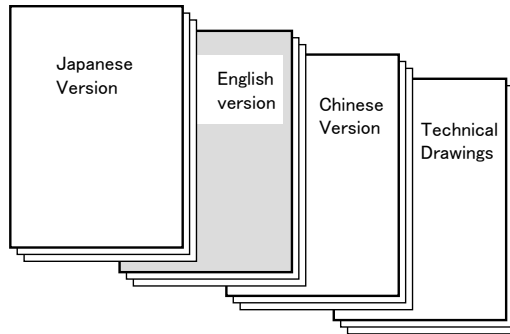


ENGLISH VERSION

- ◆ This operation manual is composed of the Japanese version, English version, Chinese version, and Technical Drawings.



FCC REGULATIONS

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

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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

Canadian Radio Interference Regulation

CAN ICES 3(B) / NMB-3(B)

CAUTION : This Class B digital apparatus complies with Canadian ICES-003.

Disposal of Electrical and Electronic Equipment in Private Households

In the European Union, Norway, Iceland and Liechtenstein:

This symbol on the product, or in the manual, and/or on its packaging indicates that this product shall not be treated as household waste. Instead it should be taken to an applicable collection point for the recycling of electrical and electronic equipment.



By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

FOR YOUR SAFETY

FOR YOUR SAFETY

This content explains important notices for all the users to use this product safely. Read the content carefully before using, and follow the instructions.

The following signs of ⚠ WARNING and ⚠ CAUTION show :

⚠ WARNING Indicates the possibility of causing death or serious injury when misused.

⚠ CAUTION Indicates the possibility of causing injury or substantial damage when misused.

⚠ WARNING

- ◆ Do not moisten inside of the appliances. It may cause fire or electric shock.
If the incident occurs, shut off the power supplied to the lens immediately.
- ◆ Be sure to attach all the parts securely. Dropping any parts from a height may cause severe accidents.
- ◆ Do not look at any sorts of strong illuminant such as the sun through the lens. Eyes could be harmed.

⚠ CAUTION

- ◆ Take care when carrying the lens. Dropping the lens while carrying may cause injury.
- ◆ Be sure to confirm that the camera to be used with the lens system (lens and accessories) is able to supply sufficient electric power to the lens system. If not, the lens system may not work normally and the camera will be damaged.
The values of the power consumption of the lens and the accessories are described in “Specifications” section of their operation manuals.
- ◆ Before supplying the power to the lens, make sure all the parts are connected correctly.
- ◆ In order to install or release a cable, be sure to hold the joint part. Do not damage the cable by gripping.
It may cause fire or electric shock.
- ◆ If any sorts of incidents such as unusual smoke, noise, smell or obstacles are found, shut off the power supplied to the lens and detach the lens from the camera immediately. Please notify the sales agent from which you purchased the product.
- ◆ Do not remodel the instrument: it may impair the functions of product or cause electric shock.

FOR YOUR SAFETY

NOTICE

- ◆ Lens and its accessories are extremely precise instrument, then be sure not to apply the strong impacts to them. If the lens is of a type in which the rear lens protrudes from the flange surface of the lens mount, be sure not to apply impact to the lens part when installing or releasing.
- ◆ There may be a case that the glasses of the lens mist when the lens is carried from a cool place to a place of high temperature and high humidity. To avoid a mist on the glasses, before moving the lens, let the lens adjust to the ambient temperature of the place where the lens will be used.
- ◆ Be sure not to apply impact to the front part of the lens when operating the camera.
- ◆ Put the cap on the lens while the camera is not used.
- ◆ If an accessory to be attached to the lens is equipped with a mechanical drive relaying part, before attaching it, check the joint part and get rid of all obstacles. If there are any unusual conditions, please contact the sales agent from which you purchased the product.
- ◆ When the lens is used in the weather of fog, raining, or snowing, cover up the lens to prevent it from the water.
- ◆ To minimize the impact to the lens in transportation, set the zoom to the wide end and the focus to the infinity side end before releasing the lens from the camera.
- ◆ In the case the lens is used without the drive unit (drive unit is detached from lens barrel), if the lens is inclined by more than 45 degrees, the zoom ring might rotate under its own weight. Please have it in mind.
- ◆ In the case the lens is used with the drive unit attached to the lens barrel, if the iris ring is rotated using an external motor, the drive unit may be broken. So, when using an external motor, detach the drive unit before using the external motor. For the method of detachment, see the “REMOVAL AND MOUNTING OF DRIVE UNIT” section in this manual.

PRIOR TO USE

INITIALIZATION WHEN POWER OF LENS IS TURNED ON

After the power for the lens is turned on, the lens must be initialized.

- The focus and zoom setting methods vary depending on the status of the respective servo/manual select knobs of focus and zoom of the lens when the power is turned on.
 - ① When the knob is set to “Servo”:
Both focus and zoom are automatically initialized.
 - ② When the knob is set to “Manual”:
Focus and zoom are initialized by turning each ring manually.
When using a communication function such as LDS, always perform initialization. See the following table for the details of the initialization method.

- The iris setting method differs depending on the setting of the lens “function/mode changeover switch SW 1-④” when the power is turned on, regardless of the setting of the iris mode changeover switch. (Refer to Page 15.)
 - ① When set to ON:
Initialization is automatically performed.
 - ② When set to OFF:
Initialization is performed by manually turning the iris ring.
When using a communication function such as LDS or controlling the iris from an external device, be sure to perform initialization.

Setting of Servo/Manual Select Knob	① Servo (Auto)	② Manual
Section of Lens		
Focus	The focus operates and is initialized automatically.	By turning the focus ring manually by about 60 degrees, the focus is initialized*1. (Turn the ring within a two-second period.)
Zoom	The zoom operates and is initialized automatically.	By turning the zoom ring manually by about 90 degrees, the focus is initialized*1. (Turn the ring within a two-second period.)

Setting the lens function/mode changeover switch	① ON	② OFF
Lens Components		
IRIS	The iris operates and initialization is automatically performed.	Initialization is performed by manually turning the iris ring approx. 45° . *2 (Turn the ring so that it moves between the open end and the close end within two seconds.)

*1 If the servo / manual select knob is set to servo in a state where the ring has not been turned to the specified angle and initialization is therefore not performed, focus / zoom starts initialization automatically.

*2 If the ring has not been turned to the predetermined angle and initialization has not been performed, turning ON the lens function/mode changeover switch SW 1 ④ causes the iris to automatically start initialization.

MEMO

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■ ILLUSTRATIONS

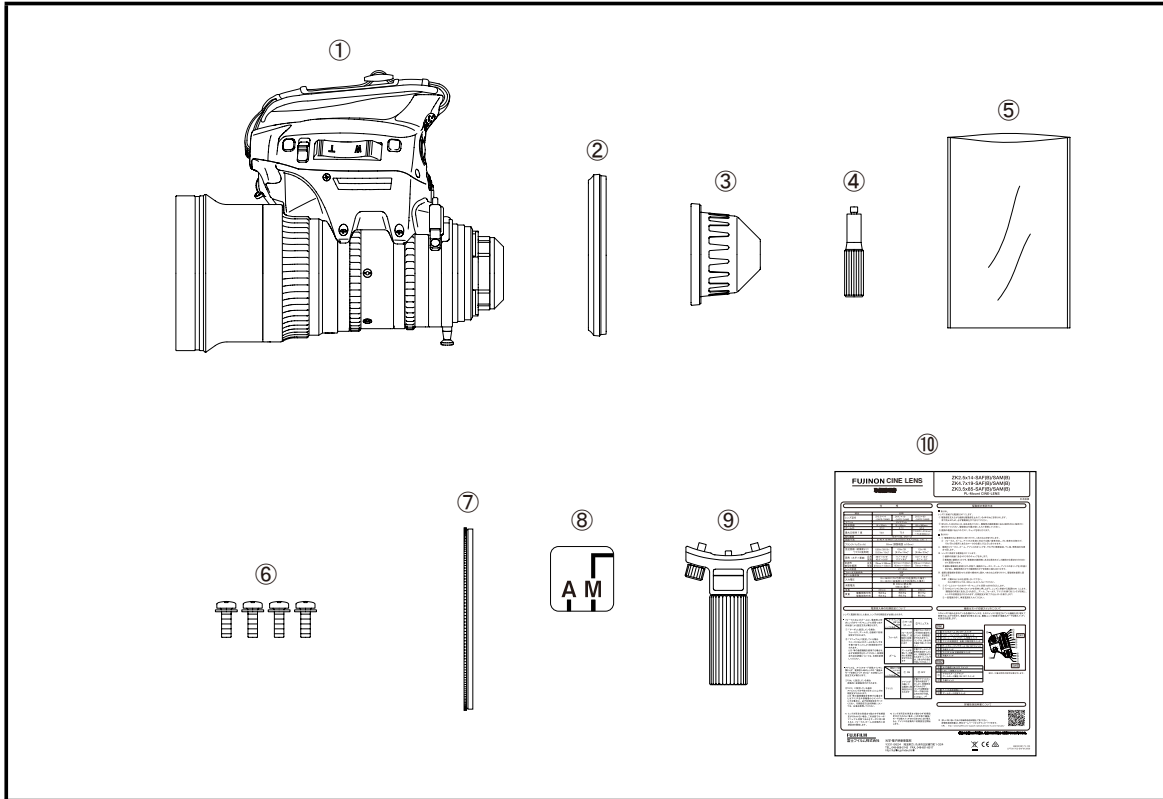
Fig. 1-1	Outline drawing	ZK2.5×14-SAFB / ZK2.5×14-SAMB
Fig. 1-2	Outline drawing	ZK4.7×19-SAFB / ZK4.7×19-SAMB
Fig. 1-3	Outline drawing	ZK3.5×85-SAFB / ZK3.5×85-SAMB

Note. The products shown in the illustrations in this manual may differ from their actual shapes.

GENERAL DESCRIPTION

A zoom lens designed for 35 mm PL mount cameras.

LIST OF COMPONENTS:



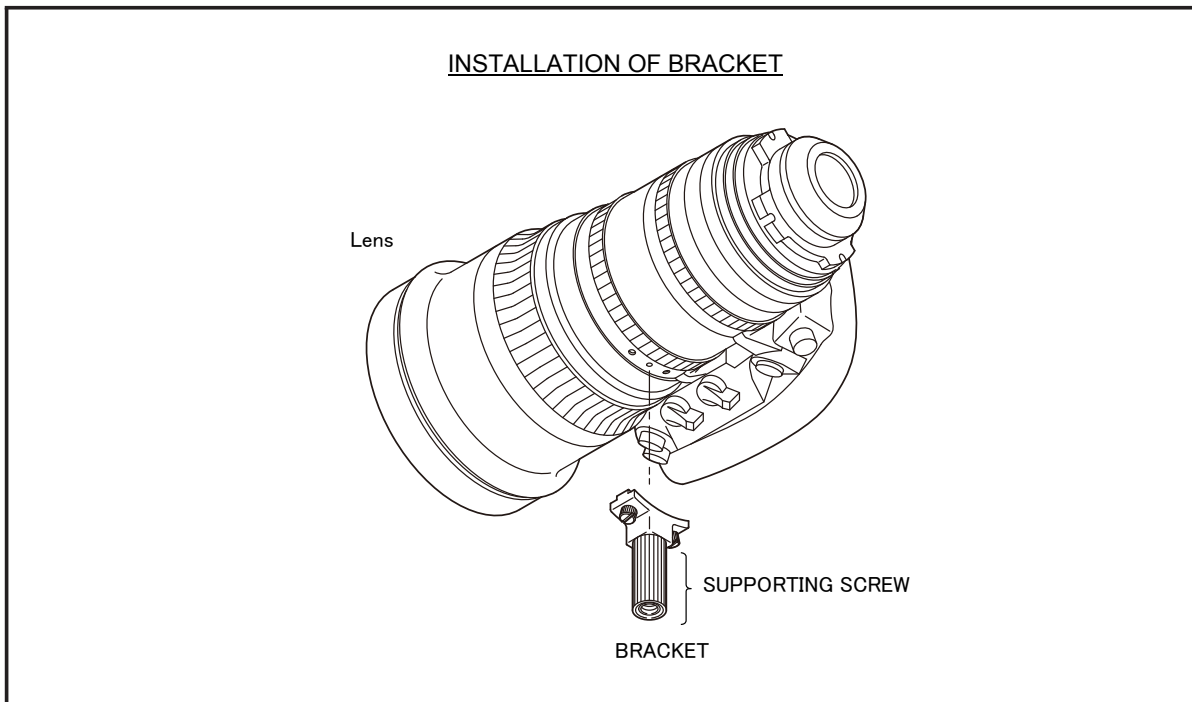
	Q'ty
① Zoom Lens	1
② Front Lens Cap	1
③ Rear Lens Cap	1
④ Zoom Lever	1
⑤ Vinyl Bag for Drive Unit	1
⑥ Attaching Screws for Drive Unit (Spare)	4
⑦ Protective Filter	1
⑧ Iris Mode Indication Label	1
⑨ Bracket	1
⑩ Operation Manual	1

* About Bracket

- Bracket is provided for fixing lens onto support rods. Use it either when total mass of lens and attached accessories exceeds 4 kg, or when camera is used on the shoulder and mass of which exceeds 6 kg.
- The supporting screw is detachable from the bracket, so the bracket is available for two types of lens support systems having a different height from each other.

■ INSTALLATION OF THE BRACKET ONTO THE LENS

- a. Align the pin at the upper center of the bracket with the hole on the lens, and insert it.
- b. The bracket has a mounting screw on both sides. Tighten the screws into the lens.

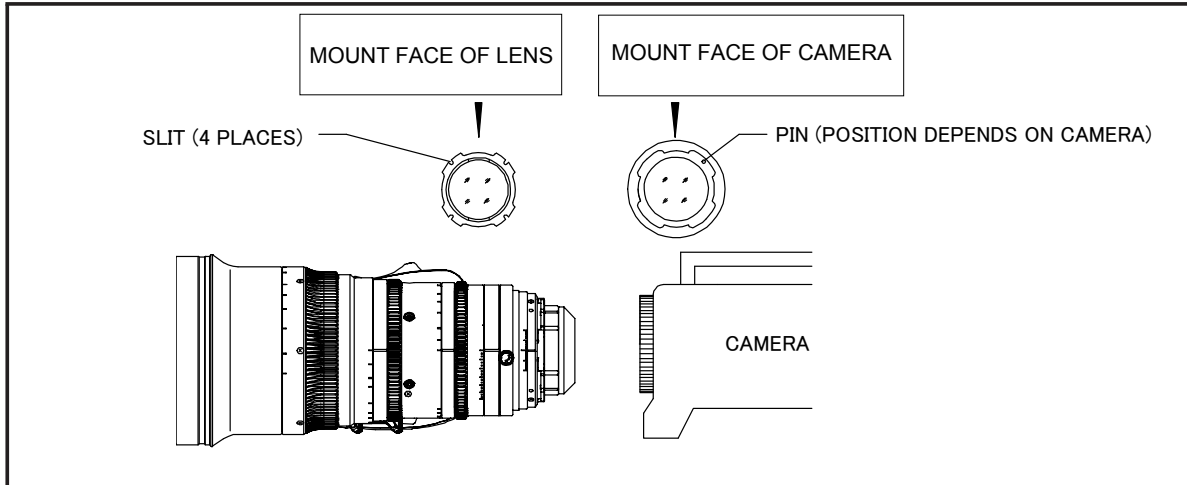


INSTALLATION!

■ INSTALLATION ONTO CAMERA

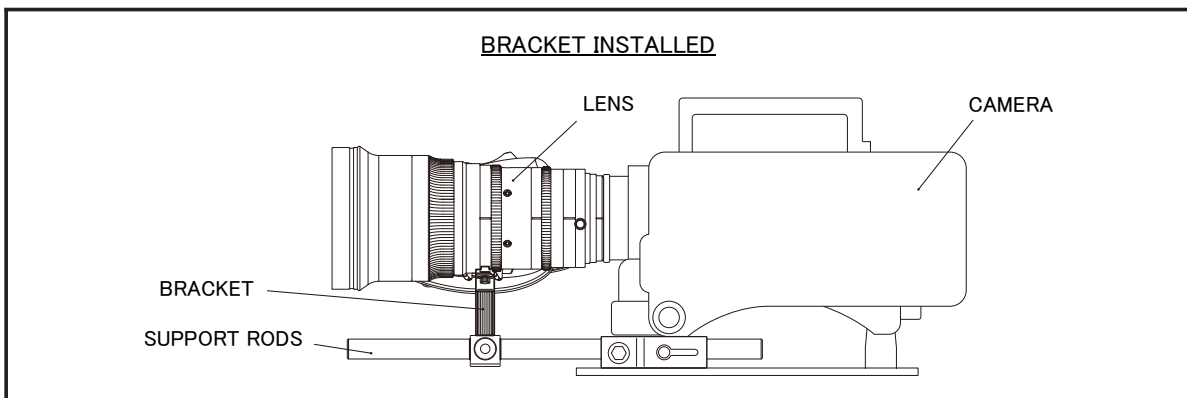
Note. Prior to installation of the lens, turn off the power of the camera and, if used, the external power source.

⚠ WARNING Be sure to attach all the parts securely.
Dropping any parts from a height may cause severe accidents.



- Take the rear lens cap off.
- Rotate the mount clamp ring on the camera fully counterclockwise.
- Fit the mounting surface of the lens to that of the camera, aligning the pin on the camera with a slot in the lens. (The position of the pin depends on the model of the camera.)
- Rotate the mount clamp ring fully clockwise.

Note. Make sure to adjust the flange focal length when installing the lens on a camera for the first time or installing it on another camera (refer to page 5).



ADJUSTMENT OF FLANGE FOCAL LENGTH

The flange focal length is the distance from the flange (mounting surface) of a lens to the focal plane.

Depending on the camera or conditions such as ambient temperature, there may be a case where the back focus is changed.

If this occurs, perform the adjustment according to the following procedure.

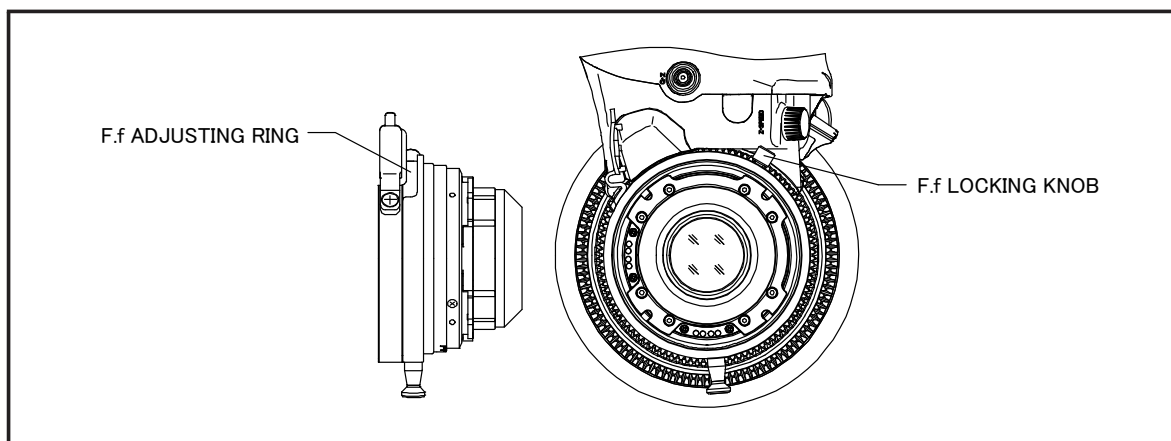
■ CONDITIONS OF OBJECT AND DIAPHRAGM

1. Object cut out the “Siemens Star” chart at the back of this manual and use it as the object
2. Distance of Object about 3 meters
3. Diaphragm open or as near to open as possible

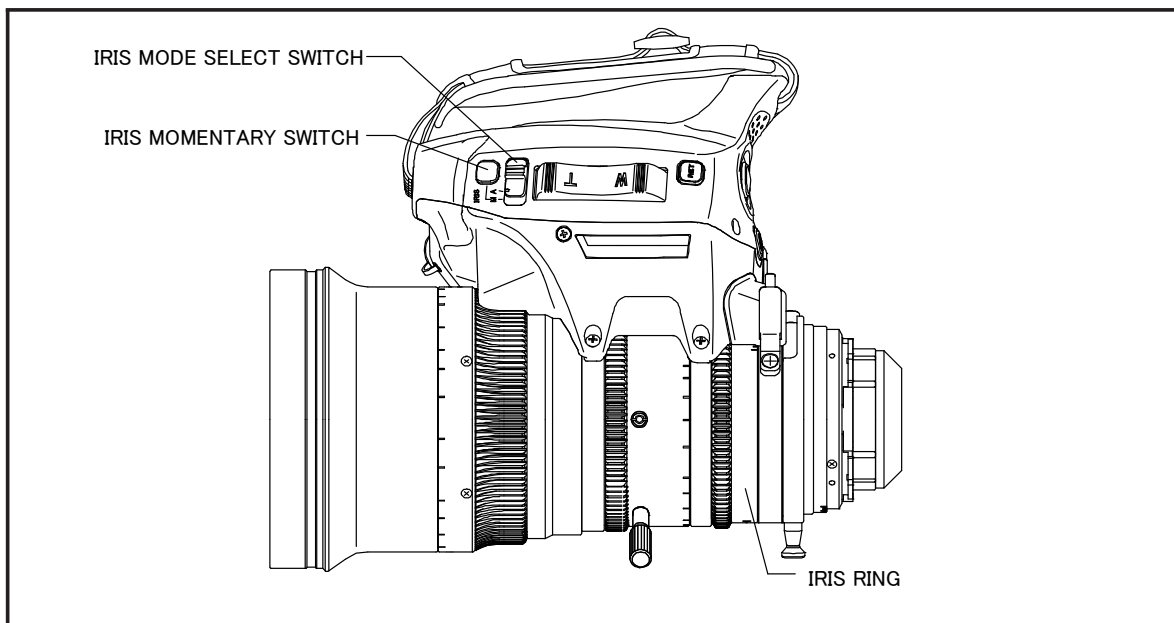
■ ADJUSTMENT

For the operation of focus and zoom, refer to pages 7 and 8.

- a. Loosen the F.f locking knob by rotating it counterclockwise.
- b. Operate the zoom to set it to the wide end.
- c. Rotate the F.f adjusting ring using the F.f locking knob to focus on the Siemens Star located approximately 3 meters away.
The position where the radial black and white lines become sharpest is the optimum focus position.
- d. Operate the zoom to set it to the telephoto end.
- e. Operate the focus to bring the object into focus.
- f. Operate the zoom to set it to the wide end again, and check that the optimum focus position adjusted in step ‘c’ is kept.
- g. To adjust precisely, repeat the above steps ‘b’ through ‘f’ several times.
(If the most optimum focus position usually holds in all zoom areas, the flange focal length is adjusted precisely. If it is not focused, the flange focal length is not adjusted sufficiently. In this case, start adjusting again from step ‘b.’)
- h. Finally tighten the F.f locking knob firmly.



IRIS OPERATION



There are two iris operation modes: auto iris mode and manual mode.
For the operating instruction in each mode, refer to the description on each mode.

Note. The auto iris mode only operates if the camera supports this mode. (The auto iris mode may not function normally due to the compatibility with the camera. In that case, use the manual mode.)

■ AUTO IRIS MODE

Set the iris mode select switch to “A.” The iris of the lens will automatically be adjusted responding to the object brightness.

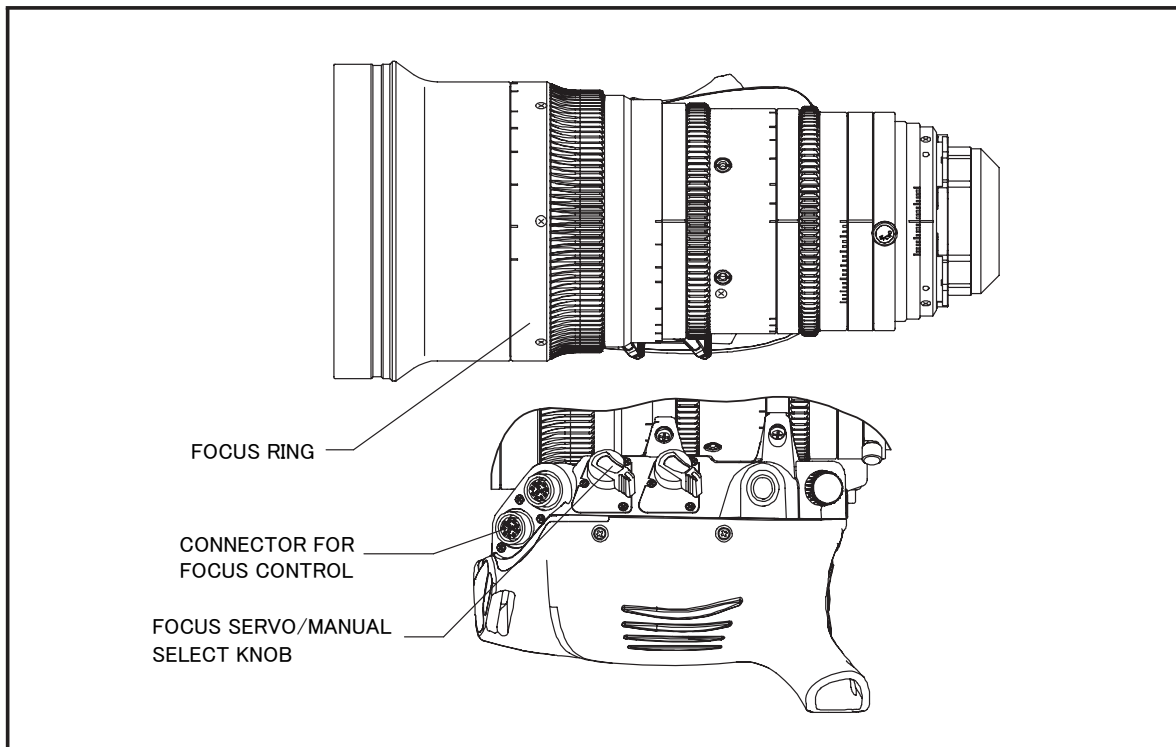
■ MANUAL MODE

- a. Set the iris mode select switch to “M.”
- b. Rotate the iris ring by hand to adjust the iris. Clockwise rotation of the ring causes the iris to move toward the closed side and counterclockwise rotation toward the open side.

Note 1. Although the iris operation mode is in Manual, the iris is adjusted automatically while the iris momentary switch is being pressed.

Note 2. The positions of the auto iris mode and the manual mode in the iris mode select switch can be interchanged by setting the iris A-M position change switch (refer to page 15) to ON.
When the positions are interchanged, apply the mode indication label, enclosed with the lens, onto the mode indication part of the lens so as not to cause confusion.

FOCUS OPERATION



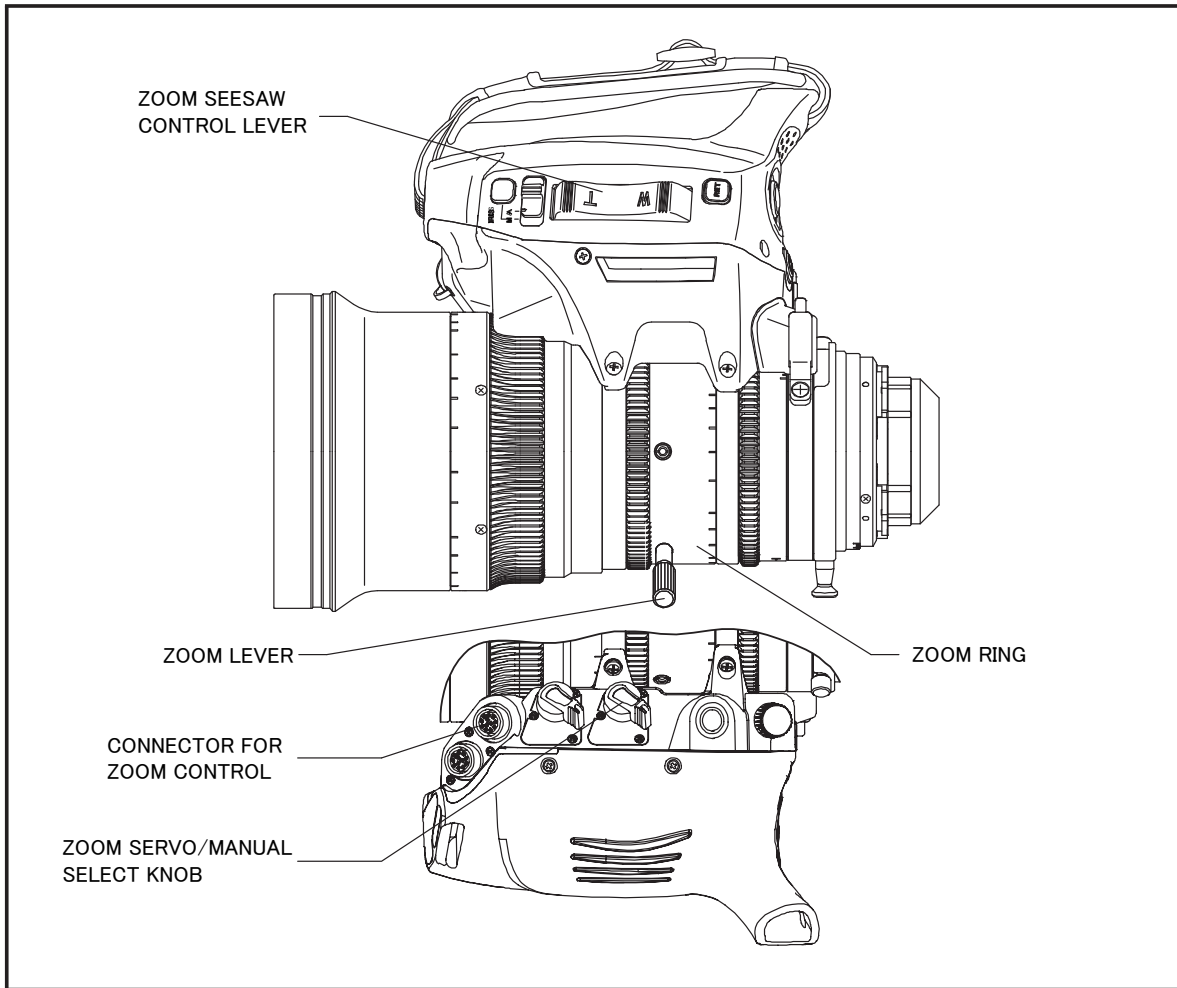
Focusing can be done by directly rotating the focus ring by hand.

Rotate the focus ring clockwise from the camera side to focus on an object on the near side.

The remote control operation is also available with optional accessories.

Set the focus servo/manual select knob to "S," when using a servo control accessory.

ZOOM OPERATION



The zoom can be operated in the following four operation modes.

	Page
(1) Manual Operation	9
(2) Operation by Zoom Seesaw Control Lever.....	9
(3) QuikZoom Operation.....	10
(4) Auto Cruising Zoom Operation	11

For the operating instruction in each mode, refer to the description on each mode.
The remote control operation is also available with optional accessories.

(1) Manual Operation

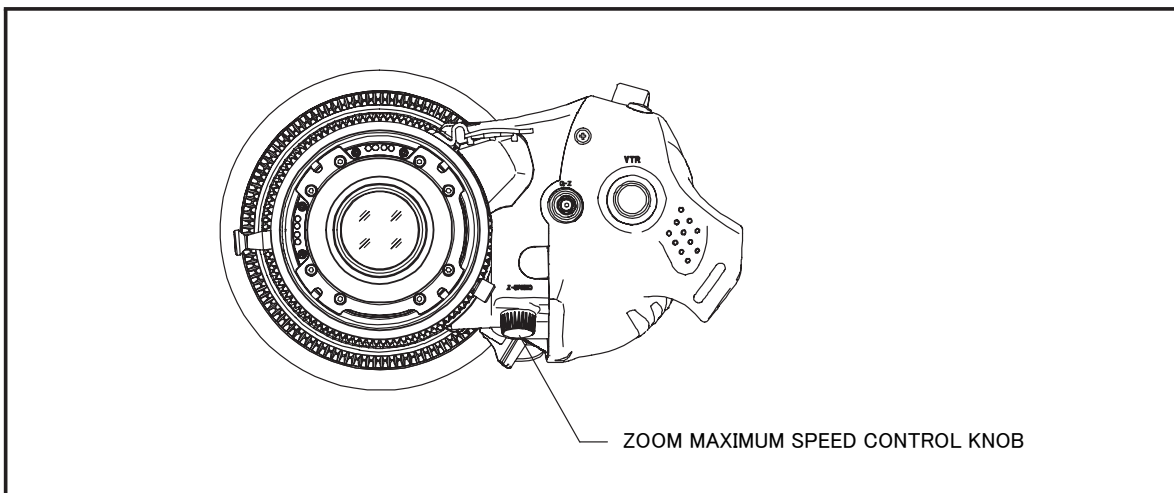
- a. Set the zoom servo/manual select knob to “M.”
- b. Rotate the zoom ring directly or using the zoom lever. Clockwise rotation of the zoom ring, viewed from the camera side, moves the zoom to the wide side, and counterclockwise rotation to the tele side. (When rotating the zoom ring directly, it is recommended to remove the zoom lever for smooth operation.)

(2) Operation by Zoom Seesaw Control Lever

- a. Set the zoom servo/manual select knob to “S.”
- b. Press the zoom seesaw control lever.
Press T-side of the lever to zoom to the tele side, and the W-side to zoom to the wide side.
For the speed control, adjust the strength to press the lever.
Pressing the lever deeply makes the zoom speed faster, and shallowly makes slower.

<Control of Zoom Maximum Speed>

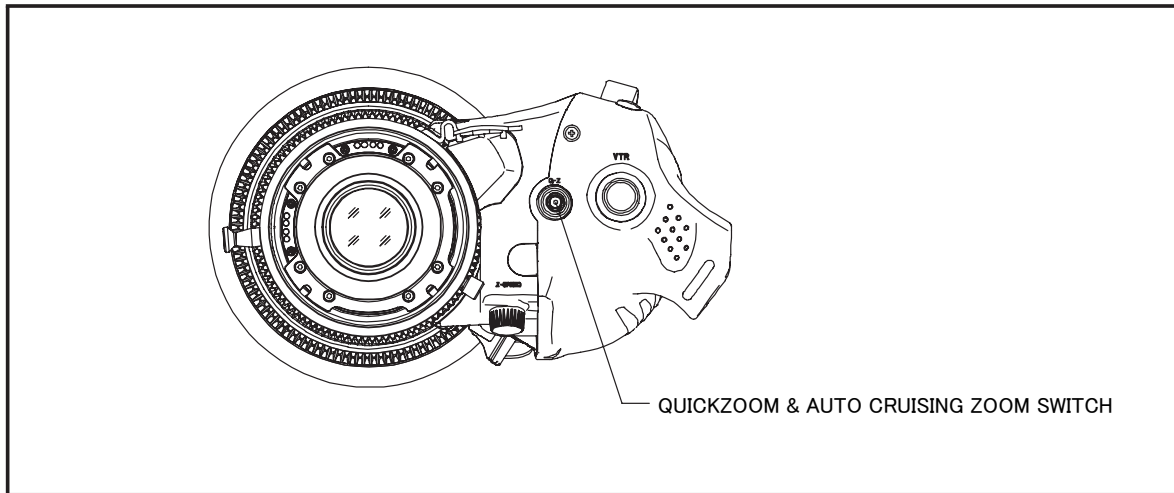
By means of the zoom maximum speed control knob (see the illustration below), the zoom maximum speed can be changed in seven steps. Rotate the knob clockwise to increase the speed.



(3) QuickZoom Operation

In quickzoom operation, pressing a switch moves the zoom to the tele end quickly. The operator can use this function in such occasions listed below.

- When rapid zooming to the tele end is required to focus on the object precisely.
- To confirm, in a moment, the composition of the image in the extreme closeup shot.



Operation

- a. Set the zoom servo/manual select knob to "S."
- b. Keep pressing the quickzoom & auto cruising zoom switch until the zoom reaches the tele end.
- c. While pressing the quickzoom & auto cruising zoom switch, perform precise focusing or confirm the composition of the image in the extreme closeup shot.
- d. Release the quickzoom & auto cruising zoom switch.
 - The zoom will move to its former position quickly.

(If you press the quickzoom & auto cruising zoom switch again before the zoom returns to its former position, the quickzoom movement restarts. After this operation, if the switch is released, the zoom will move to its former position quickly.)

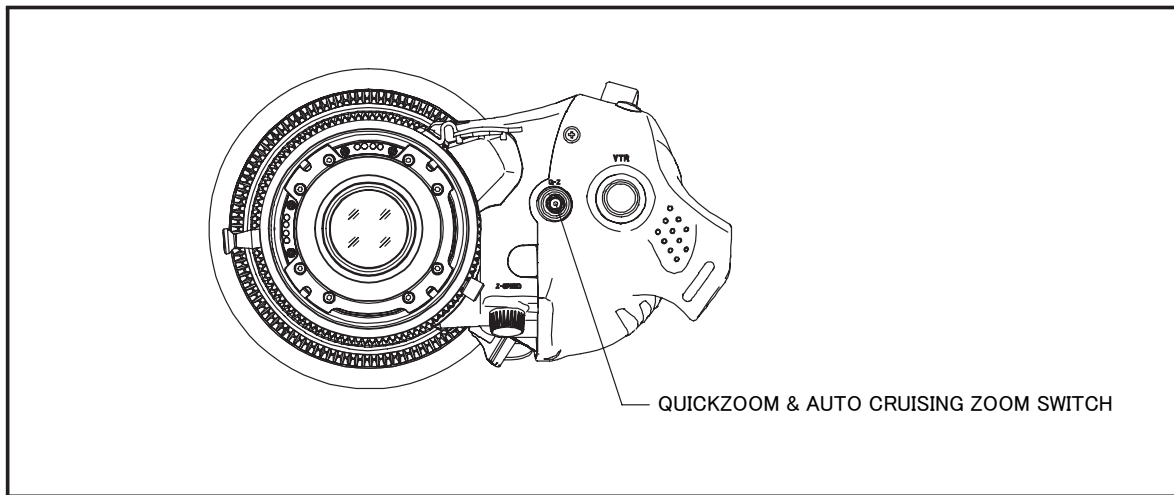
Note 1. By setting an appropriate switch in the area of "Function & Mode Select Switches" (see page 15), the return switch and the VTR switch can be used also as a quickzoom & auto cruising zoom switch.

Note 2. In quickzoom operation, the zoom moves at the maximum speed irrespective of the setting position of the zoom maximum speed control knob.

Note 3. If you press the quickzoom & auto cruising zoom switch while pressing the zoom seesaw control lever, the zoom moves in auto cruising zoom operation, not in quickzoom operation.

(4) Auto Cruising Zoom Operation

In auto cruising zoom operation, the zoom moves to the tele end or the wide end at a constant speed. This function is effective when a constant slow zoom speed is required across the zooming range.



Operation

- a. Set the zoom servo/manual select knob to “S.”
- b. Press the zoom seesaw control lever and adjust the zoom speed.
- c. While pressing the zoom seesaw control lever, press the quickzoom & auto cruising zoom switch.
 - The auto cruising zoom function will work.
- d. Release your hand from the zoom seesaw control lever.
 - The zoom will move to the tele end or the wide end at a constant speed that is determined when the quickzoom & auto cruising zoom switch is pressed.

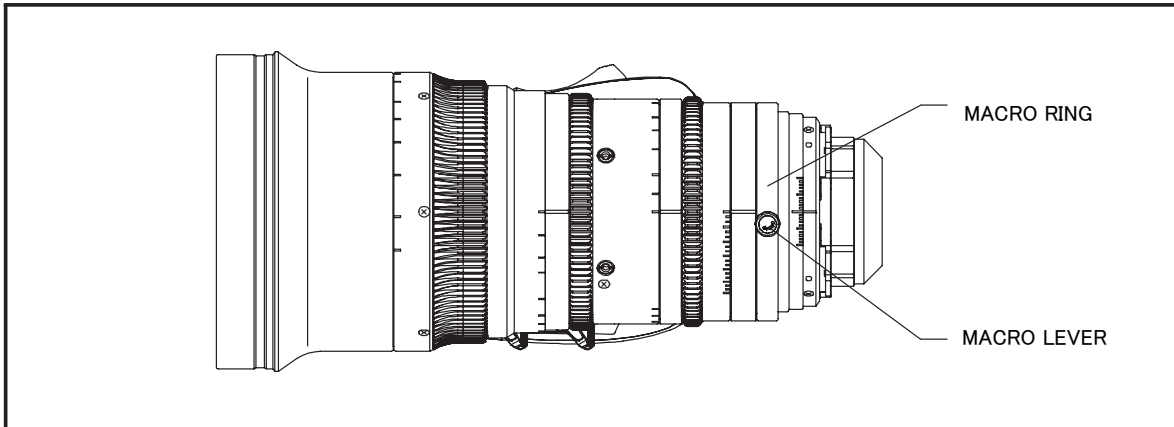
Note. By setting an appropriate switch in the area of “Function & Mode Select Switches” (see page 15), the return switch and the VTR switch can be used also as a quickzoom & auto cruising zoom switch.

Releasing

There are three ways to release the auto cruising zoom operation mode.

1. Press the zoom seesaw control lever on the side of the direction of the zoom movement.
 - When the amount of displacement of the zoom seesaw control lever exceeds that determined when the auto cruising zoom operation is set, the auto cruising zoom operation mode will be released. After released, the zoom will move continuously toward the same direction as moved before releasing. (In this way, the auto cruising zoom operation mode can be released maintaining the smooth zoom movement.)
2. Press the zoom seesaw control lever on the reverse side of the direction of the zoom movement.
 - The auto cruising zoom operation mode will be released immediately, and the zoom will move toward the reverse direction.
3. Press the quickzoom & auto cruising zoom switch.
 - The auto cruising zoom operation mode will be released immediately, and the zoom will stop.

MACRO OPERATION



Carry out the following steps for the macro operation (taking a closeup shot).

- a. Rotate the focus ring fully toward the M.O.D. side.
- b. While pulling the macro lever, rotate the macro ring fully clockwise as viewed from the camera side.
- c. Focus the lens by controlling the zoom.

Note. It is also possible to shoot an object while the macro ring is in an intermediate position. In this case, the values of the M.O.D. and the object area at M.O.D. are those of between a normal and a closeup shot.

■ PROCEDURE TO CANCEL

Rotate the macro ring counterclockwise until the macro lever automatically returns to its original position.

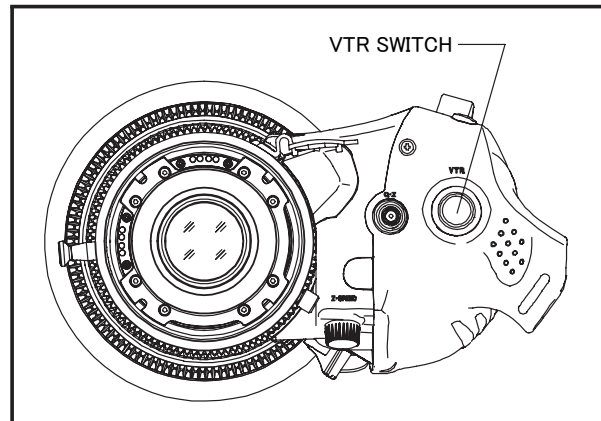
OTHER FUNCTIONS

■ VTR Switch

Note. The VTR switch operates only when the camera supports the function of the switch.

Operation of this switch starts or stops the VTR linked to the camera.

Note. If the setting of the function & mode select switches is properly arranged, this switch works as a quickzoom switch or a quickzoom & auto cruising zoom switch. (refer to page 15)

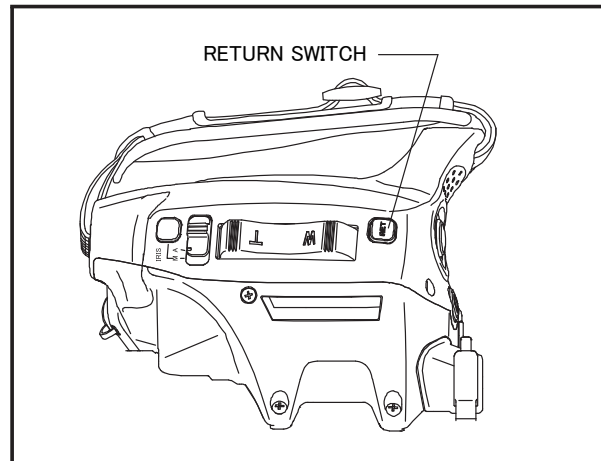


■ Return Switch

Note. The return switch operates only when the camera supports the function of the switch.

While pressing this switch, the return video picture can be seen through the viewfinder of the camera.

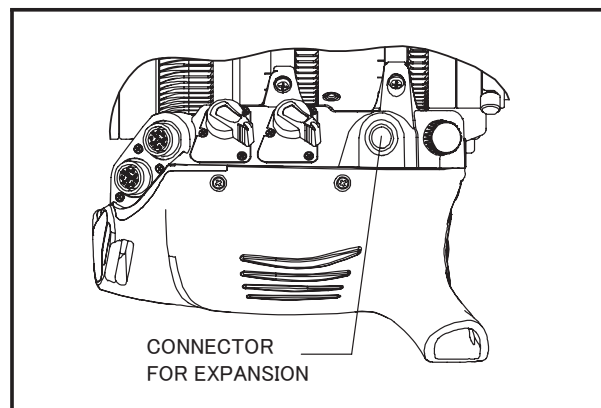
Note. If the setting of the function & mode select switches is properly arranged, this switch works as a quickzoom switch or a quickzoom & auto cruising zoom switch. (refer to page 15)



■ Connector for Expansion

This connector can be used in two applications listed below.

- (1) To control the lens from a personal computer.
- (2) To use the lens in a virtual studio system. (This connector outputs encoder signals.)

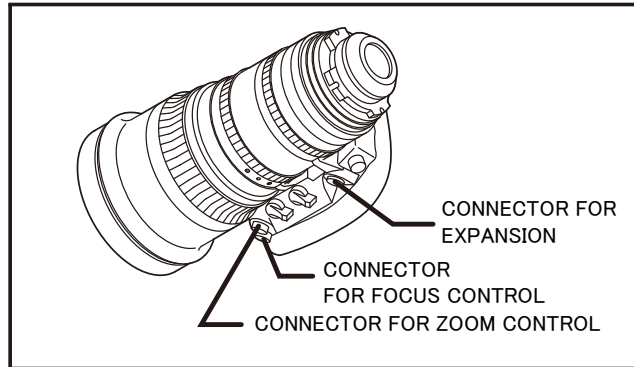


■ Data Interface (ARRI LDS, Cooke /i)

This lens supports both “ARRI LDS” and “Cooke /i” metadata interface with the camera. The choice of which metadata interface can be selected by setting the “LDS, /i select dip switch” (refer to page 15).

CONNECTOR PIN ASSIGNMENTS

The connector pin assignments and functions are listed below.



■ CONNECTOR FOR FOCUS CONTROL

HR10G-10R-12S (HIROSE)



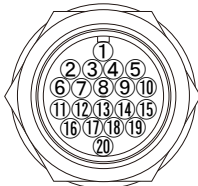
	SIGNAL	
1	+V	(+12V DC)
2	GND	GND
3	COM+V	(7.5V DC)
4	COM (5.0V DC)	(5.0V DC)
5	COM-V	(2.5V DC)
6	FOCUS DEMAND DETECT	(ANALOG DEMAND= +12V , DIGITAL DEMAND = 5V)
7	FOCUS CONTROL	(Far = 7.5V , Near = 2.5V) / RS485 B
8	FOCUS POSITION	(Far = 2.5V , Near = 7.5V) / RS485 A
9	RESERVED	
10	N.C.	
11	N.C.	
12	N.C.	

■ CONNECTOR FOR ZOOM CONTROL HR10G-10R-12S (HIROSE)



	SIGNAL	
1	+V	(+12V DC)
2	GND	GND
3	COM+V	(7.5V DC)
4	COMMON	(5.0V DC)
5	COM-V	(2.5V DC)
6	ZOOM DEMAND DETECT	(ANALOG DEMAND= OPEN , DIGITAL DEMAND = 5V)
7	ZOOM CONTROL	(WIDE = 7.5V , TELE = 2.5V) / RS485 B
8	ZOOM POSITION	(WIDE = 2.5V , TELE = 7.5V) / RS485 B
9	VTR SW	
10	VTR SW COM	
11	RET SW	
12	RET SW COM	

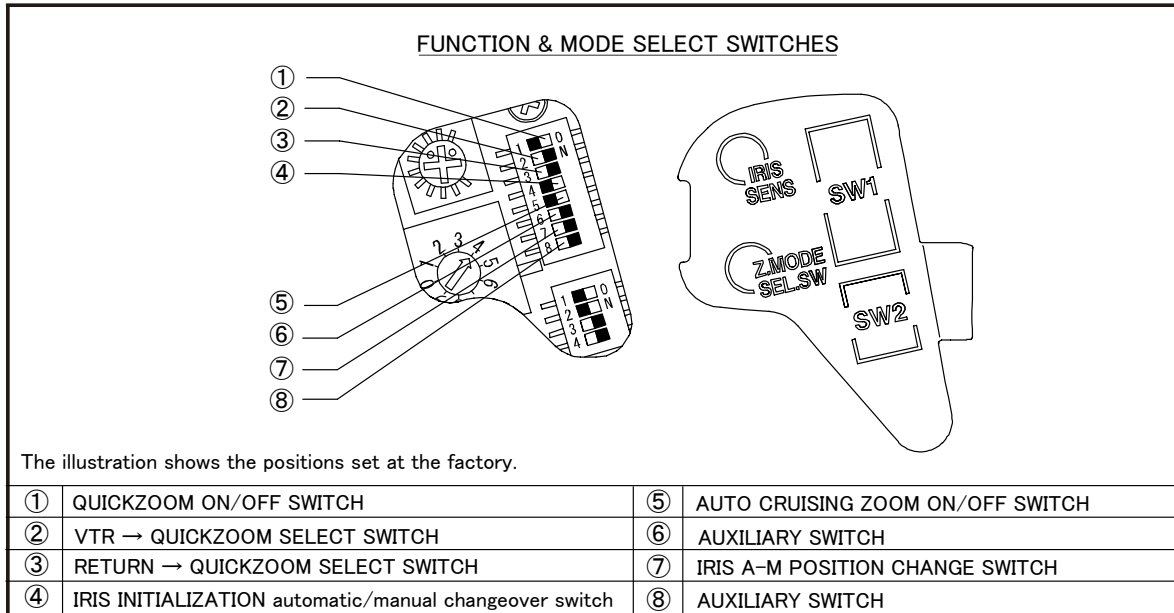
■ CONNECTOR FOR EXPANSION HR25-9R-20S (HIROSE)



	SIGNAL	
1	+V	(+12V)
2	GND	
3	TxD	(RS-232C)
4	+5V	(1kΩ)
5	DTR	(RS-232C)
6	DSR	(RS-232C)
7	RxD	(RS-232C)
8	IRIS CONTROL	(F2.8 = 6.2V / F16 = 3.4V)
9	VTR SW	OFF=OPEN / ON=0V
10	RET SW	OFF=OPEN / ON=0V
11	IRIS POSITION	F2.8=6.2V / F16=3.4V
12	IRIS AUTO/REMOTE	AUTO=0V / REMOTE=5V
13	ZOOM POSITION	WIDE=2V / TELE=7V
14	EXT SIGNAL	× 2=L (< 0.5V)
15	TxD (カメラ)	(CAMERA)
16	ZOOM(A)	
17	ZOOM(B)	
18	FOCUS(A)	
19	FOCUS(B)	
20	RxD (カメラ)	(CAMERA)

ABOUT FUNCTION & MODE SELECT SWITCHES

The function of some switches incorporated in this lens can be changed to other functions. The function can be changed by setting switches in the function & mode select switches. The function & mode select switches are accessible by removing the round rectangular rubber cap on the front of the drive unit.



① Quickzoom ON/OFF Switch

This switch changes the function of the quickzoom & auto cruising zoom switch to ON and OFF.

② VTR → QuickZoom Select Switch

This switch changes the function of the VTR switch to that of the quickzoom switch. (The function of the VTR switch incorporated in the zoom rate demand unit or the shot box linked to this lens is also changed to that of the quickzoom switch.)

③ Return → QuickZoom Select Switch

This switch changes the function of the return switch to that of the quickzoom switch. (The function of the return switch incorporated in the zoom rate demand unit or the shot box linked to this lens is also changed to that of the quickzoom switch.)

④ IRIS INITIALIZATION Automatic/Manual Changeover Switch

This switch switches the mode (automatic or manual) of the iris initialization to be performed when the power supply is turned on. This switch functions as follows, regardless of the setting of the iris mode changeover switch.

- ON : Automatic
- OFF : Manual

⑤ Auto Cruising Zoom ON/OFF Switch

This switch changes the auto cruising zoom function to ON and OFF. If this switch is set to OFF, an auto cruising zoom operation cannot be performed from all the switches that are set as an auto cruising zoom switch.

⑥ Auxiliary Switch

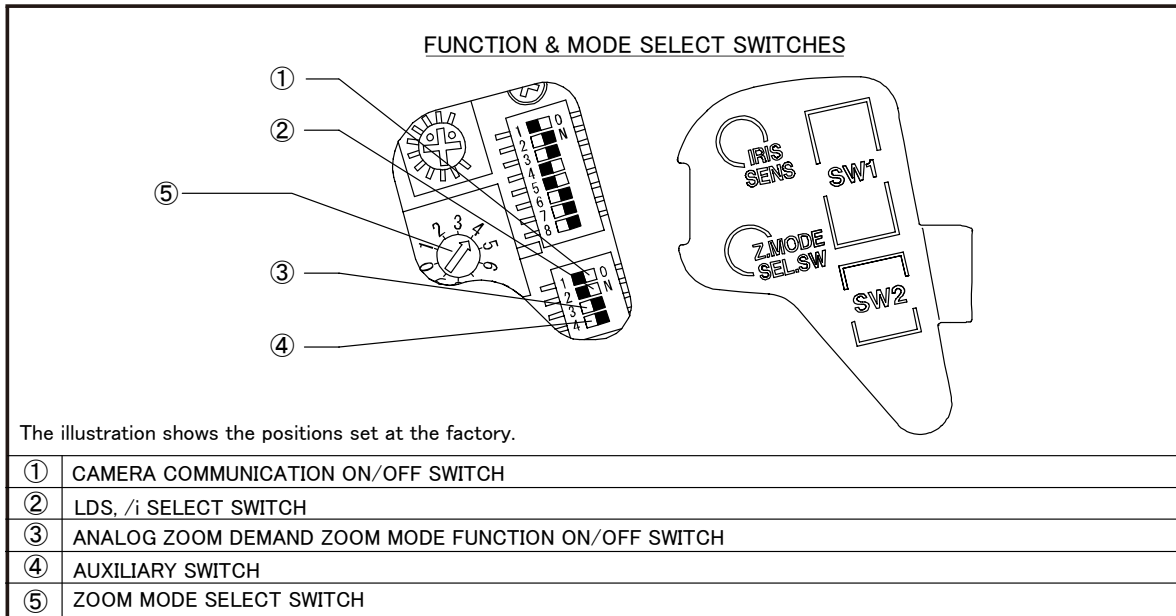
An auxiliary switch.

⑦ Iris A-M Position Change Switch

The positions of the auto iris mode and the manual mode set in the iris mode select knob can be interchanged by setting this switch.

⑧ Auxiliary Switch

An auxiliary switch.



① **Camera Communication ON/OFF Switch**

This switch changes the function of serial communication with a camera to ON and OFF.

Note. Set this switch to OFF when a malfunction occurs and it is assumed that the malfunction is caused by a serial communication failure.

② **LDS, /i Select Switch**

The choice of metadata interface with the camera can be selected from “ARRI LDS” or “Cooke /i” by setting this dip switch.

- ON : ARRI LDS
- OFF : Cooke /i

③ **Analog Zoom Demand Zoom Mode Function ON/OFF Switch**

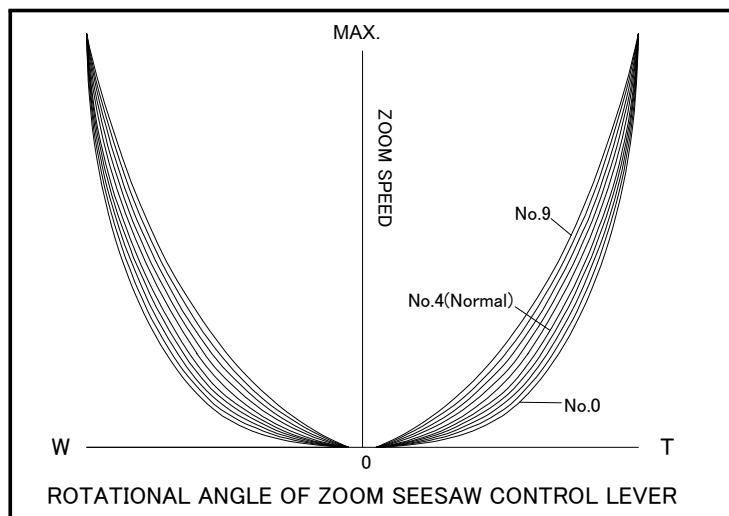
In a zoom operation with an analog zoom demand control unit, the zoom mode function (function of selecting the characteristics of “zoom speed vs zoom control signal”) can be switched to ON and OFF.

④ **Auxiliary Switch**

An auxiliary switch.

⑤ **Zoom Mode Select Switch**

The characteristics of “Zoom Speed vs Rotational Angle of Zoom Seesaw Control Lever” can be selected from ten modes. Refer to the following figure.



■ TABLE OF SWITCH FUNCTIONS

The functions of switches (return switch, VTR switch, quickzoom & auto cruising zoom switch, and iris mode select switch) can be changed to other functions by combination of the settings of the function & mode select switches. Refer to the following tables.

◎ Return Switch

Settings of Function & Mode Select Switches		Function of Return Switch
Sw1-3	Sw1-5	
RET→Quickzoom	Auto Cruising Zoom ON	
OFF	—	Return switch
ON	ON	Quickzoom & Auto Cruising Zoom switch
ON	OFF	Quickzoom switch

◎ VTR Switch

Settings of Function & Mode Select Switches		Function of VTR Switch
Sw1-2	Sw1-5	
VTR→Quickzoom	Auto Cruising Zoom ON	
OFF	—	VTR Switch
ON	ON	Quickzoom & Auto Cruising Zoom switch
ON	OFF	Quickzoom switch

◎ QuickZoom & Auto Cruising Zoom Switch

Settings of Function & Mode Select Switches		Function of QuickZoom & Auto Cruising Zoom Switch
Sw1-1	Sw1-5	
Quickzoom ON	Auto Cruising Zoom ON	
ON	ON	Quickzoom & Auto Cruising Zoom switch
OFF	OFF	Does not function
ON	OFF	Quickzoom Switch
OFF	ON	Auto cruising zoom switch

◎ Iris Mode Select Switch

Settings of Function & Mode Select Switches		Function of Iris Mode Select Switch
Sw1-7		
IRIS Position: A-M changeover Switch		
OFF		A (Auto) is hand side, M (Manual) is Lens Side. (Standard position set at the factory.)
ON		M (Manual) is hand side, A (Auto) is lens side. (Put the mode indication label enclosed with lens.)

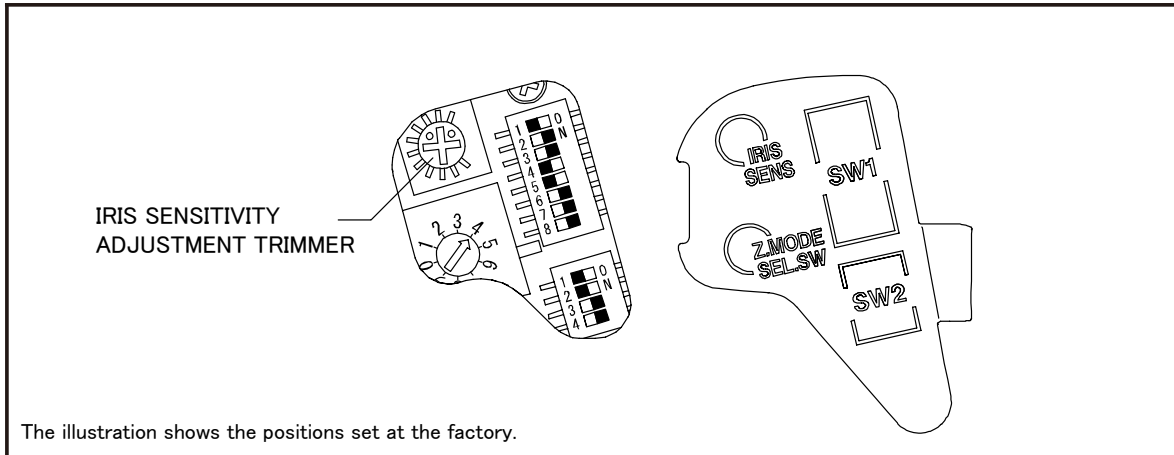
IRIS ADJUSTMENT

The Factory default setting is shown in the figure.

If for some reason an abnormality occurs, make adjustments according to the procedure described below.

The adjusting trimmer becomes visible inside the drive unit by removing the cap at the front of the drive unit.

Use a small screwdriver or similar implement to rotate the trimmer.



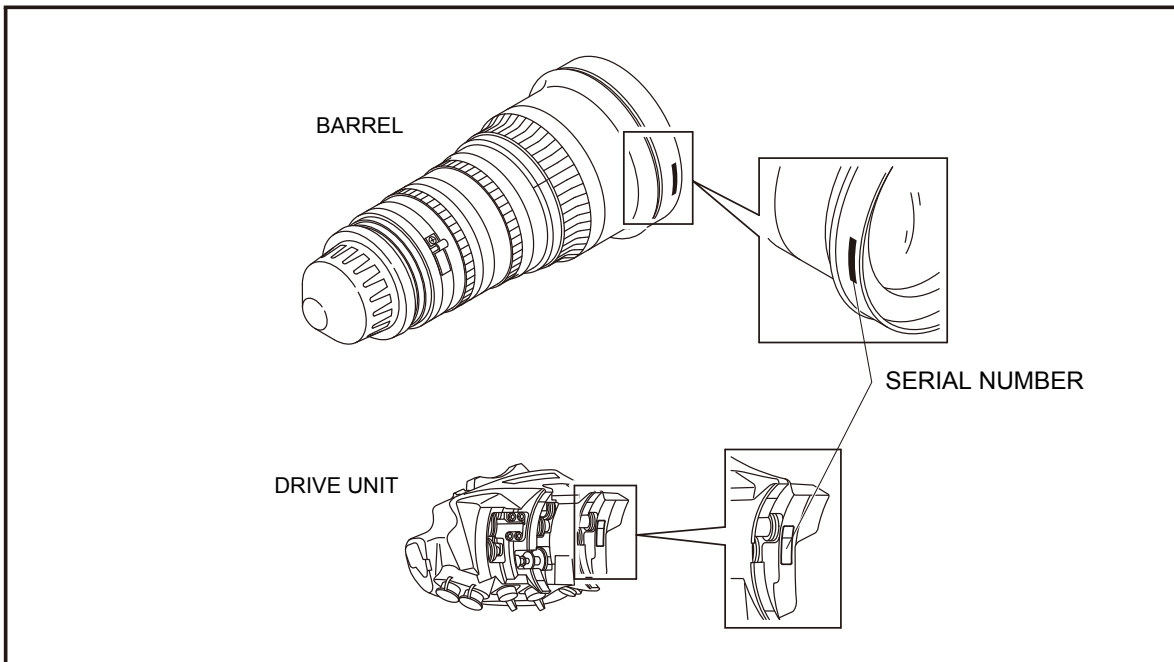
■ IRIS SENSITIVITY ADJUSTMENT

Rotate the iris sensitivity adjusting trimmer clockwise for higher sensitivity and counterclockwise for lower sensitivity. When obtaining higher sensitivity, be careful not to cause hunting.

REMOVAL AND MOUNTING OF DRIVE UNIT

The design of this lens allows the drive unit to be separated from the lens barrel (optical unit). To remove the drive unit from the lens barrel, follow the instructions in the “Removal” section (refer to page 19). Follow the instructions in the “Mounting” section (refer to page 20) to remount the drive unit.

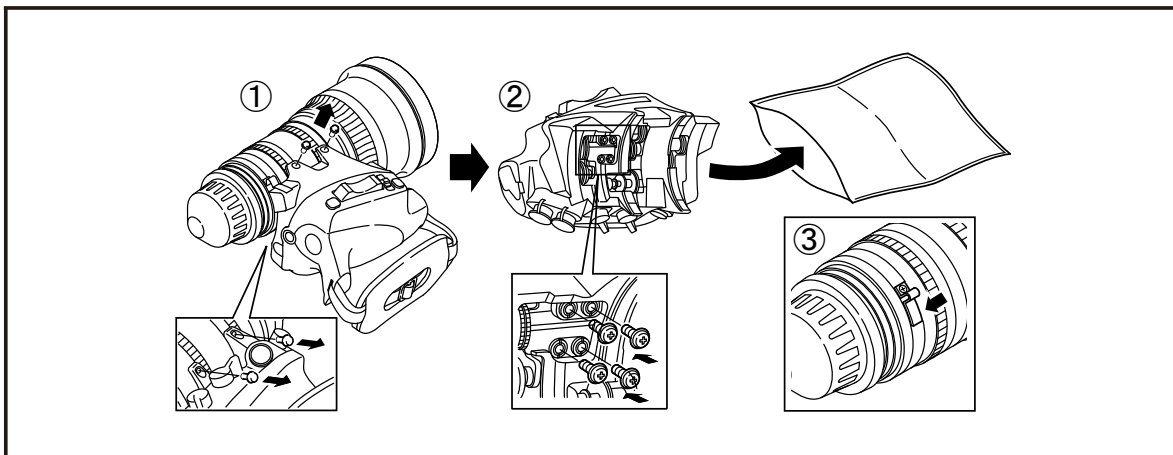
Note: Make sure that the serial numbers of the lens and drive unit match when remounting the drive unit on the lens barrel. The lens may not operate correctly if the serial numbers of the drive unit and lens barrel do not match.



■ Removal

Turn off power to the lens.

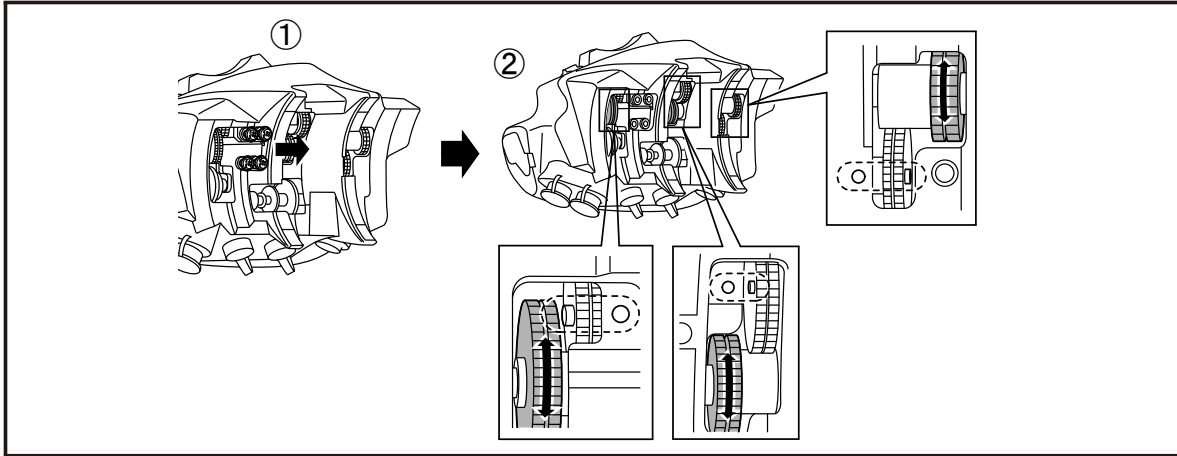
- ① Holding the drive unit, remove the four screws securing the drive unit to the lens barrel. To avoid dropping the drive unit, be sure to carefully hold it during this operation.
- ② To avoid losing the screws after removal, screw the four screws into the four storage holes in the drive unit. Place the drive unit into the accessory storage bag.
- ③ Place the protective cap on the servo connector on the side of the lens barrel.



■ Mounting

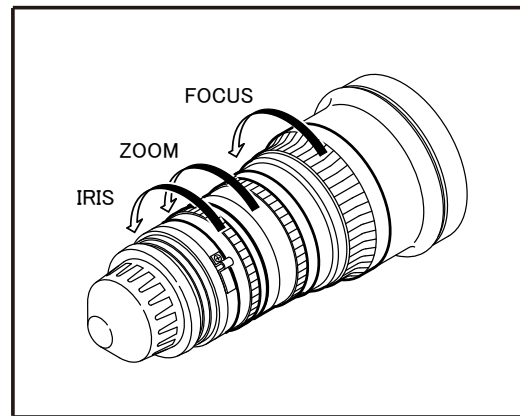
I Preparation (1)

- ① Remove the four screws from the storage holes of the drive unit.
- ② Rotate the black gears for focus, zoom, and iris, so that the protrusion on each white marked gear is aligned with the corresponding white mark next to the gear.



II Preparation (2)

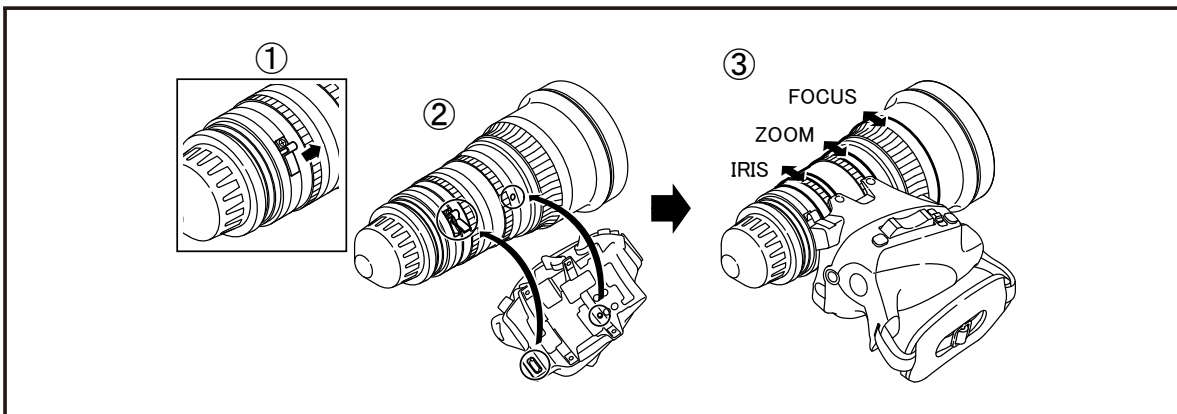
Rotate the focus to infinity, the zoom to telephoto, and the iris to wide open.



III Attaching the drive unit

Make sure the drive unit is not connected to power.

- ① Remove the cap covering the drive unit connector on the lens barrel.
- ② Align the mating connectors on the lens barrel and drive unit, insert the positioning pin of the drive unit into the positioning hole in the lens barrel, connect the two units to each other.
- ③ Keeping both units together, rotate the zoom, focus, and iris rings by two markings on each scale so that the drive unit gears and the lens barrel gears engage properly.

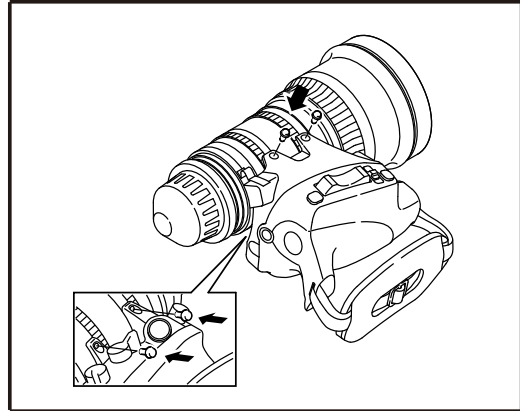


■ Mounting

IV Secure the drive unit

Keeping both units together on a stable surface, screw in the four screws to secure the drive unit to the lens barrel.

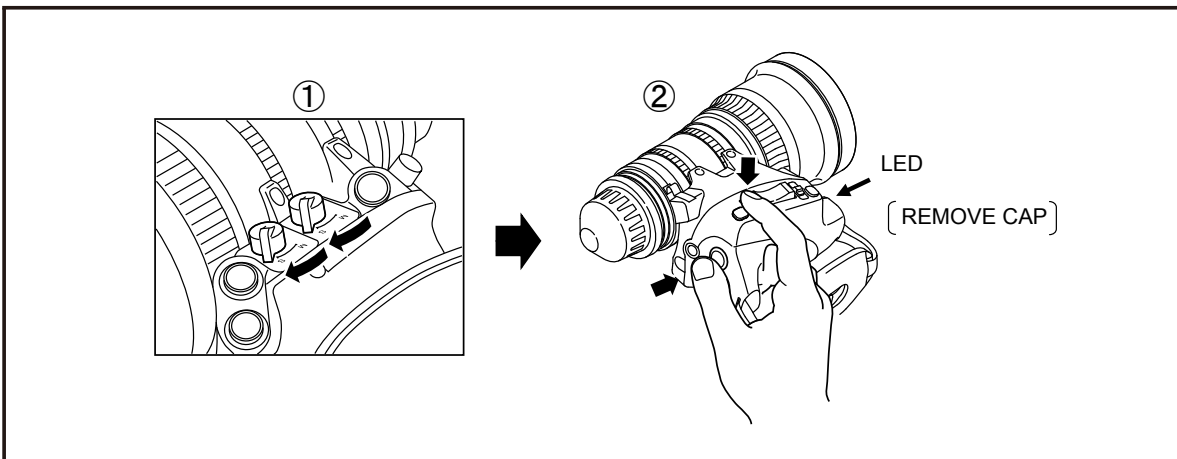
Note: DO NOT use any screws other than the original accessory screws.
DO NOT apply excessive force. A maximum torque of 80Ncm must not be exceeded.



IV Initialization

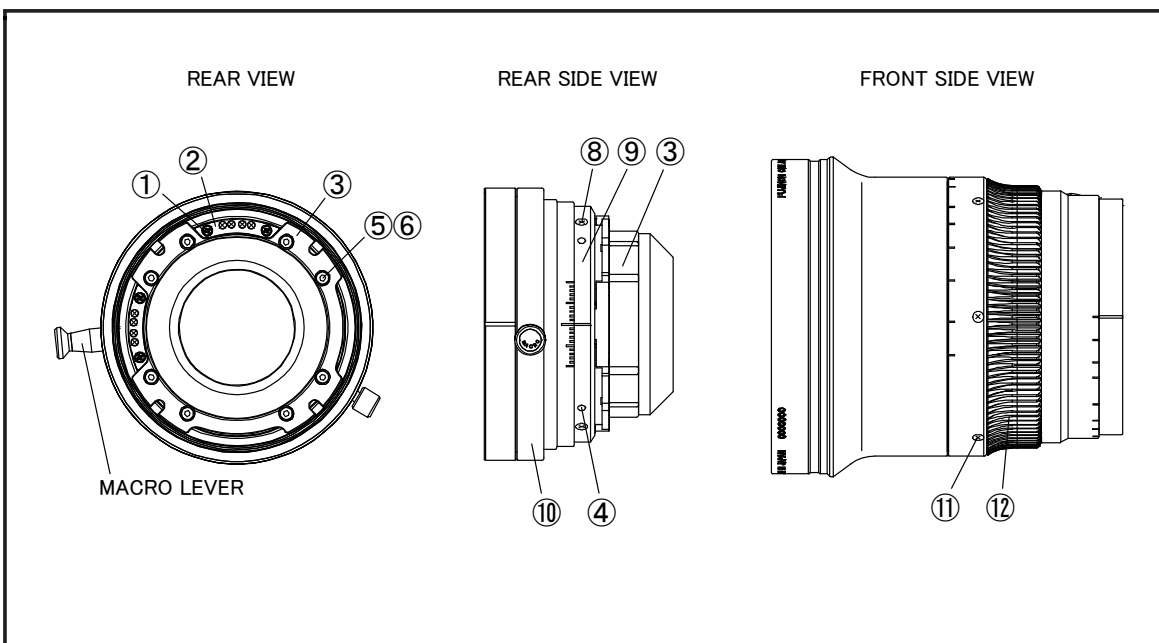
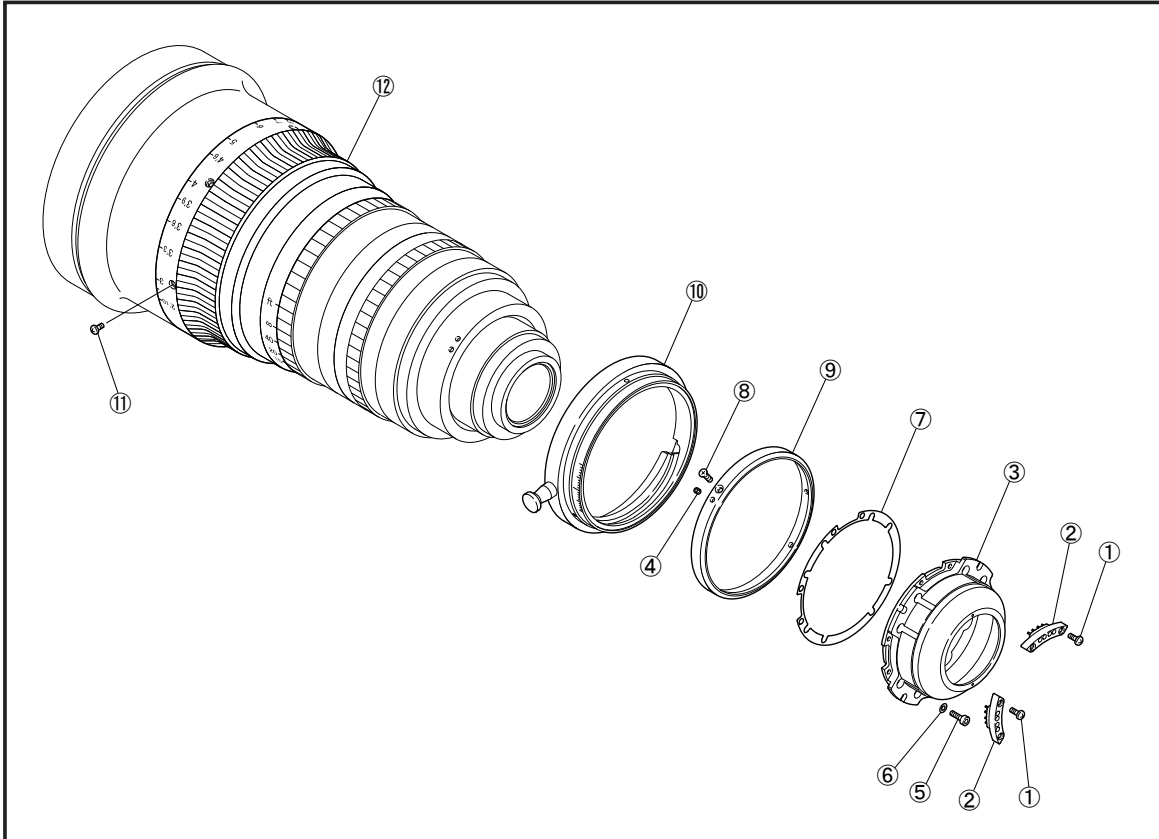
Initialize the drive unit and the lens.

- ① Set the zoom and focus servo/manual select knobs to “S.”
- ② While holding down the “VTR” and “RET” switches simultaneously, turn on power to the lens. After the zoom ring starts to move, release the switches. The LED on the front of the drive unit will light and the zoom, focus, and iris rings will rotate to initialize the lens. After the initializing program finishes, the LED will turn off.
- ③ Turn off power once, and turn on power again.



CHANGING FOCUS RING AND ADJUSTMENT OF OPTICAL AXIS

Another unit system of focus ring (meter or feet, option) is available.
 The pre-installed focus ring can be replaced with the optional focus ring.



(1) CHANGING FOCUS RING

The pre-installed focus ring can be replaced with the optional focus ring.

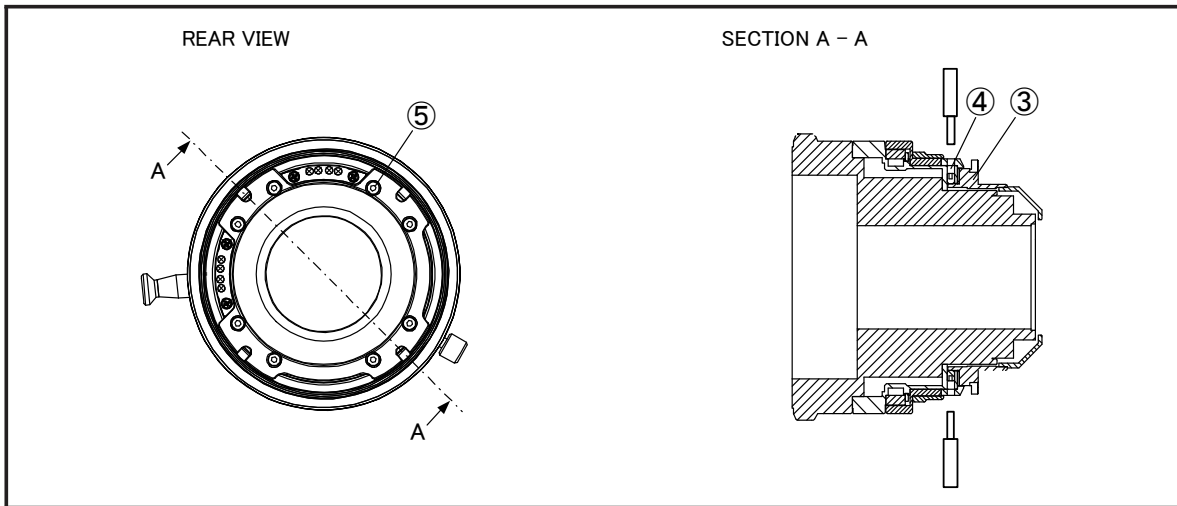
- a. Remove the drive unit. (Refer to section “Removal and Mounting of Drive Unit” on page 19.)
- b. Remove four screws ①, and detach two connectors ② from mount ring ③.
- c. Slightly loosen the adjoining two of four screws ④ for adjusting optical axis, using a hexagon screwdriver (size: 0.89 mm).
- d. Remove eight screws and eight spring washers ⑤⑥, and detach mount ring ③ and washer ⑦.
- e. Remove four screws ⑧, and detach index ring ⑨.
- f. While pulling the macro lever, rotate macro ring ⑩ clockwise as viewed from the mount ring side.
- g. While pulling the macro lever, detach macro ring ⑩.
- h. Remove six screws ⑪, and detach focus ring ⑫.
- i. Install a new focus ring ⑫ (option), and fix it with six screws ⑪.
- j. While pulling the macro lever, install macro ring ⑩ and rotate it fully counterclockwise as viewed from the mount ring side.
- k. Pressing index ring ⑨ against macro ring ⑩, install four screws ⑧.
- l. Install washer ⑦, mount ring ③, eight spring washers and eight screws ⑥⑤, and slightly tighten eight screws ⑤.
- m. Tighten two screws ④ which are loosened in step ‘c.’
- n. Tighten eight screws ⑤ to fix mount ring ③.
- o. Install four screws ① and tighten them to fix two connectors ② to mount ring ③.
- p. Mount the lens onto the camera and check that the optical axis is optimum. (Refer to section “Confirmation of Optical Axis” on the next page.) Perform adjustment if required.
- q. Mount the drive unit. (Refer to section “Removal and Mounting of Drive Unit.”)

(2) ADJUSTMENT OF OPTICAL AXIS

The alignment of the optical axes between the camera and the lens can be done as follows.

■ Confirmation of Optical Axis

- a. Set the zoom at the telephoto end. Aim the camera so that an object is located at the center of the viewfinder.
- b. Operate the zoom to the wide end. If the object at the center in the viewfinder does not move, the optical axis is optimum. If not, the optical axis is not optimum. In this case, perform "Adjustment" below.



- a. Slightly loosen eight screws ⑤ .
- b. Install the lens onto the camera.
- c. Set the zoom at the telephoto end.
- d. Aim the camera so that an object is located at the center of the viewfinder.
- e. Operate the zoom to the wide end.
- f. Confirm that the object is maintained at the center. If not, adjust four adjustment screws ④ using a hexagon screwdriver (size: 0.89 mm), so that the object is located at the center.
- g. Operate the zoom to the telephoto end, and confirm that the object is maintained at the center. (If the object is not at the center, perform steps 'c' to 'e' again.)
- h. After the adjustment is completed, detach the lens from the camera, and then tighten eight screws ⑤ .
- i. Finally, confirm that four screws ④ for adjustment of optical axis are securely tightened.

MAINTENANCE

■ CLEANING THE LENS

Prepare lens cleaning liquid and lens cleaning paper on the market.

- a. First use a soft brush or blower brush to brush dust off the surface of the lens.
- b. Fold the cleaning paper to an adequate size, and dip a part of it into the liquid. Lightly wipe the lens from the center to the periphery while drawing a spiral with the wet paper part. Repeat this operation using new paper until the lens is thoroughly cleaned.

■ REMOVING THE MOISTURE

When the lens main body is wet, first wipe the water on the external part with dry cloth immediately. Then put it together with desiccant into a vinyl bag for sealing to remove the moisture inside.

■ STORAGE

If it is assumed that the lens will not be used for a long term, store it in a place where high temperature, much moisture or corrosive gas is absent.

■ INSPECTION

If an abnormality occurs on the lens, contact the sales agent from which you purchased the lens.

To maintain the high performance for a long term for use, we recommend that a periodic inspection is conducted at least once a year.

Note that we may not be able to inspect and repair our products which have been remodeled on the user's end.

SPECIFICATION

ITEM \ LENS	ZK2.5 × 14 -SAFB/SAMB	ZK4.7 × 19 -SAFB/SAMB	ZK3.5 × 85 -SAFB/SAMB
Mount	PL Mount		
Focal Length	14 ~ 35 mm	19 ~ 90 mm	85 ~ 300 mm
Zoom Ratio	2.5 ×	4.7 ×	3.5 ×
Maximum Photometric Aperture (T No.)	T2.9	T2.9	T2.9 (85~218mm) ~T4.0 (300mm)
Iris Range	T2.9 ~ T22、Closed		
Image Format	27.45 × 15.44 mm (φ 31.5 mm) Aspect Ratio 1.78 : 1		
Flange Focal Length (in Air)	52 mm (Adjustable Range : ±0.2 mm)		
Minimum Object Distance (from Image Plane) * [in Macro Operation]	0.6 m / 2 ft [0.33m / 13 in]*	0.85 m / 2 ft 10 in [0.37 m / 15 in]*	1.2 m / 4 ft [0.97 m / 3 ft 2 in]*
Field Angle (Hor. × Ver.)	at Wide End 88.9° × 57.8° at Tele End 42.8° × 24.9°	at Wide End 71.7° × 44.2° at Tele End 17.3° × 9.8°	at Wide End 18.7° × 10.4° at Tele End 5.2° × 3.0°
Object Area at M.O.D. (Hor. × Ver.)	at Wide End 70 mm × 394 mm at Tele End 275 mm × 155 mm	at Wide End 917 mm × 516 mm at Tele End 193 mm × 109 mm	at Wide End 274 mm × 154 mm at Tele End 79 mm × 44 mm
Clear Aperture of Lens	Front 81.12 mm Rear 26.50 mm	86.4 mm 27.86 mm	85.0 mm 34.5 mm
Lens front diameter	φ 114 mm		
Full length	231 mm	226 mm	249 mm
Focus operation angle	200°		
Zoom operation angle	120°		
Iris Control	Servo or Manual		
Zoom Control	Servo (Operation Time: 1.2 ~ 45 s) or Manual		
Focus Control	Manual (Including Motor for Servo Control)		
Input Voltage	10 ~ 36 VDC (Through "Connector to Camera") 10 ~ 30 VDC (Through "Connector for Expansion")		
Current Consumption (Quiescent) (at 12V DC) (Maximum)	200 mA (Approx.) 950 mA		
Mass (with Drive Unit) (without Drive Unit)	Approx. 2.9 kg Approx. 2.4 kg	Approx. 2.8 kg Approx. 2.3 kg	Approx. 3.1 kg Approx. 2.6 kg