playback → Search Cue Point → Mark In Point → Playback (Broadcast)

Watching the Game   Trigger capture of live action   View the captured media during auto-rewind   Slow-motion playback Control - Play, Playback Speed and Stop

FT-ONE-SS4K Datasheet

1. Specifications

Camera Head basic specifications

Temperature	0℃ to 40℃
Humidity	30% to 85% (no condensation)
Power	Supplied from the base station via optical camera cable or external power supply If supplied via optical camera cable: 100 V to 240 V AC (Max. 1 km) DC IN:　　DC +10V to +17V DC OUT:　　DC +10V to +17V (Max. 20 W)
Consumption	160 W (in isolated operation) 210 W (w/ viewfinder and lens)
Dimensions	172 (W) x 275 (H) x 417 (D) mm (excluding projecting parts)
Weight	7.1 kg
Consumables (at 24-hour operation)	Cooling fan: Replace every 4 years (at normal temperature)

Technical specifications

Image sensor, shutter, etc.	
Image sensor	CMOS Global shutter
Type	Dual Optical Processing System
Effective resolution	3840 x 2160
Sensor size	2/3 inch
Quantization	12-bit x RGB
Shutter speed	1/frame rate to 1/10,000 sec. (Preset stops)
Frame rate	Max. 1,000 fps
Electrical characteristics	
Sensitivity	2000 lux F8
Video S/N ratio	Average 60 dB
H resolution	1800
Geometric distortion	None
Optical	Built-in ND filter
Lens mount	2/3 inch Bayonet-mount
Trigger signal input	From Remote Control Unit (FT-1RUB), GPI
Audio inputs	
MIC IN	x 1 (1 stereo pair), balance, high impedance Input level: -60 dBu / -50 dBu / -40 dBu Phantom power supply: +48 V / OFF

Audio output	
Embedded	2 channels (1 stereo pair), 48 kHz, synchronous
Video output	
VF1	(1920 x 1080i / 1920 x 1080p) / 59.94, 50 75Ω BNC x 2 Down-converted camera image or RET1/RET2 input image
Intercom system	
INCOM1 INCOM2	x 2 PRIV / LINE (producer line / engineer line)
External Interfaces	
Iris control	x 1 Manual / Auto
VF	Dedicated connection to CANON EVF-V70
Optical camera cable port	Manufactured by Lemo

- Use FT-1RUA / RUB for trigger and slow operation.
- Use FT-1RUA / RUB or FT-RCPA for detailed video settings.

Base Station basic specifications

Temperature	0ºC to 40ºC
Humidity	30% to 85% (no condensation)
Power	AC IN: 100 V to 240 V AC * Camera power supply is available using a camera optical cable (max: 1 km).

Consumption	Isolated operation: 222 W (at 100-120V)
	                                 218 W (at 220-240V)
	If camera head is connected: 547 W (at 100-120V)
	                                                    551 W (at 220-240V)

Dimensions	430 (W) x 88 (H) x 500 (D) mm (excluding projecting parts) 480 (W) (Including rack mount brackets)
Weight	15.4 kg
Consumables (at 24-hour operation)	Cooling fan (P-1546-2): Replace every 4 years (at normal temperature) Button battery (for memory backup) CR2032: Replace every 5 years (at normal temperature) Fuse: Slow blow 5.2x20 mm, 5.0 A / 250 V

Base Station Technical specifications

Video output (camera mode)	
12G/3G-SDI OUT:	
12G mode: Quad 3G mode:	x 2 (3840 x 2160p) / 59.94, 50 (4:2:2) Single Link 12G-SDI x 2 (3840 x 2160p) / 59.94, 50 (4:2:2) Quad Link 3G-SDI (Level-A/B, 2SI) 75Ω BNC x 8 Live or slow video
HD-SDI:	x 2 (1920 x 1080i / 1920 x 1080p): 1080i / 59.94, 50 75Ω BNC x 2 Live or slow video
Video input	
HD-SDI:	(1920 x 1080i / 1920 x 1080p) / 59.94, 50 75Ω BNC x 2

Genlock input	BB: NTSC: 0.429 Vp-p, PAL: 0.45 Vp-p or, Tri-level Sync: 0.6 Vp-p 75Ω BNC x 1 (w/ loopthrough, 75-ohm auto termination)
Genlock mode	Internal sync or External sync (B.B. or Tri-level sync)
Memory partition	1 to 16 segments
Recording duration	

RECORDING FRAM RATE (major)		
Frame rate (major)	Recording time	Image size
24 fps	680.9 sec.	
60 fps	272.3 sec.	
120 fps	136.1 sec.	
180 fps	90.7 sec.	
240 fps	68.0 sec.	
300 fps	54.4 sec.	
360 fps	45.3 sec.	
420 fps	38.9 sec.	3840×2160 pixel
480 fps	34.0 sec.	
540 fps	30.2 sec.	
600 fps	27.2 sec.	
720 fps	22.6 sec.	
840 fps	19.4 sec.	
960 fps	17.0 sec.	
1,000 fps	16.3 sec.	
* Audio are not recorded.		

Intercom system	
COMMUNICATION	25-pin D-sub (female) x 1 Intercom x 2 lines (ENG/PROD) if 4WIRE or 2WIRE selected. PGM 2 lines GPI 2 inputs (Default: R TALLY IN, G TALLY IN)
HEAD SET	4-pin XLR (male) x 1 (For intercom connection)
INTERCOM IN1, IN2	3-pin XLR (male) x 2 (when Clear-Com is selected)
Interface	
LAN	100BASE-TX/1000BASE-T RJ-45 x 1 (For FT-1RUA/RUB and FT-1RCPA connection)
Optical camera connector	Manufactured by Lemo
Flicker correction (option)	Applicable to live and recorded footage in built-in memory, in real time. (Not applicable to VF-OUT and HD-SDI 1/2) FT-1RUA/RUB required for flicker correction control.

Options

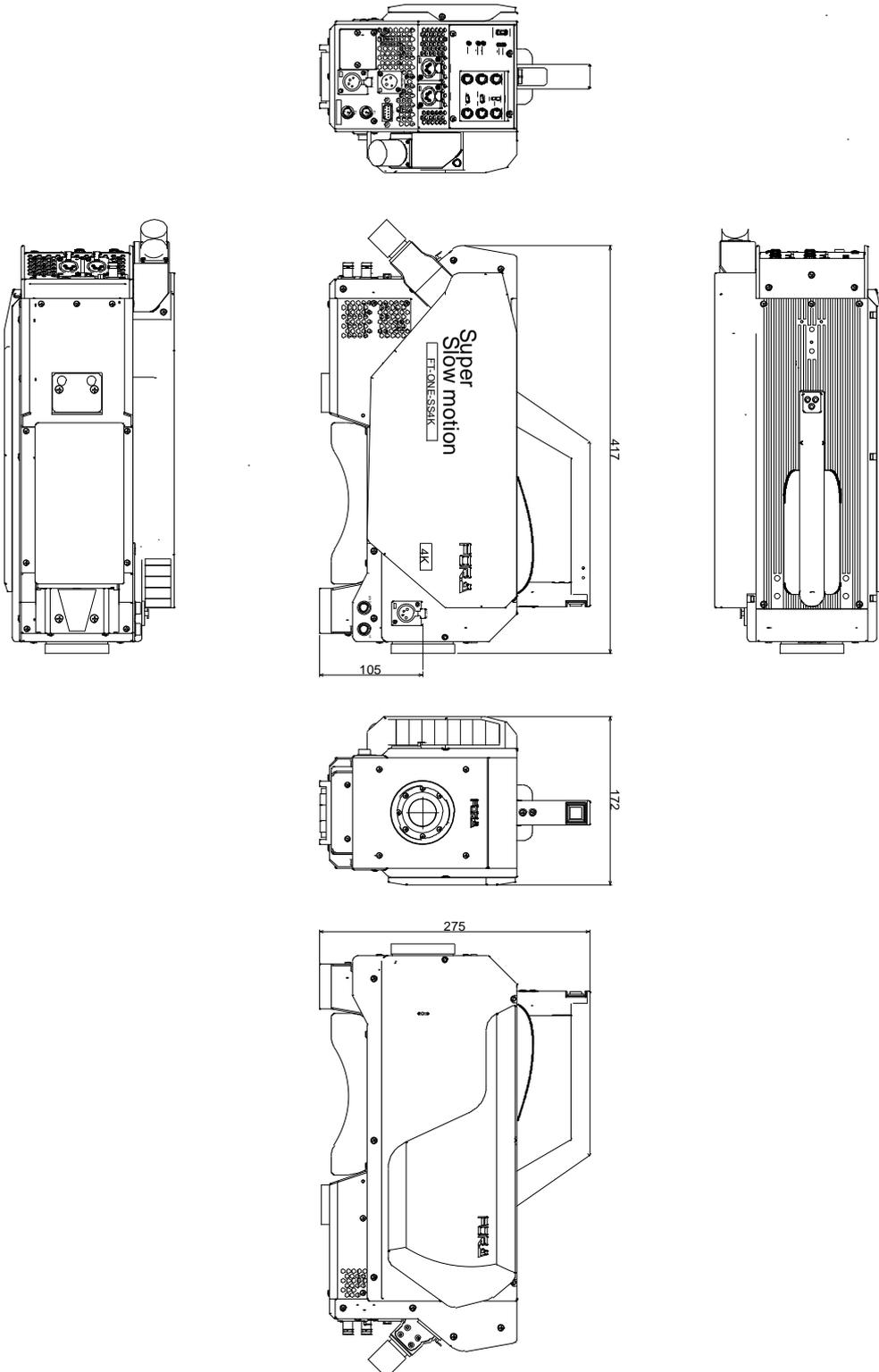|	
FT-ONE-SS4K-FC	Flicker correction
Tripod base plate	Equivalent to Sony VCT-U14
FT-1RUA FT-1RUB	Remote Control Unit (Including dedicated 16 VDC adapter)

FT-1RCPA	Remote Control Panel (Including dedicated 16 VDC adapter)

Accessories
AC Cord, EIA Rack Mount Brackets, Rubber feet, Operation Manual

2. External Dimensions
Camera Head

(All dimensions in mm.)

Base Station

(All dimensions in mm.)

RATING LABEL

32

500

50

390

60

2.9

76

88

60 310 60
430
462
480

6.4