Broadcast Television Lenses 2016/2017
Canon is a pioneer in the design of broadcast lenses. It was more than 50 years ago that we introduced the first BCTV lens – the “Field Zoom IF-1” with a 6.7x zoom range, which was the highest in the industry at the time. Since then we have energetically advanced the art of high-end optical design on many fronts – working in close collaboration with international broadcasters and producers to develop innovative products and enhance customer satisfaction. Today we offer an exciting range of innovative high-end imaging products that stimulate creativity and deliver superb quality results, as we continue our pioneering pursuit of excellence into the 21st century.

Emmy Award
The National Academy of Television Arts and Sciences awarded Canon an EMMY® in 2005 in recognition of our engineering creativity in Lens Technology Developments for Solid State Image Cameras in High Definition Formats. We also received an EMMY® in 1996 for “Implementation In Lens Technology to Achieve Compatibility with CCD Sensors”.

Customer Satisfaction
Canon is committed to total Customer Satisfaction. To meet this commitment we aim to support users by developing new lens technologies, high-quality technical service systems and other sales support.

Canon’s Worldwide Support Network
Well trained sales people and/or service technicians are ready to support you at these locations.
Since the introduction of our first BCTV lens more than 50 years ago, Canon has been developing its know-how and technologies - so that today we offer an extensive range of high end lenses with the flexibility to suit various shooting situations and meet the exacting demands of today's creative professionals.

Understanding the Lens model naming conventions

Optical compensation for Prim lenses

Special Function (1)

Special Function (2)

Zoom/Focus Control

Remote Control Lenses

System Overview

Remote Control Accessories

Remote Control Lenses

Optical Accessories

Remote Control Accessories

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Canon’s Epoch-making Technology

UHD/HDTV Lenses

Canon began developing lenses for the “HDTV System” more than 20 years ago and continues to lead the broadcast industry into the 21st century “DTV” era – most recently with the next generation of HDTV lenses and our pioneering Cinema EOS 4K lenses. The series are:

- UHDxs 4K 4K 2/3" Lens Series
- Portable HDxs Series
- HDgc Series
- EF Cinema Lens Series
- Compact HDxs Lenses
- ENG/EFP Lenses
- ENG Lenses for 1/2" Cameras
- ENG Lenses for 2/3" Cameras
- ENG Lenses for 1/3" Cameras
- Cinematography Lenses
- Studio/Field Lenses
- EFP Lenses
- Zoom Lenses
- Prime Lenses
- Prime Stabilizer Image Built-in
- Studio Lens Compact
- Studio Lens Premium
- 4K 2/3" ENG/FEP Lenses
- 4K 2/3" Studio Lenses
- 4K 2/3" Studio Lens

4K 2/3" Lens Series

New BCTV lenses designed to accelerate the pace of 4K UHD content creation. As 4K continues its steady integration into mainstream television dramas, documentaries and movies, Canon has been at the technological forefront with our innovative Cinema EOS series and our pioneering Cinema EOS 4K lenses. The series are:

- New BCTV lenses designed to accelerate the pace of 4K UHD content creation.
- As 4K continues its steady integration into mainstream television dramas, documentaries and movies, Canon has been at the technological forefront with our innovative Cinema EOS series and our pioneering Cinema EOS 4K lenses.
- The series are:
  - UHDxs 4K 4K 2/3" Lens Series
  - Portable HDxs Series
  - HDgc Series
  - EF Cinema Lens Series
  - Compact HDxs Lenses
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  - ENG Lenses for 1/2" Cameras
  - ENG Lenses for 2/3" Cameras
  - ENG Lenses for 1/3" Cameras
  - Cinematography Lenses
  - Studio/Field Lenses
  - EFP Lenses
  - Zoom Lenses
  - Prime Lenses
  - Prime Stabilizer Image Built-in
  - Studio Lens Compact
  - Studio Lens Premium
  - 4K 2/3" ENG/FEP Lenses
  - 4K 2/3" Studio Lenses
  - 4K 2/3" Studio Lens

Auto Focus Technology

To meet the increasing demand in broadcast HDTV production for highly accurate focusing, Canon has introduced a revolutionary HDTV Auto Focus System. This pioneering technology automatically keeps images in focus, allowing professional camera operators to concentrate on capturing action and beauty shots.

TTL-Secondary Image Registration Phase-detection System

The light transmitted through a pair of secondary imaging lenses focuses on separate sensors (as illustrated). The TTL-Secondary Image Registration Phase-detection System determines the positional relationship between the two images (See “d” in diagram right) to detect the amount and direction of defocusing.

Features

- Extremely high focusing accuracy in Full HDTV specifications
- Ability to focus from a completely de-focused status without hunting
- Ability to focus on a high speed moving object
- Size and position of the AF frame (target area) in the camera viewfinder can be changed from the Focus Demand FDJ-P31/P41. (The size of the AF Frame can be changed in 3 steps). Please confirm the AF camera-lens interface with your chosen camera manufacturer
- Two operation modes – Full Time AF and Part Time AF – to meet needs of professional camera operators

Changeable AF frame

2 kinds of AF Operation modes with ACTIVE/HOLD switch

<table>
<thead>
<tr>
<th>Mode</th>
<th>FULL TIME AF</th>
<th>PART TIME AF</th>
</tr>
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<tbody>
<tr>
<td>How AF works</td>
<td>Usually activated</td>
<td>Usually off</td>
</tr>
<tr>
<td>Recommended</td>
<td>Sporting event etc. To</td>
<td>Follow a moving object.</td>
</tr>
<tr>
<td>Applications</td>
<td>confirm the best focus position.</td>
<td></td>
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</table>

This article refers to Auto Focus Technology for the DIGISUPER HDTV Zoom Lenses listed below. For full lens specifications see Page 16,17 and 18.
Canon’s Epoch-making Technology

Canon offers a series of HDxs / HDGC (IRSE S / IASE S model) lenses, which are equipped with an enhanced digital drive unit. 16-bit resolution Rotary Encoder Devices are built into the unit, so the lenses can simply be integrated into a virtual digital studio system without any additions. The encoders also enable superior precise control.

The zoom servo provides a dynamic range from 0.5 sec. to over a 5 min. super slow zoom. Repeatability in focus and iris control are also much more precise. Canon’s unique technology has enabled the surprisingly small Encoder Device to be installed in the existing drive unit without any changes in size or weight.

Ecological Design

Sustainability is at the heart of Canon’s Kyosei philosophy – living and working together for the common good – and we are always looking to further reduce our environmental impact.

In 2004, Canon introduced a new broadcast lens technology, with the launch of the HJ22ex7.6B. Two aspects of the new technology are represented by the letter “e”. One is “ecological design”, as these lenses are harmless to the environment, the other “enhanced digital” technology, which improves the performance of the digital drive unit. These improvements are now also incorporated in the HDGC (IRSE S / IASE S model) and the HDxs lenses.

Canon 3D Solution

Recognising the continuing requirement for 3D program origination, Canon has prioritised adoption of most of the standard HD lens series for 3D production systems. Originally this entailed using our original 16bit resolution encoders, while allowing off sets of zoom, focus and iris positions to compensate for the tracking of each position. However we now have a new solution for a simpler, low cost 3D production system with increased interoperability.

3D Lens Lineups

The “3D Lens Adjustment Software” makes stereoscopic tracking of the zoom, focus and iris even more precise. It allows appropriate offsets to be easily made using the Digital Drive Unit’s display, to compensate for minor zoom and focus tracking differences between any two lens pairs. Using the software, Canon’s synchronous lens control system doesn’t require special controllers. All the servo controllers for digital servo lenses, as shown below, will be compatible by simply connecting the two lenses with a 3D Bridge Cable (BC-100), saving additional costs when implementing 3D production systems.

Lens Refinements for 3D

The Canon’s ergonomic Digital Drive Unit incorporates Canon-developed, ultra-compact rotary encoders capable of 0.1μm position detection, which produces 16-bit resolution of the positions of zoom, iris, and focus controls. This unique device allows for one zoom controller and one focus controller to simultaneously operate both lenses, while providing even higher interoperability and precision in the synchronisation of zoom, focus and iris positions of the lens pairs.

System Configuration

To Left Lens

To Right Lens

Left/Right Lenses

Zoom / Focus Demands

3D Bridge Cable

3D Lens Adjustment Software

1  BDC-10 conversion cable is necessary to connect between ZDJ-D02 or FDJ-D02 (18pin) and Digital Drive Lens (20pin).

2  BDC-20 conversion cable is necessary to connect between ZDJ-P01 or FDJ-P01 (12pin) and Digital Drive Lens (20pin).
Canon’s Epoch-making Technology

Optical Image Stabilizer

Vari-angle Prism Image Stabilizer (VAP-IS)

Canon’s portable HD production lens, the HJ5ex8.5B KRSE-V, incorporates an innovative built-in optical image stabilization system – the patented Vari-Angle Prism Image Stabilizer (VAP-IS) – that’s designed to significantly enhance HD motion imaging on location shoots. It delivers highly stable HD imagery – countering a wide range of disturbance frequencies that the lens-camera system may be subjected to in a variety of shooting environments. These can range from the very low frequencies encountered during handheld or shoulder-mount shooting by a walking or running camera operator, to the higher vibration frequencies associated with shooting from motorbikes, moving vehicles, and helicopters. Various stabilisation modes can be selected to address diverse shooting operations.

Optical Shift Image Stabilizer (Shift-IS)

Canon, renowned for its Optical Image Stabilization technologies, developed a built-in Optical Shift Image Stabilizer (Shift-IS) for broadcast field lenses to overcome image shaking at telephoto focal lengths. First introduced in the super telephoto DIGISUPER 86xs and DIGISUPER 95, DIGISUPER 86AF, DIGISUPER 100, DIGISUPER 100AF, DIGISUPER 6AF, DUGISUPER 86AF, DIGISUPER 95, DIGISUPER 86AF, DIGISUPER 95, HJ40x10B IASD-V and HJ40x45B IASD-V.

How the VAP-IS (Vari-Angle-Prism Image Stabilizer) Works

Under perfect shooting conditions, light rays from a scene pass through the lens optical system in a tightly prescribed manner. Any vibration or jolt to the lens-camera system will deflect those light rays and produce unsteady images. The VAP-IS technology is incorporated within the lens optical system to intercept and correct such light ray deviations in real-time. The technology is based upon a flexible optical bellows that comprises two flat glass elements separated by a special liquid, forming a sealed mini-optical group within the overall lens element groupings. The bellows expands and contracts when the lens is physically disturbed - and the very high refractive index of the liquid bends the disturbed light rays in the opposite direction. This gives a high degree of real-time correction to the angle of the light rays, ensuring their smooth arrival at the image plane.

How the Optical Shift Image Stabilizer (Shift-IS) Works

When the lens moves, the light rays from the subject are deflected, relative to the optical axis, resulting in an unsteady image. By shifting the IS lens group on a plane perpendicular to the optical axis to counter the degree of image shake, the light rays reaching the image plane can be steadied. Since image shake occurs in both horizontal and vertical directions, two shake-detecting sensors for yaw and pitch detect the angle and speed of movement and send this information to a high-speed 32-bit microcomputer, which converts the information into drive signals for the IS lens group. The actuator then moves the IS lens group horizontally and vertically to counteract the image shake and maintain a stable picture. The Shift-IS component is located within the lens group, without increasing the overall size and weight of the master lens, and is most effective for lower frequency movements caused by platform vibration or wind effect.

HDgc Series

Concept of the HDgc Series

The HDgc series supports the emergence of a new generation of cost-effective HD acquisition systems. Using Canon’s unique technology, the new HDgc lenses exhibit high Modulation Transfer Function (MTF), high resolution and high contrast from the centre of the image to its extreme edges, while maintaining compact size and weight.

Quality of the HDgc Series

The HDgc Series lenses are based upon Canon’s latest design concepts, which support the new generation of cost-effective HD acquisition systems. They are designed to meet the specific bandwidth frequency (or the number of scanning lines) of HD camera systems and at the same time offer an excellent performance-cost ratio.

Comparison of the HDgc series with SDTV Lenses

In the HDTV system the pixel size is about half, so the spread of a point image caused by a spherical aberration, coma etc. will be diminished to about half. The MTF varies as the focus changes and, even if the image is slightly out of focus, the MTF is greatly influenced as shown in Graph 01.

HDgc Lenses are specially designed with optical elements - such as “HI UD Glass”, “Aspherical Elements” and other special elements - that affectively minimise chromatic aberrations, while maintaining high MTF throughout the image.
2/3” 4K Lens series

UHD DIGISUPER Series for 4K System

Step up to 4K broadcasting with fully-featured high-quality 2/3” 4K field and studio zoom lenses.

UHDxs series

4K UHD lenses for portable cameras

Easily make the move to 4K ENG and studio applications with high quality 2/3” 4K wide and standard zoom lenses.
## UHD 4K 2/3” Lenses

### UHD DIGISUPER 86 - our Premium 4K flagship broadcast lens.

As our most refined lens designed to support 4K UHD broadcast systems, it boasts extremely high optical performance that surpasses even 4K criteria and, at the same time, embodies the ease of operation that are ideally suited for use in broadcast television production.

### High zoom ratio and long focal length

While displaying performance that surpasses 4K, the lens has the high zoom ratio (86x) and long focal length (800 mm) desired by many in television production.

### Optical performance that goes beyond 4K

This lens has outstanding optical performance that goes beyond 4K resolution, all the way from screen centre to the edges. Picture sharpness is maintained over the focal range of the lens and with changes in subject distance from the lens.

### Applicability and ease of operation ideally suited to 4K shooting

Since the lens achieves the zoom ratio, long focal length and size as well as the servo speed and stability required for the telecasting of live sports events and other applications, it ensures the applicability and ease of operation ideally suited to 4K shooting.

### Compatibility with HD lens systems

The lens enables the use of the same Canon standard controllers for zoom and focus as well as servo modules currently used by HD equipment. It comes with a 20-pin connector compatible with virtual units and that enables high-accuracy position information of the zoom, focus and iris to be read out.

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### Table of Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>UHD DIGISUPER 86</th>
<th>UHD DIGISUPER 90</th>
<th>UHD DIGISUPER 27</th>
<th>C1528-4SB</th>
<th>C1515-7RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoom Ratio</td>
<td>86x</td>
<td>90x</td>
<td>27x</td>
<td>2x</td>
<td>20x</td>
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<tr>
<td>Built-in Extender</td>
<td>2.0x</td>
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<td>2.0x</td>
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<tr>
<td>Range of Focal Length (with Extender)</td>
<td>9.3-460mm</td>
<td>9-450mm</td>
<td>4.5-180mm</td>
<td>4.3-12mm</td>
<td>7.8-166mm</td>
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<tr>
<td>Maximum Relative Aperture (with Extender)</td>
<td>1:8.0</td>
<td>1:4.8</td>
<td>1:4.0</td>
<td>1:2.4</td>
<td>1:1.7</td>
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<tr>
<td>Angular Field of View (with Extender)</td>
<td>5.4° × 2.1°</td>
<td>10.9° × 4.4°</td>
<td>10.9° × 4.4°</td>
<td>10.9° × 4.4°</td>
<td>10.9° × 4.4°</td>
</tr>
<tr>
<td>M.O.D. from Lens Front</td>
<td>3.0m</td>
<td>3.0m</td>
<td>0.6m</td>
<td>0.3m</td>
<td>0.6m</td>
</tr>
<tr>
<td>Object Dimensions at M.O.D. (with Extender)</td>
<td>276.0 × 135.0mm</td>
<td>257.0 × 120.0mm</td>
<td>144.0 × 63.0mm</td>
<td>39.6 × 18.0mm</td>
<td>39.6 × 18.0mm</td>
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<tr>
<td>Approx. Size (W x H x L)</td>
<td>250.4 × 215.5 × 437.4mm</td>
<td>250.4 × 215.5 × 437.4mm</td>
<td>250.4 × 215.5 × 437.4mm</td>
<td>250.4 × 215.5 × 437.4mm</td>
<td>250.4 × 215.5 × 437.4mm</td>
</tr>
<tr>
<td>Approx. Mass</td>
<td>27.0kg</td>
<td>25.2kg</td>
<td>21.9kg</td>
<td>2.0kg</td>
<td>2.1kg</td>
</tr>
<tr>
<td>Protection Filter</td>
<td>Yes</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Built-in Optical Image Stabilizer</td>
<td>Yes</td>
<td>Yes</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Auto Focus System</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

— Standard
— Not Applicable

* Please refer to page 10, regarding the difference between HDTV and SDTV lenses. Please note that HDTV lenses also perform excellently when they are adopted to SDTV cameras.
* M.O.D. = Minimum Object Distance
* Black colour cover lenses are also available as an alternative to the white colour lenses.
### DIGISUPER Series
for HDTV / SDTV System

The DIGISUPER series lenses are controlled by Canon’s ground breaking Digital Servo System.

### DIGISUPER 22 xs
for Portable Camera

The DIGISUPER 22 xs is a studio lens based on a new concept to be used with portable cameras.

<table>
<thead>
<tr>
<th>Studio Lens</th>
<th>Focal Length (mm)</th>
<th>Field of View</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>XJ22x7.3B</td>
<td>72.9°</td>
<td>Compact Studio Lens</td>
<td></td>
</tr>
<tr>
<td>XJ27x6.5B</td>
<td>58.3°</td>
<td>Wide Angle Studio Lens</td>
<td></td>
</tr>
<tr>
<td>XJ27x6.5B AF</td>
<td>56.1°</td>
<td>Wide Angle Studio Lens with Advanced Auto Focus Function</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field Lens</th>
<th>Focal Length (mm)</th>
<th>Field of View</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>XJ60x9B</td>
<td>66.7°</td>
<td>Affordable Field Lens</td>
<td></td>
</tr>
<tr>
<td>XJ76x9B</td>
<td>56.1°</td>
<td>Standard Field Lens with Superior Quality and Performance</td>
<td></td>
</tr>
<tr>
<td>XJ80x8.8B</td>
<td>54.6°</td>
<td>Telephoto Field Lens with Auto Focus and Image Stabilizer</td>
<td></td>
</tr>
<tr>
<td>XJ86x9.3B AF</td>
<td>56.1°</td>
<td>Telephoto Field Lens with Advanced Image Stabilizer</td>
<td></td>
</tr>
<tr>
<td>XJ95x8.6B</td>
<td>66.7°</td>
<td>Flagship Field Lens with Image Stabilizer</td>
<td></td>
</tr>
<tr>
<td>XJ100x9.3B</td>
<td>54.6°</td>
<td>Flagship Field Lens with Auto Focus and Image Stabilizer</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Studio Lens</th>
<th>Focal Length (mm)</th>
<th>Field of View</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>XJ22x7.3B</td>
<td>72.9°</td>
<td>Compact Studio Lens</td>
<td></td>
</tr>
<tr>
<td>XJ27x6.5B</td>
<td>58.3°</td>
<td>Wide Angle Studio Lens</td>
<td></td>
</tr>
<tr>
<td>XJ27x6.5B AF</td>
<td>56.1°</td>
<td>Wide Angle Studio Lens with Advanced Auto Focus Function</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field Lens</th>
<th>Focal Length (mm)</th>
<th>Field of View</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>XJ60x9B</td>
<td>66.7°</td>
<td>Affordable Field Lens</td>
<td></td>
</tr>
<tr>
<td>XJ76x9B</td>
<td>56.1°</td>
<td>Standard Field Lens with Superior Quality and Performance</td>
<td></td>
</tr>
<tr>
<td>XJ80x8.8B</td>
<td>54.6°</td>
<td>Telephoto Field Lens with Auto Focus and Image Stabilizer</td>
<td></td>
</tr>
<tr>
<td>XJ86x9.3B AF</td>
<td>56.1°</td>
<td>Telephoto Field Lens with Advanced Image Stabilizer</td>
<td></td>
</tr>
<tr>
<td>XJ95x8.6B</td>
<td>66.7°</td>
<td>Flagship Field Lens with Image Stabilizer</td>
<td></td>
</tr>
<tr>
<td>XJ100x9.3B</td>
<td>54.6°</td>
<td>Flagship Field Lens with Auto Focus and Image Stabilizer</td>
<td></td>
</tr>
</tbody>
</table>
### Studio/Field Lenses: HDTV

<table>
<thead>
<tr>
<th>Model Number</th>
<th>DIGISUPER 100 AF</th>
<th>DIGISUPER 100</th>
<th>DIGISUPER 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>XJ100x9.3B AF</td>
<td>XJ100x9.3B</td>
<td>XJ95x8.7B</td>
<td></td>
</tr>
<tr>
<td>Zoom Ratio</td>
<td>10x</td>
<td>10x</td>
<td>9x</td>
</tr>
<tr>
<td>Built-in Extender</td>
<td>2.0x</td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td>Range of Focal Length (with Extender)</td>
<td>9.5-930mm</td>
<td>9.5-930mm</td>
<td>8.6-820mm</td>
</tr>
<tr>
<td>Maximum Relative Aperture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angular Field</td>
<td>Maximum Relative Aperture</td>
<td>11.7 at 9.3-290mm</td>
<td>14.7 at 930mm</td>
</tr>
<tr>
<td>Zoom Ratio</td>
<td>2.0x</td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td>Model Number</td>
<td>2.0x</td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td>M.O.D. from Lens Front</td>
<td>3.0m</td>
<td>3.0m</td>
<td>3.0m</td>
</tr>
<tr>
<td>Macro</td>
<td>25.9 x 190.4cm at 9.3mm</td>
<td>25.9 x 190.4cm at 9.3mm</td>
<td>25.9 x 190.4cm at 9.3mm</td>
</tr>
<tr>
<td>Protection Filter</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Built-in Optical Image Stabilizer</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Auto Focus System</td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
</tbody>
</table>

### HDTV Specifications
- **Angular Field of View (8.8 x 6.6mm)**
  - 4:3 Aspect Ratio: 26.6° x 20.1° at 18.6mm (2.0x)
  - 16:9 Aspect Ratio: 54.6° x 34.9° at 9.3mm

### Reference
- The following is the lens angle (without Shrinker) in the 4:3 mode of switchable cameras.
Compact Studio Lens: DIGISUPER 22 xs

The DIGISUPER 22 xs is a “Compact HD Studio lens” specifically designed to be used with a portable camera. Incorporating Canon’s pioneering technologies it offers superior optical performance and ease of operation, compared with both HD portable lenses and SD Studio Box Type Lenses.

High Optical Performance

The DIGISUPER 22 xs offers higher contrast and resolution compared with portable lenses and at the same time, reduces Focus Breathing to zero.

Small In Size, Light In Weight

In order to realize the best capabilities from the camera / lens combination, the lens was specifically designed to be as small and light as possible.

Advanced Operation

Incorporating an “Encoder Device”, it has the capability to zoom from a very fast 0.5 sec. to a very slow 5 min. while improving the precision and repeatability of zoom, focus and iris control. The encoder device also enables the lens to be easily integrated into virtual studio applications.

Diverse Functions

The DIGISUPER 22 xs is equipped with an information display, which enables diverse digital functions to be used easily and precisely.

Studio/Field Lenses: HDTV

Compact Studio Lens

The DIGISUPER 22 xs is a “Compact HD Studio lens” specifically designed to be used with a portable camera. Incorporating Canon’s pioneering technologies it offers superior optical performance and ease of operation, compared with both HD portable lenses and SD Studio Box Type Lenses.

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---

Please refer to page 10, regarding the difference between HDTV and SDTV lenses. Please note that HDTV lenses also perform excellently when they are adopted to SDTV cameras.

M.O.D. = Minimum Object Distance

Black colour cover lenses are also available as an alternative to the white colour lenses.

---

Compact Studio Lens: DIGISUPER 22 xs

Model Number
DIGISUPER 27AF
XJ27x6.5B A/F
DIGISUPER 27
XJ27x6.5B
DIGISUPER 22 xs
XJ22x7.3B IE-D

Zoom Ratio
27x
27x
22x

Built-in Extender
2x
2x
2x

Range of Focal Length (with Extender)
6.5-180mm
13-360mm
7.3-161mm

Maximum Relative Aperture (with Extender)
1:1.5 at 6.5-123mm
1:3.0 at 13-246mm (2.0x)
1:4.4 at 360mm

Angular Field of View
4:3 Aspect Ratio
68.2° x 53.8° at 6.5mm
2.8° x 2.1° at 180mm

16:9 Aspect Ratio
72.9° x 45.1° at 6.5mm
3.1° x 1.7° at 180mm

References: The following is the lens angle (without Shrinker) in the 4:3 mode of switchable cameras.
Angular Field of View (with Extender)
4:3 mode of Most Switchable Cameras (7.3 x 5.4mm)
58.0° x 45.1° at 6.5mm
52.5° x 40.6° at 7.3mm

2.3° x 1.7° at 180mm
2.6° x 1.9° at 161mm

3.8° x 2.5° at 180mm
3.4° x 2.1° at 161mm

31.0° x 23.5° at 13mm
18.1° x 10.9° at 360mm

32.2° x 22.3° at 14.6mm
16.0° x 9.4° at 322mm

Macro Optimal (Remote) Optimal (Remote) Standard (Manual)
Protection Filter Optional Optional ––
Built-in Optical Image Stabilizer –– –– ––
Auto Focus System ✓ –– ––

Dimensions

Approx. Size (WxHxL)
250.6 x 255.5 x 567mm
250.6 x 255.5 x 550mm
165 x 175 x 336mm

Approx. Mass
23.3kg (51.4lbs)
21.9kg (48.3lbs)
6.1kg (13.42lbs)

Protection Filter
Optional
Optional
––

Macro
Optional (Remote)
Optional (Remote)
Standard (Manual)

Object Dimensions at M.O.D.

High Optical Performance

The DIGISUPER 22 xs offers higher contrast and resolution compared with portable lenses and at the same time, reduces Focus Breathing to zero.

Small In Size, Light In Weight

In order to realize the best capabilities from the camera / lens combination, the lens was specifically designed to be as small and light as possible.

Advanced Operation

Incorporating an “Encoder Device”, it has the capability to zoom from a very fast 0.5 sec. to a very slow 5 min. while improving the precision and repeatability of zoom, focus and iris control. The encoder device also enables the lens to be easily integrated into virtual studio applications.

Diverse Functions

The DIGISUPER 22 xs is equipped with an information display, which enables diverse digital functions to be used easily and precisely.

---

Standard – Not Applicable

Please refer to page 10, regarding the difference between HDTV and SDTV lenses. Please note that HDTV lenses also perform excellently when they are adopted to SDTV cameras.

M.O.D. = Minimum Object Distance

Black colour cover lenses are also available as an alternative to the white colour lenses.
DIGISUPER Studio/Field Lenses: Features

The DIGISUPER series of Studio/Field lenses has been developed with the most advanced technologies, to meet the needs of modern production styles. The digital focus and zoom servo systems use a 32-bit CPU, as opposed to a conventional analog system, and offer a range of advanced functions. The CPU can also be easily upgraded for new features and unlimited possibilities in the future. The main features are as follows:

1. Unique Features of the latest DIGISUPER Series Lens and the ZDJ-D02, Digital Servo Zoom Demand

A) SHUTTLE SHOT AND FRAME PRESET

Two preset memories are available in any combination of Shuttle Shot and Frame Preset.

Shuttle Shot
At the touch of a button, this feature allows the operator to zoom back and forth instantly between any two positions in either direction at maximum speed or at any desired speed memorised in the speed-preset function. It can be used for zooming to either the tele-side or wider focal length from any starting point to check the picture, and then return instantly to the original focal length. You can “shuttle” between any two zoom positions as you like.

Frame Preset
A movement to a preset position can be repeated multiple times. The preset memory is not automatically cleared and the agreed-on framings from rehearsal can be duplicated over and over in an actual production at the maximum speed or at any desired speed memorized in the speed preset function.

B) SPEED PRESET

A zoom speed agreed on during rehearsal can be reproduced accurately. The preset memory is not automatically cleared and can be repeated as many times as needed.

2. Unique Features of the ZDJ-P01 Digital Servo Zoom Demand for the latest DIGISUPER Series Zoom Lenses

The ZDJ-P01 is a compact zoom demand, which is smaller than the ZDJ-P02 and designed for enhanced usability and easier operation. When used with the latest DIGISUPER series zoom lenses, it allows for creative use of the digital zoom functions, such as the Frame Preset Function and Zoom Track Function. It is also a more affordable option and allows for a cost effective control system.

3. CAFS

CONSTANT ANGLE FOCUSING SYSTEM

The zooming effect of focus is a phenomenon where the picture size (angle of view) changes when focusing. To counteract this, the 32-bit CPU calculates and controls the zoom when focusing ensuring the DIGISUPER series has ZERO zooming effect of focus.

4. Other Features

A) INTERFACE TO OTHER DIGITAL TECHNOLOGY

The Digital Servo System is capable of providing high-speed interactive communication with a virtual studio computer or robotics without D/A or A/D conversion to allow accurate control.

B) PC CONNECTION

By using the digital communication interface on the lens and optional software, a personal computer system can be connected to the lens and used for lens condition.

C) CPU UPGRADE

When new additional features are available through updated software, the lens can be updated to the latest version simply by overwriting the software in the 32bit CPU.

D) HIGH SPEED

(zoom: 0.5 sec, focus: 0.8 sec in case of the DIGISUPER 27), and high repeatability.

E) AUTO FOCUS FUNCTION

Canon’s unique auto focusing system has been adapted to the DIGISUPER ID0A, DIGISUPER B6AF, and DIGISUPER 27AF. Please refer to page 6 for details.
Control Accessories for Studio/Field Lenses

**DIGITAL DIGISUPER Series**

For: DIGISUPER 100 / DIGISUPER 95 / DIGISUPER 80 / DIGISUPER 76 / DIGISUPER 60 xs / DIGISUPER 27 / DIGISUPER 23 xs

Full Servo System

Semi-Servo System

For: DIGISUPER 22 xs

With Current ENG Demand

With Compact Field/Studio

With Current Field/Studio

Full Servo System

For: DIGISUPER 100AF / DIGISUPER 86AF / DIGISUPER 27AF

Semi-Servo System

Full Manual System

For: All DIGISUPER Lenses

**Studio/Field Lenses Mount Compatibility**

To Use Camera Manufacturer’s Original Mount Lens

Studio/Field lenses are made with unique mounts corresponding to each manufacturer’s Studio/Field cameras. To make the lenses compatible with Portable Studio/Field Companion cameras, the correct lens Support System must be chosen from the following.

**Standard HD Mount (BTA)**
Broadcast ENG/EFP Lenses

**ENG/EFP lens**

for HDTV / SDTV System

Canon offers a variety of Broadcast ENG/EFP lenses, including both HDTV and SDTV versions. Please refer to page 10 regarding the difference between HDTV and SDTV lenses.

Please note that the HDTV lenses perform excellently when they are used on SDTV cameras. Please refer to page 7, 9 regarding HDxs and HDgc series lenses. All Broadcast ENG/EFP lenses are equipped with Canon’s “xs” technology as well as our enhanced “Digital Drive” which is explained on page 34 & 35.

The DIGISUPER 22 xs is a box type lens developed to be used with a portable camera. The lens provides higher optical performance compared with the HD portable lenses and higher versatility as opposed to the large box type lenses. Please refer to page 17 for the details.
### 2/3” ENG/EFP Lenses: HDTV

<table>
<thead>
<tr>
<th>HJ40x14B IASD-V</th>
<th>HJ40x10B IASD-V</th>
<th>HJ32x28B IASE S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoom Ratio</strong></td>
<td>40x</td>
<td>40x</td>
</tr>
<tr>
<td><strong>Image Size</strong></td>
<td>2/3”</td>
<td>2/3”</td>
</tr>
<tr>
<td><strong>Built-in Extender</strong></td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td><strong>Range of Focal Length</strong></td>
<td>14-560mm</td>
<td>28-1020mm</td>
</tr>
<tr>
<td><strong>Approx. Mass (IRSE/IASE)</strong></td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td><strong>M.O.D. (with Extender)</strong></td>
<td>12.8 at 14-30.7mm</td>
<td>12.0 at 10-220mm</td>
</tr>
<tr>
<td><strong>Approx. Size (WxHxL)</strong></td>
<td>40x 40x 18x</td>
<td>40x 40x 24x</td>
</tr>
<tr>
<td><strong>Approx. Mass (IRSE/IASE)</strong></td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td><strong>Built-in Extender</strong></td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td><strong>Range of Focal Length</strong></td>
<td>14-560mm</td>
<td>28-1020mm</td>
</tr>
<tr>
<td><strong>Marginal Ratio (with Extender)</strong></td>
<td>3.94 x 26.5”</td>
<td>475° x 36.5”</td>
</tr>
<tr>
<td><strong>Angular Field of View</strong></td>
<td>378° x 21.6”</td>
<td>10.0” x 0.7”</td>
</tr>
<tr>
<td><strong>M.O.D. from Lens Front</strong></td>
<td>2.8m (10mm with Macro)</td>
<td>2.8m (10mm with Macro)</td>
</tr>
<tr>
<td><strong>M.O.D. from Image Plane</strong></td>
<td>3.2m</td>
<td>3.18m</td>
</tr>
</tbody>
</table>
| **Reference:** The following is the lens angle (without Shrinker) in the 4:3 mode of switchable cameras.

<table>
<thead>
<tr>
<th>HJ24xex7.5B IRSE 5/IASE S</th>
<th>HJ28xex7.5B IASE S</th>
<th>HJ32xex7.5B IRSE 5/IASE S</th>
<th>HJ32xex7.2B IRSE 5/IASE S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoom Ratio</strong></td>
<td>24x</td>
<td>28x</td>
<td>32x</td>
</tr>
<tr>
<td><strong>Image Size</strong></td>
<td>2/3”</td>
<td>2/3”</td>
<td>2/3”</td>
</tr>
<tr>
<td><strong>Built-in Extender</strong></td>
<td>2.0x</td>
<td>2.0x</td>
<td>2.0x</td>
</tr>
<tr>
<td><strong>Range of Focal Length</strong></td>
<td>7.5-160mm</td>
<td>7.5-156mm</td>
<td>7.5-156mm</td>
</tr>
<tr>
<td><strong>Built-in Optical Image Stabilizer</strong></td>
<td>(with Extender)</td>
<td>(with Extender)</td>
<td>(with Extender)</td>
</tr>
</tbody>
</table>
| **Reference:** The following is the lens angle (without Shrinker) in the 4:3 mode of switchable cameras.

### 4:3 aspect ratio

- **Minimum Object Distance (M.O.D.)**
- **Angular Field of View**
- **Object Distance at M.O.D.**
- **Approx. Mass (IRSE/IASE)**
- **Filter Thread Size (Hood/Lens Barrel)**
- **Built-in Optical Image Stabilizer**
- **Information Display**

- **Standard**
- **Not Applicable**

*Please refer to page 103, regarding the difference between HDTV and SDTV lenses. Please note that HDTV lenses also perform excellently when they are adopted to SDTV cameras.

* M.O.D. = Minimum Object Distance

* Black colour cover lenses are also available as an alternative to the white colour lenses.
World's First HDTV Portable Lens with Built-in Image Stabilizer

The HJ15ex8.5B KRSE-V is the world’s first portable HD lens with built-in Optical Image Stabilization. Compact and lightweight the lens offers a high zoom ratio and wide angle of view and incorporates Canon’s patented VAP-IS technology to ensure stable HD imagery in shooting environments that cause vibration and physical disturbances to the lens-camera system.

The Vari-angle Prism Image Stabilizer technology overcomes a wide range of disturbance frequencies throughout the entire zoom range, while maintaining a high optical performance, to ensure a high level of HD Image Stabilization. (See page 9 for the specification)

Main Features

- Full HDTV Optical Performance
- Powerful Image Stabilization throughout the entire zoom range
- Real-time compensation for a wide range of disturbance frequencies encountered by a camera operator who is shooting handheld while walking, running, or operating from a motorcycle pillion, within a moving vehicle, boat, or helicopter etc.
- Various Stabilising Modes: combination of two modes from two categories is available and each mode is simply set by changing the switches on the lens.

Select According to the Shooting Situation

- **Portable mode**
  - Compensates for motion-related disturbances while shooting shoulder mounted or handheld
- **Tripod mode**
  - Effectively compensates for disturbances caused by unsteady platform or wind

Select According to the Direction of Disturbance

- **H+V mode**
  - Optimises stabilisation when disturbance frequencies are both horizontal and vertical
- **V mode**
  - Effectively counters vertical disturbances while panning the lens-camera

The following is the lens angle (without Shrinker) in the 4:3 mode of switchable cameras.

<table>
<thead>
<tr>
<th>Angular Field of View</th>
<th>4:3 Aspect Ratio (8.8 x 6.6mm)</th>
<th>16:9 Aspect Ratio (9.6 x 5.4mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>91° x 69° @ 4.3mm</td>
<td>96° x 64° @ 4.3mm</td>
<td></td>
</tr>
<tr>
<td>9° x 7° @ 60mm</td>
<td>9° x 5° @ 60mm</td>
<td></td>
</tr>
<tr>
<td>58° x 45° @ 8.6mm</td>
<td>58° x 35° @ 8.6mm</td>
<td></td>
</tr>
<tr>
<td>4° x 3° @ 120mm</td>
<td>4° x 2° @ 120mm</td>
<td></td>
</tr>
</tbody>
</table>

Information Display

- ✔ Standard
- ✗ Not Applicable

---

2/3” ENG/EFP Lenses: HDTV

<table>
<thead>
<tr>
<th>HJ14ex4.3B IRSE S/IASE S</th>
<th>HJ15ex8.5B KRSE-V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoom Ratio</strong></td>
<td>14X</td>
</tr>
<tr>
<td><strong>Image Size</strong></td>
<td>2/3”</td>
</tr>
<tr>
<td><strong>Built-in Extender</strong></td>
<td>2.0X</td>
</tr>
<tr>
<td><strong>Range of Focal Length (with Extender)</strong></td>
<td>4.3-60mm</td>
</tr>
<tr>
<td><strong>Maximum Relative Aperture (with Extender)</strong></td>
<td>1:1.8 at 4.3-40mm</td>
</tr>
<tr>
<td><strong>Angular Field of View (with Extender)</strong></td>
<td>91° x 69° @ 4.3mm</td>
</tr>
<tr>
<td><strong>M.O.D. from Lens Front</strong></td>
<td>0.5m (10mm with Macro)</td>
</tr>
<tr>
<td><strong>M.O.D. from Image Plane</strong></td>
<td>0.55m</td>
</tr>
<tr>
<td><strong>Object Dimensions at M.O.D. (with Extender)</strong></td>
<td>69.9 x 52.4mm at 4.3mm</td>
</tr>
<tr>
<td><strong>Approx. Size (WxHxL)</strong></td>
<td>163.5 x 108.0 x 247.8mm</td>
</tr>
<tr>
<td><strong>Filter Thread Size (Hood/Lens Barrel)</strong></td>
<td>127mm P0.75/ —</td>
</tr>
<tr>
<td><strong>Built-in Optical Image Stabilizer</strong></td>
<td>—</td>
</tr>
</tbody>
</table>

Reference: The following is the lens angle (without Shrinker) in the 4:3 mode of switchable cameras.

- ✗ Standard
- ✔ Not Applicable

Please refer to page 10, regarding the difference between HDTV and SDTV lenses. Please note that HDTV lenses also perform excellently when they are adopted to SDTV cameras.

M.O.D. = Minimum Object Distance

Black colour cover lenses are also available as an alternative to the white colour lenses.
Digital Drive ENG/EFP Lenses: **Features**

HDgc (IRSE / IASE model) lenses incorporate an enhanced “Digital Drive” that delivers a wide range of features for improved ease of operation.

### 1. Three Preset Functions

Canon’s Digital Drive provides the following “three preset functions”:

**Shuttle Shot**  
By memorising any two focal lengths, the Digital Drive can automatically “shuttle” between the two points, moving in either direction.

**Frame Preset**  
An angle of view can be preset in either of two memories (DD: one memory) and the lens will zoom to that position by simply pushing a button. During a performance, frame preset will reproduce the zoom position decided upon in rehearsal as often as you like at maximum speed or a preset zoom speed.

**Speed Preset**  
A specific zoom speed can be preset in memory and repeated as often as you like by simply pushing a button.

### 2. Zoom Mode Select

One of several operational curves can be chosen, which will allow different zoom movement characteristics when operating the seesaw switch. This is accomplished as a linear adjustment as opposed to an adjustment done in steps.

### 3. User-Customised Setting

The drive unit can memorize 9 patterns of user-customised settings and also transmit the data between different drive units.

### 4. Zoom Track

“Zoom Track” allows the camera operator to adjust the electronic focal length to their desired range by memorising zoom positions at both the tele and the wide side of the zoom.

### 5. Improved Maximum Zoom and Focus Servo Speed

- **Zoom**: 0.5 sec., **Focus**: 1.5 sec.

### 6. Demand Series to Support Digital Function

Canon offers a series of servo controllers for Digital Drive lenses. The ZSD-300D (zoom demand, FPD-400D (focus demand) and FPM-420D (focus servo module) are designed to support the Digital Drive’s unique functions. They are quickly and easily connected to the “Digital Drive” via a 20-pin one-touch type connector. With the FPD-400D, focus servo operational curve can also be selected, unlike a conventional focus demand. Except for the unique digital functions, the digital series of demands is fully compatible with conventional demands although a conversion cable may be required. (Please refer to Page 37.)

### 7. Compatibility with Virtual Studio System

Canon has a series of HDxs/e-IFxs/HDgc (IRSE / IASE model) lenses, which are equipped with an enhanced digital drive unit. 36-bit resolution Rotary Encoder Devices are built into the enhanced digital drive unit, so the lens can be simply integrated into a virtual digital studio system without any additions. The encoders also enable superior precise control.

The zoom servo provides a dynamic range of 0.5 sec. quick zooms to over a 5 min. super slow zoom. Repeatability in focus and iris control is also much more precise. Canon’s unique technology allows the surprisingly small Encoder Device to be installed in the existing drive unit without changes in size or weight.
Control Accessories of Digital Drive ENG/EFP Lenses

The IRSE lenses are the standard type of Portable lens with a Servo Zoom Digital Drive Unit. For Servo Focus operation, IRSE lenses require both a Servo Focus Module and a Servo Focus Demand. The IASE (IASD) lenses are a special type of Portable lens equipped with a Digital Drive Unit offering both Servo Zoom and Focus. For Servo Focus operation, IASE (IASD) lenses only require a Servo Focus Demand. The IASE (IASD) lenses can be used in both the Studio and the Field.

The Difference Between IRSE and IASE (IASD) Type Lenses

The IRSE lenses are the standard type of Portable lens with a Servo Zoom Digital Drive Unit. For Servo Focus operation, IRSE lenses require both a Servo Focus Module and a Servo Focus Demand. The IASE (IASD) lenses are a special type of Portable lens equipped with a Digital Drive Unit offering both Servo Zoom and Focus. For Servo Focus operation, IASE (IASD) lenses only require a Servo Focus Demand. The IASE (IASD) lenses can be used in both the Studio and the Field.

Recommended Kit Configuration

<table>
<thead>
<tr>
<th>Kit Name</th>
<th>System Component</th>
<th>System Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS-210D</td>
<td>SEMI-SERVO KIT</td>
<td></td>
</tr>
<tr>
<td>SS-41-IASD</td>
<td>FULL SERVO KIT</td>
<td></td>
</tr>
<tr>
<td>SS-42-IASD</td>
<td>FULL SERVO KIT</td>
<td></td>
</tr>
</tbody>
</table>

Applicable Component Detail

<table>
<thead>
<tr>
<th>Type</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPM-300</td>
<td>Flex Focus Module</td>
</tr>
<tr>
<td>FPM-200</td>
<td>Flex Dual Module</td>
</tr>
<tr>
<td>FPM-100</td>
<td>Flex Focus Module</td>
</tr>
</tbody>
</table>

Applicable Kit Detail

For : IRSE Type Lenses

<table>
<thead>
<tr>
<th>Kit Name</th>
<th>System Component</th>
<th>System Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoom Servo Only</td>
<td>ZR-1D</td>
<td>FZC-1</td>
</tr>
<tr>
<td>Semi-Servo</td>
<td>ZR-2(A)</td>
<td>FZC-1</td>
</tr>
<tr>
<td>Full Service</td>
<td>ZR-1D</td>
<td>FZC-1</td>
</tr>
</tbody>
</table>

For : IASE Type Lenses (Except HJ40x, J35ex)

<table>
<thead>
<tr>
<th>Kit Name</th>
<th>System Component</th>
<th>System Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoom Servo Only</td>
<td>ZR-1D</td>
<td>FZC-1</td>
</tr>
<tr>
<td>Semi-Servo</td>
<td>ZR-2(A)</td>
<td>FZC-1</td>
</tr>
<tr>
<td>Full Service</td>
<td>ZR-1D</td>
<td>FZC-1</td>
</tr>
</tbody>
</table>

For : HJ40x14B / HJ440x10B / J35ex15B / J35ex11B

<table>
<thead>
<tr>
<th>Kit Name</th>
<th>System Component</th>
<th>System Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoom Servo Only</td>
<td>ZR-1D</td>
<td>FZC-1</td>
</tr>
<tr>
<td>Semi-Servo</td>
<td>ZR-2(A)</td>
<td>FZC-1</td>
</tr>
<tr>
<td>Full Service</td>
<td>ZR-1D</td>
<td>FZC-1</td>
</tr>
</tbody>
</table>

Recommended kit configuration for the listed lenses. (See previous page)

The controllers support the new DD functions.

- The telephoto lenses (HJ40x, J35ex) are not compatible with virtual interfaces.
The HDgc lens series is designed for the new generation of cost-effective HD acquisition systems and comprises a variety of HDTV ENG Lenses for 2/3", 1/2" and 1/3" image size cameras.
HDgc Series Lenses: HDTV

### Zoom Ratio
<table>
<thead>
<tr>
<th>Lens</th>
<th>22x</th>
<th>17x</th>
<th>10x</th>
<th>20x</th>
<th>20x</th>
<th>13x</th>
</tr>
</thead>
</table>

### Image Size
- 2/3" (2/3" 2/3" 2/3" 2/3" 2/3"")

### Built-in Extender
- 2x (2x 2x 2x 2x — —)

### Range of Focal Length (with Extender)
- 7.6-168mm 15.2-336mm (2.0x)
- 7.7-131mm 15.4-262mm (2.0x)
- 4.5-45mm 9-90mm (2.0x)
- 8.2-164mm 16.4-328mm (2.0x)

### Maximum Relative Aperture (with Extender)
- 1:1.8 at 7.6~116.3mm 1:2.6 at 168mm
- 1:3.6 at 15.2~232.6mm (2.0x) 1:5.2 at 336mm
- 1:1.8 at 7.7~102.5mm 1:2.3 at 131mm
- 1:3.6 at 15.4~205mm (2.0x) 1:4.6 at 262mm
- 1:1.8 at 4.5~34.5mm 1:2.35 at 45mm
- 1:3.6 at 9~68.9mm (2.0x) 1:4.7 at 90mm
- 1:1.9 at 8.2~115.4mm 1:2.7 at 164mm
- 1:2.0 at 6~58mm 1:2.7 at 78mm

### Angular Field of View
- 351° x 290° at 7.6mm 3.0° x 2.3° at 168mm
- 197° x 157° at 15.2mm (2.0x) 1.5° x 1.1° at 336mm

### M.O.D. from Lens Front
- 0.8m (10mm with Macro) 0.6m (10mm with Macro)

### Object Dimensions at M.O.D. (with Extender)
- 87x x 65x at 7.6mm 3.8 x 3.0cm at 168mm
- 45.7 x 32.6 at 15.2mm 2.0 x 1.5cm at 336mm

### Approx. Size (HxWxL)
- 164.7 x 112.1 x 218.6mm

### Approx. Mass (IRSE/IASE)
- 1.82kg (4.0lbs)/1.90kg (4.19lbs) 1.48kg (3.26lbs)/1.56kg (3.44lbs)

### Information Display
-    — — —

### Filter Thread Size (Hood/Lens Barrel)
- 105mm P1/94mm P1 — /82mm P0.75 127mm P0.75/ — /82mm P0.75 — /82mm P0.75 105mm P1/ —

### Summary

- For control accessories, please refer to page 36 and 37.
- Please refer to page 36 for explanation about IRSE models.
- For KT17ex Digital Drive Unit come equipped with Zoom, Iris and Focus Encoders.
- For KH21ex/KH16ex/KH10ex Digital Drive Units come equipped with Zoom and Iris Encoders only. A Focus Encoder is available as an option in these units.
- The above specification for each lenses are based on the following image size formats. 1/2":Ø8mm, 1/3":Ø6mm.

### Notes
- • Standard
- • Not Applicable
- • For control accessories, please refer to page 36 and 37.
- • Please refer to page 36 for explanation about IRSE models.
- • For KT17ex Digital Drive Unit come equipped with Zoom, Iris and Focus Encoders.
- For KH21ex/KH16ex/KH10ex Digital Drive Units come equipped with Zoom and Iris Encoders only. A Focus Encoder is available as an option in these units.
- • The above specification for each lenses are based on the following image size formats. 1/2":Ø8mm, 1/3":Ø6mm.
Zoom Ratio
13x
20x

Image Size
1/2"
1/3"

Built-in Extender
—
—

Range of Focal Length (with Extender)
4.5-59mm
5-100mm

Maximum Relative Aperture (with Extender)
1:1.5 at 4.5-44mm
1:2.0 at 59mm
1:1.4 at 5.0-90.3mm
1:1.55 at 100mm

Angular Field of View (with Extender)
4:3 Aspect Ratio
(8.8 x 6.6mm)
70.8° x 56.1° at 4.5mm
6.2° x 4.7° at 59mm
51.3° x 39.6° at 5mm
2.8° x 2.1° at 100mm

16:9 Aspect Ratio
(9.6 x 5.4mm)
75.7° x 46.9° at 4.5mm
6.8° x 3.8° at 59mm
55.2° x 32.8° at 5mm
3.0° x 1.7° at 100mm

M.O.D. from Lens Front
0.4m (10mm with Macro)
0.9m (10mm with Macro)

Object Dimensions at M.O.D.
4:3 Aspect Ratio
(8.8 x 6.5mm)
66.7 x 50.0cm at 4.5mm
4.9 x 3.7cm at 59mm
80.9 x 60.7cm at 5mm
4.2 x 3.2cm at 100mm

16:9 Aspect Ratio
(9.6 x 5.4mm)
73.4 x 41.3cm at 4.5mm
5.4 x 3.0cm at 59mm
88.1 x 49.6cm at 5.0mm
4.5 x 2.5cm at 100mm

Approx. Size (WxHxL)
165.4 x 105.1 x 215.3mm
163.3 x 103 x 171.2mm

Approx. Mass (IRSE/IASE)
1.59kg (3.51lbs)
1.19kg (2.62lbs)

Information Display
—
—

Filter Thread Size (Hood/Lens Barrel)
105mm P1/
—
— /82mm P0.75

Control Accessories for Pro-video ENG Lenses and HDgc*1 Lenses

Recommended Kit Configuration
(For all Pro-video ENG Lenses)

Applicable Component Detail

Applicable Kit Detail

Recommended kit configuration for the listed lenses. (See previous page)
EF Cinema Lenses

Canon offers a full line up of zoom and prime lenses which are designed and engineered to meet or exceed the exacting standards of cinematographers, supporting 4K resolution and beyond. Zoom lenses are available in both PL or EF mount and are compatible with Super 35mm sensors, while prime lenses are available in EF mount only and are suitable for use with both Super 35mm and Full Frame sensors such as those found in Canon’s range of EOS digital SLR cameras.

Refer to the following pages for more details.

See page 46
Digital Cinema Lenses

Canon’s range of Cinema lenses is exclusively designed to stimulate creative expression and offer outstanding optical performance in movie, video and broadcast production. Reliable and robust, they include a host of advanced features, ensuring unsurpassed image quality and exceptional usability in every shooting situation.

Main Features

Superb 4K optical performance for exceptional results

The Digital Cinema lens series with 4K quality, offers unrivalled optical performance in professional shooting environments. Large aspherical lens elements ensure sharp, consistent images in virtually every shooting situation. An innovative glass construction counteracts barrel expansion and contraction to avoid temperature-induced marking discrepancies.

Uncompromising operability for working professionals

Industry standard manual control rings are engineered to maintain the proper amount of resistance with consistent operating torque. Focus, zoom, and iris markings are provided on angled surfaces on both sides of the barrel, making it easy to read settings from behind or either side of the camera.

Versatile range of focal lengths

Together these lenses support versatile shooting at many focal lengths and cover the range most commonly used in cinema shooting. These include wide angle, telephoto zooms and prime lenses.

Highlights

Easy to switch accessories

Industry standard manual control rings are engineered to maintain the proper amount of resistance with consistent operating torque. Focus, zoom, and iris markings are provided on angled surfaces on both sides of the barrel, making it easy to read settings from behind or either side of the camera.

11-blade iris

11-blade aperture diaphragms make the iris look circular even when contracted, enabling beautiful, round highlight bokeh.

CN-E18-80mm T4.4 L IS KAS S: A lightweight and versatile compact cine servo lens

Ready for anything, from movies and documentaries to corporate videos and drone shots

Stunning images in an affordable package. The Canon CN-E18-80mm T4.4 L IS KAS S Compact Cine Servo Lens is an ideal all-purpose lens: weighing only 1.2kg, it includes a fluid servo zoom and focus action, plus 3 stabilization modes for smoother footage, even in difficult shooting conditions. Camera-to-lens communication is provided via EF mount, bringing powerful features including fast Dual Pixel CMOS auto focus, lens meta data acquisition, camera-to-lens servo power supply and peripheral illumination correction. With Canon’s quality 4K-ready imaging, the compact cine servo lens delivers incredible natural bokeh and minimal focus breathing.

Our current line up of Cinema lenses encompasses compact and lightweight, wide-angle and telephoto zoom lenses for EF and PL Mounts, and single-focal lenses for EF Mounts. It also includes the latest addition to the range – the CN7x17 KAS S E1/P1– an EF or PL mount zoom lens with a servo drive unit designed for use with large sensor cameras in broadcast or handheld applications.
### Digital Cinema Lenses

#### TOP-END ZOOM LENS SERIES

<table>
<thead>
<tr>
<th>Cine Zoom Lens</th>
<th>CN-E14.5-60mm T2.6 L S/SP</th>
<th>CN-E30-300mm T2.95-3.7 L S/SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount</td>
<td>EF</td>
<td>EF</td>
</tr>
<tr>
<td>Focal Length</td>
<td>14.5-60mm</td>
<td>30-300mm</td>
</tr>
<tr>
<td>Zoom Ratio</td>
<td>4.1x</td>
<td>10x</td>
</tr>
<tr>
<td>Max. Relative Aperture (T-Number)</td>
<td>12.6 at 14.5-60mm</td>
<td>30-240mm/13.7 at 300mm</td>
</tr>
<tr>
<td>Iris Blades</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Angle of View</td>
<td>84.2° x 50.9° at 14.5mm</td>
<td>47.2° x 25.9° at 30mm</td>
</tr>
<tr>
<td>M.O.D. (from image sensor)</td>
<td>0.70m/2'4&quot;</td>
<td>1.5m/5'</td>
</tr>
<tr>
<td>Object Dimensions at M.O.D.</td>
<td>71.2 x 37.5cm at 14.5mm</td>
<td>107.9 x 56.8cm at 30mm</td>
</tr>
<tr>
<td>Front Diameter</td>
<td>ø136mm</td>
<td>ø136mm</td>
</tr>
<tr>
<td>Approx. Size (W×H×L)</td>
<td>136.0 x 163.1 x 326.0mm</td>
<td>144.0 x 1671 x 342.3mm</td>
</tr>
<tr>
<td>Approx. Mass</td>
<td>4.5kg (9.9lbs)</td>
<td>5.8kg (12.79lbs)</td>
</tr>
<tr>
<td>Pitch of Follow Focus Gear</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>

#### COMPACT ZOOM LENS SERIES

<table>
<thead>
<tr>
<th>Compact Zoom Lens</th>
<th>CN-E15.5-47mm T2.8 L S/SP</th>
<th>CN-E30-105mm T2.8 L S/SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount</td>
<td>EF</td>
<td>EF</td>
</tr>
<tr>
<td>Focal Length</td>
<td>15.5-47mm</td>
<td>30-105mm</td>
</tr>
<tr>
<td>Zoom Ratio</td>
<td>3x</td>
<td>3.5x</td>
</tr>
<tr>
<td>Max. Relative Aperture (T-Number)</td>
<td>12.8 at 15.5-47mm</td>
<td>12.8 at 30-105mm</td>
</tr>
<tr>
<td>Iris Blades</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Angle of View</td>
<td>80.4° x 48.0° at 15.5mm</td>
<td>47.2° x 25.9° at 30mm</td>
</tr>
<tr>
<td>M.O.D. (from image sensor)</td>
<td>0.5m/1'8&quot;</td>
<td>0.6m/2'</td>
</tr>
<tr>
<td>Object Dimensions at M.O.D.</td>
<td>47.6 x 25.1cm at 15.5mm</td>
<td>35.3 x 18.6cm at 10mm</td>
</tr>
<tr>
<td>Front Diameter</td>
<td>ø114mm</td>
<td>ø114mm</td>
</tr>
<tr>
<td>Approx. Size (W×H×L)</td>
<td>114.0 x 125.0 x 222.0mm</td>
<td>144.0 x 125.0 x 217.0mm</td>
</tr>
<tr>
<td>Approx. Mass</td>
<td>2.2kg (4.85lbs)</td>
<td>2.2kg (4.85lbs)</td>
</tr>
<tr>
<td>Pitch of Follow Focus Gear</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>
### Cine Prime Lens

<table>
<thead>
<tr>
<th>Cine Prime Lens</th>
<th>CN-E14mm T3.1 L F</th>
<th>CN-E24mm T1.5 L F</th>
<th>CN-E50mm T1.3 L F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount</td>
<td>EF / PL</td>
<td>EF / PL</td>
<td>EF / PL</td>
</tr>
<tr>
<td>Focal Length</td>
<td>14mm-40mm</td>
<td>24mm-100mm</td>
<td>50mm-560mm</td>
</tr>
<tr>
<td>Max. Relative Aperture (T-Number)</td>
<td>1:3.1</td>
<td>1:1.5</td>
<td>1:1.3</td>
</tr>
<tr>
<td>Iris Blades</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Angle of View</td>
<td>1.5:1 36.0 x 24.0mm</td>
<td>104.3° x 81.2mm</td>
<td>73.7° x 53.1°</td>
</tr>
<tr>
<td>M.O.D. (from image sensor)</td>
<td>0.2m/8&quot;</td>
<td>0.3m/12&quot;</td>
<td>0.5m/20&quot;</td>
</tr>
<tr>
<td>Object Dimensions at M.O.D.</td>
<td>18.4 x 18.4 x 94.5mm</td>
<td>184 x 184 x 101.1mm</td>
<td>184 x 184 x 151.6mm</td>
</tr>
<tr>
<td>Front Diameter</td>
<td>ø114mm</td>
<td>ø114mm</td>
<td>ø114mm</td>
</tr>
<tr>
<td>Approx. Mass</td>
<td>1.2kg (2.6lbs)</td>
<td>1.2kg (2.6lbs)</td>
<td>1.3kg (2.9lbs)</td>
</tr>
<tr>
<td>Pitch of Follow Focus Gear</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>

### Cine Servo Lens

<table>
<thead>
<tr>
<th>Cine Servo Lens</th>
<th>CN-E35-85mm T4.4 L IS KAS S</th>
<th>CN-E35-85mm T3.1 L IS KAS S</th>
<th>CN-E20x50 IAS H 87 / PF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount</td>
<td>EF / PL</td>
<td>EF / PL</td>
<td>EF / PL</td>
</tr>
<tr>
<td>Focal Length</td>
<td>35mm-85mm 85mm / 100mm</td>
<td>85mm / 100mm</td>
<td>50mm-100mm</td>
</tr>
<tr>
<td>Max. Relative Aperture (T-Number)</td>
<td>1:4 at 35mm</td>
<td>1:2.95 at 17mm / 1:3.9 at 80mm</td>
<td>1:5.0 at 50mm / 1:8.9 at 1000mm</td>
</tr>
<tr>
<td>Iris Blades</td>
<td>9</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Angle of View</td>
<td>1.9:1 26.2 x 13.8mm</td>
<td>86.2° x 40.8°</td>
<td>12.7° x 6.7°</td>
</tr>
<tr>
<td>M.O.D. (from image sensor)</td>
<td>0.5m/ 15.5&quot;</td>
<td>0.85m/15&quot;</td>
<td>0.5m/20&quot;</td>
</tr>
<tr>
<td>Object Dimensions at M.O.D.</td>
<td>18.4 x 18.4 x 101.1mm</td>
<td>184 x 184 x 151.6mm</td>
<td>184 x 184 x 151.6mm</td>
</tr>
<tr>
<td>Front Diameter</td>
<td>ø77mm</td>
<td>ø114mm</td>
<td>ø127mm</td>
</tr>
<tr>
<td>Approx. Mass</td>
<td>1.2kg (2.6lbs)</td>
<td>1.2kg (2.6lbs)</td>
<td>1.3kg (2.9lbs)</td>
</tr>
<tr>
<td>Pitch of Follow Focus Gear</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>
CN7x17 KAS S E1 / P1: Features for cinema use

Adopting a removable drive unit enables the lens to be used in the cinema style.

Immediate start-up of system.

Shoulder shots enabled.

Power consumption reduced.

Focal length indicated on lens barrel area.

Layout of scale marks.

Gear deployment enables operation using a follow focus.

Virtual images supported.

Easy-to-read controls.

Standard accessories supported.

Focal length indicated on lens barrel area.

Immediate start-up of system.

Shoulder shots enabled.

Power consumption reduced.

采用可拆卸驱动单元使镜头能够用于电影风格。

立即启动系统。

肩部拍摄。

功率消耗降低。

焦距表示在镜头的圆筒区域。

布局的标尺。

齿轮部署使使用跟焦器的操作成为可能。

虚拟图像支持。

容易阅读的控制。

标准配件支持。

焦距表示在镜头的圆筒区域。

立即启动系统。

肩部拍摄。

功率消耗降低。
Remote Control Lenses

The Canon Remote Control Series offers a wide variety of lenses and accessories that have been designed for various applications such as broadcasting, teleconference, distance learning and other remote control purposes. The lenses provide quiet and fast servo control of zoom, focus and iris.
Remote Control Lens Series

**BROADCAST APPLICATIONS: HDTV**

<table>
<thead>
<tr>
<th>Lens Model</th>
<th>Zoom Ratio</th>
<th>Image Size</th>
<th>Built-in Extender</th>
<th>Range of Focal Length (with Extender)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HJ18ex28B ITS-ME</td>
<td>18x</td>
<td>2/3&quot;</td>
<td>2.0x</td>
<td>28-500mm / 58-100mm (2.0x)</td>
</tr>
<tr>
<td>HJ24ex7.5B ITS-ME</td>
<td>24x</td>
<td>2/3&quot;</td>
<td>2.0x</td>
<td>75-180mm / 5.0-180mm (2.0x)</td>
</tr>
<tr>
<td>HJ18ex7.5B ITS-ME</td>
<td>18x</td>
<td>2/3&quot;</td>
<td>2.0x</td>
<td>76-157mm / 5.2-274mm (2.0x)</td>
</tr>
</tbody>
</table>

**External Extender**

For the ITS-RE model of the Broadcast Remote Control Lenses and for the UJ20x8.5B ITS, a 2x extender is motorised and can be remote controlled.

**Close-up Lens**

Four types (82CL-UP800H / 82CL-UP1300H / 105CL-UP900H / 105CL-UP8000H) are available.

**External Extender**

For 2/3" Lens Only

A 2x extender is available for telephoto shooting. For the ITS-RE model of the Broadcast Remote Control Lenses and for the UJ20x8.5B ITS, the 2x extender is motorised and can be remote controlled.

**Connecting Cable**

5m, 10m, 20m, 50m and 100m cables are available. Maximum cable length is 150m by connection of these cables.

**Remote Controller**

Three types (TCR-101F, TCR-201F, TCR-301F) are available.

*Please refer to page 50 for the applications.*

**Control Accessories for Remote Control Lenses**

Canon offers a choice of control accessories to meet a variety of remote image capture needs. Canon’s Remote Control TV Lenses accept 3 types of standard controllers, as well as standard remote control cables, which are designed to provide different types of zoom, focus and iris remote control. These lenses are also available with a simple interface for use with custom controllers.

**System Configuration**

- Speed Servo Controller
- Positional Servo Controller
- 8 Position Preset Controller
- TCR-101F
- TCR-201F
- TCR-301F

*Please refer to pages 32, 33 and 48 for more detailed specifications.*
System

1. Converters/Attachments

- TELE-SIDE CONVERTER
  - Focal length is shifted to the telephoto side by a factor of 1.5x.
  - F-No. of original lens is not affected.
  - Focal length is widened by a factor of 0.6x that of the original lens.
  - Focus is adjusted by use of the macro lever.

- WIDE CONVERTER
  - Focal length becomes wider by a factor of 0.75x that of the original lens.
  - F-No. of original lens is not affected.
  - Focal length becomes wider by a factor of 0.8x that of the original lens.
  - Focus is adjusted by use of the macro lever.

- WIDE ATTACHMENT
  - The zoom lens becomes a wider fixed focal length lens (distorted image) with the fish-eye attachment.

- FISH-EYE ATTACHMENT
  - The zoom lens becomes a fish-eye fixed focal length lens (distorted image) with the fish-eye attachment.
  - F-No. of original lens is not affected.

2. Filters

- CLEAR CRS SNY SFT
  - Tele-side: picture corners are eclipsed at wide angle.

3. Close-up lenses

- Converter
  - The minimum object distance becomes 2.25 times.
  - Only the telephoto side of the lens can be used, the other side is special Wide Converter and is exclusive to certain lens models.

- Tele-side System
  - The minimal object distance becomes 0.64 times with the W80/W80Y-85.
  - The minimal object distance becomes 0.64 times with the W80/W80Y-85.

4. Extenders

Applications of SDTV and HDTV Adaptor Type Converters / Attachments

Mount Converters for Different Image Format Size Cameras

Canon offers a variety of Mount Converters to be used between a lens and a camera of different image format sizes. Each converter will extend the effective Angular Field of View of the associated lens according to the Shift Ratio listed below.

- TELE-SIDE CONVERTER
  - 1.4x
  - 1.6x

- WIDE CONVERTER
  - 1.3x
  - 1.5x

- WIDE ATTACHMENT
  - 1.4x

- FISH-EYE ATTACHMENT
  - 1.2x

- Adapter
  - 1.2x

- Adapter

*1 The HD quality accessories offer higher optical performance.
*2 The drawing is an image of the W80-B.
*3 The converters are to be used with lenses weighing less than 2.0kg (4.4lbs).
*4 SONY’s Hot Shoes mount camera, excluding PMW-EX3.
2. Filters

**UV/CLEAR/SKY LIGHT FILTER**

- A UV (uvfilter) filter is nearly colourless. It absorbs short wavelength ultraviolet rays that the naked eye cannot see.
- A polarizer has a light polarizing effect. Used when shooting on clear days, it removes UV, and prevents natural light from giving a bluish-green cast to shaded foliage etc.
- These filters are also advisable to protect the front lens surface.

**POLARIZED LIGHT FILTER**

- A polarizer is used to intercept light reflected from the surface of water or glass.
- A polarizer is screwed into the threads of the hood, turned, and stopped in the position in which the reflected light is removed.

**SOFTON FILTER**

- A Soft-focus Filter has a real-like surface that imparts a soft, misty effect to the entire picture.
- Soft-focus Filters are frequently used for lyric stage show broadcasts.

**CROSS/SNOW CROSS/ SUNNY CROSS FILTER**

- A cross Filter creates a cross or star of light by scattering rays from a strong light source in the subject in a radial pattern. The brighter and more point like the subject is, the better the effect is. Cross filters are often used to enhance night scenery or stage show broadcasts.

**ND4/NDE FILTER**

- An ND (neutral density) Filter uniformly reduces light of all wavelengths which enters a lens.
- It is used when the subject is too bright for the light to be adjusted by the diaphragm alone.
- An ND Filter is also effective to create a shadow depth of field.

<table>
<thead>
<tr>
<th>ND Filter type</th>
<th>Transmittance</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND4</td>
<td>20%</td>
<td>0.9</td>
</tr>
<tr>
<td>ND8</td>
<td>12.5</td>
<td>0.9</td>
</tr>
</tbody>
</table>

**APPLICABLE LENSES**

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Applicable Lenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1823A042</td>
<td>YJ20x8.5B, KJ17ex7.7B, KJ20x8.2B, KJ22ex7.6B, HJ15ex8.5B, HJ18ex7.6B</td>
</tr>
<tr>
<td>1823A041</td>
<td>YJ20x8.5B, KJ17ex7.7B, KJ20x8.2B, KJ22ex7.6B, HJ15ex8.5B, HJ18ex7.6B</td>
</tr>
</tbody>
</table>

- HD quality accessories offer higher optical performance.

3. Close-up lenses

- A close-up lens is used to shorten the M.O.D. of the master lens for close-up shooting.
- The maximum object distance becomes the focal length of the close-up lens.
- The minimum object distance is calculated by the following formula:

\[
\text{New minimum object distance} = \frac{f_x \times S}{S + f_x}
\]

where:
- \(f_x\) = Focal length of the close-up lens
- \(S\) = M.O.D. of the master lens

**APPLICABLE LENSES**

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Applicable Lenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1823A095H</td>
<td>105CL-UP900H, 105CL-UP800H</td>
</tr>
<tr>
<td>1823A094H</td>
<td>105CL-UP900H, 105CL-UP800H</td>
</tr>
</tbody>
</table>

4. Extenders

- An extender X2.0-B4 is mounted between the camera and the lens to enlarge the image of the subject.
- It doubles the focal length of the master lens, making it into a more telephoto lens.
- The 2.0x Extender also doubles the F-number.

**APPLICABLE LENSES**

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1823A042</td>
<td>YJ20x8.5B, KJ17ex7.7B, KJ20x8.2B, KJ22ex7.6B, HJ15ex8.5B, HJ18ex7.6B</td>
</tr>
</tbody>
</table>

* Only for 2/3 lenses