
I N S T R U C T I O N M A N U A L

FCR-10 Camera

Cat. No. 5-5330

CAUTION

**Read and understand this manual
before using this product.**



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Instruction Manual for the FCR-10 Camera

Cat. No. 5-5330

Table of Contents

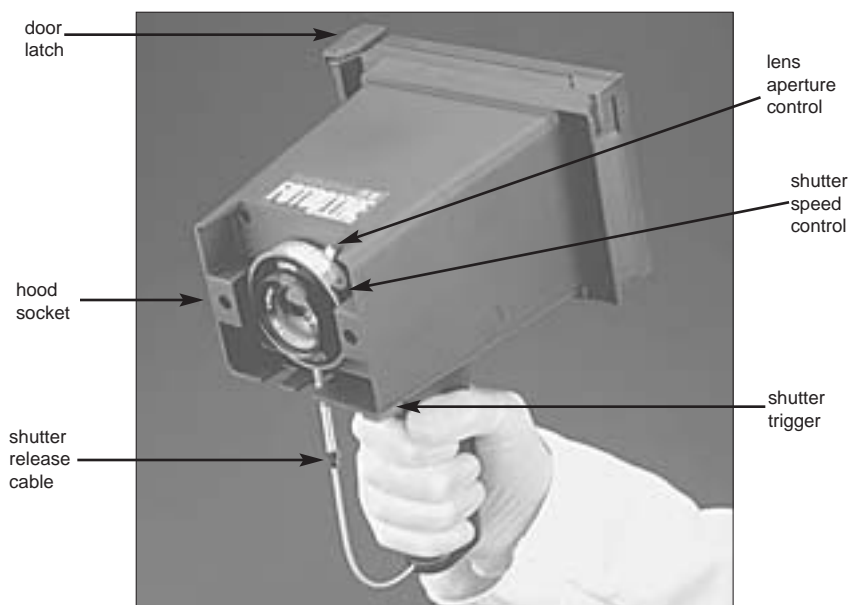
Introduction	2
Diagram	2
Unpacking Instructions	3
Set-Up Instructions.....	3
Operating Instructions	4
Additional Information.....	7
Routine Maintenance.....	11
Servicing Information.....	11
Troubleshooting.....	12
Related Equipment	13
Ordering Information/ Technical Assistance	14

Introduction

The FCR-10 combines a fixed focal length camera with the versatility of optional interchangeable hoods. Variable shutter speeds and aperture settings allow photographic flexibility, and the pistol grip design with trigger shutter release provides hand-held simplicity. You just make the appropriate setting, put the camera over the subject on a transilluminator, and pull the trigger.

Whether you have an 8 cm x 10 cm mini-gel or a large 20 cm x 25 cm gel, the FCR-10 is capable of meeting your needs. Team your FCR-10 with a variety of camera hoods to allow photography of a wide range of image areas. Each hood contains a diopter which adjusts the focal length to accommodate the image area, resulting in sharp pictures without focusing. A tension clip holder permits rapid loading of FOTODYNE 50 mm filter kits. In addition, the hood blocks ambient light, so there is no need to turn off the room lights.

Diagram



Unpacking Instructions

Check-out Procedure

1. Unpack and examine the FCR-10 Camera carefully. Immediately report any damage to the transporting carrier and to FOTODYNE Incorporated. Be sure to save all cartons for claim purposes if damage is found.
2. Identify the following components:
 - a. FCR-10 Camera
 - b. Pistol Grip Shutter Release
 - c. Instruction Manual

Note: In addition to the above camera components, an FCR-10 photographic hood and the desired photographic filter are required for laboratory photodocumentation (see Additional Information pages 7-10).

Set-Up Instructions

Camera Assembly

1. **Attach the pistol grip:** Place the camera on a table with the lens up, and the FOTODYNE label facing away. Align the three pins on the pistol grip with the three holes on the side of the camera that is toward you. Mount the pistol grip to the camera by firmly tightening the chrome ring on the pistol grip.
2. **Attach the shutter release cable:** Screw the shutter release cable from the pistol grip into the socket on the shutter (see diagram for location of shutter release cable).

Film Loading

1. **Open the film compartment door:** With the camera facing downward, pull down the latch securing the rear film door. Open the door completely.
2. **Check the steel rollers:** Dirt on the rollers may cause a number of photograph problems, such as repeated spots or bars on pictures, poor colors, and jammed film. If necessary, clean the rollers as described in Routine Maintenance, page 9.

Set-Up Instructions (cont.)

3. **Remove the empty film cartridge:** If an empty film cartridge is present, lift it up and out, then discard it.
4. **Insert a new film cartridge:** Hold the film pack by the edges only with white-coated foam pad facing up. Push the closed end of the pack in at an angle; then push it down into the camera. Check that the white tabs are free, not caught between the pack and the camera.
5. **Close the film compartment door:** Close the film door and push the latching bar up over the camera so that it clicks into position. The end of the film safety cover (black tab with silver arrows) should extend from the side of the closed unit. Grip the end of the black paper tab firmly and pull it straight, all the way out of the camera. When the black safety cover is removed, a small white tab should stick out of the same slot. The camera is now loaded and ready for the first exposure. The number on the white tab indicates the exposure number.

Operating Instructions

UV CAUTION:

Ultraviolet (UV) radiation can cause severe eye and skin damage! Do not view a UV light source with unprotected eyes. For maximum protection from skin damage, wear protective clothing and a UV blocking face shield over UV blocking eyeglasses. UV blocking eyeglasses are necessary with a face shield to prevent accidental exposure when the shield is raised or removed.

Always turn off midrange and short-wave ultraviolet light sources when setting up a system or setting up objects to be photographed. The ultraviolet lights should be activated only when observing or photographing objects.

Operation

1. **Place subject on flat, lighted surface:** Place the subject on a light box or a transilluminator. Make sure there is enough surface around the subject for placement of the camera hood.

Operating Instructions (cont.)

- Select a filter:** Two styles of filters are available, glass and gelatin. If a glass filter is used, simply screw it onto the lens of the camera before attaching the hood. The gelatin filter, on the other hand, fits in a metal frame which is inserted after the camera is attached to the hood. Just place the gelatin filter assembly in the wire brackets inside the hood. For more information about filter selection (glass vs. gelatin, orange vs. yellow), refer to page 8.
- Attach a photographic hood:** Select a photographic hood that is appropriate for the size of the subject. Place the hood against the front of the camera so that the pins on either side of the mounted hood lens fit into the corresponding sockets on the camera. Secure the hood by reaching into the hood, locating the two black buttons, and snapping them into place by pushing firmly.

CAUTION: The camera hood is strictly for photographic purposes. Do not attempt to use the camera hood to view subjects on the transilluminator. Serious skin or eye injuries may result from improper hood use.

Note: Photographic hoods are available in eight different sizes. To select the hood or hoods that best suit your needs, refer to page 10.

- Set the aperture and shutter speed on the camera:** The aperture and shutter speed selection dials are located beneath the FOTODYNE label on the side of the camera opposite the pistol grip (see diagram). Select the aperture (f-stop) by moving the chrome arrow to the desired setting, and select the shutter speed by moving the red line to the desired setting (See Table 1).

RECOMMENDED CAMERA SETTINGS		
	Aperture	Shutter Speed
Methylene Blue/Coomassie Blue White Light	f/32	1/30 second
Ethidium Bromide UV	f/5.6	1/2 second

Table 1: Recommended camera settings for both White Light and UV transilluminators using Type 667 film. These settings are recommended as a starting point, actual exposure times may vary according to band intensity after staining.

Operating Instructions (cont.)

5. **Photograph the subject:** Hold the camera steady, and simply squeeze the trigger on the pistol grip to take the photograph.

Film Processing

1. **Pull the small white tab:** Remove the camera/hood from the transilluminator and place it on a solid surface. Holding the camera, grasp the small white tab and pull it out and down from the side of the camera in a steady continuous manner.
2. **Pull the large white tab:** Once the small white tab is free from the camera, a large white tab with black arrows should appear slightly above where the white tab had been. Grip this tab in the center and pull it straight, at moderate speed, without hesitation, all the way out of the camera. This will start the film developing.
3. **Allow the film to develop:** The recommended development time is specified in the film instructions (e.g. 45 seconds at 70°F for 667 film). Do not disturb the print while the film is developing. After the full development time, separate the finished print from the developing pod starting at the end nearest the striped tab. Do not allow the print to drop back onto the damp negative. Discard the developing pod and print backing.

CAUTION: Avoid getting any of the caustic developing gel on your clothes or skin. If you do, immediately wash it off with lots of water.

Additional Information

Exposure

Film exposure is determined by the size of the lens opening (aperture) and the length of time that the shutter stays open (shutter speed). The aperture size is given by f-stops on the lens. Each f-stop represents a two-fold change from the next setting. For example, the size of the aperture at f/8 is twice as large as that at f/11 and half the size of an f/5.6 opening. Note that the aperture size decreases with increasing f number and increases as the f numbers get smaller. Shutter speeds are similarly selectable in roughly two-fold increments. The numbers on the shutter represent fractional portions of 1 second. That is, a setting of 15 will result in the shutter being kept open for 1/15th of a second.

The lightness or darkness of a photograph may be adjusted by changing these two parameters on your FCR-10 camera. If a photo is too light, then the exposure should be reduced. This may be done either by reducing the exposure time (increasing shutter speed) or making the lens aperture smaller (going to a high f-number). Conversely, if the photo is too dark, the exposure should be increased by using a longer exposure time (slower shutter speed) or a larger lens aperture (lower f-number).

Shutter Speeds

125 60 31 15 8 4 2 1
<-----Darken/Lighten----->

Lens Openings

4.5 5.6 8 11 16 22 32
<-----Lighten/Darken----->

Blurry or hazy photographs can result from improper selection of exposure settings. This is especially true in low-light photography, such as that for ethidium bromide-stained DNA in agarose electrophoresis gels. These low-light situations require a lens aperture open very wide (e.g. f/4.5 or f/5.6) to allow as much light as possible into the camera. The large lens aperture (low f-number) results in a very shallow depth of focus. Because the 5 mm or greater gel thickness often used in this application can exceed this depth of focus, some of the gel may lie outside the focal plane. To correct such a problem, it is necessary to close down the lens aperture to a higher f-number. While this increases the depth of focus, the exposure time must be lengthened to compensate for the reduction of light through the lens.

Additional Information (cont.)

Film Selection

A wide variety of instant image pack films are available to fit your particular FCR-10 photodocumentation needs:

- Type 667 (3000 ISO), Black and White
- Type 665 (80 ISO), Positive/Negative Black and White
- Type 691 (80 ISO), Color Transparencies
- Type 612 (20,000 ISO), High Speed Black and White

Optimal exposure settings depend upon the speed of the film that is used. For example, a 3000 ISO film such as Type 667 is roughly 40 times “faster” than an 80 ISO film such as Type 665. Therefore, a 40-fold increase in exposure is required to achieve the same quality of photograph. If a 1/2 second, f/5.6 exposure works best for Type 667 film, then a 20-second exposure at f/5.6 might be needed for Type 665.

Filter Selection

1. Gelatin Filters

Gelatin filter assemblies are the best choice if your work requires different types of filters. Because gelatin filter assemblies are inserted into the hood after it is attached to the camera, you can easily change the filters without removing the hood from the camera.

a. Ethidium Bromide Filter Kit

The Ethidium Bromide Filter Kit consists of a red-orange color correction filter, and a pale yellow UV-blocking filter placed together in a metal frame. Make certain that the pale yellow UV-blocking filter is closest to the light source to protect the color correction filter from UV damage. Photographs with fuzzy bands may result if the two filters are in reverse orientation. The metal frame of the DNA Filter Kit has a yellow dot on it to help determine the correct orientation. The yellow dot should be visible from the open end of the hood.

b. Coomassie/Methylene Blue Filter Kit

The Coomassie/Methylene Blue Filter Kit consists of a yellow color correction filter in a metal frame for insertion into the camera hood.

Additional Information (cont.)

2. Threaded Glass Filters

Threaded Glass filters are the best choice if your work involves only one type of filter. Simply screw the glass filter directly onto the camera lens and attach the hood.

a. Ethidium Bromide Threaded Glass Filter

The red-orange Ethidium Bromide Threaded Glass Filter can be screwed directly onto the lens of the FCR-10 Camera. A UV blocking filter is not necessary.

b. Commassie/Methylene Blue Threaded Glass Filter

The yellow Commassie/Methylene Blue Threaded Glass Filter can be screwed directly onto the lens of the FCR-10 Camera.

c. Fluorescent Green Threaded Glass Filter

The Fluorescent Green Threaded Glass Filter can be screwed directly onto the lens of the FCR-10 Camera. A UV blocking filter is not necessary.

Additional Information (cont.)

Hood Selection

A wide variety of photographic hoods are available for use with the FCR-10 Camera. Each hood contains a diopter which adjusts the focal length to accommodate the image area.

<u>Cat. No.</u>	<u>Approximate Image Area</u>	<u>Magnification</u>
1-1440	FOTO/Phoresis® UV, 8.6 x 10.8 cm (for use with FOTO/Phoresis® UV or WL transilluminator)	1.00x
5-5335	8.1 cm x 10.0 cm	0.90x
5-5333	8.9 cm x 11.5 cm	0.82x
5-5334	10.4 cm x 13.5 cm	0.70x
5-5342	11.5 cm x 15.8 cm	0.60x
5-5343	12.8 cm x 16.7 cm	0.57x
5-5344	15.2 cm x 22.8 cm	0.42x
5-5345	17.9 cm x 25.4 cm	0.37x
5-5346	20.8 cm x 27.8 cm	0.34x

Remote Shutter Release

Holding the pistol grip trigger for the duration of long exposures is a source of camera movement. If longer exposures (greater than 1 second) are routinely required for your photodocumentation application, a Remote Shutter Release (Cat #5-5462) can be connected to your FCR-10 camera to prevent blurry images that result from such camera movement.

Routine Maintenance

Cleaning the Developer Rollers

1. **Open the film compartment door:** With the camera facing downward, pull down the latch securing the rear film door. Open the door completely.
2. **Remove the roller assembly:** With both hands, lift the steel loops on either side of the roller assembly and remove it.
3. **Clean the rollers:** Clean both rollers with a damp, lint-free cloth. Never scrape the rollers with anything metallic, nor with your fingernail; do not attempt to disassemble the rollers. Rotate both rollers as you clean and inspect them. Also clean the film tab slot.
4. **Replace the roller assembly:** Slide the rollers into position, then, using both hands, push the steel loops down flat.

Servicing Information

Cleaning the lens

Occasional cleaning of the camera lens, hood diopter, and glass photographic filter with lens tissue is recommended. This will ensure optimal quality of resulting photographic prints.

If the FCR-10 Camera fails to operate as instructed, or if there are any questions regarding its correct usage, please contact FOTODYNE Incorporated for technical assistance at 1-800-362-3686.

Troubleshooting

Symptom	Possible Problem/Solution
Repeated white spots on prints.	<ul style="list-style-type: none"> • Dirty developer rollers. Clean roller assembly.
Underdeveloped edges or corners on prints.	<ul style="list-style-type: none"> • Yellow tab pulled out at an angle. Repeat exposure; pull tabs straight out.
Numerous small white specks on prints.	<ul style="list-style-type: none"> • Yellow tab pulled too rapidly. Repeat exposure; pull tabs at moderate speed.
Very light image, or none at all.	<ul style="list-style-type: none"> • Incorrect exposure settings. Check film speed. Adjust camera setting. • No photographic filter. Insert the proper filter.
Nearly black image, or none at all.	<ul style="list-style-type: none"> • Incorrect exposure settings. Check film speed. Adjust camera setting. • FOTO/Phoresis® UV Hood is not properly aligned over the safety interlock on the FOTO/Phoresis® UV Transilluminator. Remove the hood from the camera, rotate it 180° and reattach it. Try photographing again.
No white tab appears when film safety cover is removed.	<ul style="list-style-type: none"> • White tabs trapped by film pack. Carefully open door and push tabs out. Close and latch the door with the white tab outside.
No yellow tab appears after white tab is pulled.	<ul style="list-style-type: none"> • Film is jammed. DO NOT pull another white tab. Do the following in dim light: Carefully open the door without moving the film pack. Hold the pack in position with a fingertip while gently pulling the yellow tab out. Clean the developer rollers if necessary. Close and latch the door with the next white tab outside.

Related Equipment

Product	Cat. No.
FOTO/Phoresis® Ultraviolet Transilluminator	1-1430
FOTO/Phoresis® White Light Transilluminator	1-1700
FOTO/UV® 26 Ultraviolet Transilluminator	3-3035
FOTO/UV® 21 Ultraviolet Transilluminator	3-3025
FOTO/UV® 15 Ultraviolet Transilluminator	3-3015
VariQuest® 26 White Light Transilluminator	3-3715
FOTO/Convertible™ Dual Transilluminator	3-3400
FOTO/Spectrum™ Dual Transilluminator	3-3200
Ethidium Bromide Filter Kit	3-4309
Coomassie/Methylene Blue Filter Kit	3-4224
Ethidium Bromide Threaded Glass Filter	3-4205
Coomassie/Methylene Blue Threaded Glass Filter	3-4224
Fluorescent Green Threaded Glass Filter	3-4219
Photographic Hood (6.8 cm x 9.2 cm)	5-5335
Photographic Hood (7.2 cm x 10.0 cm)	5-5333
Photographic Hood (8.2 cm x 11.1 cm)	5-5334
Photographic Hood (9.9 cm x 13.3 cm)	5-5342
Photographic Hood (10.5 cm x 14.0 cm)	5-5343
Photographic Hood (14.3 cm x 19.0 cm)	5-5344
Photographic Hood (15.7 cm x 21.2 cm)	5-5345
Photographic Hood (16.9 cm x 22.8 cm)	5-5346
Type 667 Film (2 packs of 10 exposures)	4-4667
Type 665 Film (1 packs of 8 exposures)	4-4665
Type 691 Film (1 packs of 8 exposures)	4-4691
Type 612 Film (1 packs of 8 exposures)	4-4612
Pistol Grip	5-5351
Pistol Grip Cable Release	5-5454
Remote Shutter Release	5-5462
Mini-Roller Assembly	5-6400

ORDERING INFORMATION

Call or Fax Toll-Free:

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Fax Orders: 1-800-362-3642

Research Products Division

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1-800-362-3686

Fax Orders: 1-800-362-3642

Mail to:



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TECHNICAL ASSISTANCE

Technical questions regarding the operation and safe use of this instrument should be directed to FOTODYNE Incorporated.

Call 1-414-369-7000.