Canon

BROADCAST TELEVISION LENS

DIGI SUPER 86 XS

XJ86x9.3B IE 9.3-800mm 1:1.7

OPERATION MANUAL

Read this operation manual before using the product.
Keep the manual safe so that it can be referenced when it is neede.

E

FCC REGULATIONS

※ (NOTE): This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference, when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the operation manual, may cause harmful interference to radio communications. Operation to this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at has his own expense.

- Use of shielded cable is required to comply with Class a limits in Subpart B of Part 15 of the FCC rules.

Do not make any changes or modifications to the equipment unless otherwise specified in the manual. If such changes or modification should be made, you could be required to stop operation of the equipment.

Canadian Radio Interference Regulations

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil mumérique de la class A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

CE

We, Canon Inc., in Japan and Canon Europa N. V., in The Netherlands, confirm that the **XJ86x9.3B IE** series zoom lens is in conformity with the essential requirements of EC Directive(s)

89/336/EEC, and 93/68/EEC

by applying the following standards

EN55103-1, and EN55103-02

Note:

a) Applicable Electromagnetic Environment:
E1 (Residential area)
E2 (Commercial and light industrial area)
E3 (Urban outdoors area)

b) Use of shielded cable is required to comply with limits specified by above standards.

NOTE : Above declaration is applicable to 12V DC input zoom lenses.

CE

We, Canon Inc., in Japan and Canon Europa N. V., in The Netherlands, confirm that the **XJ86x9.3B IE** series zoom lens is in conformity with the essential requirements of EC Directive(s)

73/23/EEC, 89/336/EEC, and 93/68/EEC

by applying the following standards

EN60065, EN55103-1, and EN55103-02

Note:

a) Applicable Electromagnetic Environment:
E1 (Residential area)
E2 (Commercial and light industrial area)
E3 (Urban outdoors area)

b) Park inrush current : not measured, since this unit in not directly connected to the 230V AC commercial power outlet.

C) Use of shielded cable is required to comply with limits specified by above standards.

NOTE : Above declaration is applicable to 230V AC input zoom lenses.

PREFACE

Thank you for purchasing the Canon XJ86x9.3B series TV zoom lens.
This manual explains the functions and operating instructions of the XJ86x9.3B series lens. It also describes precautions for handling the lens. Please read this document carefully before using the lens, and keep it in a safe, easy-to-access place so that you can refer to it whenever necessary.

OVERVIEW

The XJ86x9.3B lens has realized the broadcasting world's highest zoom (as of August 2000) of x86. While this lens has an extended telephoto angle focal length of 800mm (1600mm when the 2x extender is used), it can also achieve a wide angle focal length as small as 9.3mm, and is also suitable for HDTV.
It is the first field lens to use Canon's independently developed Optical Image Stabilizer (optical anti-vibration system) to hold down shaking on the screen that occurs with the slightest shake or vibration of the camera. This epoch-making product realizes high-quality video images.

CONTENTS

⚠ GENERAL SAFETY INFORMATION

Be sure to observe the safety warnings and cautions provided on the product and in this operation manual.
Failure to observe these warnings and cautions may result in injury or accident.
Read this operation manual carefully to familiarize yourself with its contents and ensure that you can operate the product properly.
Also, store this manual in a safe place where it can easily be referenced whenever necessary.

This operation manual uses the following symbols and terms to identify hazards in order to prevent accidents.

⚠ WARNING	Indicates potentially hazardous situations which, if not heeded, may result in death or serious injury to you or other persons.
⚠ CAUTION	Indicates potentially hazardous situations which, if not heeded, may result in minor or moderate injury to you or other persons, or property damage.
※ (NOTE)	Emphasizes essential information which, if not heeded, may make the product unworkable or cause it to function improperly. Helpful information for operation is also provided.

HANDLING THE PRODUCT

⚠ WARNING

1. Never allow water or other liquids to enter or be spilled on the product.
   Immediately stop using the product if water or other liquids get inside the product.
   Otherwise, fire or electric shock could result.
2. Do not stare at the sun or any other source of high-intensity light through the lens.
   Doing so could injure your eyes.

⚠ CAUTION

1. Always grasp the specified portions of the lens when transporting the lens, or when attaching or detaching it to or from the camera head.
   Otherwise, the lens may fall, possibly causing injury.
2. All mountings must be tightened securely. If any of the mountings become loose, the lens may fall, possibly causing injury.
3. Always grasp the connector itself when connecting or disconnecting the demand cable.
   Pulling on the cable portion may result in damage to the cable, such as exposure or breakage of the conductors.
   Power leaking from a damaged cable may present a fire or electric shock hazard.
4. Check periodically (for instance, every 6 months to 1 year) that all mountings are securely tightened.
   If any of the mountings become loose, the lens may fall, possibly causing injury.
5. If it becomes necessary to disassemble, modify or make adjustments not mentioned in this operation manual, contact Canon's representative or the dealer who originally supplied the lens for the proper service training.
   The lens contains high-voltage parts that may cause electric shock.

※ (NOTE)

1. Protect the lens from strong impacts or shocks. Striking or dropping the lens could damage it.
2. Since the lens is not completely waterproof, avoid directly exposing the lens to rain or snow.
   When the lens has to be used in rain or snow, provisions should be made to prevent the lens from getting wet.
3. Under dusty conditions, the lens should be mounted or dismounted with a cover placed over the mount so as to prevent dust from entering the inside.
4. Do not bring the lens from an area with a very cold ambient temperature abruptly into a warm room, as the lens may fog on the inside.
   If this happens, the lens cannot be used until the condensation clears.
   Take adequate countermeasures to ensure that condensation does not form.
5. Consult with Canon's representative before using the lens in adverse environments, such as in a chemical-laden atmosphere.

DEALING WITH ABNORMALITIES

⚠WARNING

1. Should any of the abnormalities described below occur, immediately remove the lens from the camera, then contact Canon's representative or the dealer who originally supplied the lens.
   •Smoke, unusual smell or unusual noise
   •Entry of foreign objects (including metals or liquids) inside the lens.

MAINTENANCE AND INSPECTION

⚠WARNING

1. Unplug the demand cable and remove the lens from the camera, before attempting to clean the lens. Never use flammable substances such as benzene or thinner for cleaning, as this may present a serious fire or electric shock hazard.

※ (NOTE)

1. Dust or fingerprints on the lens surface
   Gently blow or brush away dust or dirt on the lens surface using a lens blower or a soft lens brush.
   Remove any fingerprints or other stains with a soft clean cotton cloth moistened with lens cleaning fluid or lens cleaning paper (Shilbon paper, etc.).
   Gently swirl the cloth or paper over the lens surface. Start first at the center area of the lens and rub with a circular motion, then gradually shift the circle until whole lens surface has been covered.
   Be careful not to rub dust across the lens, as the lens surface may be scratched.

2. Periodic inspection
   Periodic inspection (about once a year) is recommended.
   The inspection and maintenance interval depends on the operating conditions, the frequency of use, and the environment. If required, overhaul the lens.

STORAGE

⚠CAUTION

1. Always attach the hood cap and the dust cap before storing the lens.
   Storing the lens without these caps attached may present a fire hazard due to light convergence effect.

※ (NOTE)

1. If moisture enters the lens due to mist or light rain, etc., immediately wipe away any water with a dry cloth and then seal the lens in a vinyl bag together with a dessicant (use as fresh a dessicant as possible) to completely remove the moisture from inside the lens.

OTHER

All information contained in this operation manual, as well as the attached or supplementary materials regarding the specifications, appearance, and/or product configuration, is subject to change without prior notice.
Repairs or modifications of this lens and accessories, or adjustments not mentioned in this operation manual require service manuals and training in some cases.
For further information on these adjustments, repairs or modifications, contact Canon's representative or the dealer who originally supplied the lens.

Note that if a product is modified without consulting Canon Inc. or Canon's representative, we may be unable to undertake servicing or repair of that product.

Contact:
Broadcast Equipment Group
Canon Inc.
20-2 Kiyohara Kogyo Danchi,
Utsunomiya-shi, Tochigi-ken, 321-3292, Japan

TEL: 81-(028)-667-5711
FAX: 81-(028)-667-8672

§ 1. CONFIGURATION

● Standard configuration

Lens 1
Hood cap (attached to the lens) 1
Dust cap (attached to the lens) 1
Connector cap (attached to the lens) 1
IS controller 1

● Accessories used for zooming and focusing

(1) Flexible system

Flexible zoom control unit 1
Flexible focus control unit 1
Flexible cable 2
Flexible module (built into the lens) 2

(2) Full servo system

Servo zoom demand 1
Servo focus demand 1
Servo module (built into the lens) 2

(3) Semi-servo system

Flexible focus control unit 1
Flexible cable 1
Flexible module (built into the lens) 1
Servo zoom demand 1
Servo module (built into the lens) 1

● Accessories used for specific cameras and applications (available separately)

Switch box 1
Lens supporter 1
Power module 1
Dust cover 1

※ (NOTE) : Storage environment

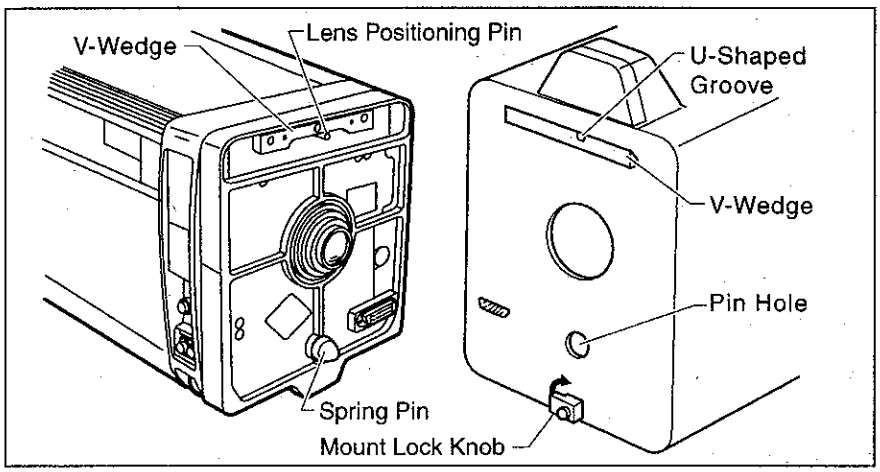
Check the following points when storing the lens.

1) Store the lens in a place that satisfies the following conditions.
   • Ambient temperature: –30˚C to 60˚C
   • Ambient humidity : 60%RH or less (no condensation)
2) Do not bring the lens, kept in a very cold ambient temperature, abruptly into a warm room, as the lens may fog on the inside or experience condensation.
3) Do not subject the lens to strong physical shock or vibration.

§2. MOUNTING AND CONNECTIONS

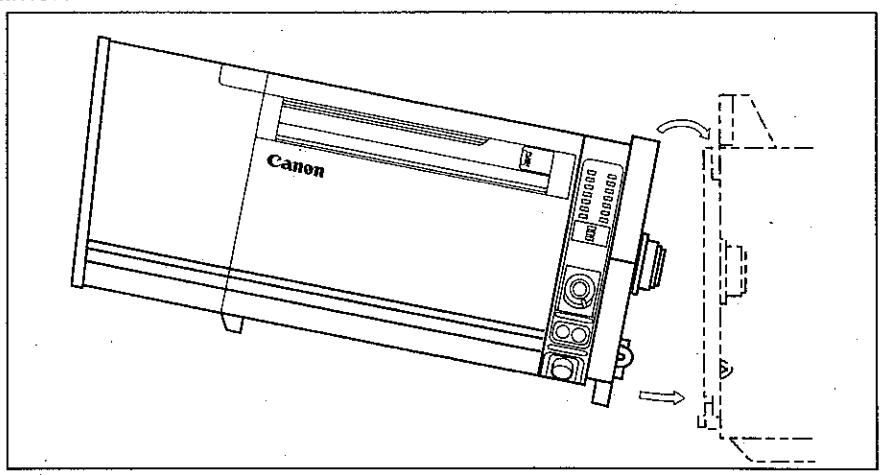
2-1. Mounting the Lens onto the Camera

1. Turn the mount lock knob 90° counterclockwise as viewed from the lens, so that the lens can be mounted to the camera.
2. Carefully holding the lens with both hands, mount it by hooking the V-wedge of the lens mount over that of the camera, with the positioning pin of the lens mount surface inserted into the U-shaped groove of the V-wedge of the camera.



⚠ CAUTION: The lens is quite heavy. When lifting the lens, use both hands to hold the grips on both sides of the lens cover, and assume the correct lifting posture. Failure to do so may cause the lens to drop, resulting in damage to the lens and/or injury.

3. Make sure that the spring pin at the bottom of the lens mount is fitted securely into the corresponding pin hole in the camera.
4. After lining up the lens correctly, press the lens toward the camera and turn the mount lock knob in the direction indicated by the arrow (see the figure above) to secure the lens to the camera.

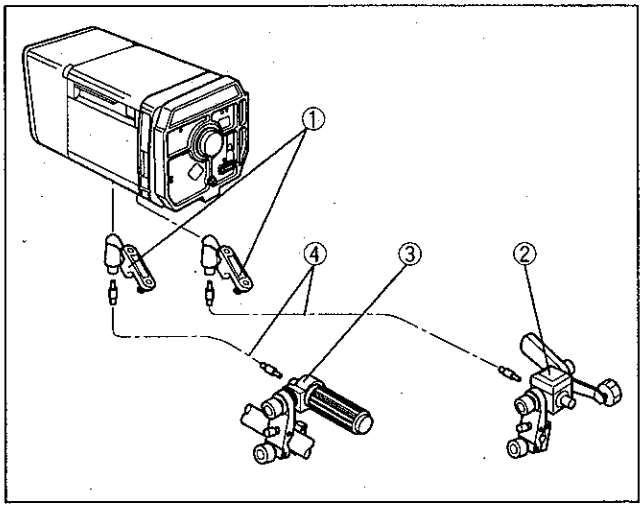


※ (NOTE): The connectors on the lens and the camera are connected automatically by performing steps 3 and 4. If an attempt is made to connect them forcibly without lining up the spring pin with the pin hole as described in step 3, the lens and camera connectors may be damaged.

2-2. Mounting the Accessories onto the Lens

A. Mounting and connecting the flexible system

○ Mount and connect the flexible zoom and focus control units as shown in the figure below. For details, see the mounting and connecting procedures described as follows.

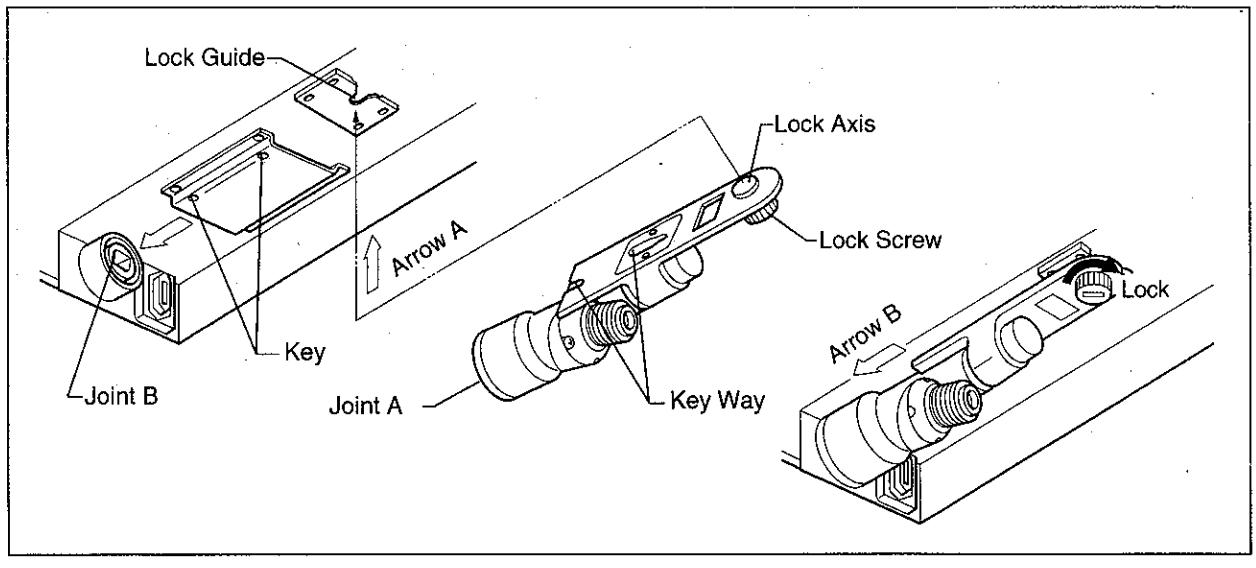


① Flexible module FMJ-452
② Flexible zoom control unit FZP-T61
③ Flexible focus control unit..... FFP-T61
④ Flexible cable

A-1. Mounting the flexible modules

1. Before mounting a flexible module to the lens, turn the lock screw of the module counterclockwise until the lock axis extends to its maximum length.
2. Press the flexible module in the direction of arrow A so that the keys on the lens are inserted in the key ways of the flexible module.
3. Mate joint A of the flexible module with joint B of the lens, then push the flexible module in the direction of arrow B until it stops.
4. Finally, turn the lock screw of the flexible module clockwise to secure the module. Use slotted screwdriver, etc., to tighten the lock knob.

※ (NOTE): The flexible modules support both zooming and focusing, so it can be mounted on either the zoom or focus side.

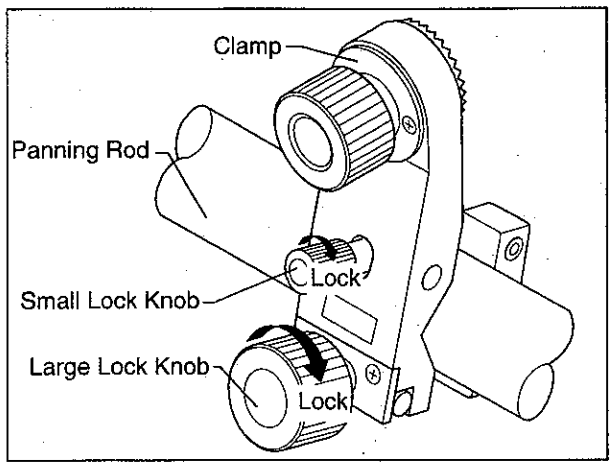


A-2. Mounting and connecting the flexible zoom control unit

Mount and connect the flexible zoom control unit as instructed below.

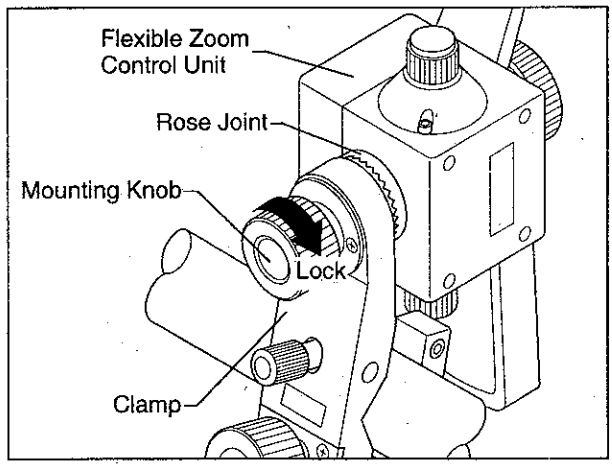
1. Loosen the large and small lock knobs of the clamp supplied with the flexible zoom control unit, then mount the clamp to the panning rod of the tripod.

2. After mounting the clamp to the panning rod of the tripod, tighten the large and small lock knobs of the clamp to secure the clamp.



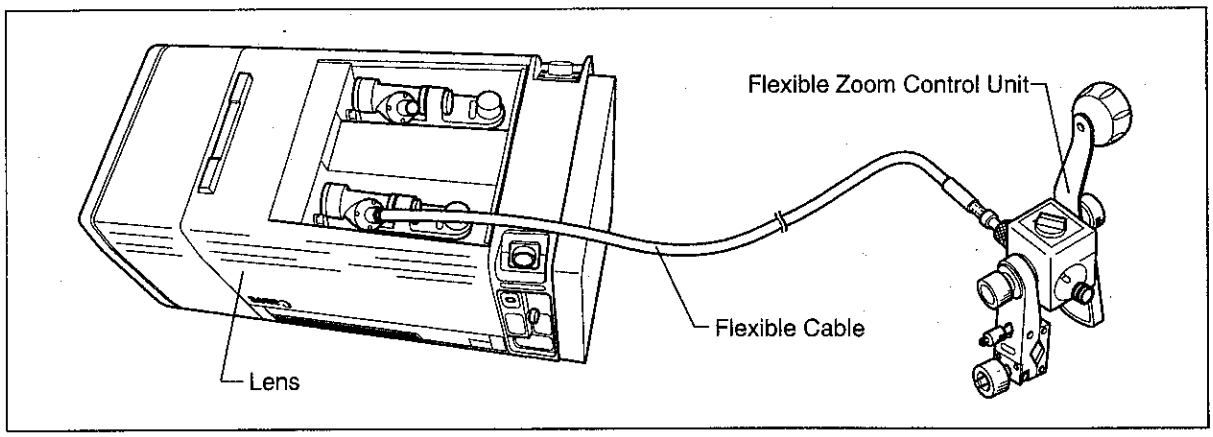
3. Mate the rose joint of the flexible zoom control unit with the rose joint of the clamp.

4. Tighten the mounting knob of the clamp to firmly secure the flexible zoom control unit.



※ (NOTE): The mounting angle of the flexible zoom control unit can be adjusted according to how the rose joints are mated.

5. Screw the flexible cable firmly into the cable connector of the flexible module mounted on the zoom side of the lens and the cable connector of the flexible zoom control unit.

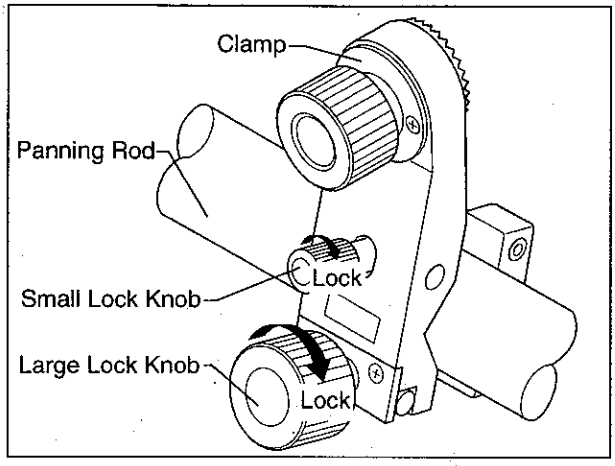


A-3. Mounting and connecting the flexible focus control unit

Mount and connect the flexible focus control unit as instructed below.

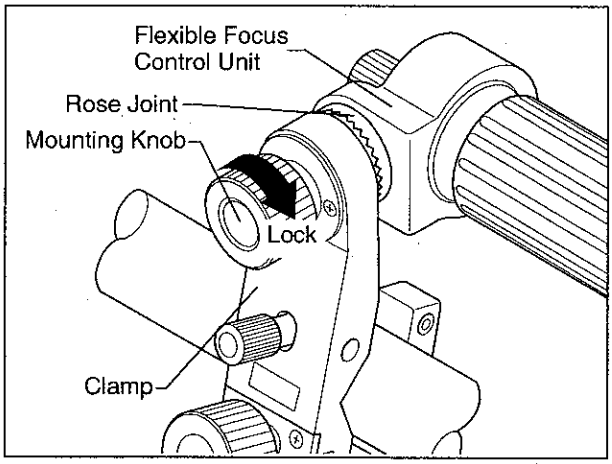
1. Loosen the large and small lock knobs of the clamp supplied with the flexible focus control unit, then mount the clamp to the panning rod of the tripod.

2. After mounting the clamp to the panning rod of the tripod, tighten the large and small lock knobs of the clamp to secure the clamp.



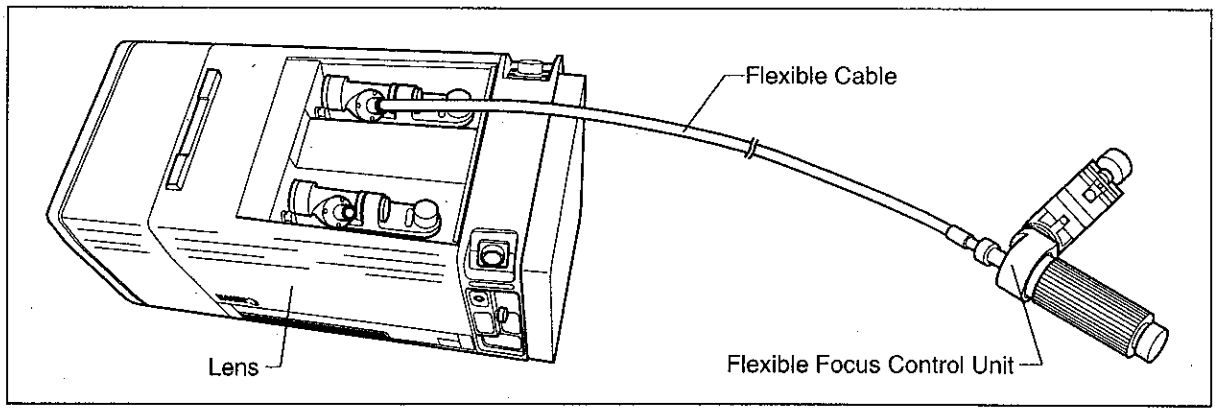
3. Mate the rose joint of the flexible focus control unit with the rose joint of the clamp.

4. Tighten the mounting knob of the clamp to firmly secure the flexible focus control unit.



※ (NOTE): The mounting angle of the flexible focus control unit can be adjusted according to how the rose joint are mated.

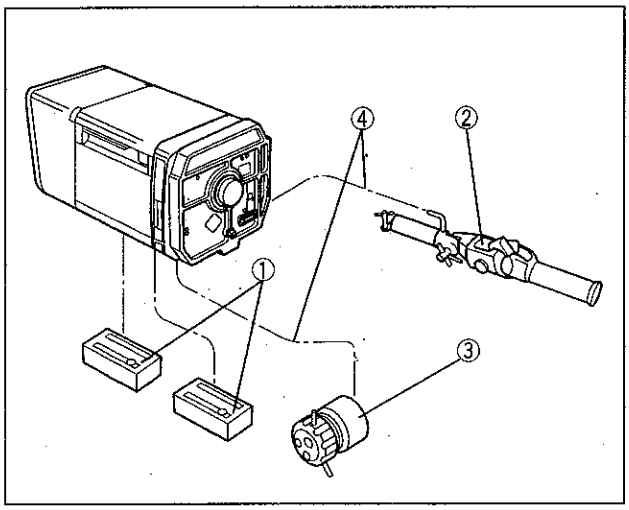
5. Screw the flexible cable firmly into the cable connector of the flexible module mounted on the focus side of the lens and the cable connector of flexible focus control unit.



B. Mounting and connecting the full servo system

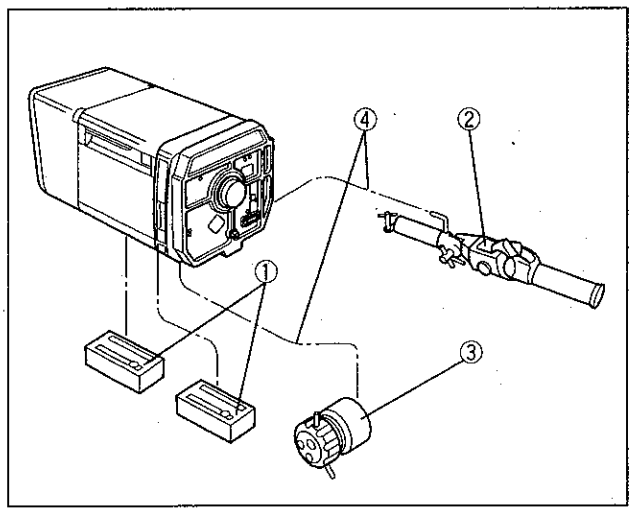
○ Mount and connect the DIGI zoom and focus servo demands as shown in the figure below.

For details, see the mounting and connecting procedures described on the following pages.



① Servo module SMJ-D01
② Servo zoom demand ZDJ-D01
③ Servo focus demand FDJ-D01
FDJ-D11
④ Demand cable

○ When not using DIGI servo demands (when using analog servo demands (ZDJ-A01, FDJ-I01, etc.)), connect the full servo system as shown in the figure below. The mounting and connecting procedures are the same as for the DIGI servo demands.

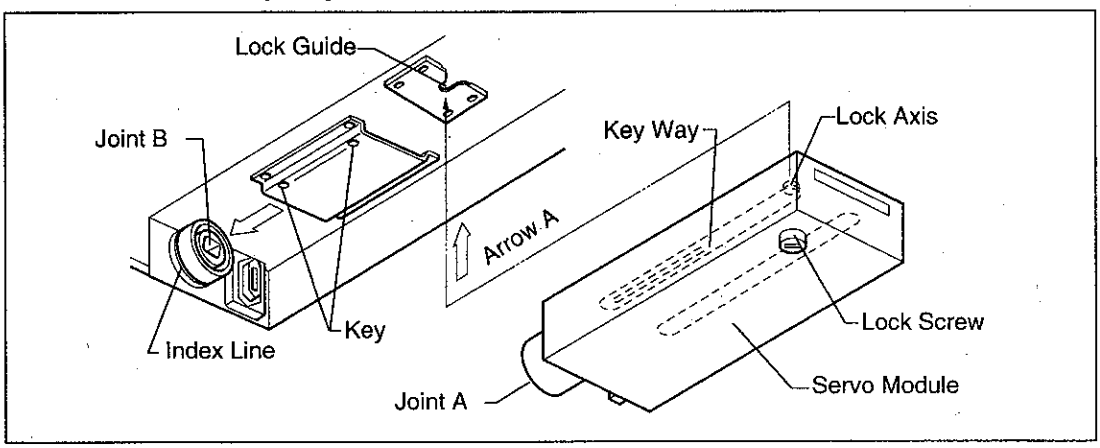


① Servo module SMJ-D01
② Servo zoom demand ZDJ-A01
③ Servo focus demand FDJ-I01
FDJ-H01
④ Demand cable

B-1. Mounting the servo modules

1. Before mounting a servo module to the lens, turn the lock screw of the servo module counterclockwise until the lock axis extends to its maximum length.

2. Press the servo module in the direction of arrow A so that the keys on the lens are inserted in the key ways of the servo module.

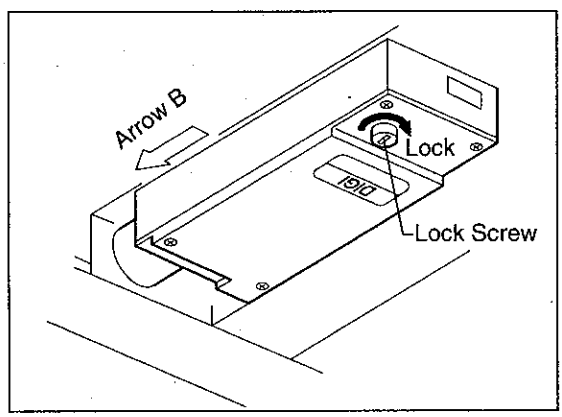


3. Mate joint A of the servo module with joint B of the lens.

4. Push the servo module in completely so that the white line (index line) on the circumference of joint B of the lens is entirely hidden.

※ (NOTE): When mating joints A and B, push the servo module in completely so that the white line on the circumference of joint B of the lens is entirely hidden. If joints A and B are not mated correctly (if the white line is not hidden), the servo module may fail to operate or it may generate abnormal noise. Before operating the servo module, confirm that joints A and B are mated correctly.

5. Finally, turn the lock screw of the servo module clockwise using slotted screwdriver, etc., to secure the servo module.



※ (NOTE): The servo modules support both zooming and focusing, so it can be mounted on either the zoom or focus side.

B-2. Mounting and connecting the servo zoom demand

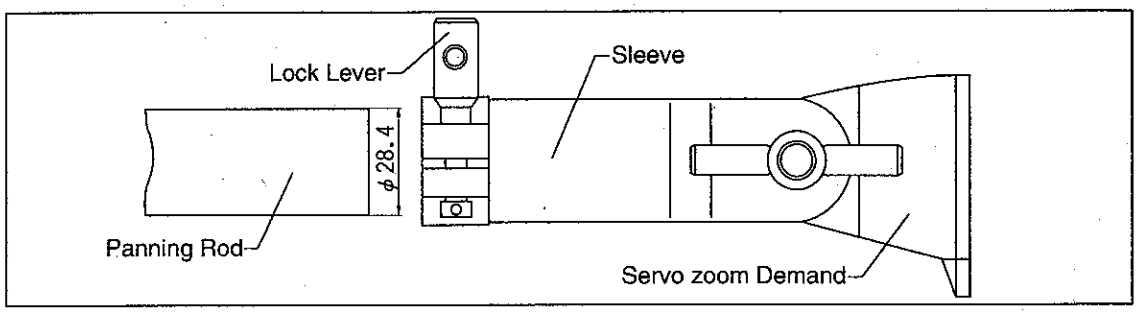
(1) Mounting the servo zoom demand

Mount the servo zoom demand by one of the following three methods.

(1)-1. For a demand that is slipped over the panning rod

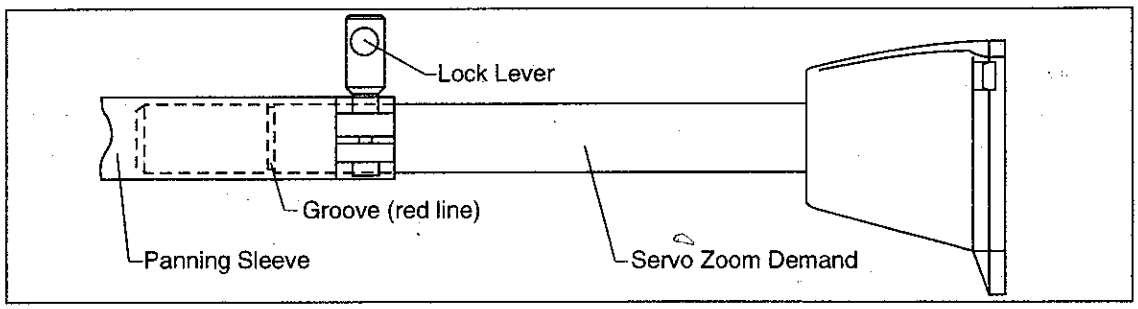
Slip the sleeve over the panning rod of the tripod until it stops, then turn the lock lever to secure the sleeve.

The applicable panning rod is 28.4mm in diameter.



(1)-2. For a demand that is inserted into the panning rod

Insert the axis at the tip of the demand into the mounting hole in the panning rod of the tripod. Then secure the demand with the lock lever on the tripod.



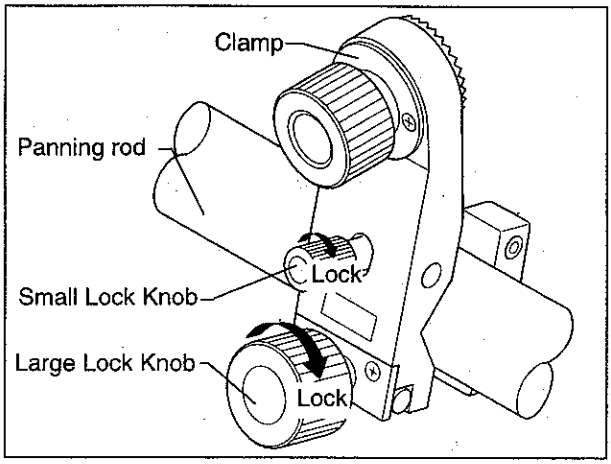
⚠CAUTION: Insert the axis at the tip of the demand completely into the mounting hole of the panning rod of the tripod, so that the groove (red line) on the axis is entirely hidden.

(1)-3. For a clamp-mounted demand

Mount the servo zoom demand as instructed below.

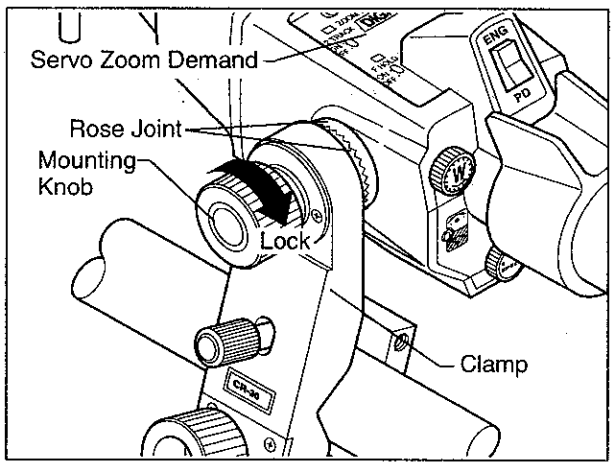
1. Loosen the large and small lock knobs of the clamp supplied, then mount the clamp to the panning rod of the tripod.

2. After mounting the clamp to the panning rod of the tripod, tighten the large and small lock knobs of the clamp to secure the clamp.



3. Mate the rose joint of the servo zoom demand with the rose joint of the clamp.

4. Tighten the mounting knob of the clamp to firmly secure the servo zoom demand.



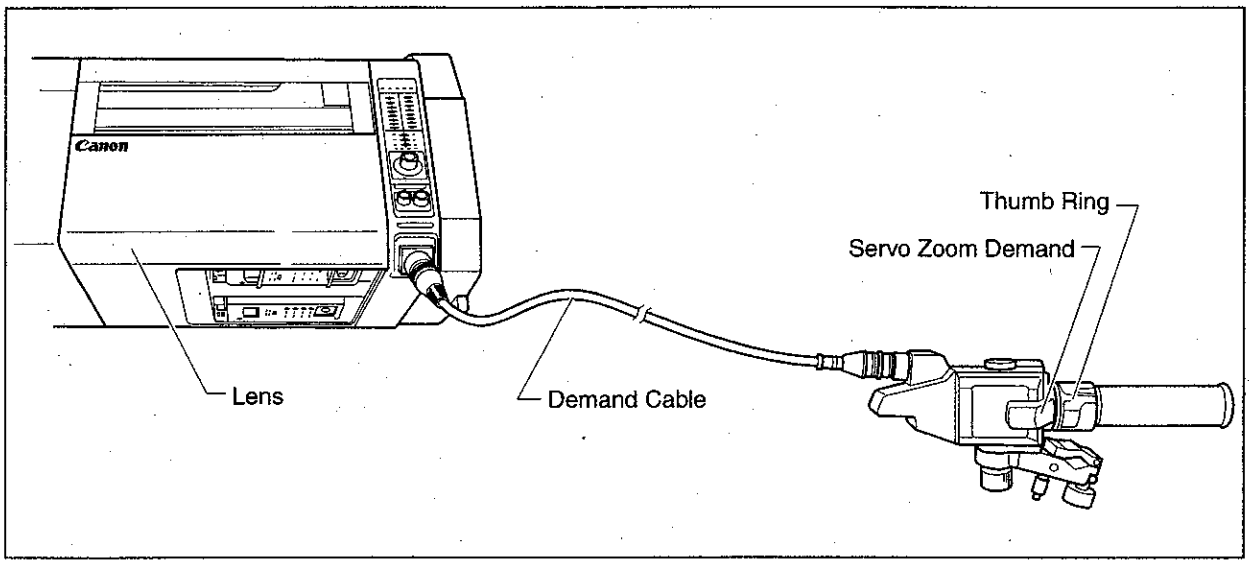
※ (NOTE): 1) The mounting angle of the servo zoom demand can be adjusted according to how the rose joints are mated.

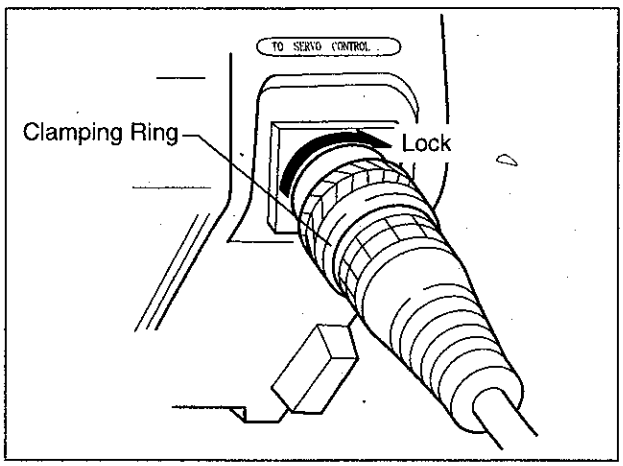
2) Clamp-mounted servo zoom demands have rose joints in three places. Mount the servo zoom demand using the rose joint that offers the easiest operation.

(2) Connecting the demand cable

1. Plug the male connector of the demand cable into the connector labeled "TO SERVO CONTROL" at the bottom rear of the lens. Plug the other end of the cable into the connector on the servo zoom demand.
2. After connecting the cable, turn the clamping rings of the connectors clockwise to securely tighten the demand cable.

※ (NOTE): Servo zoom demand can be connected to either right or left connector. Connect it that offers easieat operation.





⚠ CAUTION: When connecting the servo zoom demand, ensure that the thumb ring of the servo zoom demand has not been turned. If the thumb ring has been turned, DIGI demands may not be initialized normally, resulting in abnormal zooming.

※ (NOTE): Recovery if abnormal zooming occurs

Perform either of the following operation. Doing so results in DIGI demands being initialized normally, so that zooming can be performed normally.

- Reconnect the cable without touching the thumb ring.

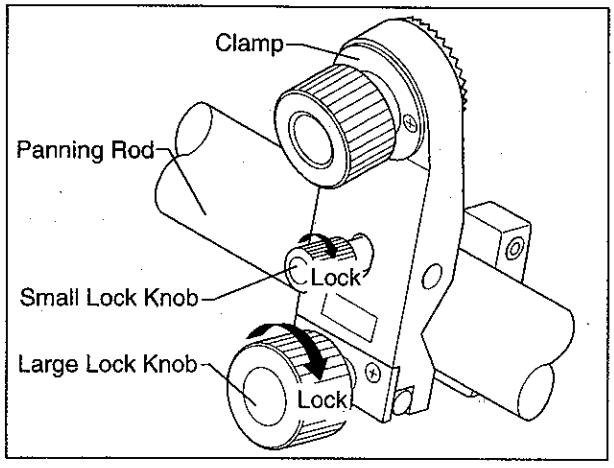
B-3. Mounting and connecting the servo focus demand

(1) Mounting the servo focus demand

Mount the servo zoom demand as instructed below.

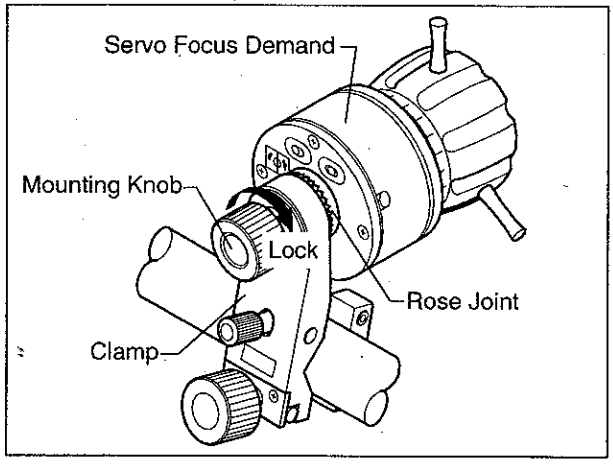
1. Loosen the large and small lock knobs of the clamp supplied with the servo focus demand, then mount the clamp to the panning rod of the tripod.

2. After mounting the clamp to the panning rod of the tripod, tighten the large and small lock knobs of the clamp to secure the clamp.



3. Mate the rose joint of the servo focus demand with the rose joint of the clamp.

4. Tighten the mounting knob of the clamp to firmly secure the servo focus demand.



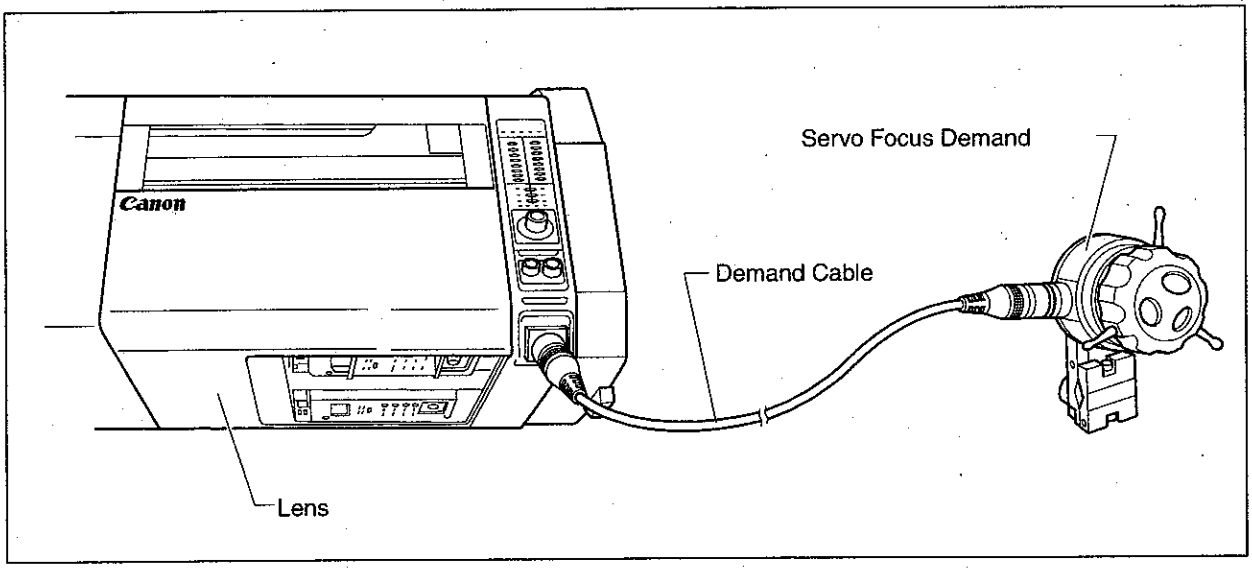
※ (NOTE): The mounting angle of the servo focus demand can be adjusted according to how the rose joints are mated.

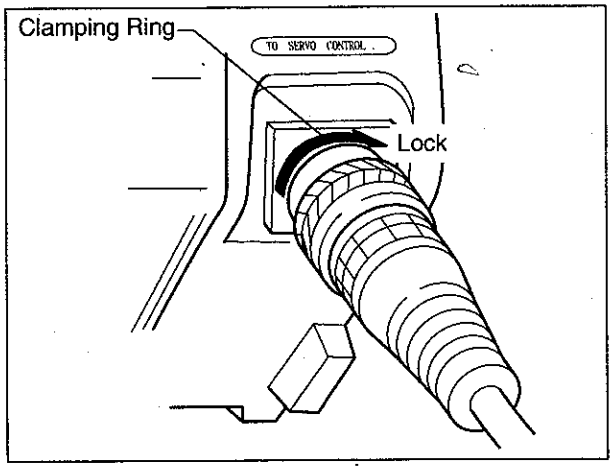
(2) Connecting the demand cable

1. Plug the male connector of the demand cable into the connector labeled "TO SERVO CONTROL" at the bottom rear of the lens. Plug the other end of the cable into the connector on the servo focus demand.

2. After connecting the cable, turn the clamping rings of the connectors clockwise to securely tighten the demand cable.

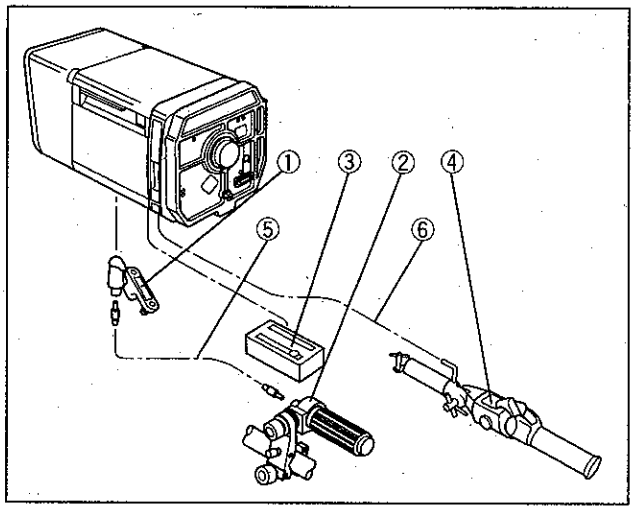
※ (NOTE): Servo focus demand can be connected to either right or left connector. Connect it that offers easieat operation.





C. Mounting and connecting the semi-servo system

○ Mount the servo zoom demand and the flexible focus control unit as shown in the figure below.



① Flexible module FMJ-452
② Flexible focus control unit FFP-T61
③ Servo module SMJ-D01
④ Servo zoom demand ZDJ-D01
⑤ Flexible cable
⑥ Demand cable

○ For an explanation of mounting and connecting the various accessories, see the flexible system and full servo system pages listed below.

D. Mounting and Connecting the Image Stabilizer System

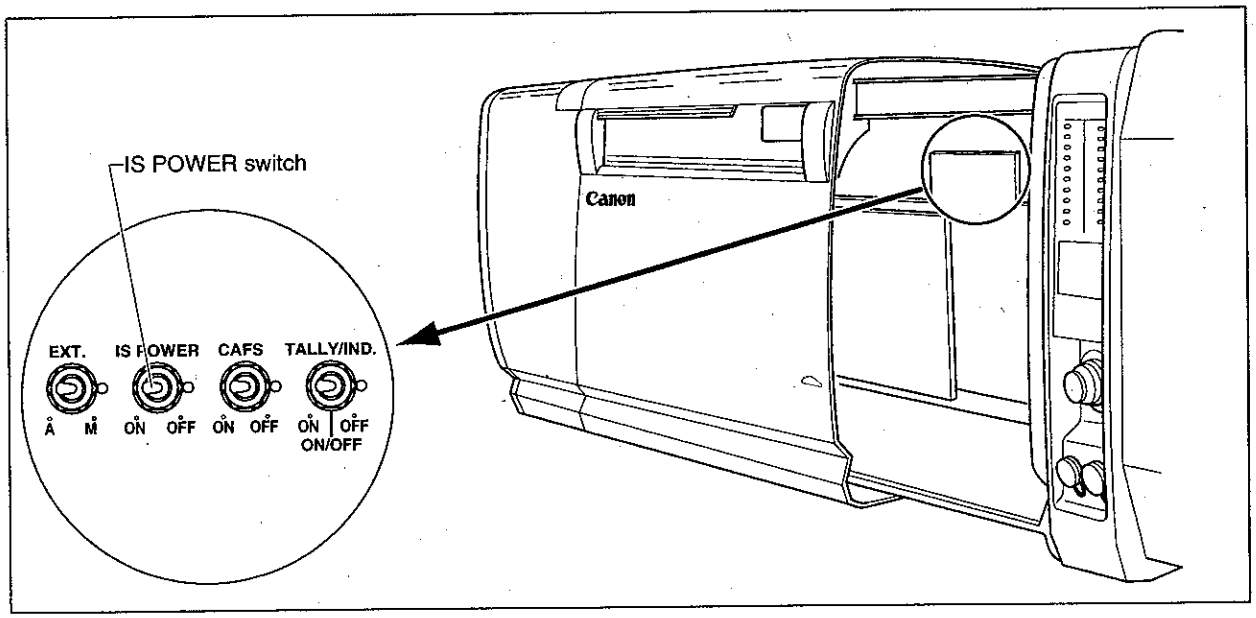
D-1. Checking the IS-POWER switch

Open the lens cover on the lens unit to find the IS-POWER switch on the upper right side of the electrical board (see the figure below). Check that the switch is at the [ON] position. If it is at the [OFF] position, move to the [ON] position.

※ (NOTE): 1) The IS-POWER switch turns the power supply to the image stabilizer system ON and OFF. Normally, it is acceptable to leave this switch at the [ON] position, but it will consume minute amounts of electric power even when the image stabilizer system is not operating.

2) If the power supply to the lens is OFF, the image stabilizer system will automatically lock to protect it even when the IS-POWER switch is set to the [ON] position. Therefore, it is acceptable to leave this switch set to the [ON] position even when transporting the camera.

3) See page 38 for details of how to open the lens cover.

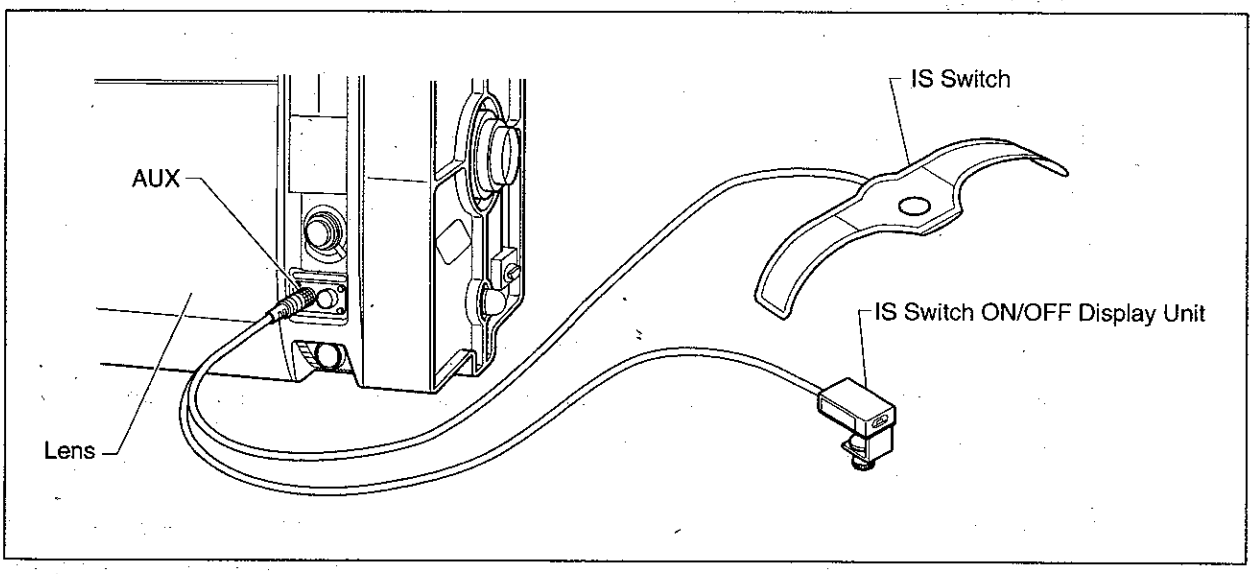


D-2. Mounting and Connecting the IS Controller

Use the procedures described below to mount and connect the IS Controller.

1. Connect the male end of the IS Controller cable connector to the "AUX" connector on the backside of the lens unit.
2. The belt on the "IS switch unit" branched from the cable is equipped with Velcro. Wrap it around any position from which it can be easily operated, such as the Pan bar or the Controller grip.
3. Set the "IS Switch ON/OFF Display Unit," which is the other branch of the cable, in a position (a viewable position on the view finder etc.) so that whether or not the LED is lit can easily be checked.
4. A warming up time of approximately 40 seconds is required after turning ON the power.

※ (NOTE): There is no hindrance to the operation of the image stabilizer during the warming up time, but anti-vibration performance will be slightly degraded.

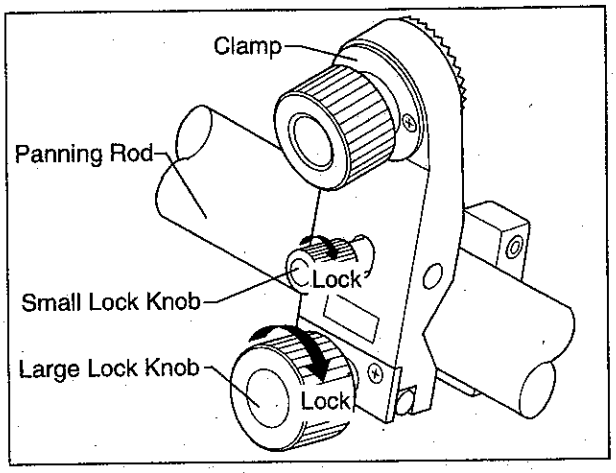


E. Mounting and connecting the switch box

Mount and connect the switch box as instructed below.

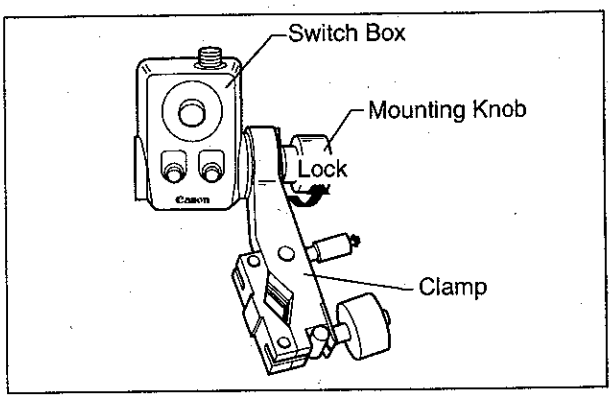
1. Loosen the large and small lock knobs of the clamp supplied with the switch box, then mount the clamp to the panning rod of the tripod.

2. After mounting the clamp to the panning rod of the tripod, tighten the large and small lock knobs of the clamp to secure the clamp.



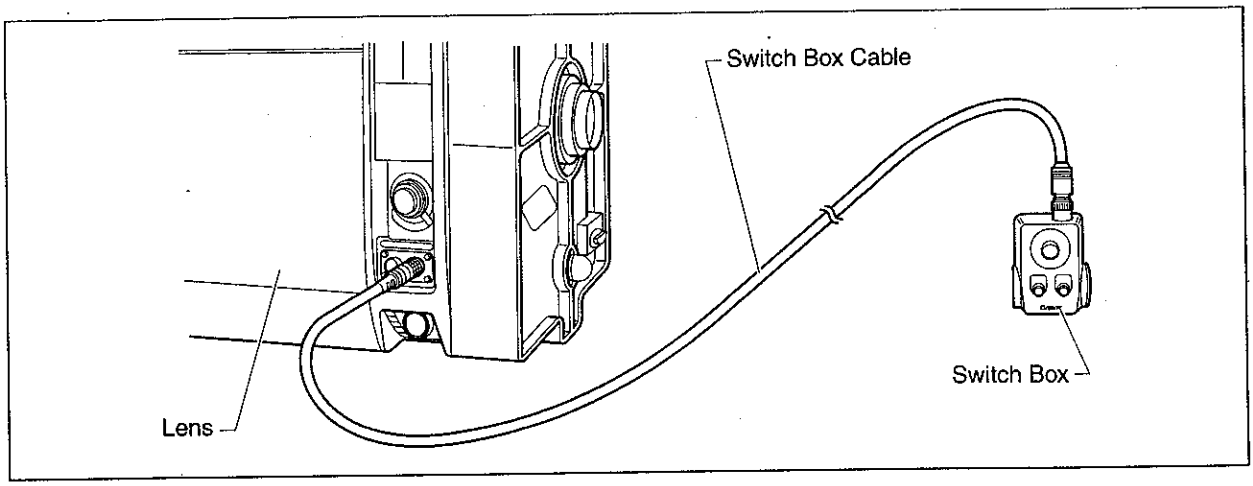
3. Mate the rose joint of the switch box with the rose joint of the clamp.

4. Tighten the mounting knob of the clamp to firmly secure the switch box.



※ (NOTE): The mounting angle of the switch box can be adjusted according to how the rose joints are mated.

5. Plug the male connector of the switch box cable to the connector labeled "TO SW BOX" at the bottom rear of the lens. Plug the other end of the cable to the connector on the switch box.



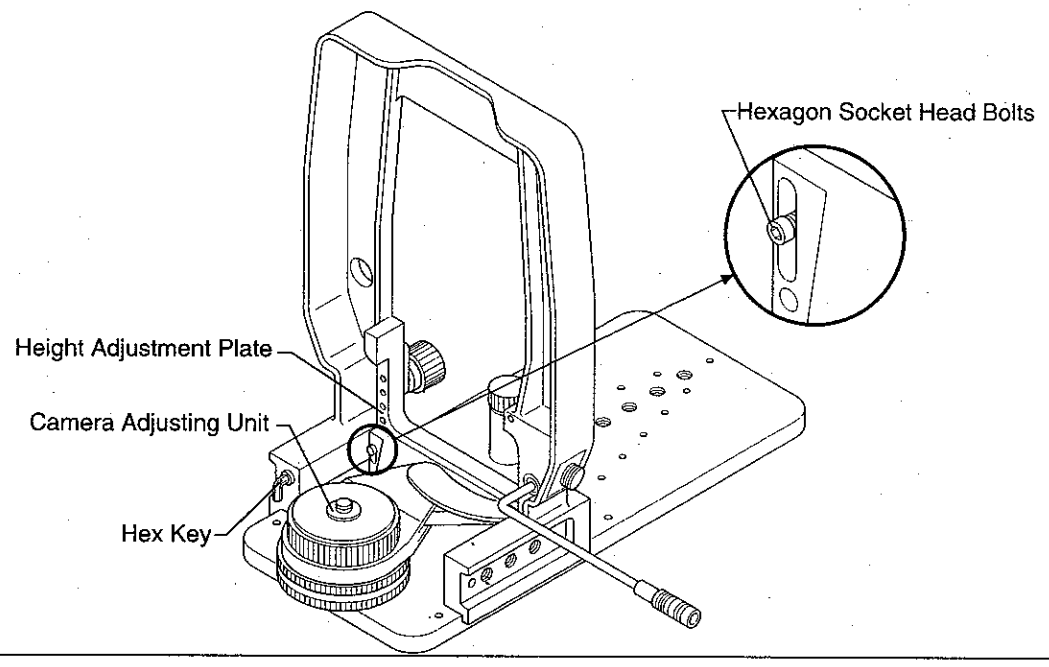
F. Mounting the supporter (SUP-NC2L)

(Refer to the attached manual when using other supporter.)

F-1. Mounting the supporter and lens unit on the cam head

Mount the supporter as instructed below.

1. Check whether the camera adjusting unit is locked in the specified place according to the TABLE-I or TABLE-II in "SUP-NC2L supporter reference information" on page 26 or 27. If the camera adjusting unit is not in the specified place, remove the two or four hexagon socket head bolts from the camera adjusting unit and height adjustment plate, then attach them in different places using the hex key supplied with the unit, so that the camera adjusting unit is locked in the specified position.

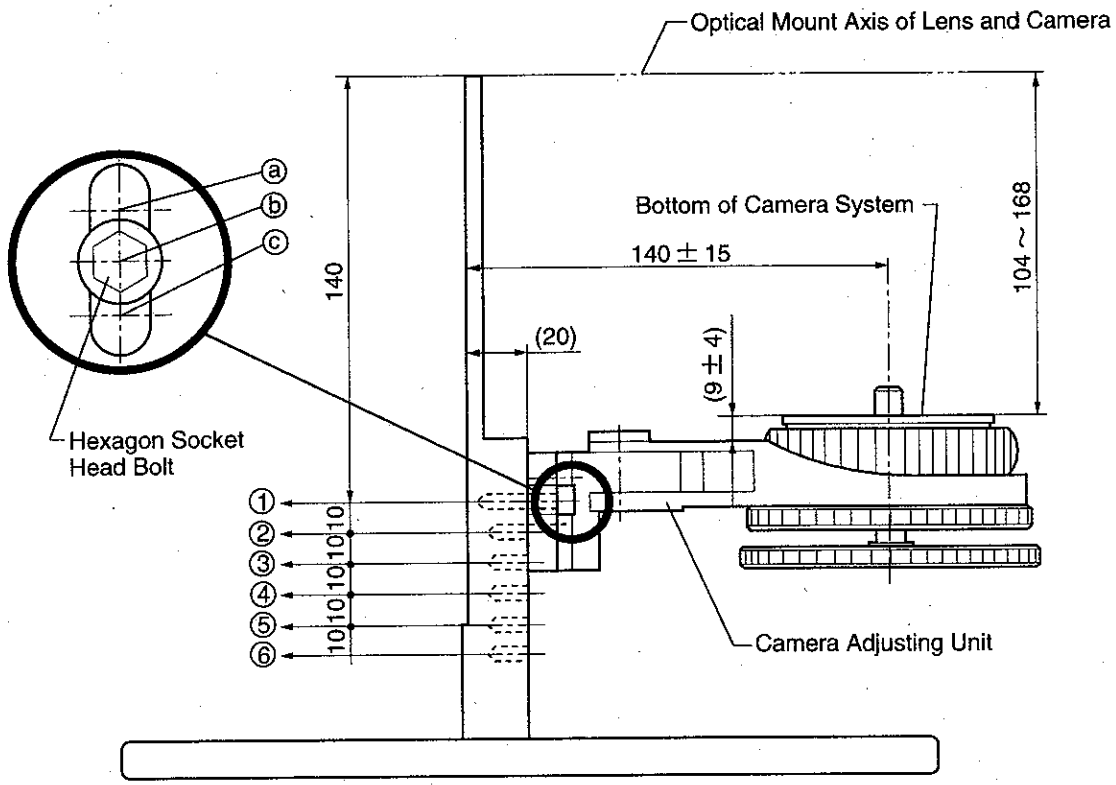


※ (NOTE): TABLE-I and TABLE-II in "SUP-NC2L supporter reference information" on the following pages list approximate data.
The thickness of the tripod adapter differs according to the camera manufacturer. When the tripod adapter which you have is mounted to the camera as shown in TABLE-I on page 26, or TABLE-II on page 27, the dimension between the bottom of the camera system and the camera optical axis position may be different from the data in the table. If the dimension does not match when the camera is mounted to the supporter, check and adjust the camera position, then mount the camera.

2. Make sure that the pan and tilt mechanisms of the cam head are locked, then place and fix the supporter on the cam head.

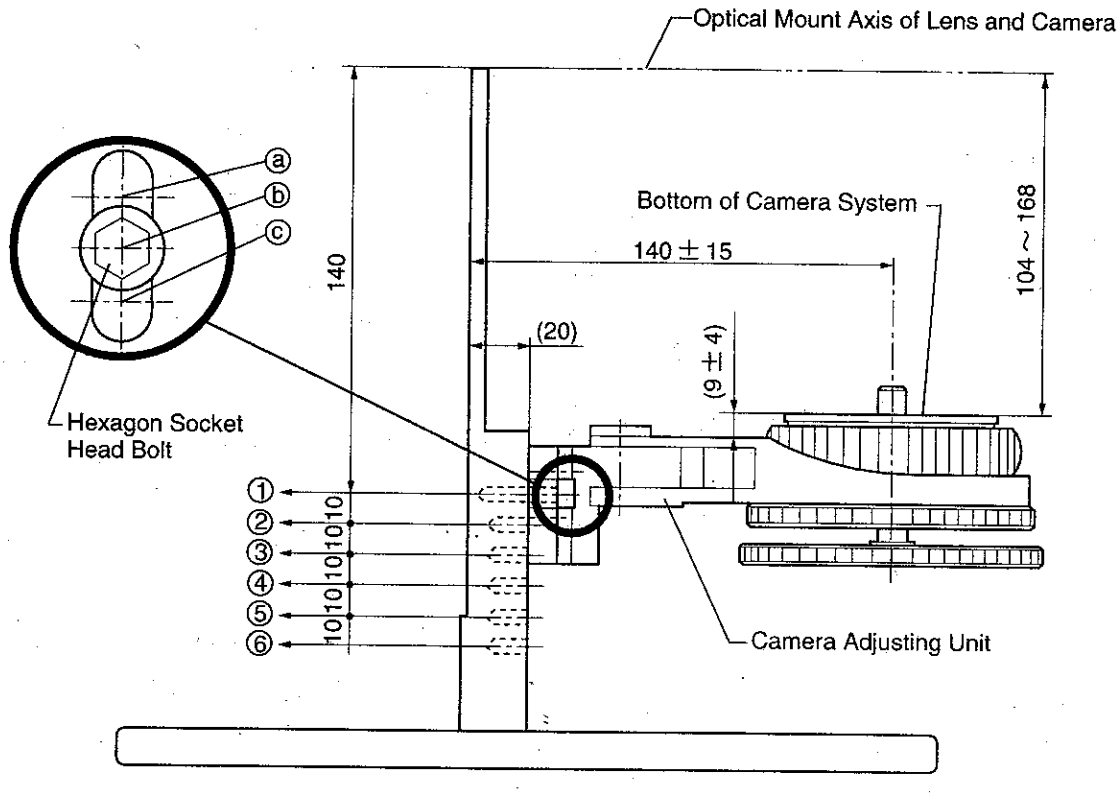
⚠ CAUTION: Read the operation manual for the tripod and pedestal carefully.
Before starting work, be sure to sufficiently understand the procedures for locking and unlocking the pan and tilt mechanisms and fastening the male V wedge to the cam head.
If the pan and tilt mechanisms are not locked, the camera, lens and supporter may fall, possibly causing injury. Always make sure they are locked before starting work.

TABLE-I
SUP-NC2L (B3) SUPPORTER REFERENCE INFORMATION



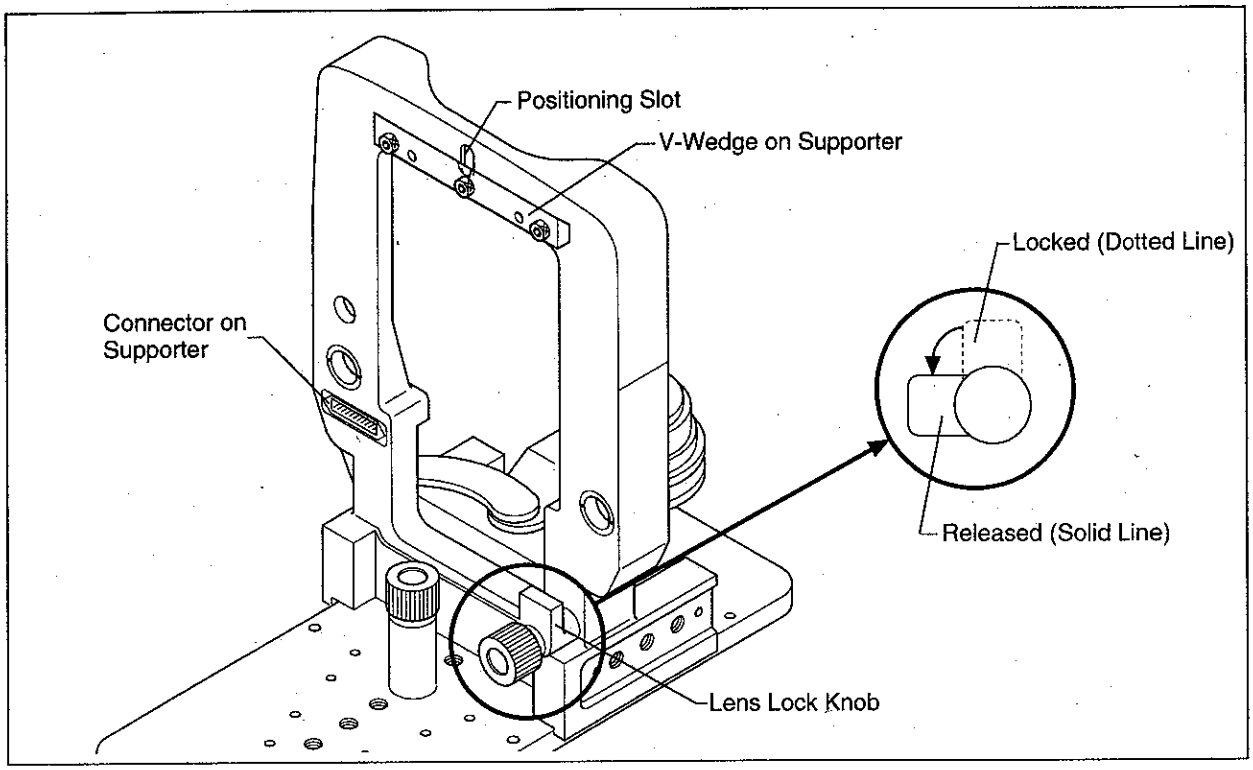
Applicable Camera Model: Height of optical axis from bottom of camera system including prompter adapter or tripod adapter	Height Adjustment Plate Position	Adjusting Unit Position	Height of Optical Axis from Camera Adjusting Unit	
HL-V55/57:117	①	ⓒ	118 ± 4	114 – 122
	②	ⓐ		
HL-53/55/57:129	②	ⓒ	128 ± 4	124 – 132
	③	ⓐ		
HK-355P/377P:142(TRIPOD ADAPTOR USE) HL-59/HL-791:144	④	ⓑ	143 ± 4	139 – 147
HL-79E:147	④	ⓒ	148 ± 4	144 – 152
	⑤	ⓐ		
HL-79D:157 HK-323P:159(TRIPOD ADAPTOR USE)	⑤	ⓒ	158 ± 4	154 – 162
	⑥	ⓐ		

TABLE-II
SUP-NC2L (B4) SUPPORTER REFERENCE INFORMATION



Applicable Camera Model: Height of optical axis from bottom of camera system including prompter adapter or tripod adapter	Height Adjustment Plate Position	Adjusting Unit Position	Height of Optical Axis from Camera Adjusting Unit	
BVP-5:116.2 SK-F1/F3/F38:117.3 EP-3/SP-30:119	①	ⓒ	118 ± 4	114 – 122
	②	ⓐ		
BVW-400/300/200:124 BVP-90/70/50/7:126.2 SK-97D/SP-3A:127 FP-C1:128 Z-ONE:129	②	ⓒ	128 ± 4	124 – 132
	③	ⓐ		
AQ-20:132.5 AK-400/450:135	③	ⓑ	133 ± 4	129 – 137
AK-30:145	④	ⓑ	143 ± 4	139 – 147
SK-H5:147.3 BVP-350:148.2 KY-210:148.5 BVP-3/30:149.2	④	ⓒ	148 ± 4	144 – 152
	⑤	ⓐ		
KY-80:154 KY-80:154(TPA-Z31)	⑤	ⓑ	153 ± 4	149 – 157
BVP-300/330/3000:161(TPA-S01)	⑥	ⓑ	163 ± 4	159 – 167

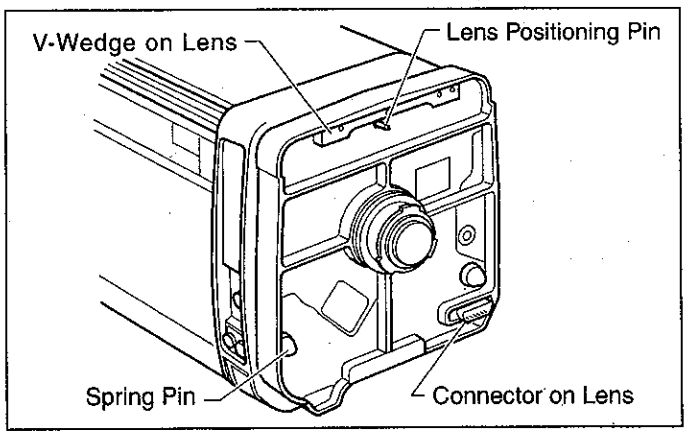
3. Turn the lens lock knob 90° in the direction of the arrow (released position) so that the lens unit can be mounted to the supporter.



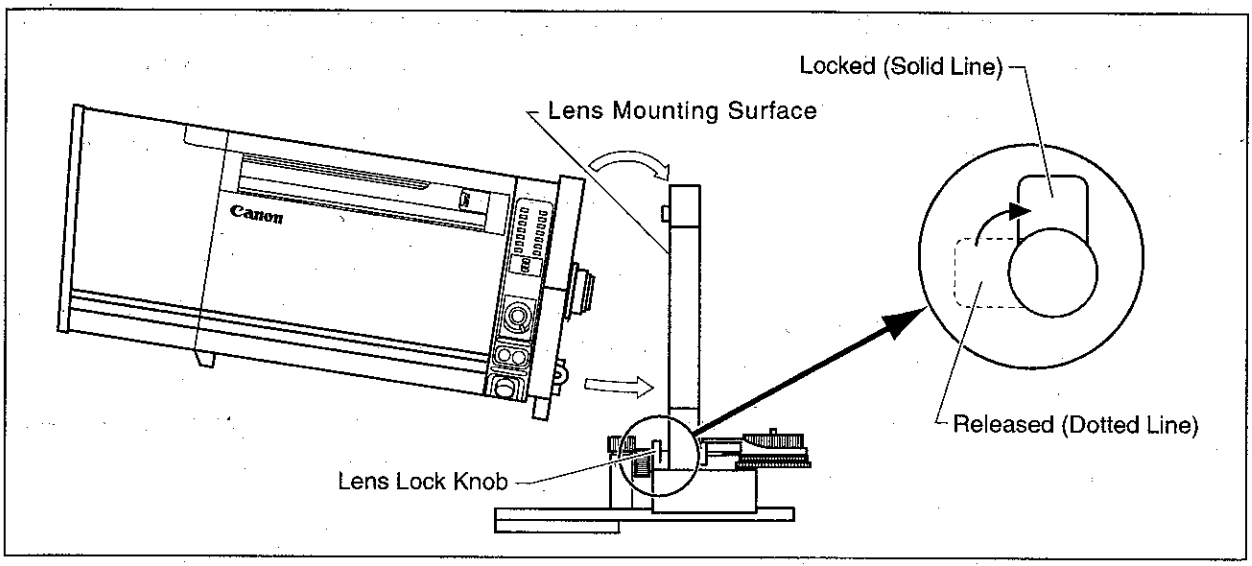
4. Next, hold the lens unit with both hands and mount it by hooking the V-wedge on the lens unit over the V-wedge on the supporter, with the positioning pin on the lens mount surface inserted into the lens positioning slot in the supporter wedge plate.

※ (NOTE): The lens is quite heavy. When lifting the lens, use both hands to hold the grips on both sides of the lens cover, and assume the correct lifting posture.

5. Make sure that the spring pin at the bottom of the lens mount surface is fitted securely into the corresponding hole in the supporter.



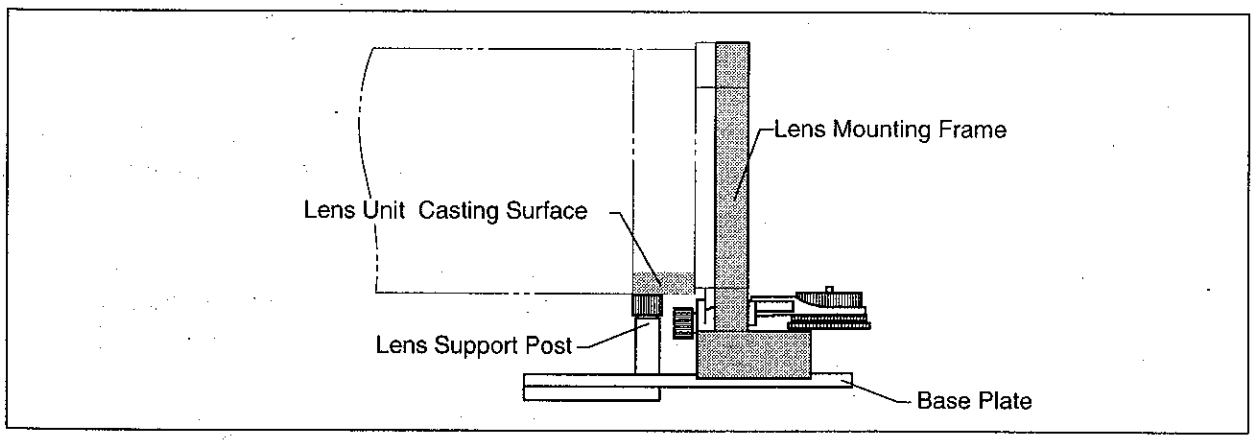
6. Press the lens unit against the lens mounting surface, then turn the lens lock knob in the direction of the arrow (locked position) to secure the lens unit to the supporter.



※ (NOTE): The connectors on the lens unit and the supporter are connected automatically by performing steps 5 and 6.
If an attempt is made to connect them forcibly without lining up the spring pin with the pin hole as described in step 5, the lens and supporter connectors may be damaged.

7. Make sure the following conditions;
   - The lens support post is in a place where the support post meets the lens unit casting surface.
   - The lens mounting frame is vertical to the base plate.

   If these conditions are not satisfied when mounting lens, detach the lens from the supporter immediately, and contact Canon's representative or the dealer who originally supplied this supporter.



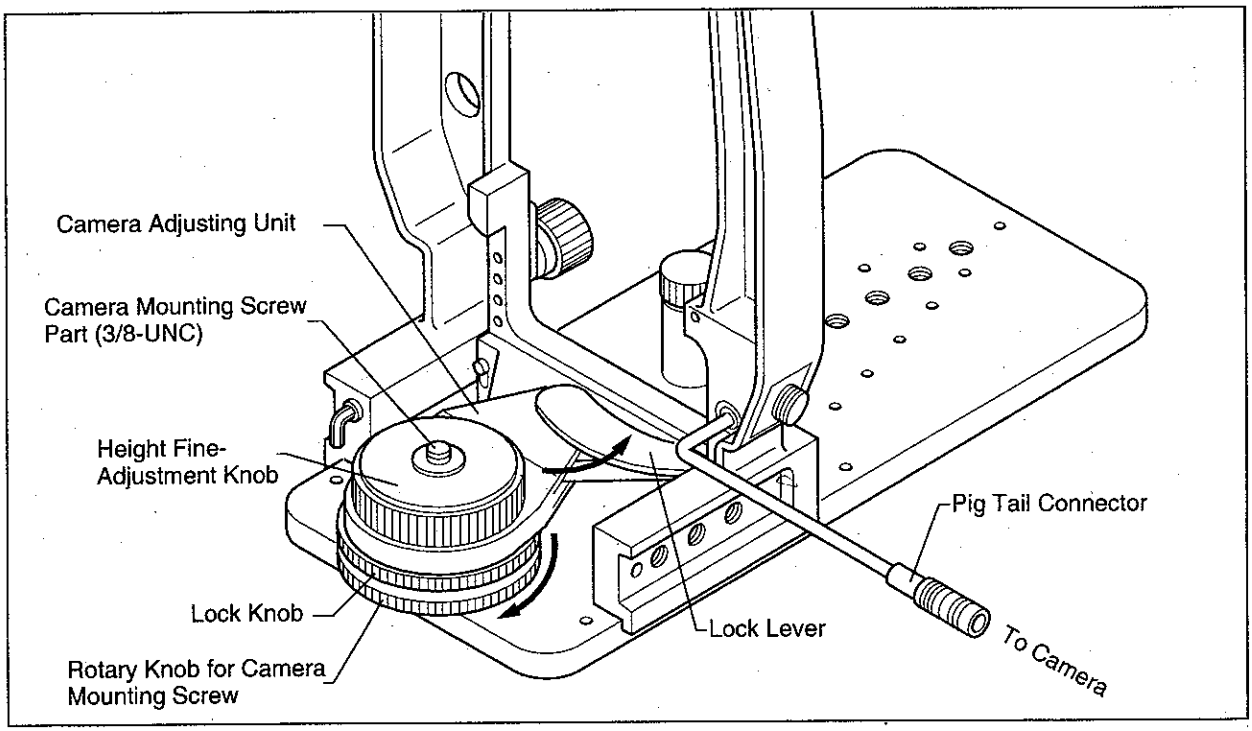
※ (NOTE): Mounting position and height of the lens support post have already been adjusted at the factory. However, readjustment is needed if, when mounting lens are checked in step 7, the lens mounting frame is not vertical to the base plate, or if the lens support post is not in a place where the support post meets the lens unit casting surface. In this case, detach the lens from the supporter immediately and contact Canon's representative or the dealer who originally supplied this supporter.

E-2. Mounting a camera on the supporter

This section describes the procedure for mounting a camera on the supporter.
For some types of cameras, the camera adjusting unit must be positioned correctly in relation to the lens mounting frame before the camera can be mounted. Check the position with TABLE-I on page 26 or TABLE-II on page 27. This checking should have been performed in step 1 of E-1. If not, remount the camera adjusting unit correctly.

1. Turn the lock knob and height fine-adjustment knob on the camera adjusting unit in the direction of the arrows until they lock in place. Next, turn the lock lever securing the camera adjusting unit 30° to 45° so that the unit can move freely.

2. Mount the tripod adapter (supplied by the camera manufacturer) by aligning and screwing the tip of the rotary knob for camera mounting screw into the tripod screw hole in the tripod adapter.

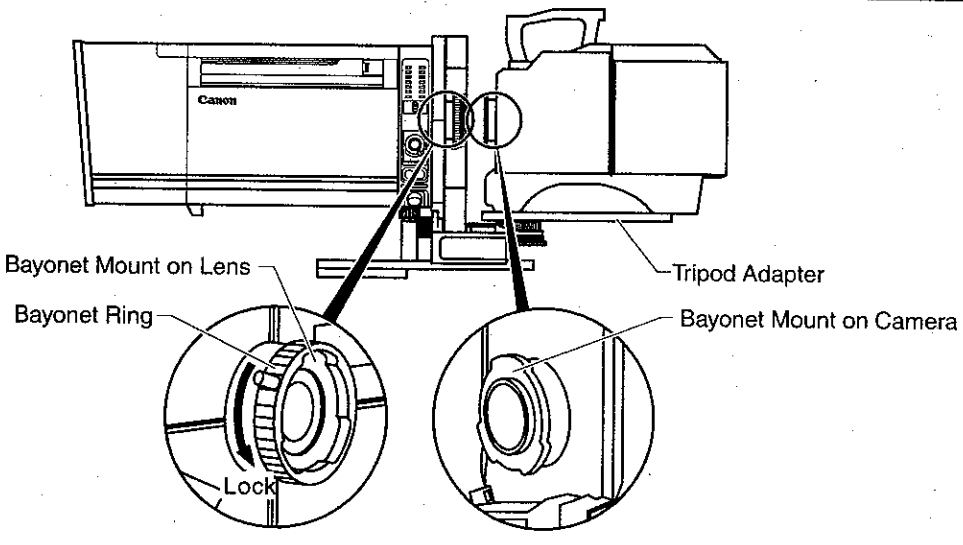


3. Connect the pig tail connector of the supporter to the lens connector on the camera head, then secure the camera to the tripod adapter.

※ (NOTE): 1) If steps 2 and 3 are reversed, it will be difficult to attach the connectors because of a limited gap between the supporter and camera. Be sure to follow the steps in the stated sequence.
2) Refer to the operating instruction manual of the camera for how to mount the camera to the tripod adapter.
3) If the tip of the tripod adapter interferes with the lens mounting frame making it impossible to mount the camera, reverse the front-back facing of the tripod adapter as well as the two V-shaped blocks on the bottom surface of the camera head.

[FOR 2/3" PORTABLE CAMERA ON B3 MOUNT]

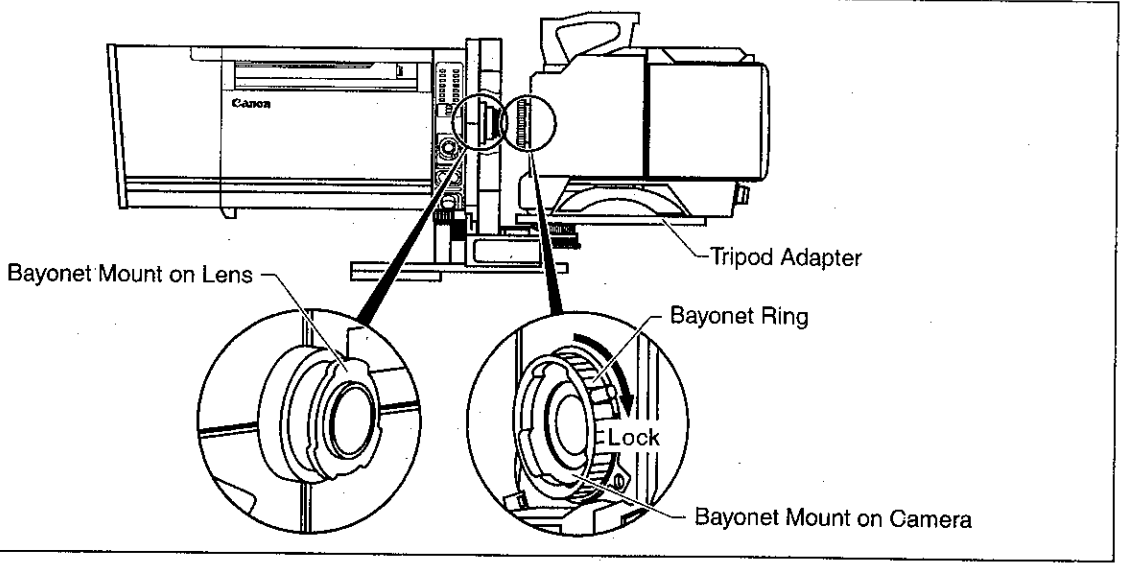
4. Lift the camera head, align the male baycnet mount on the front surface of the camera with the female bayonet mount on the lens unit, and push the camera forward. Then turn the bayonet ring in the direction of the arrow. The camera head is locked to the lens unit.



※ (NOTE): Note that the camera can be moved only within a limited range.
When the camera head is lifted, the tripod adapter and camera adjusting unit are also lifted because they are already mounted to the camera head.

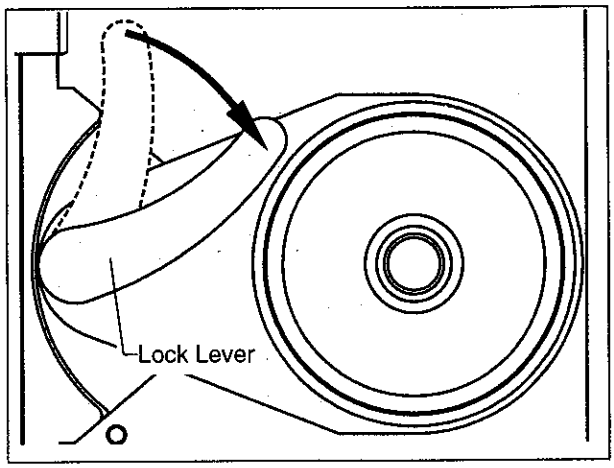
[FOR 2/3" PORTABLE CAMERA ON B4 MOUNT]

4. Lift the camera head, align the female bayonet mount on the front surface of the camera with the male bayonet mount on the lens unit, and push the camera forward. Then turn the bayonet ring in the direction of the arrow. The camera head is locked to the lens unit.



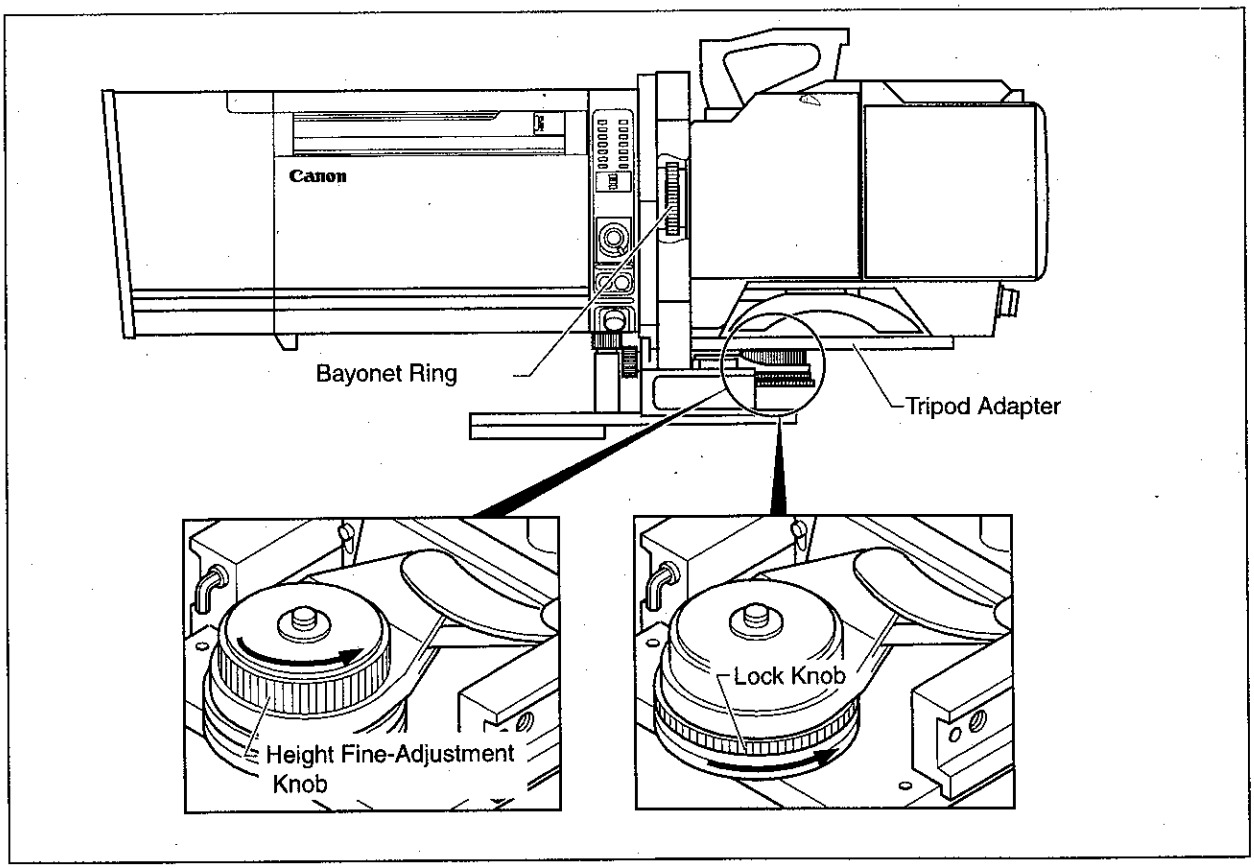
※ (NOTE): Note that the camera can be moved only within a limited range.
When the camera head is lifted, the tripod adapter and camera adjusting unit are also lifted because they are already mounted to the camera head.

5. Turn the lock lever of the camera adjusting unit in the direction of the arrow to lock the lever.



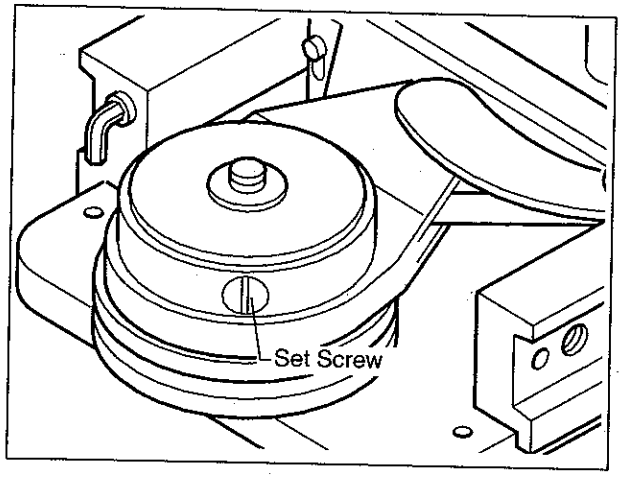
6. Keep the camera head lifted and turn the height fine-adjustment knob in the direction of the arrow until there is no gap between the top surface of the knob and the bottom surface of the tripod adapter.
   Next turn the lock knob for the rotary knob for camera mounting screw in the direction of the arrow to secure the knob.

※ (NOTE): When fixing the camera adjusting unit by turning the height fine-adjustment knob, be sure to fix the camera adjusting unit to maintain its balance, so that the tripod adapter stays horizontal with the bottom of the camera system. Otherwise, the bayonet mounts of the lens and camera will not fit correctly and the bayonet ring may not rotate.

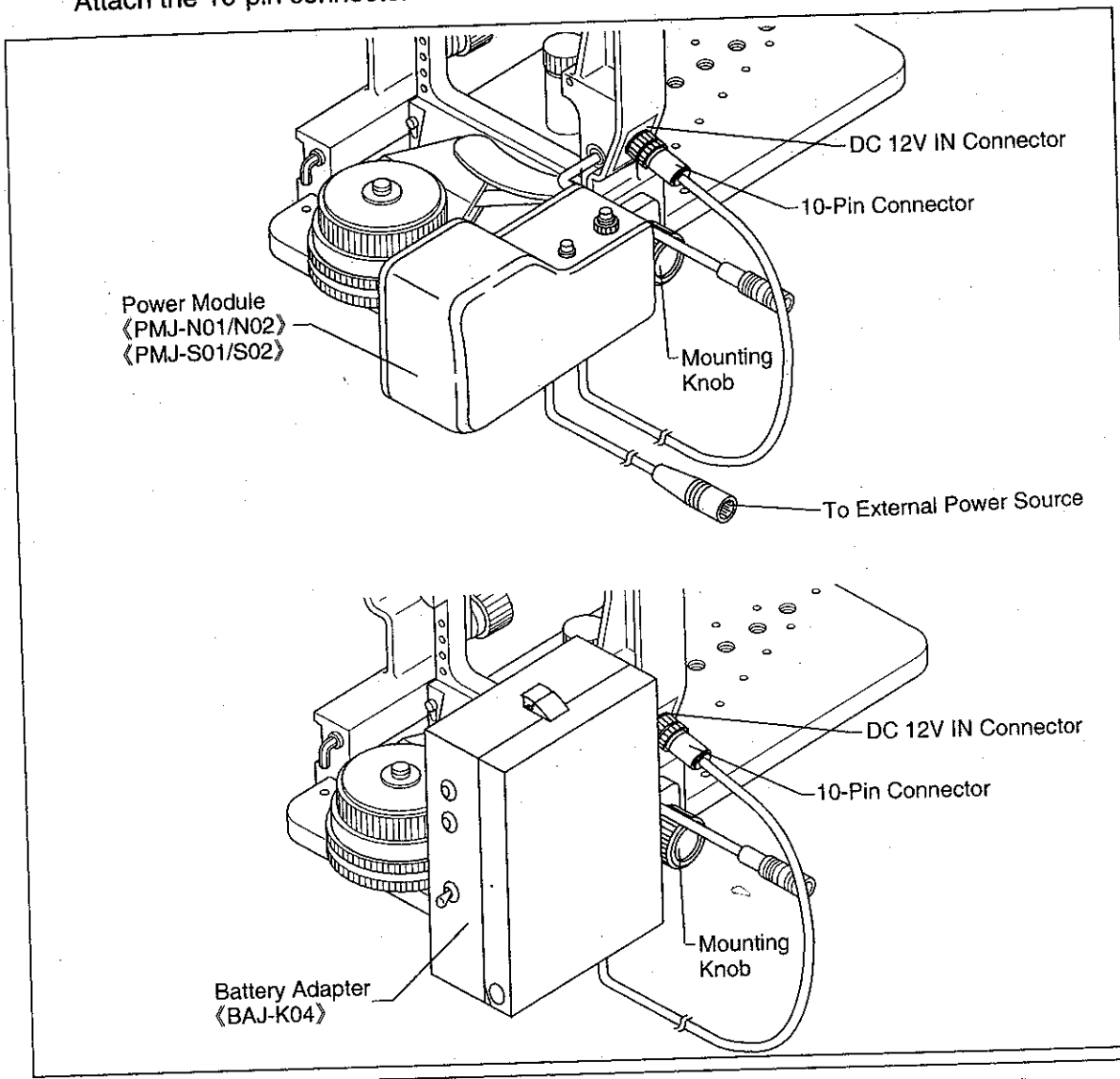


7. Let go of the camera head and make sure that the camera mount bayonet ring turns smoothly. If not, the camera is not in the correct position relative to the lens unit. Rotate the height fine-adjustment knob clockwise or counterclockwise to adjust the height of the camera until the camera mount bayonet ring turns smoothly.

8. Tighten at least one of the two set screws on the height fine-adjustment knob.



9. When using a Canon power module or battery adapter, snap this power unit into the slot on the side of the supporter main body and secure it with the mounting knob.
Attach the 10-pin connector to the DC12V IN connector on the supporter main body.



※ (NOTE): Battery packs which can be used with the battery adapter 《BAJ-K04》 are as follows:
BP-90 by SONY Corp / DP1240 by PACO / MASTER90 by PAG
Purchase the battery pack from the battery manufacturer.
The battery pack is not included with the battery adapter.

⚠ CAUTION: When removing the camera and lens from the supporter, first make sure the pan and tilt mechanisms on the cam head are locked.
If the pan and tilt mechanisms are not locked, the camera and lens may fall, possibly causing injury or damage.

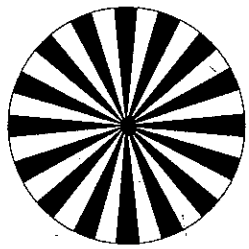
§ 3. ADJUSTMENT

3-1. Flange Back Adjustment of the Lens

Follow the procedure below to adjust the flange back of the lens.

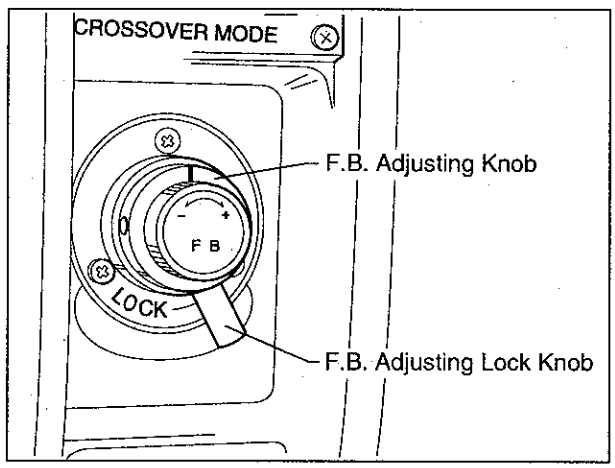
※ (NOTE): See "§4. OPERATION" for the zooming, focusing and iris operations used with the flange back adjustment.

1. Select an object 5 to 7 m away from the lens or at the actual distance at which the lens will be used. A Siemens star chart should be used of available. If a Siemens star chart is not available, use on object with sharp contrast. A Siemens star chart features stripes which narrow toward the chart's center, as shown on the right, which facilitates focusing.



Siemens Star Chart

2. Open the iris of the lens fully.
3. Set the lens to the telephoto end.
4. Focus on the object for the green channel with the lens.
5. Set the lens to the wide end.
6. Loosen the F.B. adjusting lock knob on the left side of the lens (as viewed from the camera).
7. Turn the F.B. adjusting knob to bring the object into focus.
8. Repeat steps 3 to 7 several times until the object is brought into focus at both the wide and telephoto ends.
9. Tighten the F.B. adjusting lock knob with the F.B. adjusting knob set in the proper position.



When steps 1 to 9 have been performed, the flange back adjustment of the lens is complete.

※ (NOTE): When adjusting the flange back, do not use an extender (other than 1x).

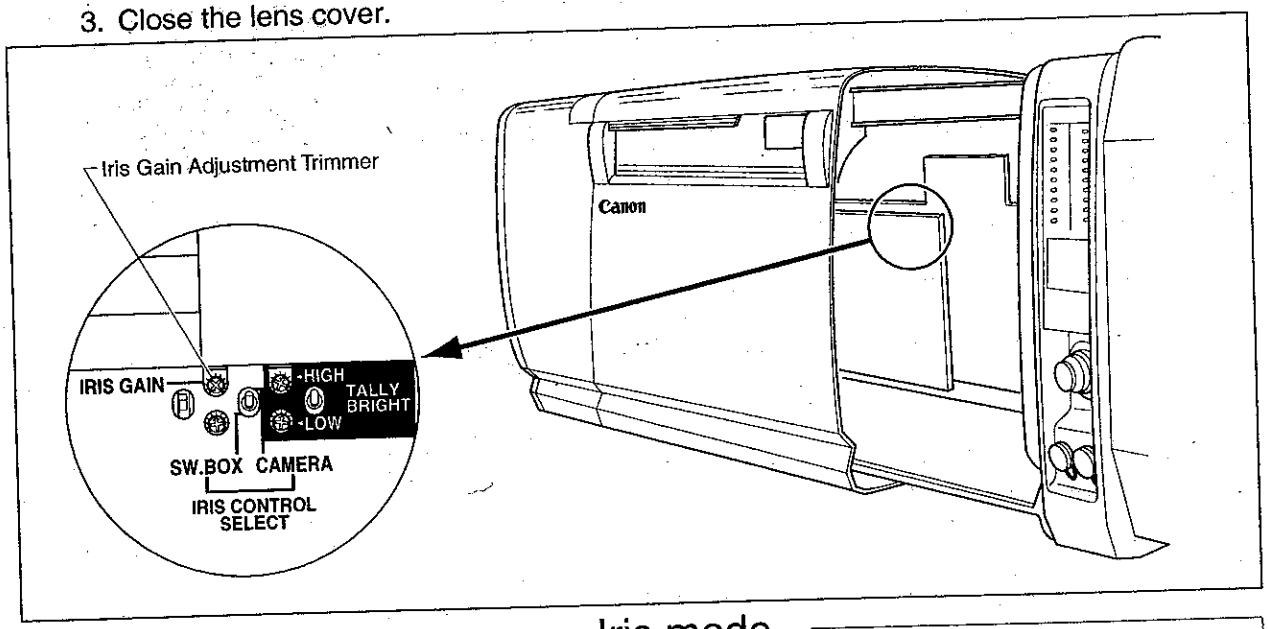
3-2. Iris Adjustment

The iris gain is factory-adjusted to the proper setting.
However if iris hunting occurs or the response characteristics are extremely poor, readjust the iris gain as follows.

1. Open the lens cover.

※ (NOTE): See page 38 for details of how to open the lens cover.

2. Adjust the iris gain by turning the iris gain adjustment trimmer on the circuit board.
3. Close the lens cover.



Iris mode

Iris control and actual operation depend on the following three signals (when the camera settings enable both modes)

1. Forced auto signal from camera (IRIS ENF)
2. AUTO/REMOTE signal from camera (IRIS A/R)
3. Iris Control Select switch on lens circuit board (CAMERA/SW.BOX)

The table below lists the relationship between iris mode and these three signals.

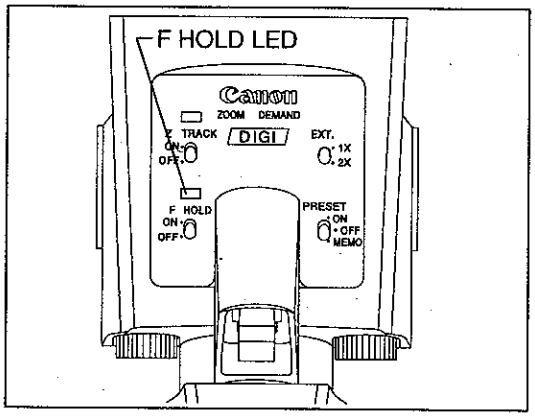
Iris Control Select Switch on Lens Circuit Board	Signal from Camera		Command Signal	IRIS MODE
	IRIS ENF	IRIS A/R		
CAMERA	Forced ON	AUTO	Camera	Auto iris
CAMERA	Forced ON	REMOTE	Camera	Remote iris
CAMERA	Forced OFF	AUTO	Camera	Auto iris
CAMERA	Forced OFF	REMOTE	Camera	Remote iris
SW.BOX	Forced ON	AUTO	Camera	Auto iris
SW.BOX	Forced ON	REMOTE	Camera	Remote iris
SW.BOX	Forced OFF	AUTO	Switch Box	Remote iris
SW.BOX	Forced OFF	REMOTE	Switch Box	Remote iris

3-3. Initialization of DIGI Demands

When DIGI demands are to be used, they must be initialized to enable checking of their connection and transmission/reception of position data between the lens and the demands. Initialize the demands as follows:

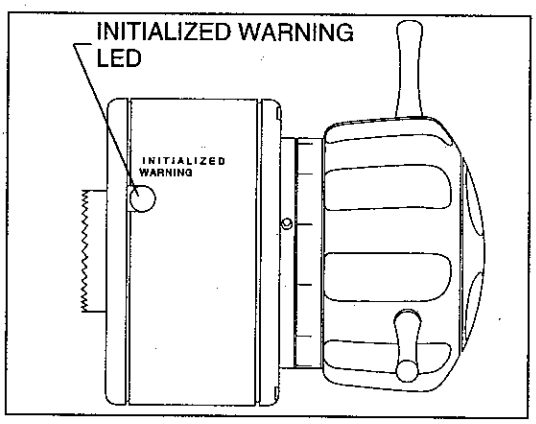
1. Connect the servo zoom demand and servo focus demand to the lens body.
   Refer to the following pages on how to connect them.

2. Check the demand cable connections, then turn on the power to the camera. When supplying external power to the lens while using a portable camera, be sure to start supplying the power after connecting the demand cables.
3. Initializing the zoom demand:



Turning on the power automatically starts initialization of the zoom demand. Once initialization has been started, the F HOLD LED on the top of the zoom demand lights red. Once initialization has been completed, the LED goes off.

4. Initializing the focus demand:



Turning on the power causes the INITIALIZED WARNING LED on the circumference of the focus demand to light red. Turn the focus demand knob until the LED goes off. Once initialization of the focus demand has been completed, the LED goes off.

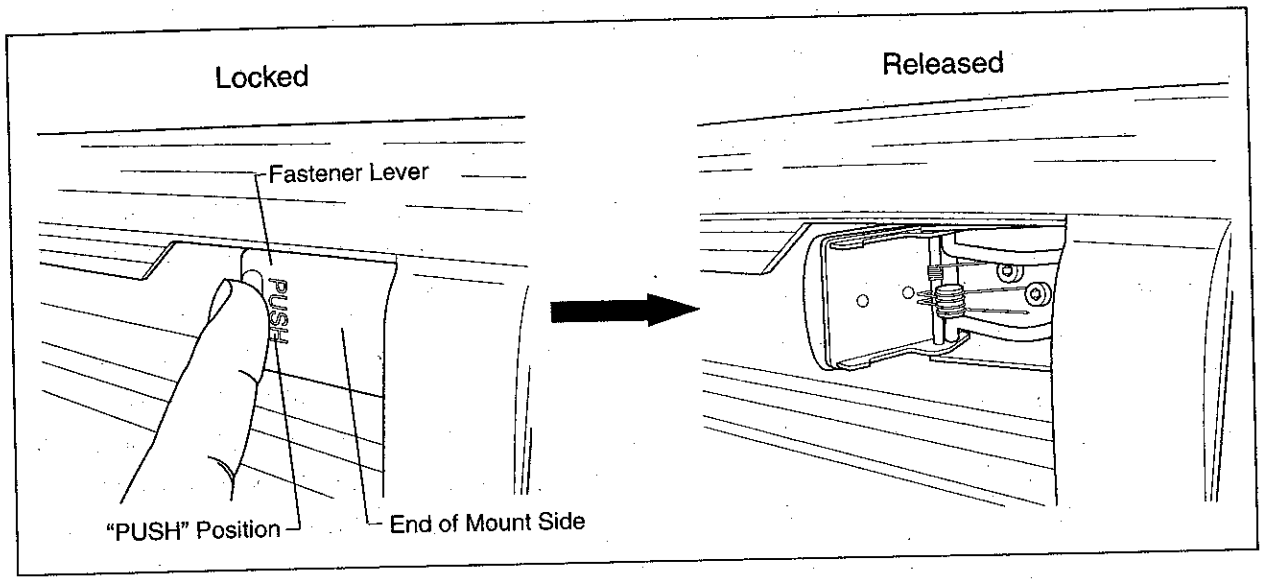
5. This completes initialization of the DIGI demand.

※ (NOTE): 1) If initialization is not completed normally, press the reset switch (SW7) on the circuit board inside the lens cover, then perform steps 3 and 4 again to initialize the demands.
2) Demands without the DIGI indication need not be initialized.
3) Under certain conditions, a faint, repeated bumping sound may be heard during the zoom operation at the telephoto or wide-angle end of the zoom range. This sound is the result of feedback in the lens' position recognition mechanism, which is used in order to permit highly accurate zooming, the sound is not an indication of a problem with the lens.

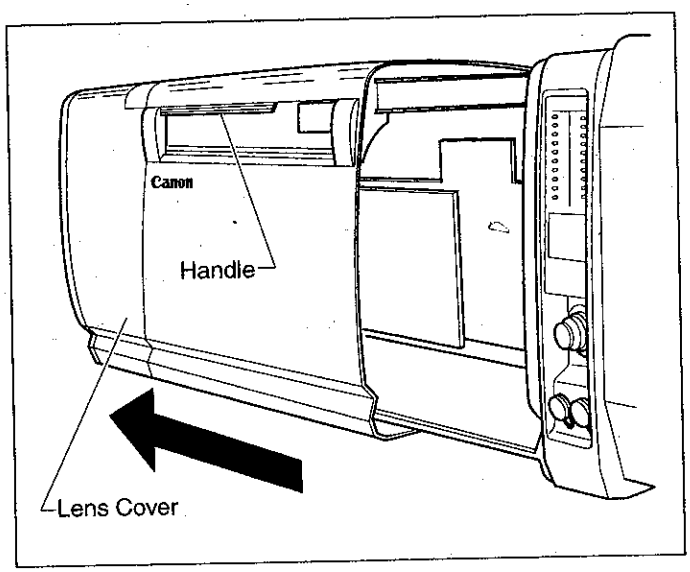
3-4. Open the lens cover

Open the lens cover as instructed below.

1. Press the "PUSH" position on the fastener lever to release the lever lock.



2. Hold the handles on both sides of the lens cover to pull the cover out to the lens barrel.



3. When closing the lens cover, set the cover to the lens body and lock the lens cover by pressing the fastener lever at the end of the mount side.

※ (NOTE): Be sure to secure the lens cover to use the lens. If the cover lock is released, the cover may be removed and dropped down.

§ 4. OPERATION

4-1. Zooming and Focusing

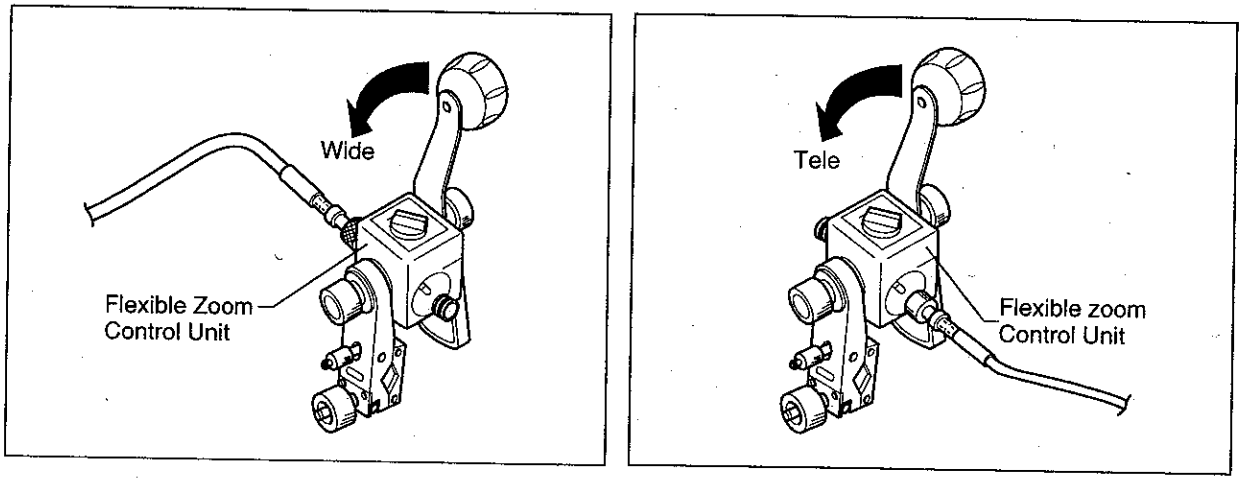
A. Flexible system operation

A-1. Flexible zoom control unit operation

[Zooming]

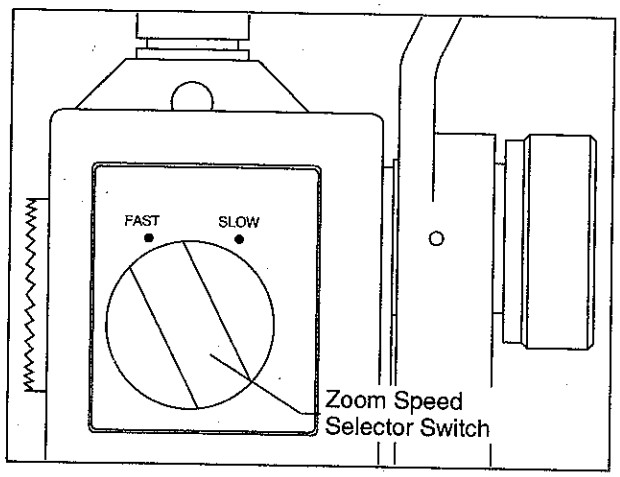
The lens is zoomed by turning the handle of the flexible zoom control unit.

During shooting, the approximate zoom value can be checked with the indicator on the left side of the lens (as viewed from the camera). (See the figure on page 49.)



[Changing the zoom speed]

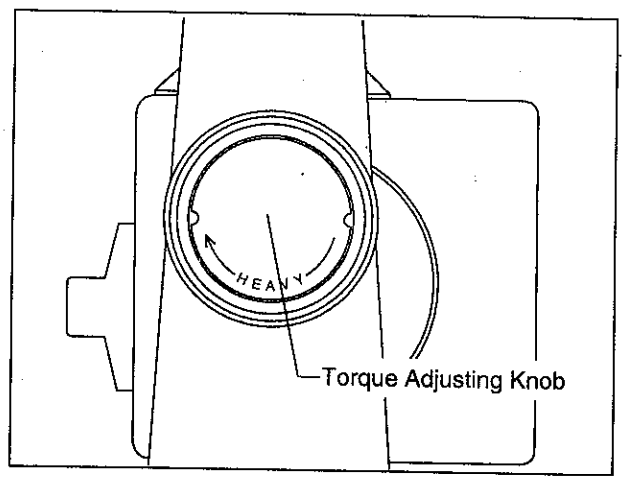
One of two zoom speeds (FAST and SLOW) can be set with the zoom speed selector switch on the flexible zoom control unit.



[Adjusting the torque]

Turning the torque adjusting knob on the flexible zoom control unit changes the torque of the handle.

To increase the torque, turn the knob clockwise (as viewed from the torque adjusting knob).

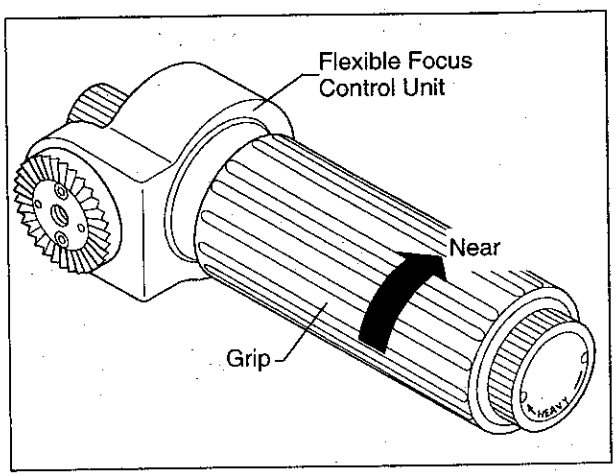


A-2. Flexible focus control unit operation

[Focusing]

The lens is focused by turning the grip on the flexible focus control unit.

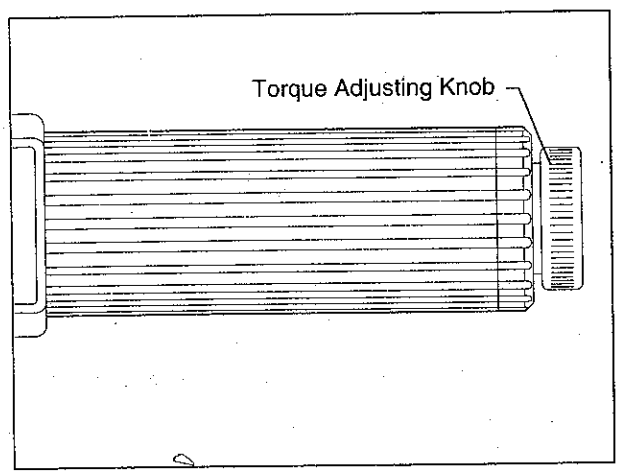
Turning the grip clockwise (as viewed from the grip) brings nearer objects into focus.



[Adjusting the torque]

Turning the torque adjusting knob on the flexible focus control unit changes the torque of the grip.

To increase the torque, turn the knob clockwise (as viewed from the grip).



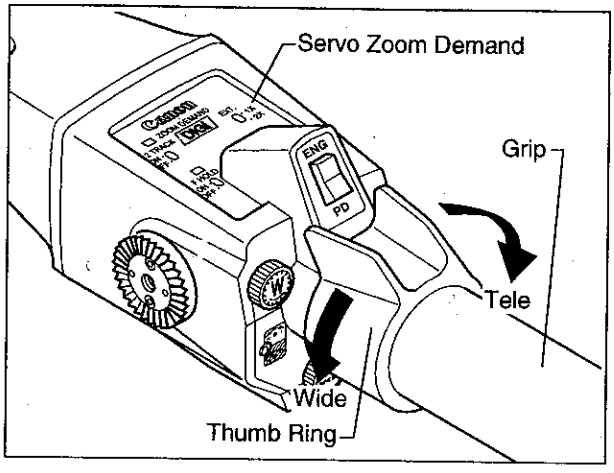
B. Servo system operation

B-1. Servo zoom demand operation

The lens is zoomed by turning the thumb ring of the servo zoom demand.

[Zooming]

The lens is zoomed toward the telephoto end by turning the thumb ring of the servo zoom demand clockwise (as viewed from the grip of the servo zoom demand). The lens is zoomed toward the wide end by turning the thumb ring counterclockwise.

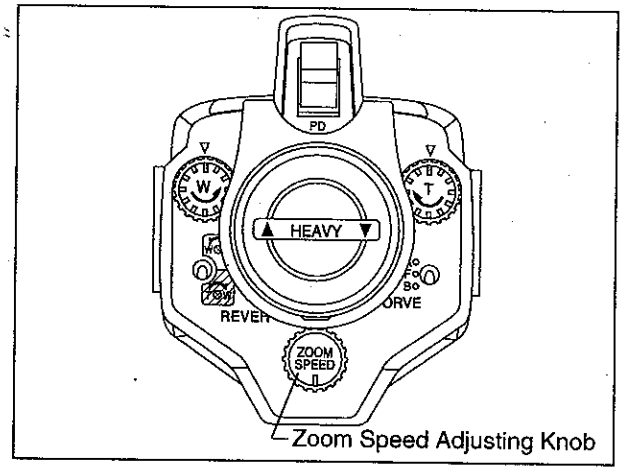


The zoom speed varies according to the angle of rotation of the thumb ring.

During shooting, the approximate zoom value can be checked with the indicator on the left side of the lens (see the figure on page 49).

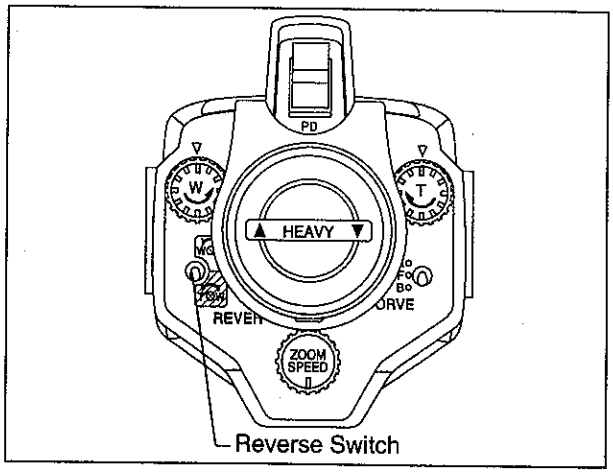
[Adjusting the zoom speed]

The maximum speed obtained by completely turning the thumb ring of the servo zoom demand can be changed with the zoom speed adjusting knob.



[Changing the rotation direction]

The rotation direction is factory-set so that turning the knob clockwise (as viewed from the grip of the servo zoom demand) zooms toward the telephoto end. The tele/wide direction of the knob can be switched with the reverse switch on the servo zoom demand.



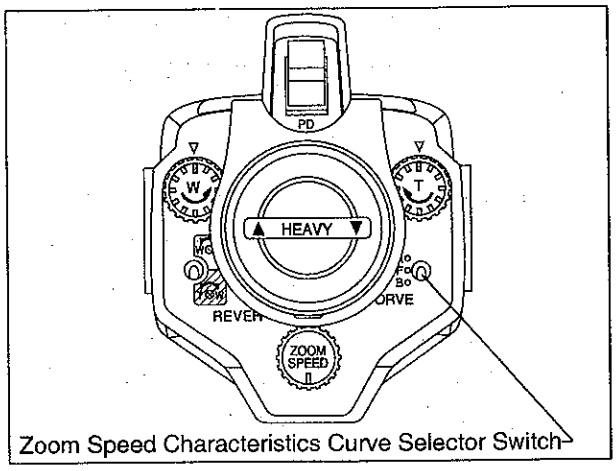
[Selecting the zoom speed characteristics curve]

The zoom speed characteristics curve selector switch on the servo zoom demand can be used to select the zoom characteristics from the following three curve modes:

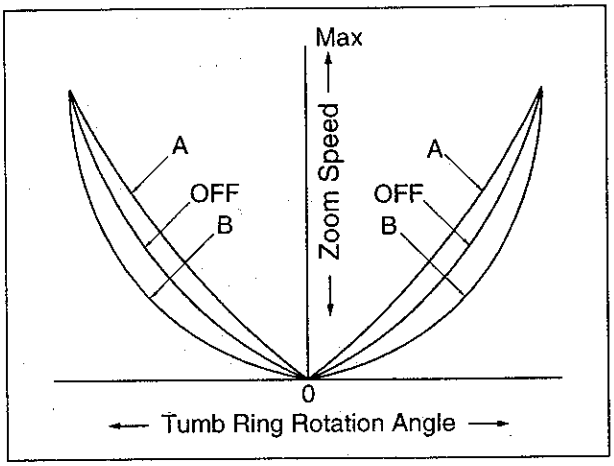
OFF mode (center): The zoom speed varies with the thumb ring rotation angle according to a standard curve.

A mode (top): The zoom speed varies with the thumb ring rotation angle according to a tense curve, compared with that for OFF mode.

B mode (bottom): The zoom speed varies with the thumb ring rotation angle according to a lax curve, compared with that for OFF mode.



Zoom Speed Characteristics Curve Selector Switch

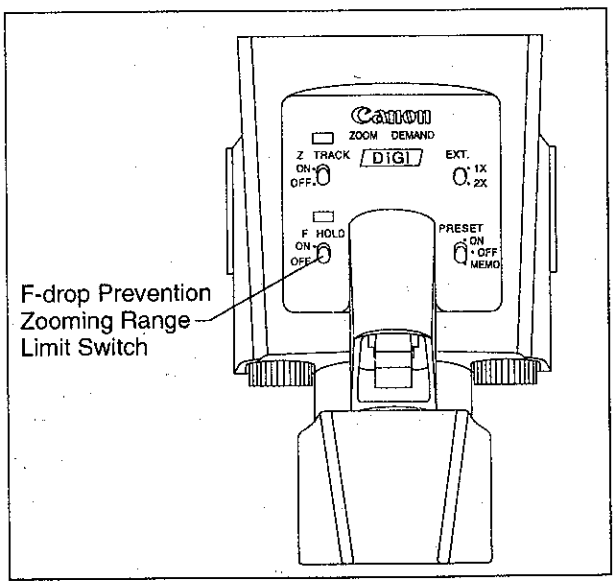


[Zooming range control to prevent F-drop]

The F-drop prevention zooming range limit switch on the servo zoom demand is used for remote iris control to limit the telephoto end of the zooming range so that zooming does not cause the image to become darker relative to the F No. value specified by the CCU. When this switch is on, zooming toward the telephoto end is limited to the point at which the F number becomes larger than (darker than) the F No. value specified by the CCU.

ON ..... The LED lights green.
(When the lens is operating)

OFF ..... The LED does not light.



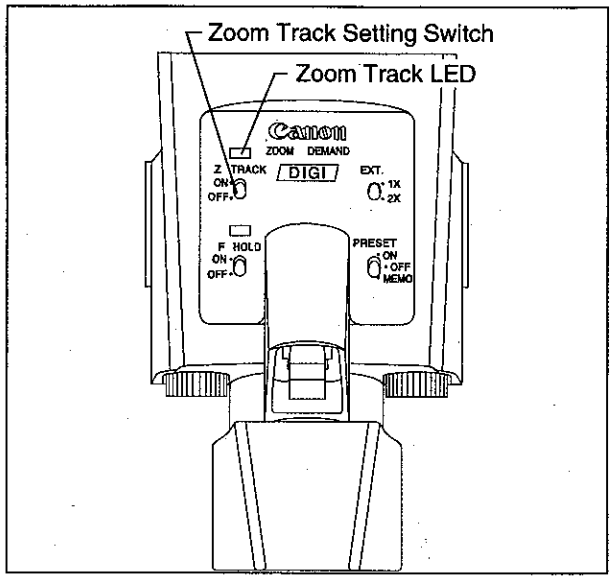
[Zoom track setting]

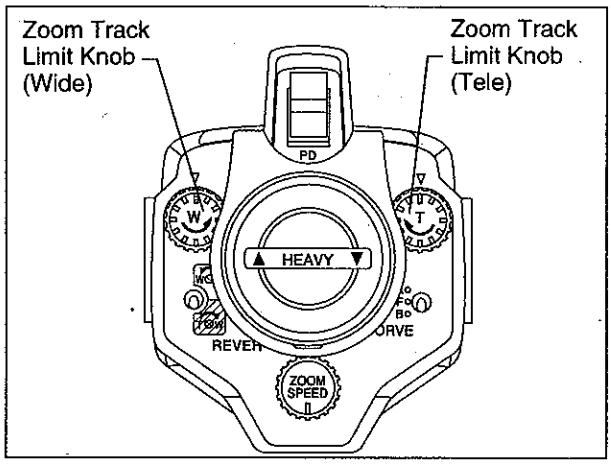
1. Set the zoom track setting switch on the servo zoom demand to ON, and then check that the zoom track LED goes on.

   ON ..... Lights green.
   OFF ..... Does not light.

2. The zoom control range can be set by turning the zoom track limit knobs (wide and tele).

   Turning the knobs in the direction indicated by arrow.....Broadens the zoom control range.
   Turning the knobs in the direction opposite the arrow.....Narrows the zoom control range.



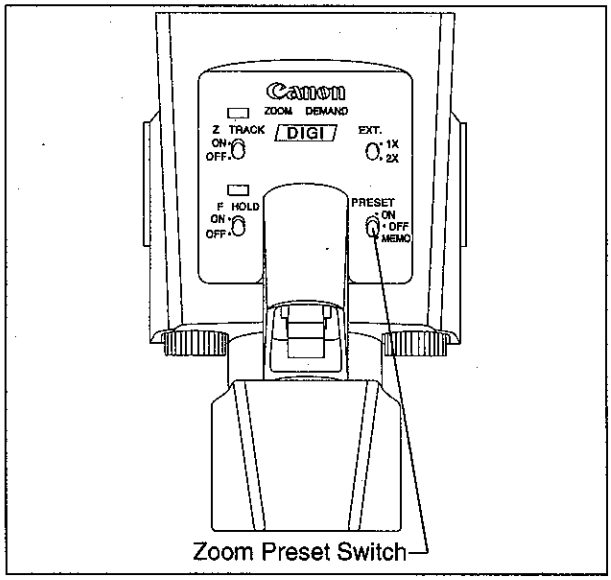


※ (NOTE): When checking the zoom control range that has been set, turn the thumb ring while observing the image in the viewfinder or on a monitor.

3. If the zoom track setting switch is set to OFF, the lamp turns off, the zoom track setting is released, and the zoom control range returns to the whole range.

[Single-shot zoom preset switch]

The zoom preset switch on the servo zoom demand can be used to save and recall a single zoom position.



Saving

1. Obtain the desired zoom position by using the thumb ring.
2. Turn the zoom preset switch to MEMO to save the current zoom position. (Once released, the switch automatically returns to OFF (center).)

Recalling

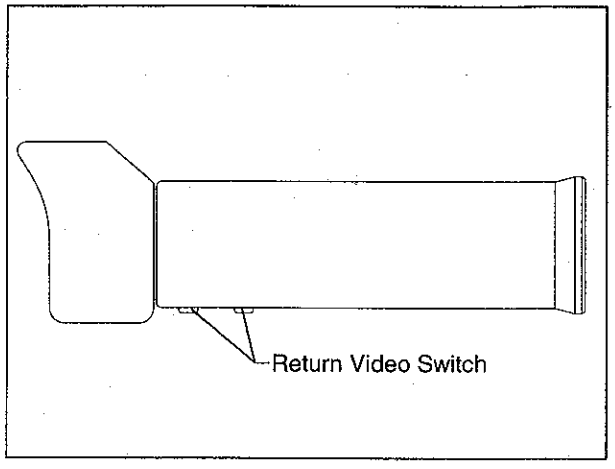
Turning the switch to ON recalls the saved zoom position.
(Once released, the switch automatically returns to OFF (center).)

※ (NOTE): Each time the switch is turned to MEMO, the saved data is updated to the current zoom position.

[Return video switch]

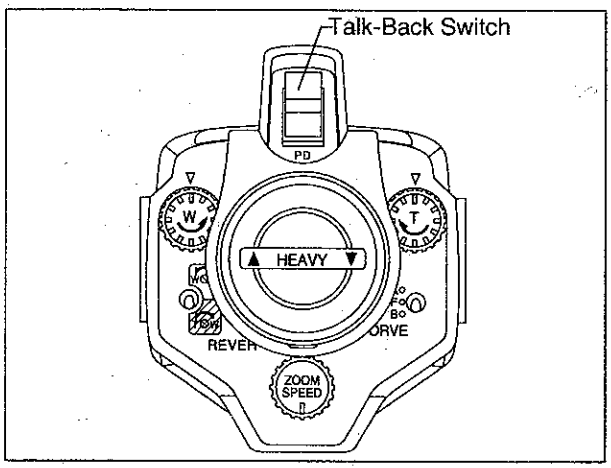
There are two return video switches located below the grip of the servo zoom demand.

When the camera used processes only a single signal system, a cap is placed over one of the switches, or both switches are used in parallel processing mode.



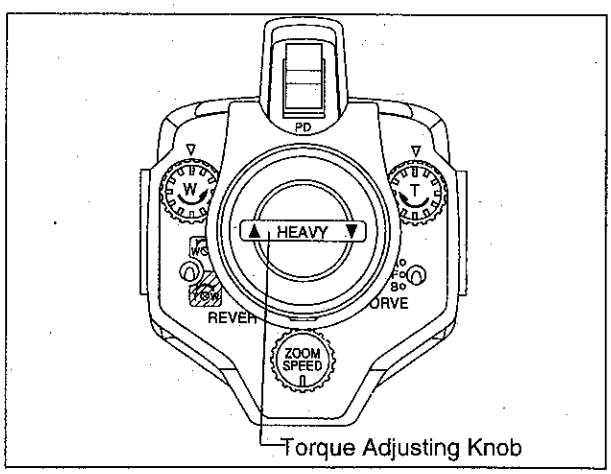
[Talk-back function]

When the camera used has a talk-back function (PRODUCER/ENGINEER), the talk-back switch located on top of the servo zoom demand can be used.



[Adjusting the torque]

Turning the thumb ring torque adjusting knob on the servo zoom demand changes the torque of the thumb ring. To increase the torque, turn the knob clockwise (as viewed from the grip).

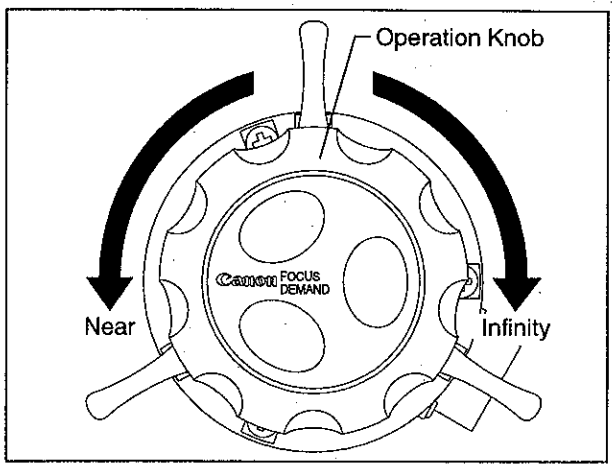


B-2. Focusing with Servo Focus Demand 《FDJ-D01》

Turn the knob on the servo focus demand to focus the lens.

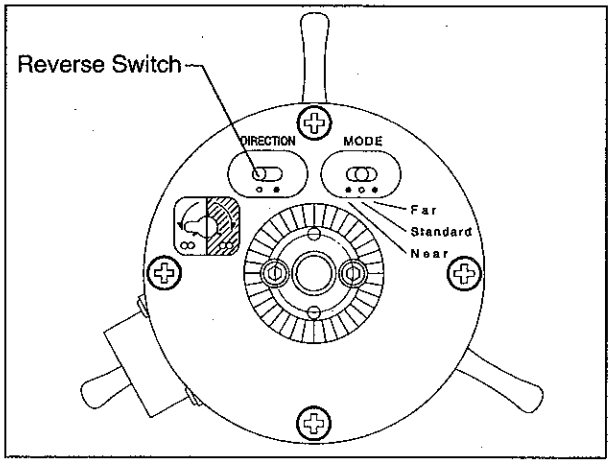
[Operation]

Turning the servo focus demand operation knob clockwise (as viewed from the knob) brings object at infinity into focus. Turning the knob counterclockwise brings objects at the M.O.D. into focus.



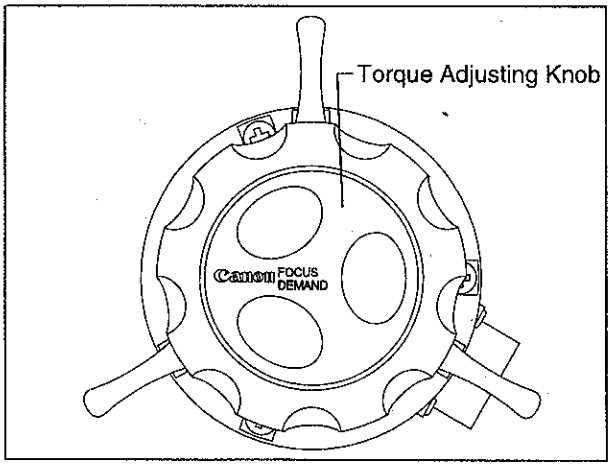
[Changing the rotation direction]

The rotation direction is factory-set so that turning the knob clockwise (as viewed from the knob) brings object at infinity into focus. The infinite/near direction of the knob can be reversed with the reverse switch on the servo focus demand.



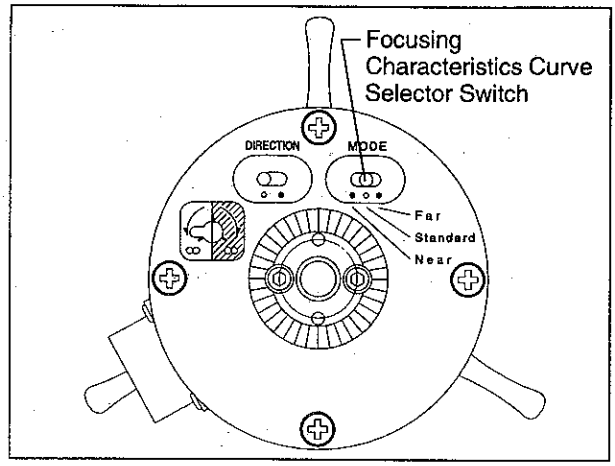
[Adjusting the torque]

Turning the torque adjusting knob on the servo focus demand changes the torque of the focus demand.



[Selecting the focusing characteristics curve]

The focusing characteristics curve selector switch on the servo focus demand can be used to select the focusing characteristics from the following three modes (one linear, two curved modes).

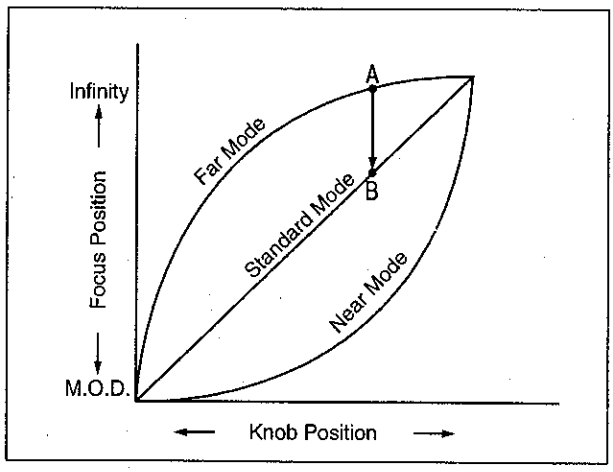


Standard mode (center) : Standard characteristics where the focus lens group is moved linear, relative to knob rotation.

Far mode (right) : Curve characteristics where the focus lens group is moved by a smaller amount, relative to knob rotation, toward infinity. This enables fine focus adjustment near infinity.

Near mode (left) : Curve characteristics where the focus lens group is moved by a smaller amount, relative to knob rotation, toward M.O.D. This is the opposite of far mode. This enables fine focus adjustment near M.O.D.

※ (NOTE): Changing the setting of this switch during shooting changes the focusing characteristics curve, so the focus position may also be changed abruptly. In the figure below, for example, if Far mode is changed to Standard mode when the focus position is point A, the focus position is moved to point B.



[End slip function]

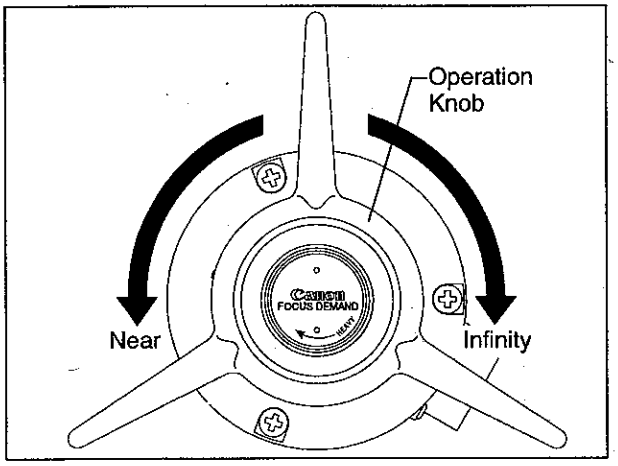
A end slip function is provided to reduce impacts at the infinite and near ends of the servo focus demand.

B-3. Focusing with Servo Focus Demand 《FDJ-D11》

Turn the knob on the servo focus demand to focus the lens.

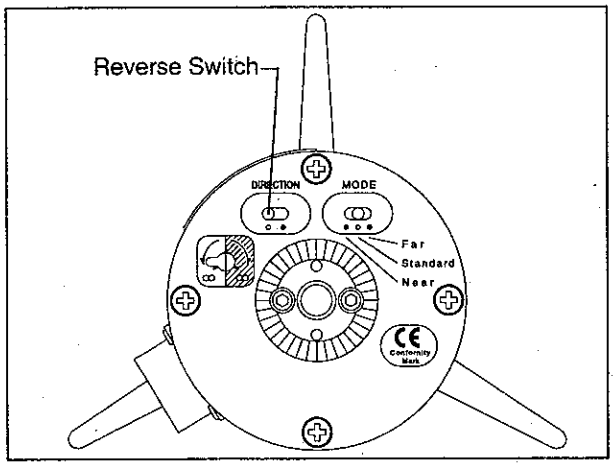
[Operation]

Turning the servo focus demand operation knob clockwise (as viewed from the knob) brings object at infinity into focus. Turning the knob counterclockwise brings objects at the M.O.D into focus.



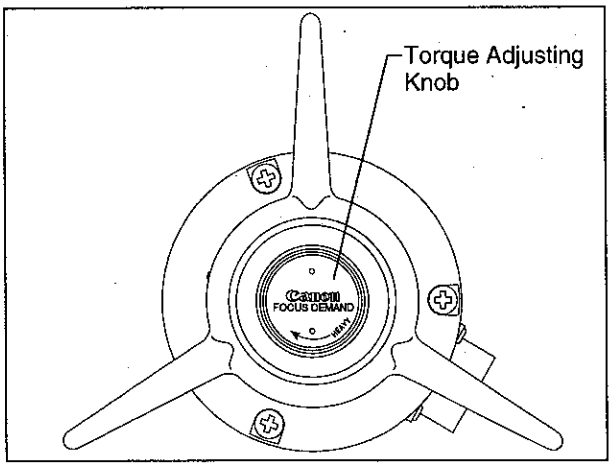
[Changing the rotation direction]

The rotation direction is factory-set so that turning the knob clockwise (as viewed from the knob) brings object at infinity into focus. The infinite/near direction of the knob can be reversed with the reverse switch on the servo focus demand.



[Adjusting the torque]

Turning the torque adjusting knob on the servo focus demand changes the torque of the focus demand.



[End slip function]

A end slip function is provided to reduce impacts at the infinite and near ends of the servo focus demand.

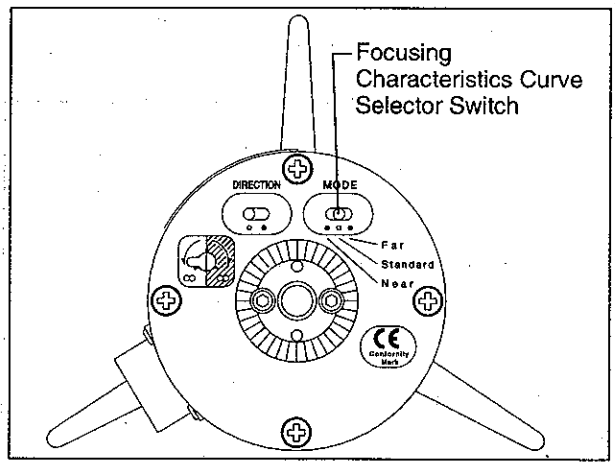
[Selecting the focusing characteristics curve]

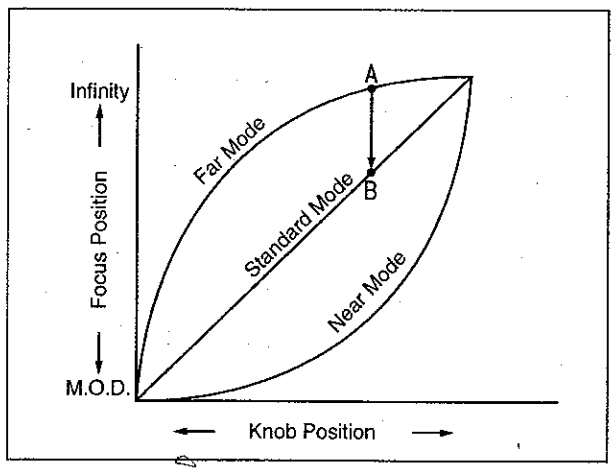
The focusing characteristics curve selector switch on the servo focus demand can be used to select the focusing characteristics from the following three modes (one linear, two curved modes).

Standard mode (center) : Standard characteristics where the focus lens group is moved linear, relative to knob rotation.

Far mode (right) : Curve characteristics where the focus lens group is moved by a smaller amount, relative to knob rotation, toward infinity. This enables fine focus adjustment near infinity.

Near mode (left) : Curve characteristics where the focus lens group is moved by a smaller amount, relative to knob rotation, toward M.O.D. This is the opposite of far mode. This enables fine focus adjustment near M.O.D.

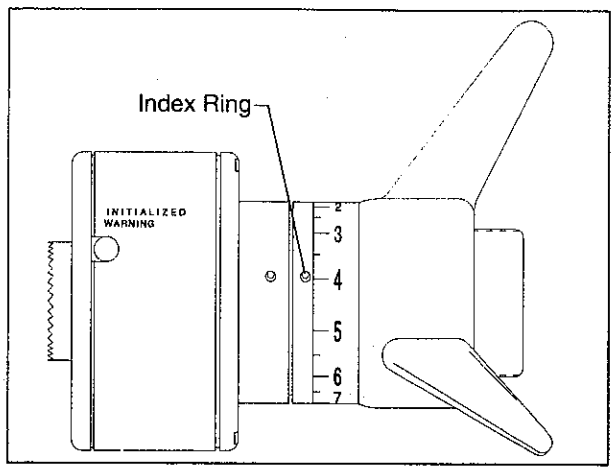




※ (NOTE): Changing the setting of this switch during shooting changes the focusing characteristics curve, so the focus position may also be changed abruptly. In the figure above, for example, if Far mode is changed to Standard mode when the focus position is point A, the focus position is moved to point B.

[Movable index ring]

A movable index ring is provided. So the tint can be set anywhere.



4-2. Operation of the Image Stabilizer (Image Shaking Offset Mechanism)

"Shaking" (vibration) when shooting a field appears as it is as "shaking" in the video image. It is impossible to prevent this even when using the sturdiest of tripods. Shaking becomes even more notable as the distance of the focal point becomes farther. It is a major hindrance to shooting a field. Canon has made it possible to offer powerful video images that have extremely little "shaking" even at ultra-high magnifications using its independently developed image stabilizer (Image Shaking Offset Mechanism).

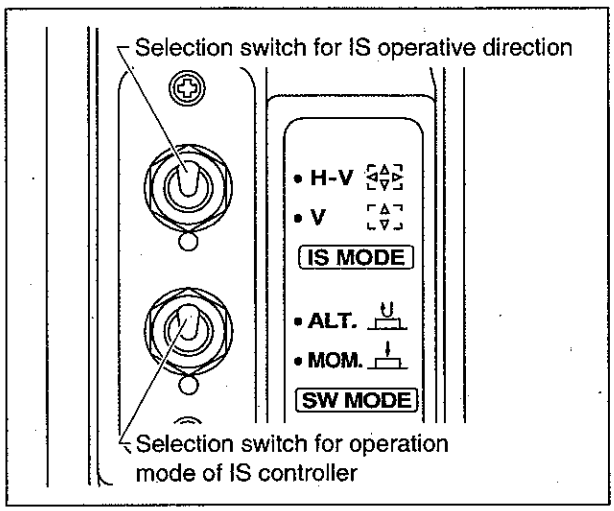
How to Operate

Check section "2.D. Mounting and Connecting the Image Stabilizer System" before operating.

A. Basic Operations

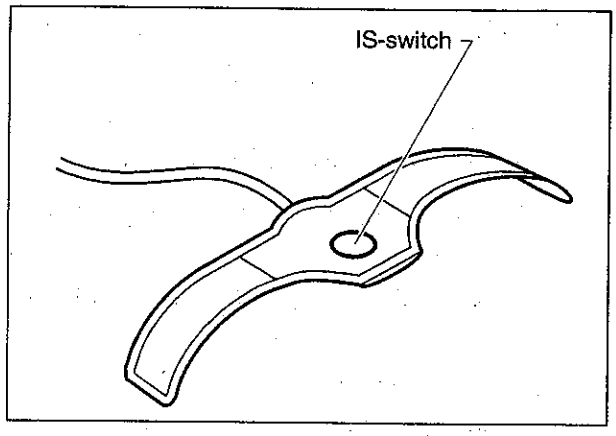
1. Check that the Selection switch for operation mode of IS controller ("SW MODE" switch) is at the [MOM] position. If it is at the [ALT] side, set it to the [MOM] side.

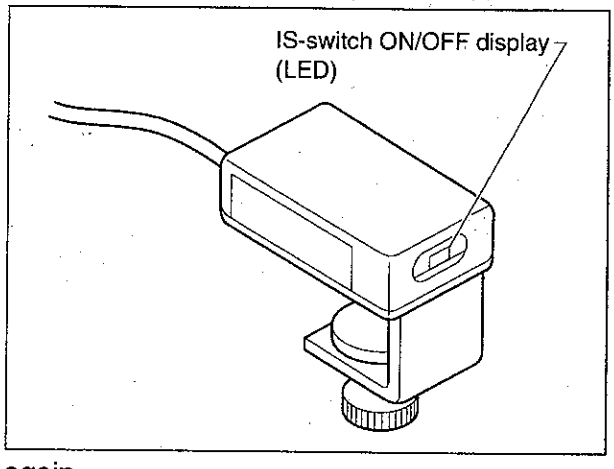
2. Check that the Selection switch for IS operative direction ("IS MODE" switch) is at the [H-V] position. If it is at the [V] position, move it to the [H-V] position.



3. Determine the composition by operating pan-tilt.

4. If "shaking" is noticeable, press the IS-switch. At this time the LED on the IS-switch ON/OFF display will light in green and the image stabilizer will operate. (The image stabilizer operates while it is pressed.)





5. Release the IS-switch to operate pan-tilt again.

※ (NOTE): 1. Operating the pan-tilt while the image stabilizer is operating will make the composition appear unnatural, because of the nature of the mechanism. Therefore, it is recommended that pan-tilt be operated while the image stabilizer is stopped.

2. If pan-tilt is operated while the image stabilizer is being used, start and stop pan-tilt slowly without causing sudden pan-tilt operations. However, the user must be accustomed to operations to a certain degree.

B. Application to Operations

B-1. Selection Switch for Operation Mode of IS Controller ("SW MODE" switch)

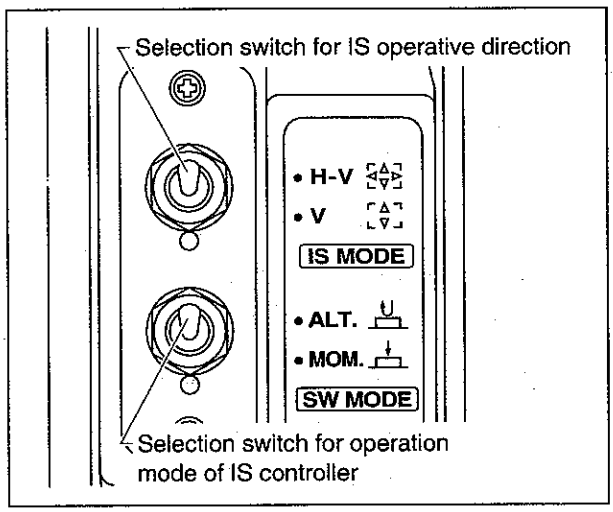
Following settings for the IS switch operating environment are possible with the "SW MODE" switch.

SW MODE Switch	IS Switch	Image Stabilizer Start and Stop
MOM. (Momentary Switch)	Continue Pressing	Operates
	Release	Stops
ALT. (Alternate)	Pressed then Released	Repeats Starting and Stopping with Each Press

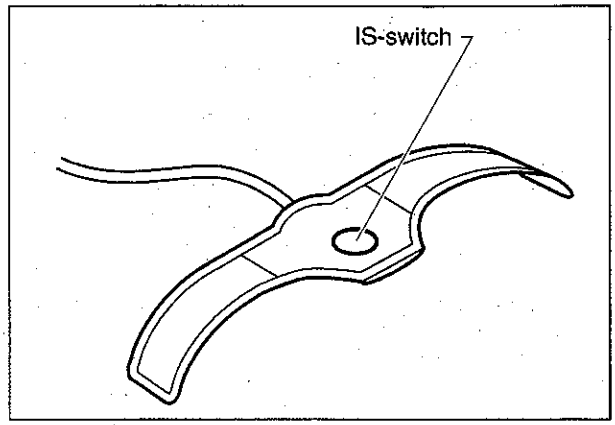
B-2. Selection Switch for IS Operative Direction ("IS MODE" switch)

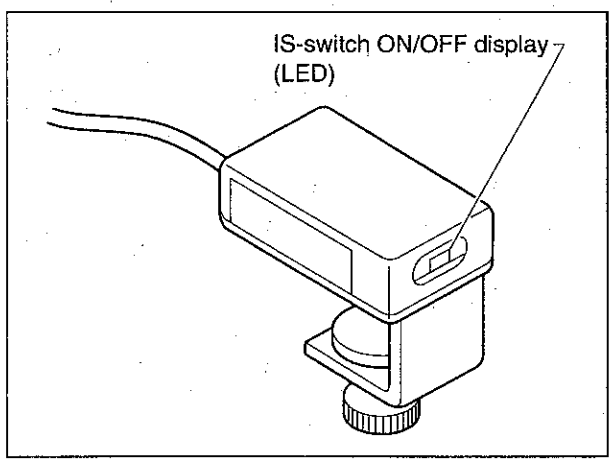
This is used when frequently performing only panning operations (horizontal direction), or when you want to operate the image stabilizer (Image Shaking Offset Mechanism) only when tilting (vertical direction).

1. Set the "IS MODE" switch to the [V] position.



2. Operate the image stabilizer using the IS switch when "shaking" is noticeable. The LED of the IS switch ON/OFF display unit will light in green and the image stabilizer operates.
(The operation of the IS switch varies according to the "SW MODE" switch. See B-1. Selection Switch for Operation Mode of IS Controller for details.)





3. Operate panning (horizontal direction). At this time, the image stabilizer will operate only when tilting (vertical direction).

※ (NOTE): Because the Image Shaking Offset Mechanism operates only for the tilting (vertical direction) when the "IS MODE" switch is set to the [V] position for the image stabilizer, offset for the shaking when panning (horizontal direction) will not operate.

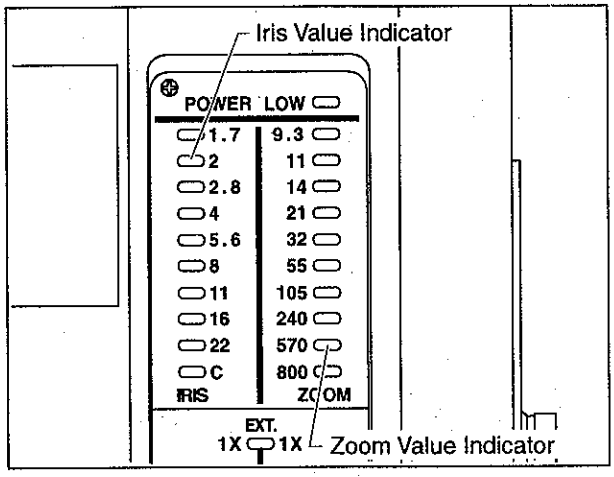
Operations of the Image Stabilizer According to Each Switch Setting

IS MODE	SW MODE	IS Switch	Operation of the Image Stabilizer
H-V	MOM.	When Pressed	Offsets for shaking for all directions.
		Released	Stops
	ALT.	Pressed then Released	Repeats "offsets for shaking for all directions and stops." (Repeated each time the IS Switch is pressed.)
V	MOM.	When Pressed	Offsets for shaking only for the vertical direction.
		Released	Stops
	ALT.	Pressed then Released	Repeats "offsets for shaking for the vertical direction and stops." (Repeated each time the IS Switch is pressed.)

4-3. Iris Operation

Iris operation used the position servo control method based on instructions from the CCU. Operation can be switched between auto iris control and remote iris control.

During shooting, the approximate iris value can be checked with the indicator on the left side of the lens (as viewed from the camera).



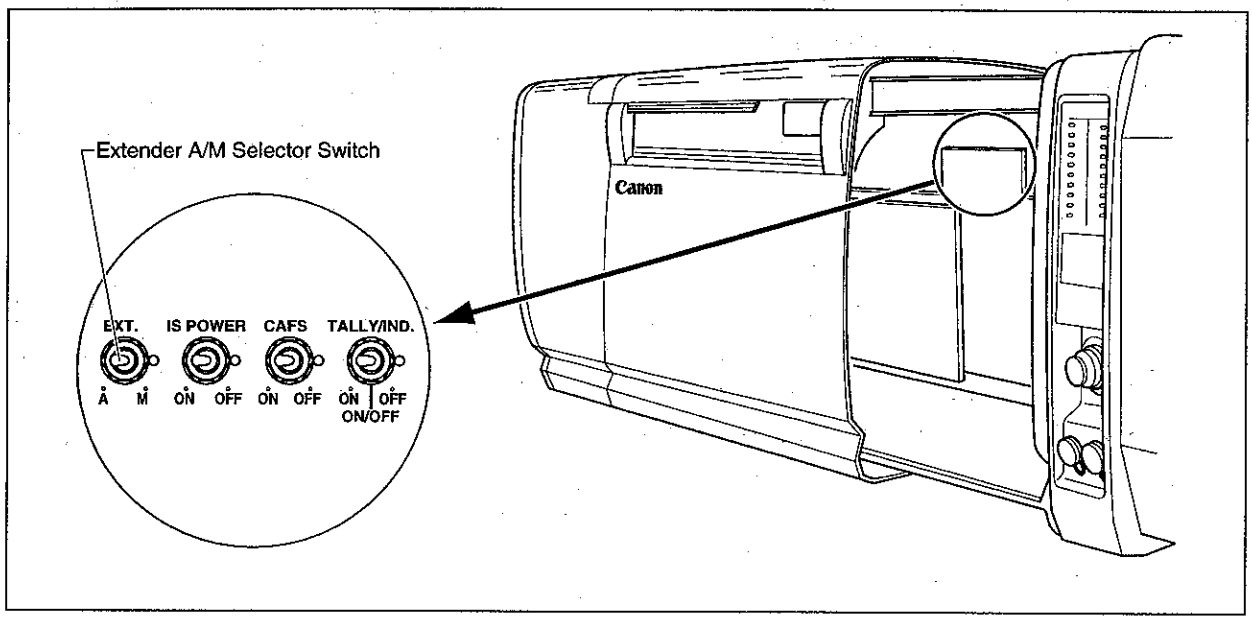
Control from the CCU

Both auto iris and remote iris can be performed using control from the CCU. See the operation manual of the camera for details.

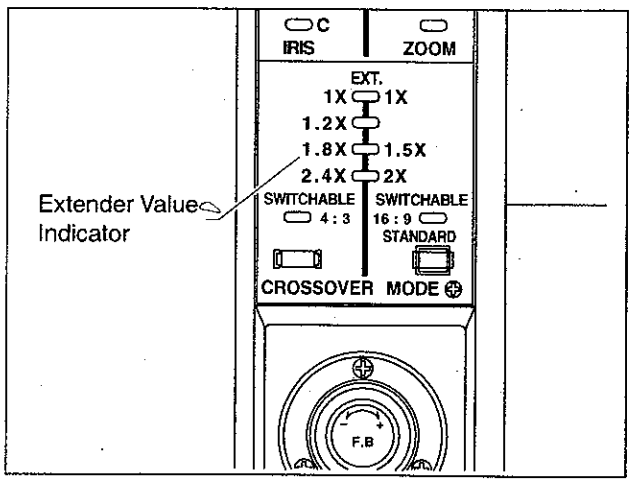
4-4. Extender Operation

The extender can be operated by servo operation from the servo zoom demand, switch box or camera, or manually by the operation knob on the lens.

To select the operation mode, set the extender A/M selector switch (on the upper right of the lens circuit board) to "A" (auto) or "M" (manual).



While the extender is being used, the extender value can be checked with the indicator on the left side of the lens (as viewed from the camera).



※ (NOTE):
1) See page 38 for details of how to open the lens cover of the lens.
2) The extender A / M selector switch is factory-set to "A" (auto).
3) The indicators in the figure to the right are switchable indicators. Standard type indicators have a slightly different shape.

A. Servo operation

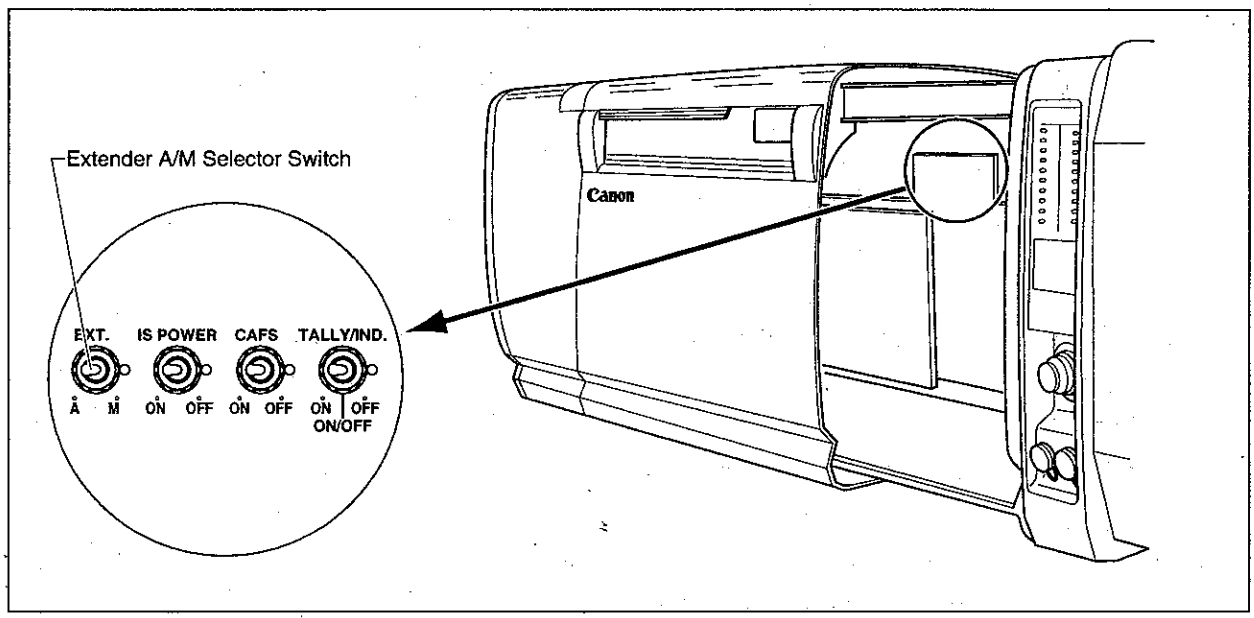
[Preparing the lens]

1. Open the lens cover of the lens.

※ (NOTE): See page 38 for details of how to open the lens cover.

2. Set the extender A/M selector switch inside the lens cover (located at the upper right of the circuit board) to "A"(auto).

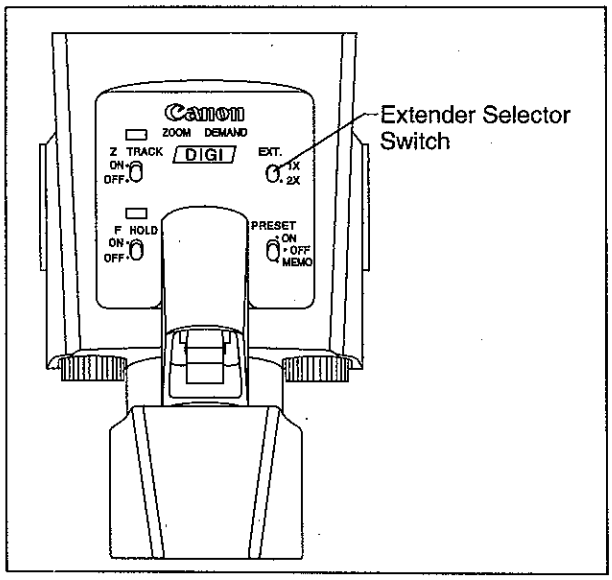
3. Close the lens cover.



A-1. Operation using the extender selector switch on the servo zoom demand

Operate the extender by switching the extender selector switch on the servo zoom demand.

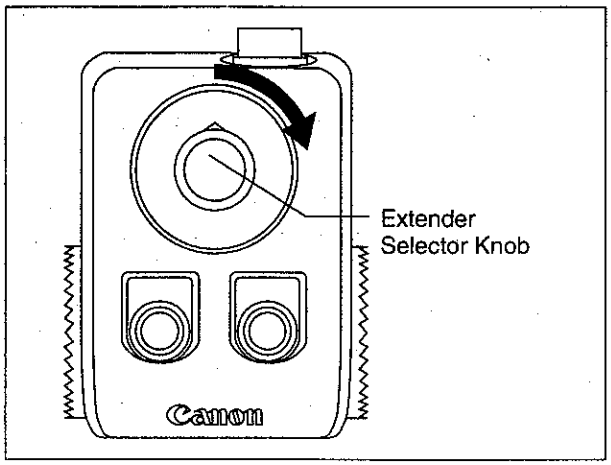
Set the extender selector switch on the servo zoom demand to the Nx side to switch the extender value to Nx. Set the switch to the 1x side to switch the extender value to 1x.



A-2. Operation using the extender selector knob on the switch box

Operate the extender by turning the extender selector knob on the switch box.

Turn the extender selector knob on the switch box in the direction of the arrow as viewed from the knob to switch the extender value to Nx. Turn the knob in the opposite direction to switch the extender value to 1x.



※ (NOTE): See "§ 2. 2-2. D. Mounting and connecting the switch box" for details of how to mount and connect the switch box.

A-3. Operation using the extender selector switch on the camera

(For lenses that support cameras with an extender switching function in the interface between the lens and the camera)

Operate the extender by switching the extender selector switch on the camera.

※ (NOTE): 1) See the operating instruction manual of the camera for details of how to switch the extender from the camera.

2) When using the camera, servo zoom demand and switch box together, the last operated switch has priority.

B. Manual operation

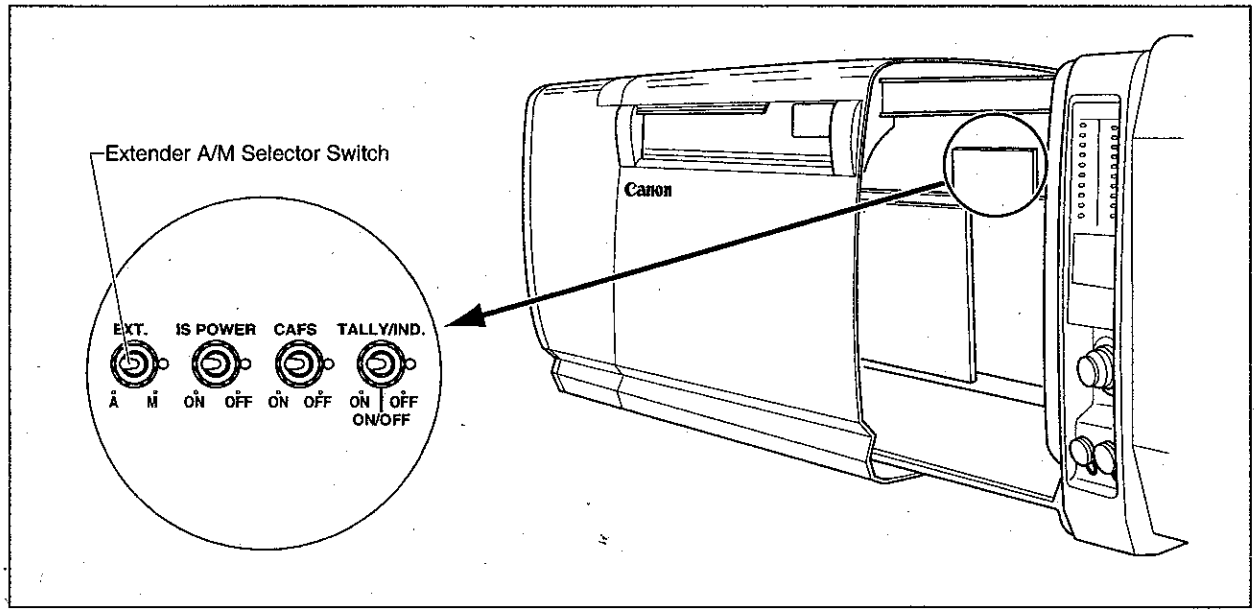
[Preparing the lens]

1. Open the lens cover of the lens.

※ (NOTE): See page 38 for details of how to open the lens cover.

2. Set the extender A/M selector switch inside the lens cover (located at the upper right of the circuit board) to "M" (manual).

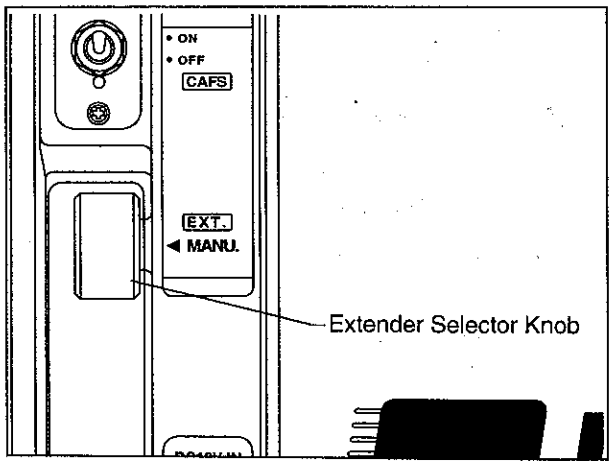
3. Close the lens cover.



[Operation]

Turn the extender selector knob on the right side of the lens (as viewed from the camera) to operate the extender.

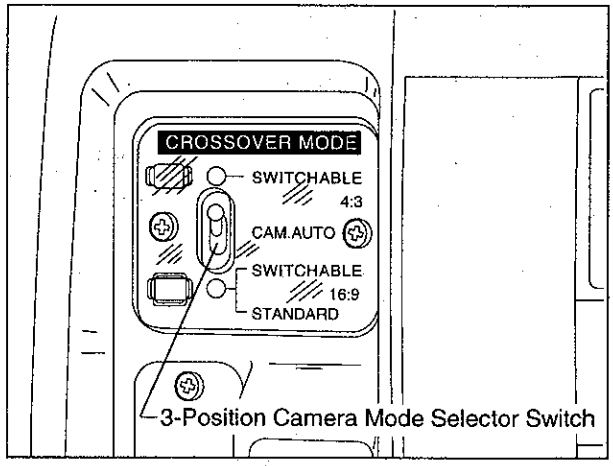
Turn the extender selector knob counter-clockwise as viewed from the camera to switch the extender value to Nx.



4-5. Camera Mode Switching (Optional)

This lens optionally supports switchable cameras.

The camera mode can be switched by the 3-position camera mode selector switch on the right side of the lens (as viewed from the camera). Set the mode selector switch to the desired position according to the camera.



Camera	Automatic Switching Interface	Switch Position		Application
Switchable Camera	Provide	CAM.AUTO	Center	Automatic mode switching according to the camera setting
	Not Provided	SWITCHABLE 4:3	Top	Selecting 4:3 mode
		SWITCHABLE 16:9 / STANDARD	Bottom	Selecting 16:9 mode
16:9 camera 4:3 camera		SWITCHABLE 16:9 / STANDARD		When using a camera which does not support mode switching

- After setting the mode, you can change the extender value by using the servo zoom demand or switch box.

  In 16:9 mode 1x, 2x

  In standard mode 1x, 2x

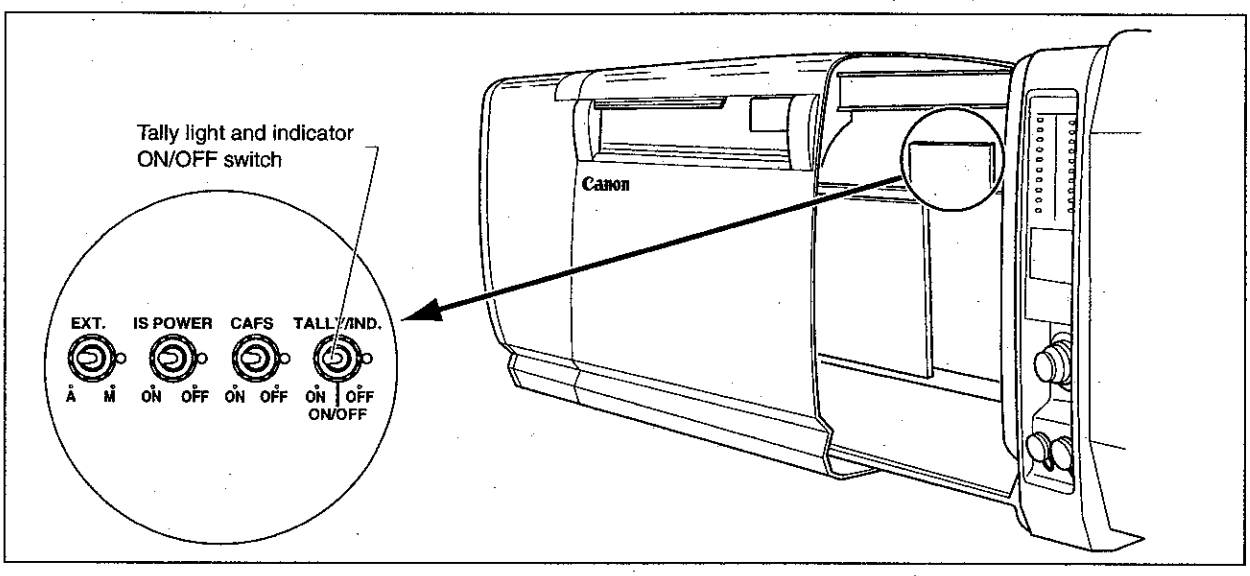
  In 4:3 mode 1x, 2.4x

4-6. Other Lens Functions

(1) Tally light and indicator ON/OFF switch

The tally light and indicator ON/OFF switch are located on the right side of the lens (as viewed from the camera).

When tally display and indicator display are not necessary, set the switch to OFF to turn off the indicators.



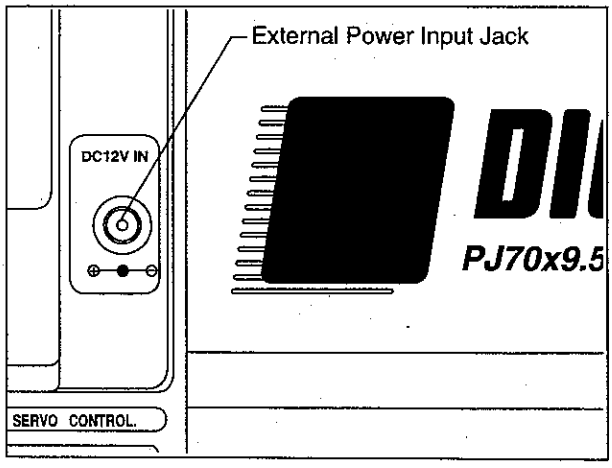
※ (NOTE): 1) After opening the lens cover, you will see a switch for selecting the brightness of the tally light. For details, see item (4), "Setting the brightness of the tally light," on the next page.

2) Box-type lenses for portable cameras do not have a tally light. Therefore, this switch functions only as the indicator ON/OFF switch.

(2) External power input (Optional)

An external power input jack is provided at the right side of the lens (as viewed from the camera). This 12 V DC jack can be used to supply power to the lens when using a portable camera (with a supporter). A commercially available battery can be used.

Maker	: WAKA
Model	: 178J035
Canon Parts No.	: BH7-1009-000



※ (NOTE): 1) There is a cable manufactured by Canon to protect against the electromagnetic radiation.

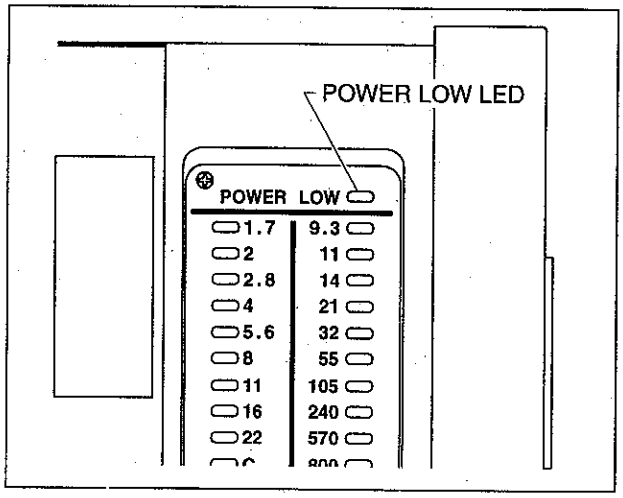
When using the external power input jack, use this cable.

2) Other systems for supplying power to the lens when using a portable camera are also supported. Contact Canon Inc. for derails.

(3) External power indicator (Power Low)

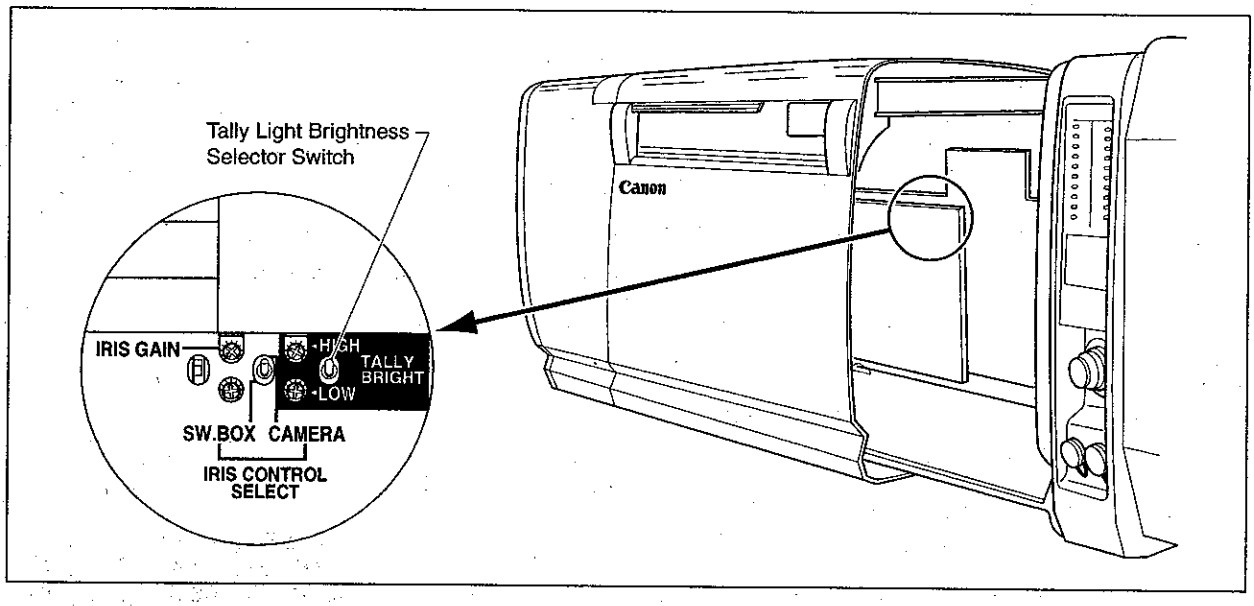
A Power Low LED, used to indicate a low power supply, is provided on the indicator panel at the left side of the lens (as viewed from the camera). Replace the battery according to the following LED indication:

Off : Power is supplied normally
Blinks red : 10.5 V – 10 V
Lights red : 10 V or less



(4) Setting the brightness of the tally light

After opening the lens cover, you will see a circuit board.
The brightness of the tally light can be selected by setting the tally light brightness selector switch on this board. This switch is factory-set to the "HIGH" position.



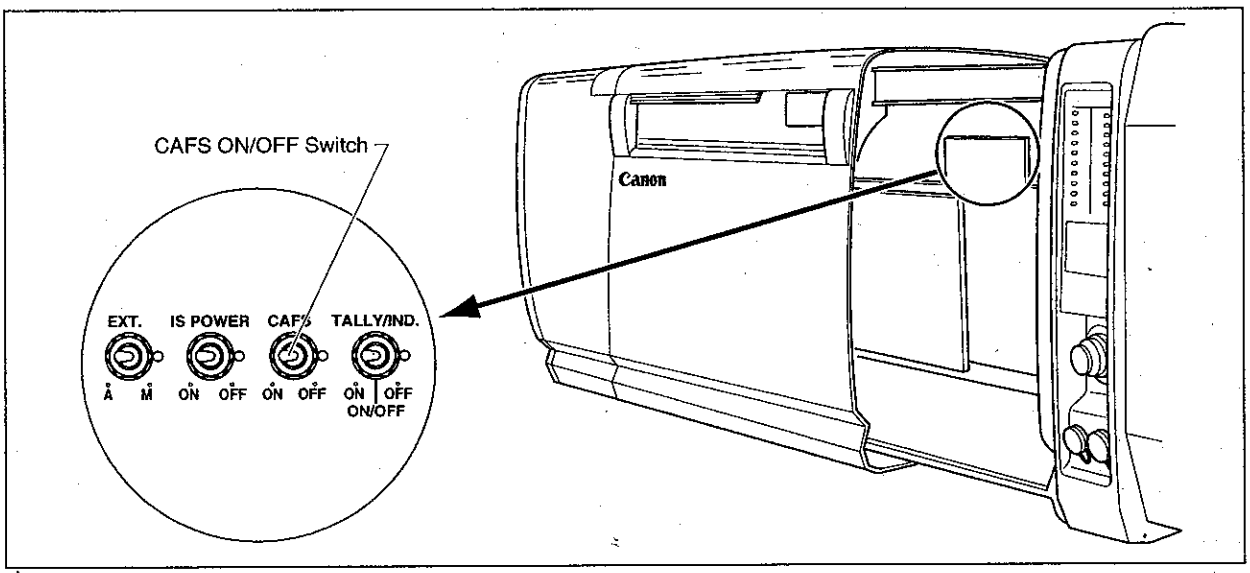
※ (NOTE): 1) The brightness of the tally light is adjusted to a suitable level at the factory.
2) Before attempting to set the brightness of the tally light, check that the tally light and indicator ON/OFF switch is set to ON on the tally light side. The function of the tally light and indicator ON/OFF switch is explained on the previous page.
3) For an explanation of how to open the lens cover, see "Opening the lens cover" on page 38.

(5) CAFS: Constant Angle Focusing System

The lens is equipped with a CAFS function that suppresses changes in the angle of view that occur during focusing. Follow the steps below to activate this function.

※ (NOTE): Be sure to turn off the zoom track switch of the analog servo zoom demand (ZDJ-A01, etc.) mounted on the lens when using CAFS function.

1. Set the CAFS ON/OFF switch located on the right side of the lens (as viewed from the camera) to ON.
2. The CAFS function is activated to suppress changes in the angle of view during focusing.

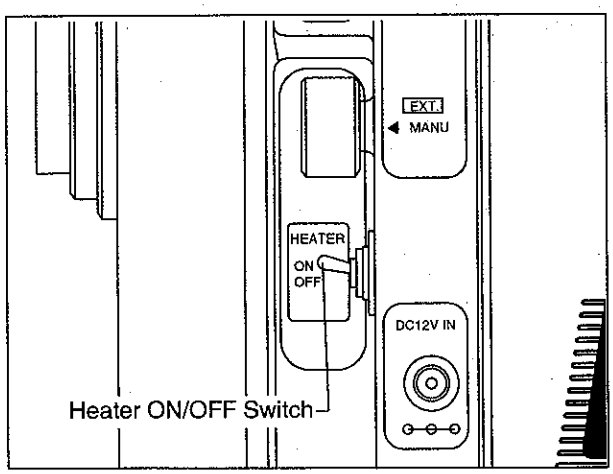


(6) Heater (Optional)

The heater functions to warm the inside of the lens.

Operate the heater function as instructed below.

1. Turn on the heater ON/OFF switch positioned at the right side of the lens as viewed from the camera.
2. The heater starts to warm the inside of the lens.



§ 5. SPECIFICATIONS

	Normal (4:3) mode		16:9 mode	
	1x	2x	1x	2x
Focal Length	9.3 – 800 mm	18.6 – 1600 mm	9.3 – 800 mm	18.6 – 1600 mm
Zoom Ratio	86x			
Maximum Relative Aperture	1:1.7 (9.3 – 340 mm) 1:4.0 (800 mm)	1:3.4 (18.6 – 680 mm) 1:8.0 (1600 mm)	1:1.7 (9.3 – 340 mm) 1:4.0 (800 mm)	1:3.4 (18.6 – 680 mm) 1:8.0 (1600 mm)
Image Format	8.8 x 6.6 mm (Diagonal 11 mm)		9.6 x 5.4 mm (Diagonal 11 mm)	
Angular Field of View (Wide) (Tele)	50.6° x 39.1° 0.63° x 0.47°	26.6° x 20.1° 0.32° x 0.24°	54.6° x 32.4° 0.69° x 0.39°	28.9° x 16.5° 0.34° x 0.19°
Minimum Object Distance (M.O.D.)	3.0 m			
Object Dimensions at M.O.D. (Wide) (Tele)	252.5 x 189.4 cm 3.0 x 2.2 cm	129.4 x 97.1 cm 1.5 x 1.1 cm	274.9 x 145.6 cm 3.3 x 1.8 cm	141.1 x 79.4 cm 1.7 x 0.9 cm

	Switchable (4:3) mode		
	1x	1.2x	2.4x
Focal Length	7.65 – 660 mm	9.3 – 800 mm	18.6 – 1600 mm
Zoom Ratio	86x		
Maximum Relative Aperture	1:1.7 (7.65 – 340 mm) 1:3.3 (660 mm)	1:1.7 (9.3 – 340 mm) 1:4.0 (800 mm)	1:3.4 (18.6 – 680 mm) 1:8 (1600 mm)
Image Format	7.2 x 5.4 mm (Diagonal 9 mm)		
Angular Field of View (Wide) (Tele)	50.6° x 39.1° 0.63° x 0.47°	42.3° x 32.4° 0.52° x 0.39°	21.9° x 16.5° 0.26° x 0.19°
Minimum Object Distance (M.O.D.)	3.0 m		
Object Dimensions at M.O.D. (Wide) (Tele)	252.5 x 189.4 cm 3.0 x 2.2 cm	206.2 x 154.6 cm 2.4 x 1.8 cm	105.8 x 79.4 cm 1.3 x 0.9 cm

Dimensions : See attached outside drawing.
Flange back : See attached outside drawing.
Zoom speed : 0.6 ± 0.1s Max.
Focus speed : 0.8 ± 0.1s Max.
Iris speed : 0.8 ± 0.1s
Mount : B3, B4
Input voltage : Ikegami dedicated lens : AC 220 V, Other : DC 12 V (10 V – 17 V)
Power consumption : Flexible system : 6 W Max., Servo system : 24 W Max.
Operating temperature : –20°C to +45°C

JAPAN — CANON INC.
20-2, kiyohara-kogyo-danchi,
Utsunomiya-shi, Tochigi-ken, 321-3292, Japan

U.S.A — CANON U.S.A., INC.
400 Sylvan Ave., Englewood Cliffs,
N.J. 07632 U.S.A

CANADA — CANON CANADA INC.
6390 Dixie Road, Mississauga,
Ontario L5T1P7 Canada

EUROPE,AFRICA &MIDDLE EAST — CANON EUROPA N.V.
Bovenkerkerweg 59-61, P.O.Box 2262 1180 EG
Amstelveen, The Netherlands

OCEANIA — CANON AUSTRALIA PTY. LTD.
1 Thomas Holt Drive, North Ryde,
NSW 2113 Australia

ASIA — CANON SINGAPORE PTE. LTD.
No.1 Jalan Kilang Timor #03-01,
Pacific Tech Center Singapore, 159303

Canon

CANON INC.

Broadcast Equipment Production

20-2, Kiyohara-kogyo-danchi, Utsunomiya-shi,

Tochigi-ken, 321-3292, Japan

Telephone: 81-(028)-667-5711

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