



**MACRO FLASH CONTROLLER  
MACRO TWIN FLASH 2400  
MACRO RING FLASH 1200**

---

**E INSTRUCTION MANUAL**

**BASIC OPERATION**

**APPLICATIONS**

**APPENDIX**

## CONTENTS

|  |    |
|--|----|
| Names of Parts.....                                      | 10 |
| BASIC OPERATION  |    |
| Installing Batteries.....                                | 15 |
| Checking Batteries .....                                 | 16 |
| Attaching and Removing the Controller.....               | 17 |
| Attaching the Twin Flash.....                            | 18 |
| Attaching the Ring Flash.....                            | 23 |
| Turning the Flash On and Off.....                        | 25 |
| Film .....   | 25 |
| Basic Flash Mode.....                                    | 26 |
| Selecting Apertures - TTL Flash -.....                   | 30 |
| P Mode.....  | 33 |
| DETAILED OPERATIONS                                      |    |
| Manual Flash.....  | 35 |
| Manual Flash (M) with Twin Flash .....                   | 35 |
| Manual Flash (M) with Ring Flash.....                    | 37 |
| Manual Flash - Selecting Apertures and Power Levels..... | 38 |
| Test Flash .....   | 44 |
| Modeling Flash (Twin Flash Only).....                    | 45 |
| Wide Angle Adapter (Twin Flash Only).....                | 46 |
| Diffuser (Twin Flash Only).....                          | 48 |
| Focus Lamps (Ring Flash Only).....                       | 51 |
| Custom Functions.....                                    | 52 |
| APPENDIX   |    |
| Examples of Twin Flash Photography.....                  | 56 |
| Examples of Ring Flash Photography.....                  | 59 |
| Aperture Range Graphs - Twin Flash.....                  | 60 |
| Aperture Range Graphs - Ring Flash.....                  | 62 |
| Compatibility .....                                      | 64 |
| Care and Storage.....                                    | 66 |
| Specifications.....                                      | 68 |

## FOR PROPER AND SAFE USE

Please read and understand all warnings and cautions before using this product.

### **WARNING**

- Do not put your finger or metallic objects into the cord sockets on the controller. Be careful not to let moisture such as rain enter the socket(s). It may cause an electric shock. Attach the protective socket caps when not in use.
- When unplugging the cord, do not pull on the cord. Hold the plug when removing.
- Do not damage, twist, modify, or heat the cord. A damaged cord may cause damage or injury through fire or electric shock.

Using batteries improperly can cause them to leak harmful solutions, overheat, or explode which may damage property or cause personal injury. Do not ignore the following warnings.

- Only use the batteries specified in this instruction manual.
- Do not install the batteries with the polarity (+/-) reversed.
- Do not use batteries which show wear or damage.
- Do not expose batteries to fire, high temperatures, water, or moisture.
- Do not attempt to short or disassemble batteries.
- Do not store batteries near or in metallic products.
- Do not mix batteries of different types, brands, or ages; rechargeable batteries should be charged together, so that the battery power is equal. Do not attempt to recharge alkaline or lithium batteries.
- Do not use leaking batteries. If fluid from the batteries enters your eye, immediately rinse the eye with plenty of fresh water and contact a doctor. If fluid from the batteries makes contact with your skin or clothing, wash the area thoroughly with water.
- Tape over lithium battery contacts to avoid short-circuiting during disposal; always follow local regulations for battery disposal.

## FOR PROPER AND SAFE USE

### **WARNING**

- Do not disassemble this product. Electric shock may cause injury if a high voltage circuit inside the product is touched. Take the product to a Minolta Service Facility when repairs are required.
- Immediately remove the batteries and discontinue use if the flash or the controller is dropped or subjected to an impact in which the interior, especially the flash unit, is exposed. The flash has a high voltage circuit which may cause an electric shock resulting in injury. The continued use of a damaged product or part may cause injuries.
- Keep batteries or small parts that could be swallowed away from infants. Contact a doctor immediately if an object is swallowed.
- Store this product out of reach of children. Be careful when around children, not to harm them with the product or parts.
- Do not fire the flash directly into the eyes. It may damage eyesight. When taking close-ups of the facial area, subject's eyes should be protected.
- Do not fire the flash at vehicle operators. It may cause a distraction or temporary blindness which may lead to an accident.
- Do not use the product near inflammable gases or liquids such as gasoline, benzine, or paint thinner. Do not use inflammable products such as alcohol, benzine, or paint thinner to clean the product. The use of inflammable cleaners and solvents may cause an explosion or fire.
- If the product emits a strange odor, heat, or smoke, discontinue use. Immediately remove the batteries taking care not to burn yourself, as batteries become hot with use. The continued use of a damaged product or part may cause injuries.
- Take the product to a Minolta Service Facility when repairs are required.

### **CAUTION**

- Do not use or store the product in a hot or humid environment such as the glove compartment or trunk of a car. It may damage the product and batteries which may result in burns or injuries caused by heat, fire, explosion, or leaking battery fluid.
- If batteries are leaking, discontinue use of the product.
- Do not fire the flash while it is in contact with people or objects. The flash unit discharges a large amount of energy which may cause burns.
- Burns may result if the batteries are removed immediately after prolonged or heavy flash use. Wait for the batteries to cool.

Thank you for purchasing this Minolta product. Please read this manual thoroughly before using the macro flash or ring flash. We hope that you will continue to be satisfied by our products.

These products are designed and manufactured for use with Minolta Maxxum/Dynax series cameras and some Minolta digital cameras. Performance when used with cameras from other manufacturers cannot be guaranteed. Minolta takes no responsibility for accidents or malfunctions due to use with such cameras.

The AC Adapter for this Macro Flash Controller is available only in Japan. The use of an AC Adapter other than the specified unit can permanently damage the flash and cause heat or fire.

The information in this manual is relevant for products introduced before February 2001. Contact the nearest authorized Minolta Service Facility to obtain information for products released after this date.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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

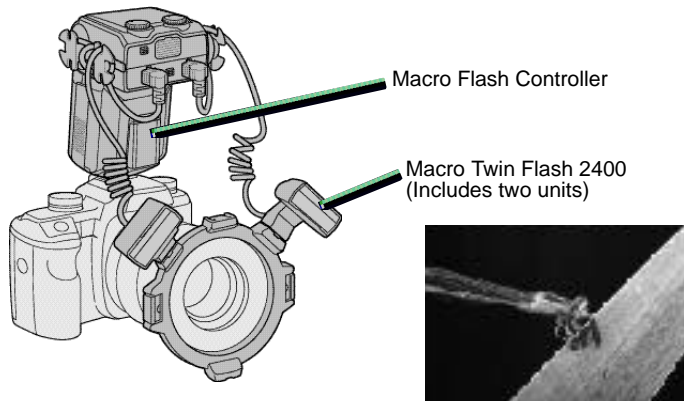


This mark certifies that these products meet the requirements of the EU (European Union) concerning interference causing equipment regulations. CE stands for *conformité Européenne* (European conformity).

## MACRO FLASH OPTIONS

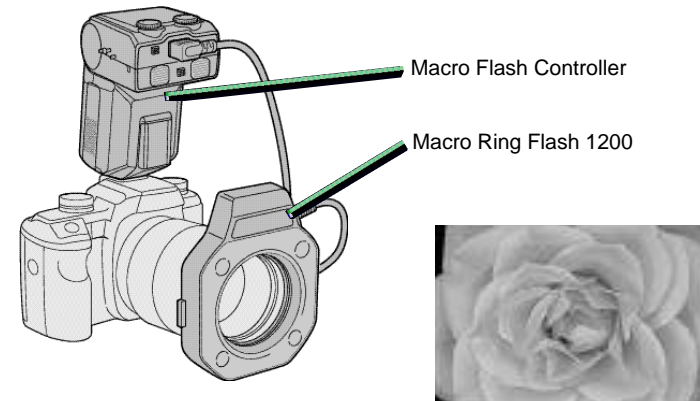
There are two types of lighting available; twin flash and ring flash. Choose one, depending on your subject.

### Twin Flash (2 flashtubes)



A wide choice of lighting variations is possible when the Macro Twin Flash 2400 is used with the Macro Flash Controller. Suitable for photographing flowers, insects, and small objects.

### Ring Flash (4 flashtubes)



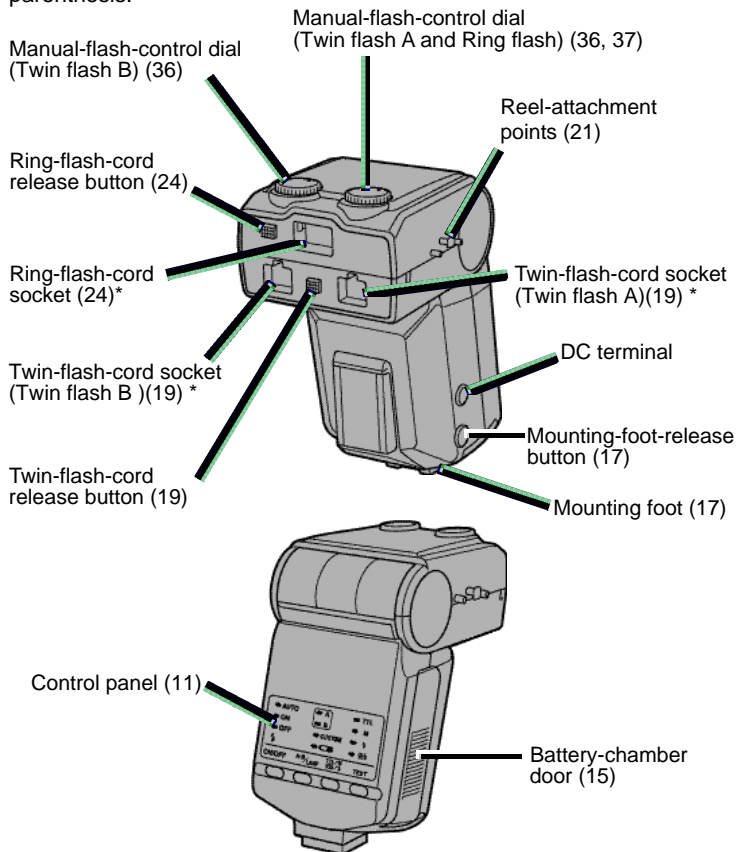
Use the optional Macro Ring Flash 1200 with the Macro Flash Controller. Used for photographing small subjects in fine detail and for scientific applications.

- The Macro Ring Flash 1200 is identical to that provided in the Macro Flash 1200AF set. If you already have the Macro Flash 1200AF set, it is only necessary to purchase the Macro Flash Controller.
- Each part may be purchased separately.
- The Macro Twin Flash 2400 cannot be used with the AF Macro Zoom 3X-1X f/1.7-2.8 lens.
- Twin flash and the ring flash cannot be used together. When both are connected, only the twin flash will fire.

# NAMES OF PARTS

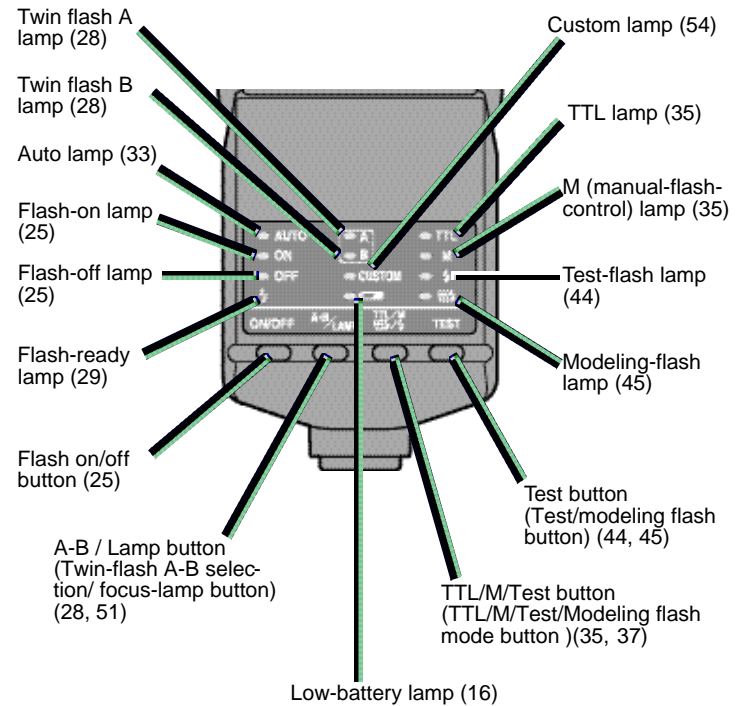
## Macro Flash Controller MFC-1000

For information on specific parts, refer to the page numbers shown in parenthesis.



\* Do not touch.

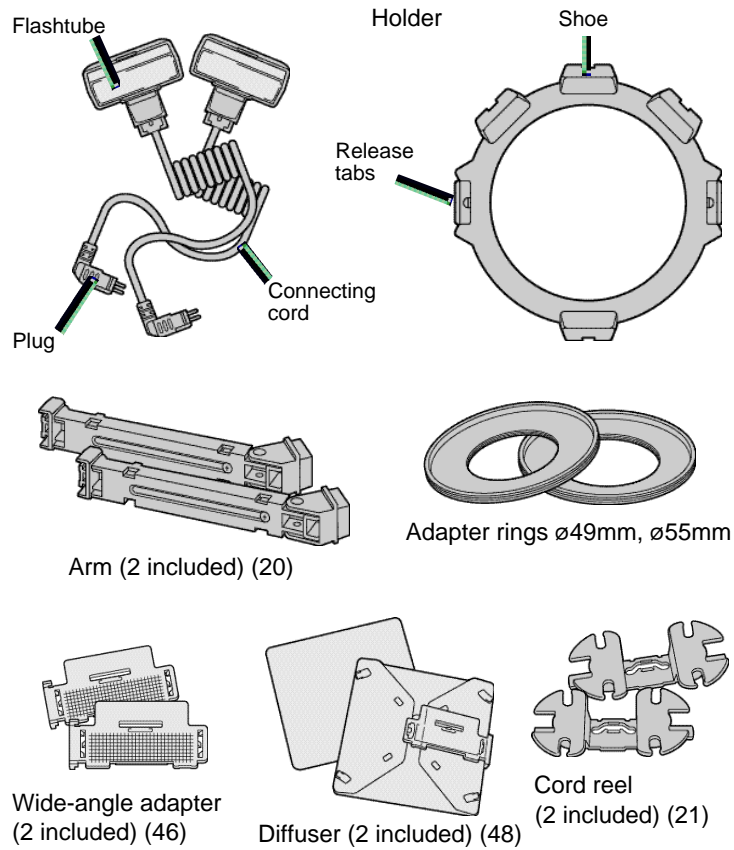
## Control Panel



## NAMES OF PARTS

### Macro Twin Flash 2400

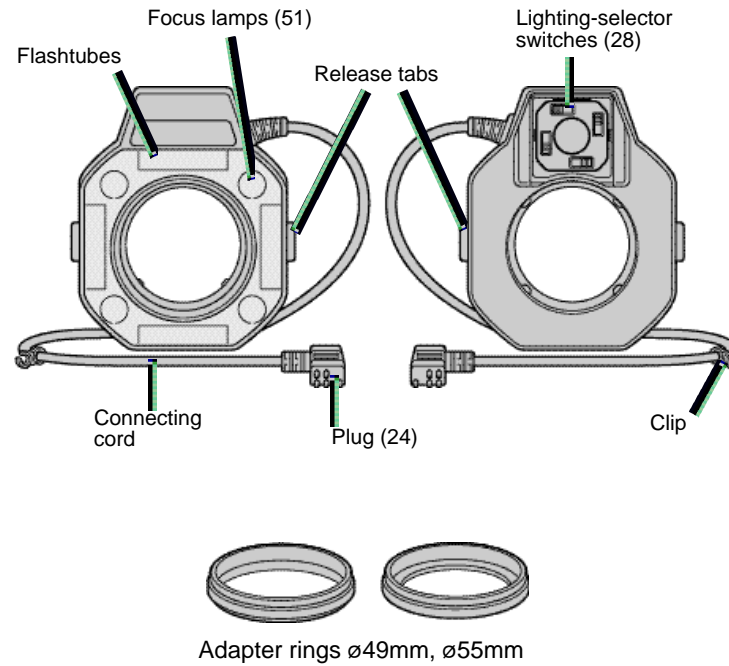
Twin Flash Unit T-2400  
(2 included)



12

### Macro Ring Flash 1200

Ring Flash Unit R-1200



13

# BASIC OPERATION

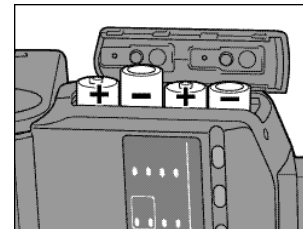
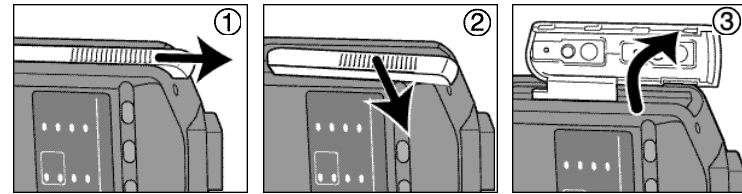
## INSTALLING BATTERIES

The Macro flash controller MFC-1000 may be powered by:

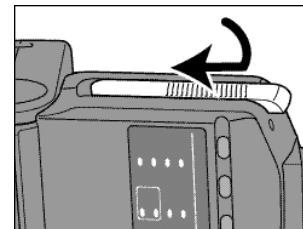
- Four AA-size alkaline batteries
- Four AA-size lithium batteries
- Four AA-size rechargeable nickel-metal hydride (Ni-MH) batteries

Always ensure that rechargeable nickel-metal hydride batteries are charged in the proper charging unit.

**1. Open the battery-chamber door as shown.**



**2. Insert the batteries according to the diagram in the battery chamber.**




**3. Close the battery-chamber door.**

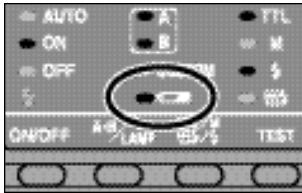
- The indicator lamps on the control panel should light. If not, press the flash on/off button.



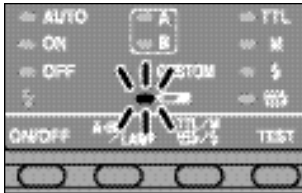
## INSTALLING BATTERIES

### Checking Batteries

The  lamp on the control panel glows or blinks when the batteries are low.



When glowing; Power is low. The batteries will need to be replaced soon.

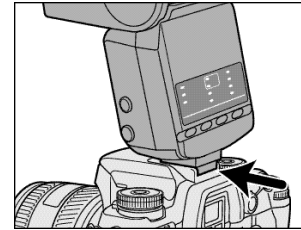


When blinking; Insert new batteries. Flash cannot be used.

- Check the orientation of the batteries if nothing appears when the controller's flash on/off button is pressed.

## ATTACHING AND REMOVING CONTROLLER

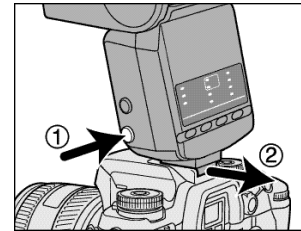
### Attaching To The Camera



**Push the mounting foot firmly onto the camera until it stops.**

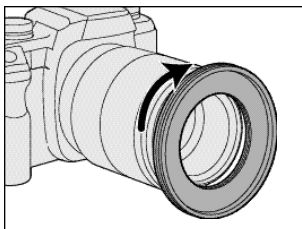
- The controller locks in place automatically.
- If the camera's built-in flash is raised, lower it before attaching the controller.

### Removing From The Camera



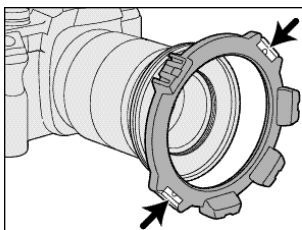
**While pressing the mounting-foot release button ①, remove the controller ②.**

## ATTACHING THE TWIN FLASH

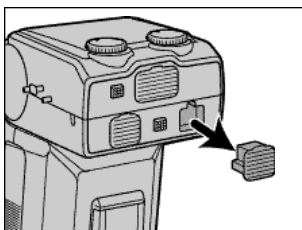


**1. Screw the appropriate adapter ring onto the lens.**

- 49mm and 55mm diameter adapters are provided.
- If using the AF 200mm f/4 Macro Apo G lens, a 72mm adapter is needed, which can be purchased separately (p. 64).

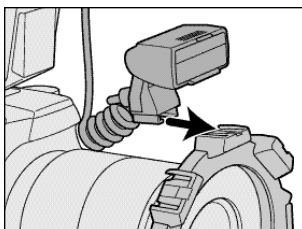


**2. While pressing the tabs on both sides of the holder, place the holder over the adapter, then release both tabs.**



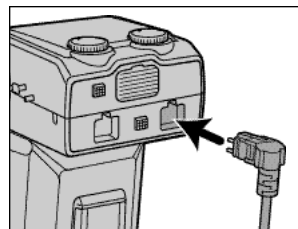
**3. Remove the protective socket caps.**

- For safe-keeping, place the cap(s) in the case. Replace caps after use.

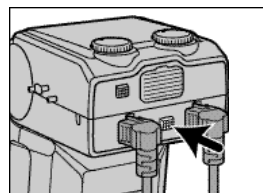


**4. Place a twin flash unit into one of the holder's shoes.**

- Use of an arm is also possible (p. 20).



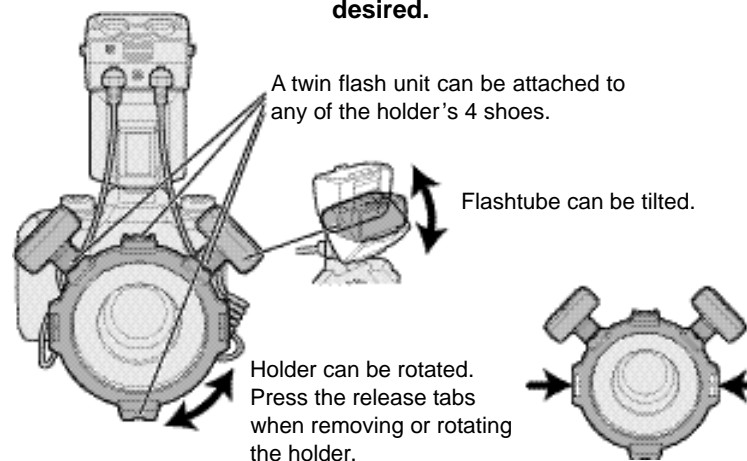
**5. Insert the twin-flash plug into the twin-flash-cord socket on the controller.**



When removing the plug, press the twin-flash-cord release button and pull plug straight out of the socket.

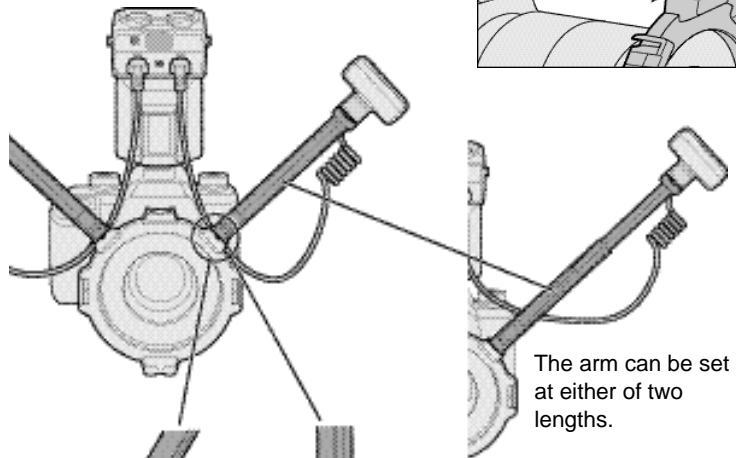
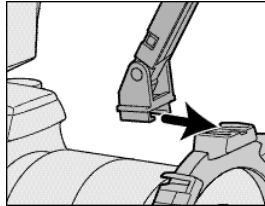
- Do not remove the plug by pulling on the cord.

**6. Adjust position of flashtubes as desired.**

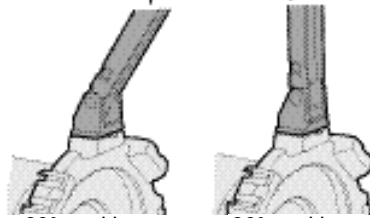


## ATTACHING THE TWIN FLASH

You can use an arm to position the flash unit away from the lens. Attach the arm by sliding its base into one of the four shoes on the holder.



The arm can be set at either of two lengths.



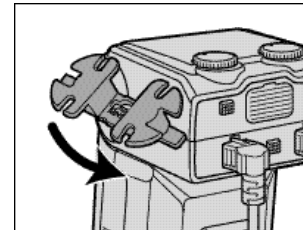
60° position

90° position

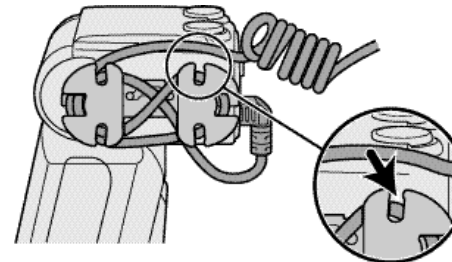
The angle of the arm can be adjusted to either of two positions. The arm is secured in each position by a double click stop.

- In order to prevent breakage, it is possible to move the arm past the two correct stop positions. However, to prevent excessive wear, use only in the correct positions.
- It is also possible to attach the two arms in tandem, but this is not recommended as the excessive length could result in breakage.

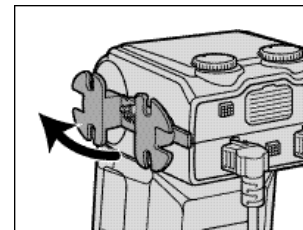
The cord reel can be attached to the side of the controller to take up excessive cord slack.



When attaching it to the controller, orient the reel with the Minolta logo in a readable horizontal position, and place the top of the reel's center cut-out over the top of the three protruding pins on the controller. Next, rotate the reel down until the reel's center cut-out clicks into place over the lower protruding pins.

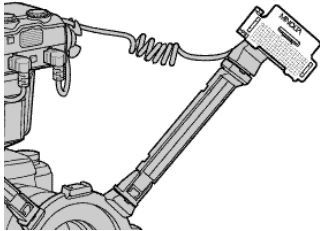


Secure the excess cord by wrapping it around the reel and using the outer cut-outs as shown in the illustration.

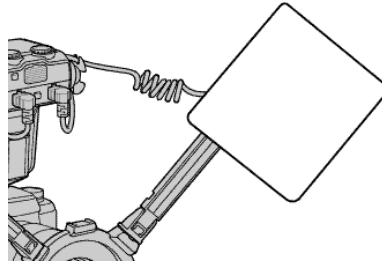


To remove the reel, rotate the bottom of the reel away from the controller and remove.

## ATTACHING THE TWIN FLASH



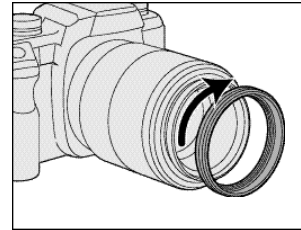
The angle of flash coverage will increase if you attach the wide-angle adapter to the flashtube (p. 46).



Strong shadows can be softened by using the diffuser attached to the flashtube. Always use the diffuser with an arm (p. 48).

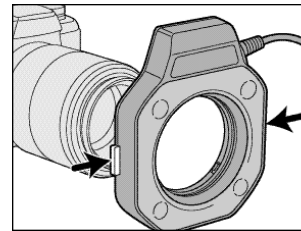
- Do not allow the cord to get in front of the flashtube or lens.
- Make sure the flashtube is pointing at the subject.
- See page 56 for photographic examples.
- If an arm is used when taking very close-ups with the AF Macro 50mm f/2.8 lens, the subject may not receive sufficient lighting (p. 57).
- The AF Macro Zoom 3X-1X f1.7-2.8 lens can not be used with the twin flash.

## ATTACHING THE RING FLASH



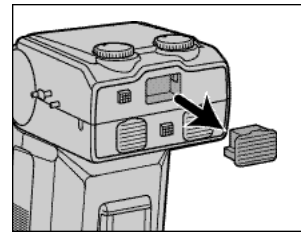
### 1. Screw the appropriate adapter ring onto the lens.

- 49mm and 55mm diameter adapters are provided.
- If using the AF 200mm f/4 Macro Apo G lens, a 72mm adapter is needed, which can be purchased separately (p. 64).



### 2. While pressing the tabs on both sides of the ring flash, place the ring flash over the adapter, then release both tabs.

- Attach the ring flash directly to the AF Macro Zoom 3X-1X f/1.7-2.8 lens.

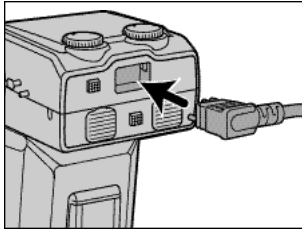


### 3. Remove the protective socket cap.

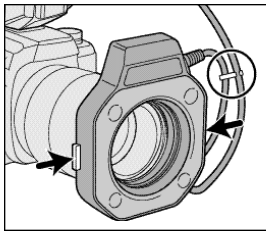
- For safe-keeping, place cap in bag. Replace cap after use.

Continued on next page

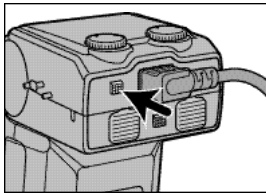
## ATTACHING THE RING FLASH



4. Insert the ring-flash plug into the ring-flash-cord socket on the controller.



- Press the release tabs when removing the ring flash.
- Do not allow the cord to get in front of the lens or ring flashtubes. Use the cord clip to secure the cord.



When removing the plug, press the ring-flash-cord release button and pull plug straight out of the socket.

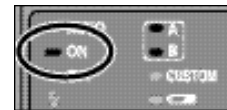
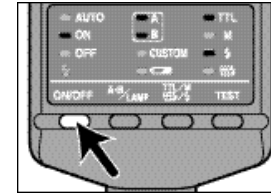
- Do not remove the plug by pulling on the cord.

- See page 59 for photographic examples.

## TURNING THE FLASH ON AND OFF/ FILM

### ON/OFF

Turn the flash on by pressing the flash on/off button.



When the flash turns on, the flash-on lamp will glow.



With the flash on, pressing the flash on/off button will turn the flash off and flash-off lamp will glow.

- The lamp will go out after a little more than 10 seconds.

- When the flash is attached and you operate your camera, power is supplied automatically to the flash, and the lamp will glow. (auto power on). Power is switched off and lamps go out automatically to save batteries when the camera or flash is not used for four minutes (auto power off).
- Custom settings may be used to change the time of auto power off, or to disable auto power off (p. 52).

### Film

Do not use high-speed film (rating in excess of ISO 1000) with TTL direct metering (TTL lamp will be on, see page 35). Use of such film increases the exposure error.

- The low-speed film limit is the same as that for the films specified for the camera. See the camera manual for details.

## BASIC FLASH MODES

Camera's exposure mode should be set to either **A (aperture priority) mode\***, or **M (manual) mode\*\***.

Depth-of-field\*\*\* is quite shallow at close-up and macro ranges, so focusing is very important. It is recommended that you use a macro lens and select an aperture as small as practical to maximize the depth-of-field.

In this section, the basic flash operation in A or M mode with TTL metering (TTL lamp on) is described.

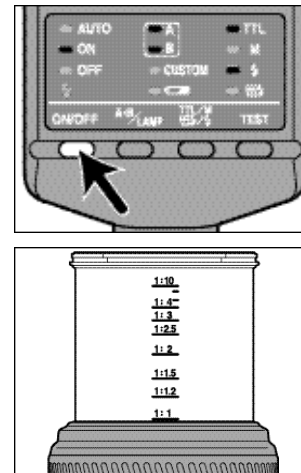
- \*A mode: In A mode, you select the aperture and the camera automatically sets the shutter speed required for proper exposure.
- \*\*M mode: You can select both aperture or shutter speed. HSS (high-speed sync) is not possible.
- \*\*\*Depth-of-field: The range behind and in front of the subject that appears sharp.

This part of the manual assumes that the user is using one of the following cameras and macro lens.

Camera: A camera having A mode (aperture priority) or M mode (manual).

Lens: AF 50mm f/2.8 Macro  
 AF 50mm f/2.8 (D) Macro  
 AF 50mm f3.5 Macro  
 AF 100mm f/2.8 Macro  
 AF 100mm f/2.8 (D) Macro  
 AF 200mm f/4 Macro Apo G  
 AF Macro Zoom 3X-1X f/1.7-2.8

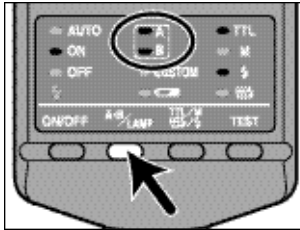
If you use a camera other than one listed above, refer to P mode flash section (p. 33). If using a different lens, see pages 60 and 62.



1. Turn camera on and set to A mode or M mode.
2. Turn the flash on by pressing the flash on/off button. The flash-on lamp will glow.
3. Focus your subject and check the magnification ratio.
  - The location of the magnification ratio scale differs, depending on which lens is used.
4. When using M mode, select a shutter speed that is slower than the camera's sync speed.
5. Select an aperture. Refer to the tables on pages 30 to 32.

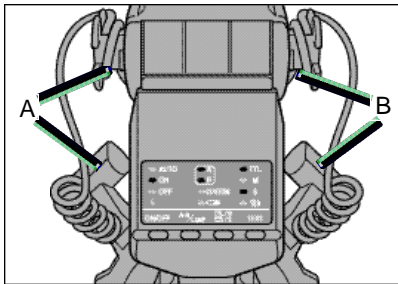
Continued on next page

## BASIC FLASH MODES

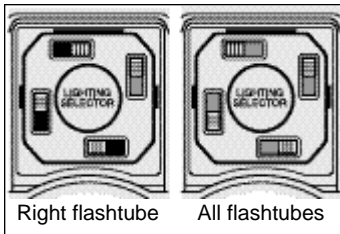


### 6. Select the flash.

In the case of the twin flash, each press of the A-B / lamp button causes the selected flash units to go from both A and B, then only A, and finally only B.

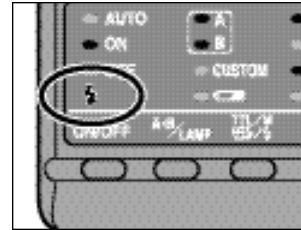


As viewed from the rear (control panel side), the A flash is the one connected to the left side socket, the B flash to the right side.



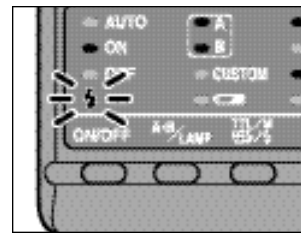
The ring flash has four separate flashtubes. These can be turned on or off independently by using the lighting-selector switches on the back of the unit. When the switch shows red, that flashtube is on. When black, that flashtube is off.

- If you turn off the ring flash while it is connected to the controller, press the flash on/off button on the controller. Proper exposure will not be obtained if only the four lighting-selector switches on the ring flash are turned off.



### 7. When the flash is charged, press the shutter-release button to take the photo.

- The flash is charged when ⚡ is lit on the rear of the unit, and ⚡ also appears in the camera viewfinder.



When the correct exposure was obtained for the photo just taken:

- The flash-ready lamp ⚡ blinks on the control panel for two seconds.
- ⚡ blinks in the camera viewfinder.

- The photo will be under-exposed if taken before charging is complete.
- The use of a tripod or remote cord is recommended to reduce camera shake.
- Camera-to-subject distance of less than 0.5m, and a magnification ratio of more than 0.15X (greater than 1:7), are recommended to get the best results from the macro flash units.
- When neither a twin flash or ring flash is attached, turn the controller off. Otherwise proper exposure will not be obtained.
- The camera's AF illuminator is blocked by the adapter ring or flash and cannot be used for focusing.

## BASIC FLASH MODES

### Selecting Apertures - TTL Flash -

- The tables beginning at the bottom of this page shows values when ISO 100 film is used without the wide-angle adapter or diffuser. For other ISO film speeds, or if you use the wide-angle adapter or diffuser, adjust the aperture settings according to the tables on page 32.
- The aperture ranges given in the tables are calculated values; the actual lens will have its own usable aperture range.  
Example: Using an AF 50mm f/2.8 Macro lens with a pair of twin flash units with no arm, at a magnification ratio of 1:1. The range of acceptable apertures is calculated to be from f/4 to f/90 (bold type in the table). However, the actual range possible with this lens is f/4 to f/32.
- The following tables show data for certain lenses and magnification ratios. For other lenses and magnification ratios, see pages 60 and 62.

AF 50mm f/2.8 Macro (Lens aperture range: f/2.8 - f/32)

AF 50mm f/3.5 Macro (Lens aperture range: f/3.5 - f/32)

|            |                              | Magnification ratio       |                     |                      |                      |                       |
|------------|------------------------------|---------------------------|---------------------|----------------------|----------------------|-----------------------|
|            |                              | 1:1                       | 1:1.5               | 1:2                  | 1:3                  | 1:4                   |
| Twin flash | Without arm                  | <b>4 ~ 90</b><br>2.8 ~ 64 | 5.6 ~ 128<br>4 ~ 90 | 8 ~ 180<br>5.6 ~ 128 | 5.6 ~ 128<br>4 ~ 90  | 4.5 ~ 108<br>3.5 ~ 76 |
|            | Arm (short)<br>60 ° position | 2.4 ~ 54<br>1.7 ~ 38      | 2.8 ~ 64<br>2 ~ 45  | 4 ~ 90<br>2.8 ~ 64   | 4 ~ 90<br>2.8 ~ 64   | 4.5 ~ 180<br>3.5 ~ 76 |
|            | Arm (long)<br>90 ° position  | 1.4 ~ 32<br>1 ~ 22        | 1.4 ~ 32<br>1 ~ 22  | 2 ~ 45<br>1.4 ~ 32   | 2.4 ~ 54<br>1.7 ~ 38 | 2.8 ~ 64<br>2 ~ 45    |
|            | Ring Flash                   | 2.8 ~ 64                  | 3.5 ~ 76            | 3.5 ~ 76             | 2.4 ~ 54             | 2 ~ 45                |

Upper set of numbers is for two twin flash units.

Lower set is for one twin flash unit.

Ring flash is common for 1 ~ 4 tubes.

AF 100mm f/2.8 Macro (Lens aperture range: f/2.8 - f/32)

|            |                              | Magnification ratio   |                      |                    |                      |
|------------|------------------------------|-----------------------|----------------------|--------------------|----------------------|
|            |                              | 1:1                   | 1:1.5                | 1:2                | 1:3                  |
| Twin flash | Without arm                  | 3.5 ~ 76<br>2.4 ~ 54  | 3.5 ~ 76<br>2.4 ~ 54 | 2.8 ~ 64<br>2 ~ 45 | 2.4 ~ 54<br>1.7 ~ 38 |
|            | Arm (short)<br>60 ° position | 2 ~ 45<br>1.4 ~ 32    | 2.8 ~ 64<br>2 ~ 45   | 2.8 ~ 64<br>2 ~ 45 | 2.8 ~ 64<br>2 ~ 45   |
|            | Arm (long)<br>90 ° position  | 1.2 ~ 27<br>0.85 ~ 19 | 1.7 ~ 38<br>1.2 ~ 27 | 2 ~ 45<br>1.4 ~ 32 | 2 ~ 45<br>1.4 ~ 32   |
|            | Ring Flash                   | 1.4 ~ 32              | 1.4 ~ 32             | 1.2 ~ 27           | 1 ~ 22               |

AF 200mm f/4 Macro Apo G (Lens aperture range: f/4 - f/32)

|            |                              | Magnification ratio |                    |                      |
|------------|------------------------------|---------------------|--------------------|----------------------|
|            |                              | 1:1                 | 1:1.5              | 1:2                  |
| Twin flash | Without arm                  | 2.8 ~ 64<br>2 ~ 45  | 2 ~ 45<br>1.4 ~ 32 | 1.7 ~ 38<br>1.2 ~ 27 |
|            | Arm (short)<br>60 ° position | 2.8 ~ 64<br>2 ~ 45  | 2.8 ~ 64<br>2 ~ 45 | 2 ~ 45<br>1.4 ~ 32   |
|            | Arm (long)<br>90 ° position  | 2 ~ 45<br>1.4 ~ 32  | 2 ~ 45<br>1.4 ~ 32 | 1.7 ~ 38<br>1.2 ~ 27 |
|            | Ring Flash                   | 1.7 ~ 38            | 1.2 ~ 27           | 1 ~ 22               |

AF Macro Zoom 3X-1X f/1.7-2.8 (Lens aperture range: 1X: f/5.6 - 54, 3X: f/6.7 - 64)

|            |  | Magnification ratio |        |
|------------|--|---------------------|--------|
|            |  | 1X                  | 3X     |
| Ring Flash |  | 4.5 ~ 108           | 4 ~ 90 |

Upper set of numbers is for two twin flash units.

Lower set is for one twin flash unit.

Ring flash is common for 1 ~ 4 tubes.

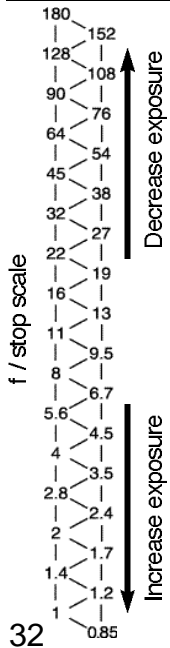


## BASIC FLASH MODES

### When Using Film Other Than ISO 100, Or When Using the Wide-Angle Adapter or Diffuser

An additional adjustment must be applied to the previous tables.

|         | W/O Wide-angle adapter or Diffuser (Exposure adjustment) | With Wide-angle adapter (Exposure adjustment) | With Diffuser (Exposure adjustment) |
|---------|--|---|-------------------------------------|
| ISO 25  | +2 Stop  | +3.5 Stop                                     | +4.5 Stop                           |
| ISO 50  | +1 Stop  | +2.5 Stop                                     | +3.5 Stop                           |
| ISO 100 | No change  | +1.5 Stop                                     | +2.5 Stop                           |
| ISO 200 | -1 Stop  | +0.5 Stop                                     | +1.5 Stop                           |
| ISO 400 | -2 Stop  | -0.5 Stop                                     | +0.5 Stop                           |
| ISO 800 | -3 Stop  | -1.5 Stop                                     | -0.5 Stop                           |



Using the diagram at the left, moving one step vertically is equal to a full-stop change. Moving one step diagonally, is equal to a half-stop change.

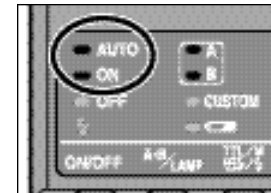
Example: starting at f/8, if you decrease the exposure by a full-stop, you get f/11. If you increase by a half-stop, you get f/6.7.

Example: using an AF 50mm f/2.8 Macro lens, two twin flash units, no arm, magnification ratio of 1:1, and ISO 100 film. The calculated acceptable aperture range is f/4 - f/90 (bold type in the table, page 30). But with ISO 50 film and the diffuser, using the chart above, you will see that you need to increase the aperture by +3.5 stops. This results in a calculated acceptable aperture range of f/1.2 - f/27. However, because the actual aperture range for this particular lens is f/2.8 - f/32, the usable range for satisfactory results would be f/2.8 - f/27.

### P Mode

The procedure for P mode, including subject program selection, is the same as that for A or M mode, except that the aperture is set automatically.

- With some cameras, the flash will fire automatically in P mode. In this case, the auto lamp will glow and the flash may not fire if the surrounding conditions are bright.



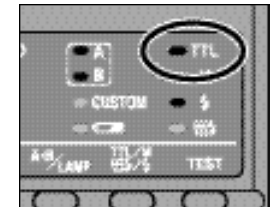
- P mode flash program is designed for general subjects, not close-up or macro subjects. If macro photos are taken, the depth-of field may be very shallow. If the aperture selected by the camera is outside the allowable range, the proper exposure can not be obtained (p. 30 - 32).

# DETAILED OPERATIONS

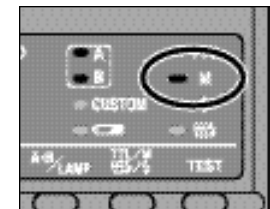
## MANUAL FLASH (M)

Normal TTL flash metering automatically adjusts the flash intensity to provide the proper exposure for the subject. Manual flash provides a fixed flash intensity irrespective of the brightness of the subject and the camera setting.

- In manual flash, the maximum flash power is when the manual flash control is set to 1/1. Each step of the flash power level corresponds to one aperture stop. For example, changing the setting from 1/1 to 1/2, or from 1/32 to 1/64 decreases the exposure by one stop.
- Manual flash operates in the camera's M (manual) mode only. In other modes, TTL measuring is selected automatically.
- As manual flash is not affected by the reflectivity of the subject, it is useful for subjects with extremely high or low reflectivity.



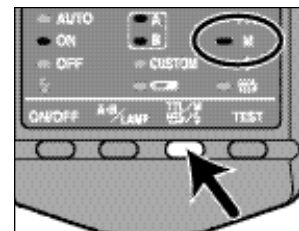
TTL flash metering



Manual flash

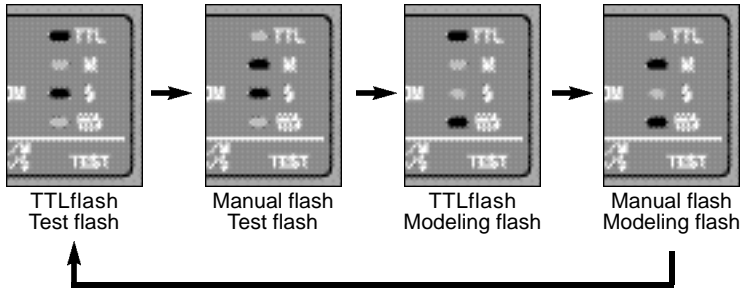
MANUAL FLASH (M)

### Manual Flash With Twin Flash



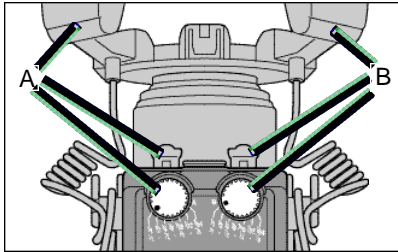
1. Select the M mode on the camera.
  2. Press the TTL/M/test button (TTL/M/TEST) until the M lamp glows.
- Each time the button is pressed, the flash modes will change (see next page). For test firing and modeling, see page 44 and 45.

## MANUAL FLASH (M)




3. Select shutter speed and aperture (p. 38).

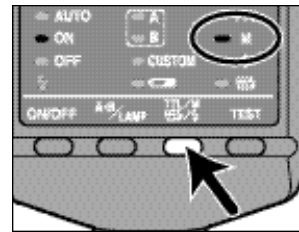
4. Turn the appropriate manual-flash-control dial and select the desired power level (p. 38).




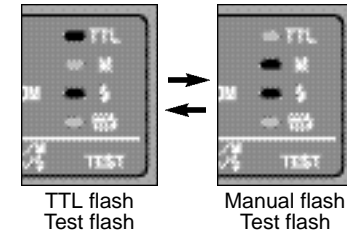
When viewed from the rear (control panel side), the manual-flash-control dial for twin flash A is on the left; and that for twin flash B is on the right. Any power level setting between 1/1 ~ 1/64 can be selected.

- See the tables on page 38 to 43 for the aperture and power level needed to obtain a proper exposure. The flash-ready lamp  will not blink on the control panel after the photo is taken.
- The size of the step on the manual-flash-control dials can be changed from full-stop increments to half-stop increments by adjusting the custom settings. See page 52.

## Manual Flash With Ring Flash

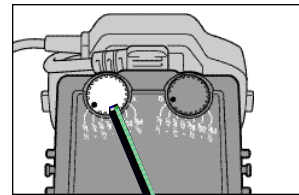


1. Select the M mode on the camera.
2. Press the TTL/M/test button (TTL/M/) until the M lamp glows.
  - Each time the button is pressed, the flash modes will change as follows: (For test flash firing see page 44.)



3. Select shutter speed and aperture (p. 38).

4. Turn manual-flash-control dial and select the desired power level (p. 38).




For ring flash

The manual-flash-control dial for the ring flash is on the left side (this is the same control dial used for the twin flash A). Select any power lever between 1/1 ~ 1/64.

Continued on next page

## MANUAL FLASH (M)

- See the tables on pages 38 to 43 for the aperture and power level needed to obtain a proper exposure. The flash-ready lamp  will not blink on the control panel after the photo is taken.
- The size of the step on the manual-flash-control dials can be changed from full-stop increments to half-stop increments by adjusting the custom settings. See page 52.

### Selecting Apertures and Power Level - Manual Flash -

- The tables beginning on the next page show values for ISO 100 speed film without the wide-angle adapter or diffuser. For other ISO film speeds, or for the use of the wide-angle adapter or diffuser, adjust the aperture settings according to the table on page 43. When using the twin flash, the data assumes that the power lever is the same for both units. If they are set at different power levels, see page 42.
- The aperture values given in the tables are calculated values; the actual lens will have its own usable aperture range.  
Example: using an AF 50mm f/2.8 Macro lens with a pair of twin flash units with no arm, power level of 1/1, and a magnification ratio of 1:1, the aperture is calculated at f/90 (bold type in the table, page 39). However, the smallest actual aperture possible with this lens is f/32. Therefore, if you set the power level to 1/1, the picture will be overexposed. But, if you set the power level to 1/8, you will get a correct exposure at f/32 (italic type in the table, page 39).
- These tables show the apertures where the proper exposure of the illuminated area is obtained. Actual exposure varies according to the subject's shape or position. Test photographs or bracketing is recommended especially when the subject is illuminated from side or behind.
- The following tables show data for certain lenses and magnification ratios. For other lenses and magnification ratios, see pages 61 and 63.

AF 50mm f/2.8 Macro (Lens aperture range: f/2.8 - f/32)

AF 50mm f/3.5 Macro (Lens aperture range: f/3.5 - f/32)

|            |                              | Magnification Ratio |                |          |           |           |          |
|------------|------------------------------|---------------------|----------------|----------|-----------|-----------|----------|
|            |                              | 1:1                 | 1:1.5          | 1:2      | 1:3       | 1:4       |          |
|            |                              | Power level         |                |          |           |           |          |
|            |                              | 1/1                 | 1/2            | 1/4      | 1/8       | 1/16      | 1/32     |
| Twin flash | Without arm                  | <b>1/1</b>          | <b>90</b> (64) | 128 (90) | 180 (128) | 128 (90)  | 108 (76) |
|            |                              | 1/2                 | 64 (45)        | 90 (64)  | 128 (90)  | 90 (64)   | 76 (54)  |
|            |                              | 1/4                 | 45 (32)        | 64 (45)  | 90 (64)   | 64 (45)   | 54 (38)  |
|            |                              | 1/8                 | 32 (22)        | 45 (32)  | 64 (45)   | 45 (32)   | 38 (27)  |
|            |                              | 1/16                | 22 (16)        | 32 (22)  | 45 (32)   | 32 (22)   | 27 (19)  |
|            |                              | 1/32                | 16 (11)        | 22 (16)  | 32 (22)   | 22 (16)   | 19 (13)  |
|            | 1/64                         | 11 (8)              | 16 (11)        | 22 (16)  | 16 (11)   | 13 (9.5)  |          |
|            | Arm (short)<br>60 ° position | 1/1                 | 54 (38)        | 64 (45)  | 90 (64)   | 90 (64)   | 108 (76) |
|            |                              | 1/2                 | 38 (27)        | 45 (32)  | 64 (45)   | 64 (45)   | 76 (54)  |
|            |                              | 1/4                 | 27 (19)        | 32 (22)  | 45 (32)   | 45 (32)   | 54 (38)  |
|            |                              | 1/8                 | 19 (13)        | 22 (16)  | 32 (22)   | 32 (22)   | 38 (27)  |
|            |                              | 1/16                | 13 (9.5)       | 16 (11)  | 22 (16)   | 22 (16)   | 27 (19)  |
|            |                              | 1/32                | 9.5 (6.7)      | 11 (8)   | 16 (11)   | 16 (11)   | 19 (13)  |
|            | 1/64                         | 6.7 (4.5)           | 8 (5.6)        | 11 (8)   | 11 (8)    | 13 (9.5)  |          |
|            | Arm (long)<br>90 ° position  | 1/1                 | 32 (22)        | 32 (22)  | 45 (32)   | 54 (38)   | 64 (45)  |
|            |                              | 1/2                 | 22 (16)        | 22 (16)  | 32 (22)   | 38 (27)   | 45 (32)  |
|            |                              | 1/4                 | 16 (11)        | 16 (11)  | 22 (16)   | 27 (19)   | 32 (22)  |
|            |                              | 1/8                 | 11 (8)         | 11 (8)   | 16 (11)   | 19 (13)   | 22 (16)  |
|            |                              | 1/16                | 8 (5.6)        | 8 (5.6)  | 11 (8)    | 13 (9.5)  | 16 (11)  |
|            |                              | 1/32                | 5.6 (4)        | 5.6 (4)  | 8 (5.6)   | 9.5 (6.7) | 11 (8)   |
|            | 1/64                         | 4 (2.8)             | 4 (2.8)        | 5.6 (4)  | 6.7 (4.5) | 8 (5.6)   |          |
|            | Ring flash<br>(1 ~ 4 lamps)  | 1/1                 | 64             | 76       | 76        | 54        | 45       |
|            |                              | 1/2                 | 45             | 54       | 54        | 38        | 32       |
|            |                              | 1/4                 | 32             | 38       | 38        | 27        | 22       |
| 1/8        |                              | 22                  | 27             | 27       | 19        | 16        |          |
| 1/16       |                              | 16                  | 19             | 19       | 13        | 11        |          |
| 1/32       |                              | 11                  | 13             | 13       | 9.5       | 8         |          |
| 1/64       | 8                            | 9.5                 | 9.5            | 6.7      | 5.6       |           |          |

MANUAL FLASH (M)

Use aperture values inside ( ) when only one twin flash unit is used.

## MANUAL FLASH (M)

AF 100mm f/2.8 Macro (Lens aperture range: f/2.8 - f/32)

|            |                             | Magnification Ratio |                  |           |         |           |
|------------|-----------------------------|---------------------|------------------|-----------|---------|-----------|
|            |                             | 1:1                 | 1:1.5            | 1:2       | 1:3     |           |
|            |                             | Power level         |                  |           |         |           |
| Twin flash | Without arm                 | 1/1                 | 76 (54)          | 76 (54)   | 64 (45) | 54 (38)   |
|            |                             | 1/2                 | 54 (38)          | 54 (38)   | 45 (32) | 38 (27)   |
|            |                             | 1/4                 | 38 (27)          | 38 (27)   | 32 (22) | 27 (19)   |
|            |                             | 1/8                 | 27 ( <b>19</b> ) | 27 (19)   | 22 (16) | 19 (13)   |
|            |                             | 1/16                | 19 ( <b>13</b> ) | 19 (13)   | 16 (11) | 13 (9.5)  |
|            |                             | 1/32                | 13 (9.5)         | 13 (9.5)  | 11 (8)  | 9.5 (6.7) |
|            |                             | 1/64                | 9.5 (6.7)        | 9.5 (6.7) | 8 (5.6) | 6.7 (4.5) |
|            | Arm (short)<br>60° position | 1/1                 | 45 (32)          | 64 (45)   | 64 (45) | 64 (45)   |
|            |                             | 1/2                 | 32 (22)          | 45 (32)   | 45 (32) | 45 (32)   |
|            |                             | 1/4                 | 22 (16)          | 32 (22)   | 32 (22) | 32 (22)   |
|            |                             | 1/8                 | 16 (11)          | 22 (16)   | 22 (16) | 22 (16)   |
|            |                             | 1/16                | 11 (8)           | 16 (11)   | 16 (11) | 16 (11)   |
|            |                             | 1/32                | 8 (5.6)          | 11 (8)    | 11 (8)  | 11 (8)    |
|            |                             | 1/64                | 5.6 (4)          | 8 (5.6)   | 8 (5.6) | 8 (5.6)   |
|            | Arm (long)<br>90° position  | 1/1                 | 27 (19)          | 38 (27)   | 45 (32) | 45 (32)   |
|            |                             | 1/2                 | 19 (13)          | 27 (19)   | 32 (22) | 32 (22)   |
|            |                             | 1/4                 | 13 (9.5)         | 19 (13)   | 22 (16) | 22 (16)   |
|            |                             | 1/8                 | 9.5 (6.7)        | 13 (9.5)  | 16 (11) | 16 (11)   |
|            |                             | 1/16                | 6.7 (4.5)        | 9.5 (6.7) | 11 (8)  | 11 (8)    |
|            |                             | 1/32                | 4.5 (3.5)        | 6.7 (4.5) | 8 (5.6) | 8 (5.6)   |
|            |                             | 1/64                | 3.5 (2.4)        | 4.5 (3.5) | 5.6 (4) | 5.6 (4)   |
|            | Ring flash<br>(1 ~ 4 lamps) | 1/1                 | 32               | 32        | 27      | 22        |
|            |                             | 1/2                 | 22               | 22        | 19      | 16        |
|            |                             | 1/4                 | 16               | 16        | 13      | 11        |
|            |                             | 1/8                 | 11               | 11        | 9.5     | 8         |
|            |                             | 1/16                | 8                | 8         | 6.7     | 5.6       |
|            |                             | 1/32                | 5.6              | 5.6       | 4.5     | 4         |
|            |                             | 1/64                | 4                | 4         | 3.5     | 2.8       |

Use aperture values inside ( ) when only one twin flash unit is used.

AF 200mm f/4 Macro Apo G (Lens aperture range: f/4 - f/32)

|            |                             | Magnification Ratio |                |         |           |
|------------|-----------------------------|---------------------|----------------|---------|-----------|
|            |                             | 1:1                 | 1:1.5          | 1:2     |           |
|            |                             | Power level         |                |         |           |
| Twin flash | Without arm                 | 1/1                 | 64 (45)        | 45 (32) | 38 (27)   |
|            |                             | 1/2                 | 45 (32)        | 32 (22) | 27 (19)   |
|            |                             | 1/4                 | <b>32</b> (22) | 22 (16) | 19 (13)   |
|            |                             | 1/8                 | 22 (16)        | 16 (11) | 13 (9.5)  |
|            |                             | 1/16                | 16 (11)        | 11 (8)  | 9.5 (6.7) |
|            |                             | 1/32                | 11 (8)         | 8 (5.6) | 6.7 (4.5) |
|            |                             | 1/64                | 8 (5.6)        | 5.6 (4) | 4.5 (3.5) |
|            | Arm (short)<br>60° position | 1/1                 | 64 (45)        | 64 (45) | 45 (32)   |
|            |                             | 1/2                 | 45 (32)        | 45 (32) | 32 (22)   |
|            |                             | 1/4                 | 32 (22)        | 32 (22) | 22 (16)   |
|            |                             | 1/8                 | 22 (16)        | 22 (16) | 16 (11)   |
|            |                             | 1/16                | 16 (11)        | 16 (11) | 11 (8)    |
|            |                             | 1/32                | 11 (8)         | 11 (8)  | 8 (5.6)   |
|            |                             | 1/64                | 8 (5.6)        | 8 (5.6) | 5.6 (4)   |
|            | Arm (long)<br>90° position  | 1/1                 | 45 (32)        | 45 (32) | 38 (27)   |
|            |                             | 1/2                 | 32 (22)        | 32 (22) | 27 (19)   |
|            |                             | 1/4                 | 22 (16)        | 22 (16) | 19 (13)   |
|            |                             | 1/8                 | 16 (11)        | 16 (11) | 13 (9.5)  |
|            |                             | 1/16                | 11 (8)         | 11 (8)  | 9.5 (6.7) |
|            |                             | 1/32                | 8 (5.6)        | 8 (5.6) | 6.7 (4.5) |
|            |                             | 1/64                | 5.6 (4)        | 5.6 (4) | 4.5 (3.5) |
|            | Ring flash<br>(1 ~ 4 lamps) | 1/1                 | 38             | 27      | 22        |
|            |                             | 1/2                 | 27             | 19      | 16        |
|            |                             | 1/4                 | 19             | 13      | 11        |
|            |                             | 1/8                 | 13             | 9.5     | 8         |
|            |                             | 1/16                | 9.5            | 6.7     | 5.6       |
|            |                             | 1/32                | 6.7            | 4.5     | 4         |
|            |                             | 1/64                | 4.5            | 3.5     | 2.8       |

Use aperture values inside ( ) when only one twin flash unit is used.

## MANUAL FLASH (M)

AF Macro Zoom 3X-1X f/1.7-2.8 (Lens aperture range at 1X: f/5.6 - 54, at 3X: f/6.7 - 64)

| Magnification Ratio         |      | 1X  | 3X |
|-----------------------------|------|-----|----|
| Power level                 |      |     |    |
| Ring flash<br>(1 ~ 4 lamps) | 1/1  | 108 | 90 |
|                             | 1/2  | 76  | 64 |
|                             | 1/4  | 54  | 45 |
|                             | 1/8  | 38  | 32 |
|                             | 1/16 | 27  | 22 |
|                             | 1/32 | 19  | 16 |
|                             | 1/64 | 13  | 11 |

### When Twin Flash Units are at Different Power Level Settings

The values given in the preceding tables for the twin flashes, assume that both twin flash units are set at the same flash level. When they are set to different flash power levels, the aperture needed for correct exposure can be calculated using the following equation:

$$\text{Aperture}^* = \sqrt{(A \text{ flash aperture})^2 + (B \text{ flash aperture})^2}$$

Example: using an AF 100mm f/2.8 Macro lens with a pair of twin flash units with no arm. "A" twin flash is set at a power level of 1/8, "B" twin flash unit is set at 1/16, and the magnification ratio is 1:1 (bold type values in the table on page 40).

$$\text{Aperture} = \sqrt{19^2 + 13^2} = \sqrt{361 + 169} = \sqrt{530} \approx 22$$

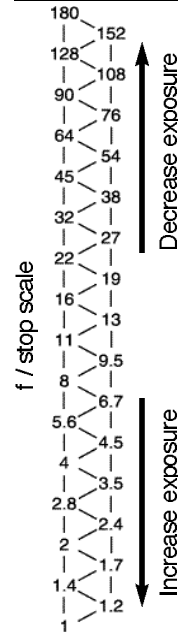
Therefore, in the above example, an aperture setting of f/22 will give proper exposure.

\* When both twin flash units are used.

### When Using Film Other Than ISO 100, Or When Using the Wide-Angle Adapter or Diffuser

The following adjustment must be made to the exposure when using different film speeds or accessories.


|         | W/O Wide-angle adapter or Diffuser (Exposure adjustment) | With Wide-angle adapter (Exposure adjustment) | With Diffuser (Exposure adjustment) |
|---------|--|---|-------------------------------------|
| ISO 25  | +2 Stop  | +3.5 Stop                                     | +4.5 Stop                           |
| ISO 50  | +1 Stop  | +2.5 Stop                                     | +3.5 Stop                           |
| ISO 100 | No change  | +1.5 Stop                                     | +2.5 Stop                           |
| ISO 200 | -1 Stop  | +0.5 Stop                                     | +1.5 Stop                           |
| ISO 400 | -2 Stop  | -0.5 Stop                                     | +0.5 Stop                           |
| ISO 800 | -3 Stop  | -1.5 Stop                                     | -0.5 Stop                           |

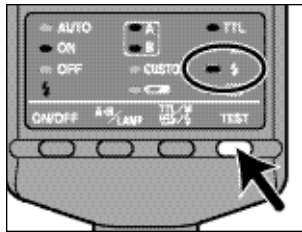



Using the diagram at the left, moving one step vertically is equal to a full-stop change. Moving one step diagonally, is equal to a half-stop change. Example: starting at f/8, if you decrease the exposure by a full stop, you get f/11. If you increase the exposure by a half stop, you get f/6.7.

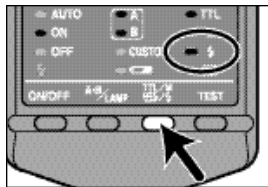
If you were using an AF 200mm f/4 Macro Apo G lens, two twin flash units, no arm, a power level of 1/4, magnification ratio of 1:1, and ISO 100 film, the calculated aperture would be f/32 (bold type in the table on page 41). But with ISO 200 film and the diffuser, using the chart above, you will see that you need to adjust the aperture by +1.5 stops. The resulting aperture of f/19 is required for a correct exposure.


## TEST FLASH

One test flash may be used before taking a photograph. Use test-flash mode  when using a flash meter in manual-flash mode.



**Check that the test-flash lamp  is on. Press the test button to fire the test flash.**

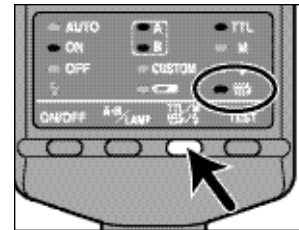


- If the test-flash lamp  isn't glowing, press the TTL/M/Test button to make the test-flash lamp glow.
- Each time the TTL/M/Test button is pressed, the TTL and M lamp will change - be sure to check that the appropriate lamp is glowing. See page 36 (twin flash) or page 37 (ring flash) for the display sequence.


- With TTL flash metering, the test flash will fire at full power when the test button is pressed.
- In manual flash mode, the test flash will fire at the selected power level when the test button is pressed. When using a flash meter, use the manual flash mode.
- If the modeling-flash lamp glows, the modeling flash will fire when the test button is pressed. See page 45.

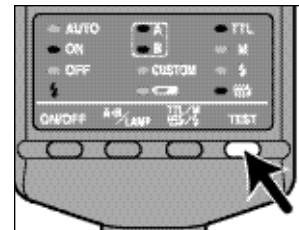
## MODELING FLASH (TWIN FLASH ONLY)

The modeling flash is used to check for shadows on the subject before taking a photograph. The flash will fire for 2 seconds at a rate of 40 flashes per second.



**1. Press the TTL/M/Test button to make the modeling-flash lamp  glow.**

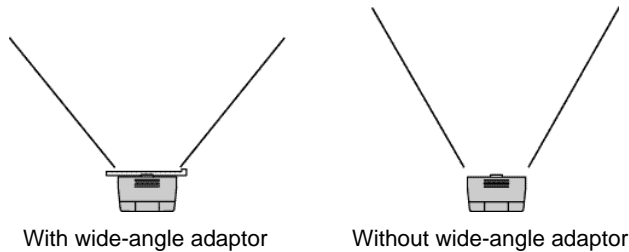
- With the modeling-flash lamp  on, confirm that either the TTL or M mode is selected as desired.



**2. Press the test button. The modeling flash will fire.**

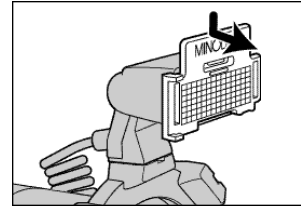
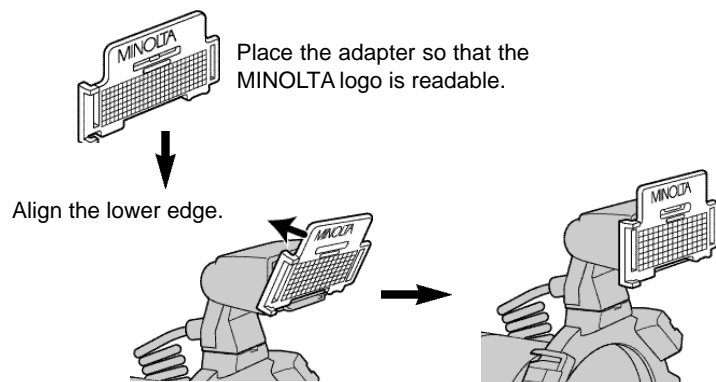
- Do not release the shutter while the modeling flash is firing.
- The strength of the shadows will differ from the actual photograph.
- Shadows will be lighter when using the flash in bright areas or outdoors.
- When the ring flash is used, the modeling-flash lamp will not glow.

## WIDE-ANGLE ADAPTER (TWIN FLASH ONLY)



The twin flash unit has a coverage of 60° horizontally, and 45° vertically (equivalent to a lens with a 35mm focal length). But by attaching the wide-angle adaptor, the angles will be increased to 78° horizontally and 60° vertically (equivalent to a lens with a 24mm focal length).

**While holding the wide-angle adaptor by its top tab, press it against the face of the twin flash unit until it clicks and is securely mounted.**



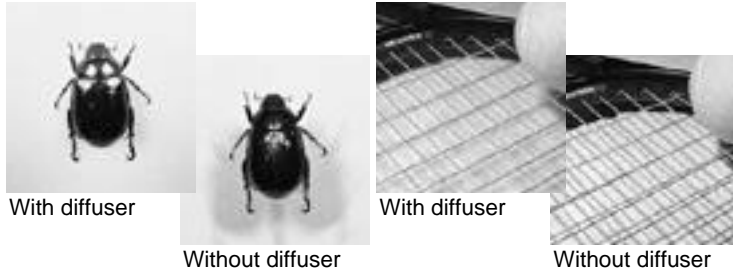
- Remove the wide-angle adaptor while holding its top tab.

- The flash output is reduced when using the wide-angle adaptor. See page 32 for TTL flash metering, or 43 for manual flash metering.

WIDE-ANGLE ADAPTER

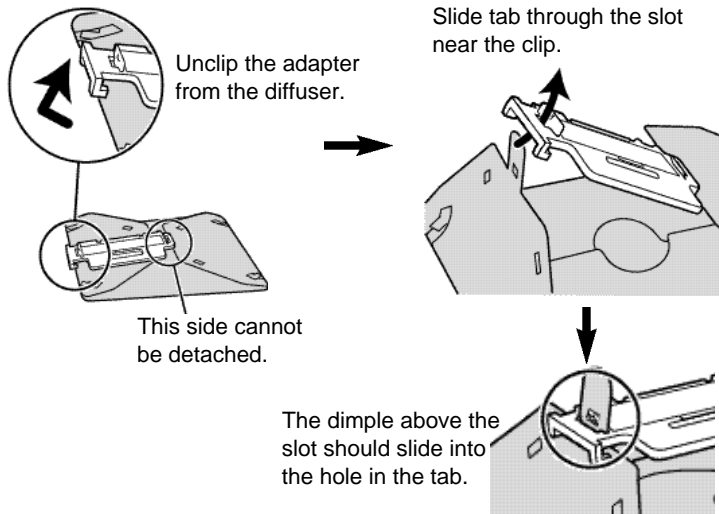


## DIFFUSER (TWIN FLASH ONLY)



Strong shadows can be softened by using the diffuser attached to the flashtube. Always use the diffuser with an arm set at the 90 ° position. If the arm is set at the 60° position and used with a wide angle lens, the diffuser may show in the image.

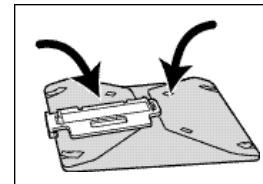
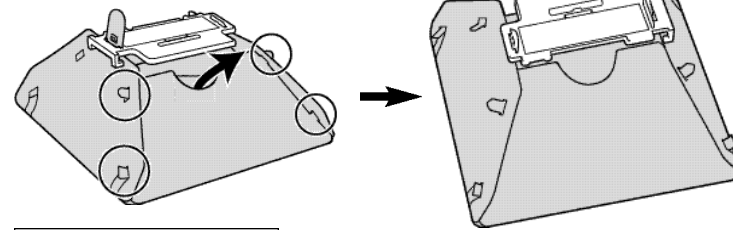
### 1. Prepare the diffuser for use.



48

Place the four side tabs into each slot on the side of the diffuser.

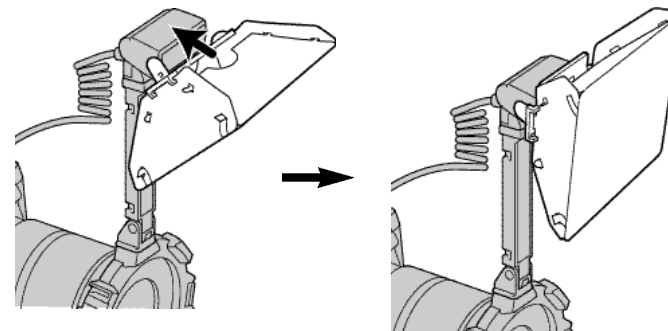
Assembled



- If it is difficult to assemble the diffuser, fold it and try again.
- The diffuser should assemble easily. Do not force or pull hard on the diffuser.
- Do not fold the diffuser inside out.

### 2. While holding the diffuser by its top tab, press it against the face of the twin flash unit until it clicks and is securely mounted.

Align the lower edge.

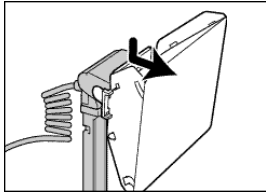


DIFFUSER

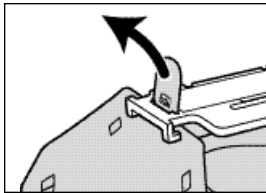
49

## DIFFUSER (TWIN FLASH ONLY)

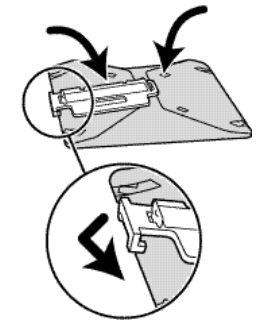
- The flash output is reduced when using the diffuser. See page 32 for TTL flash metering, or page 43 for manual flash metering.



- When removing, remove the diffuser while holding its adapter's top tab.



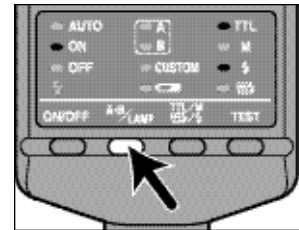
- When folding the diffuser, pull the tab off the dimple as shown. The tab can now be easily removed.



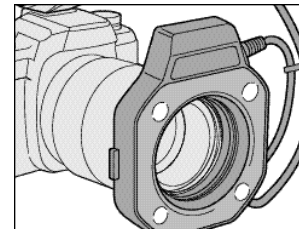
- When storing, refold the diffuser, and secure it by clipping the adapter to the diffuser.

## FOCUS LAMPS (RING FLASH ONLY)

The ring flash has four focus lamps mounted near the flashtubes in the lighting unit. These lamps make framing subjects easy and provide light for the camera's autofocus system.



**Press the A-B / lamp button on the back of the controller.**



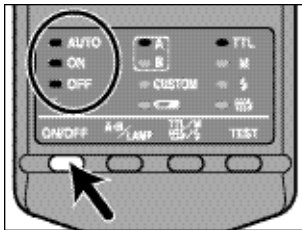
- After the A-B / lamp button is pressed, the focus lamps will turn on for a little more than 10 seconds.
- The focus lamps can be turned off manually by pressing the A-B / lamp button again.

- Unlike the modeling flash, it is not possible to preview the shadows with the focus lamps.
- The illumination period of the lamps will be extended if an operation is made on the camera or controller while the focus lamps are on.
- When the shutter is released while the focus lamps are on, the lamps will automatically turn off for the exposure and then turn on again after the picture is taken.
- When using rear sync flash, manually turn off the focus lamps in advance; they will not turn off automatically.
- By using custom functions, the focus lamps' automatic turn-off feature can be canceled (p. 52).

# CUSTOM FUNCTIONS

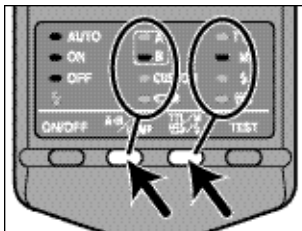
The following four flash settings may be customized:

- Auto power off period (4, 15, 60 minutes or canceled)
- Focus-lamp illumination period (8 seconds/ No limit)
- Exposure modes in which manual flash may be set (M mode/ all modes)
- Manual-flash power-level steps (1EV increments / 1/2EV increments)



**1. Press the flash on/off button for 3 seconds until the three lamps glow at the same time: auto lamp, flash-on lamp, flash-off lamp.**

- The setting for the first item "Auto power off" can now be selected.

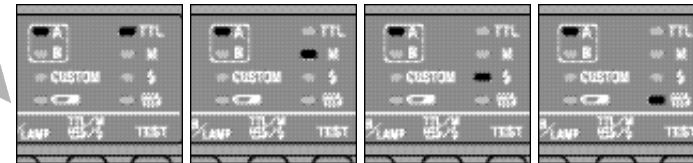


**2. Press the A-B/Lamp button to select the item, and the TTL/M/Test button to select the desired setting.**

- Each time the A-B / lamp button is pressed, the four items appear in the order listed at the top of this page.
- Each time the TTL/M/Test button is pressed, the items appear in the order shown horizontally on the next page.

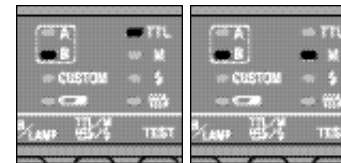
Select using the TTL/M/Test button

1. Auto power off period



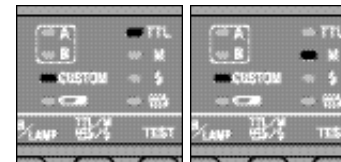
4 minutes    15 minutes    60 minutes    Canceled

2. Focus-lamp illumination period



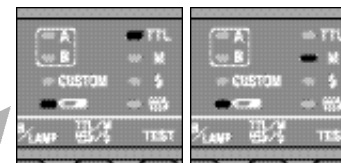
4 minutes    No time limit

3. Exposure modes in which manual flash may be set



M mode only    All modes

4. Manual-flash power-level



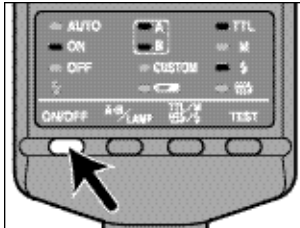
1EV steps    1/2 EV steps

Select using the A-B / Lamp button

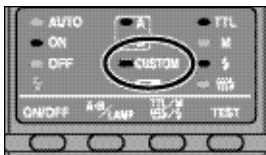
CUSTOM MODE

Continued on next page

## CUSTOM FUNCTIONS



3. After making your selections, press the flash on/off button to return to exit the custom mode.



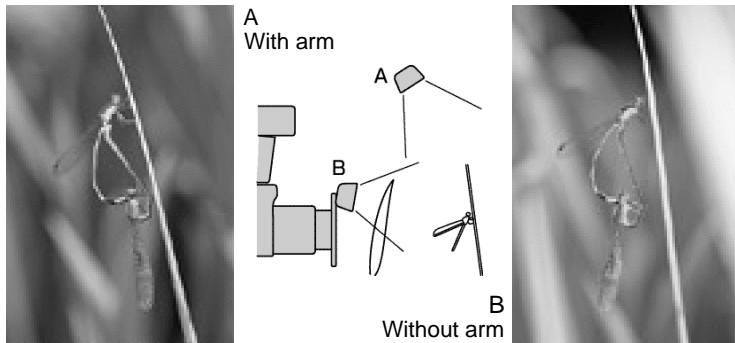
• When a setting other than the default setting is selected in custom mode, the custom lamp remains lit.

- If “canceled” is selected in #1, the flash will not turn off automatically.
- If “no limit” is selected in #2, the ring flash’s focus lamps will remain lit until the A-B/ Lamp button is pressed again.
- To preserve the life of the focus lamps, do not keep them lit for long periods. Care should be taken when using the focus lamps when the auto power off period and the focus-lamp illumination period allow the continuous operation of the lights.
- When “All modes” is selected in #3, manual flash photography may be used with all the camera’s exposure modes. The setting is provided for the sake of convenience, however, this may result in incorrect exposures with exposure modes other than M mode; M mode is recommended for optimum results with manual flash photography.
- If “1/2EV steps” is selected in #4, use the gray power values provided on the lower scale of the manual-flash-control dials. The half stop values are not written on the scale. The power values are 1/1, 1/1.4, 1/2, 1/2.8, 1/4, 1/5.6, and 1/8.
- The selected settings are maintained even when the flash unit is turned off, or the batteries are removed.

# APPENDIX

## EXAMPLES OF TWIN FLASH PHOTOGRAPHY

The twin flash's arms create and control lighting for dramatic effect.



If there is an object such as leaf near the lens, the flash illumination will be blocked when the arm is not used. With an arm, natural lighting conditions can be obtained.



Top light only

Side light only

Top and side light

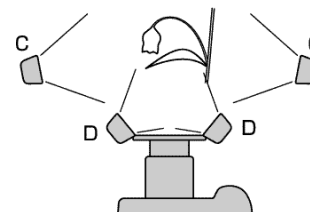


Strong shadows can be softened by using the diffuser attached to the flashtube.



C With arm

D Without arm

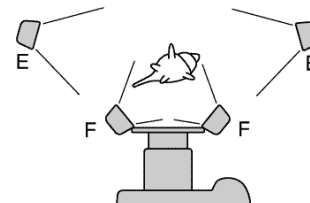


To accent detail and give depth, illuminate the subject from the sides using the arms.



E With arm

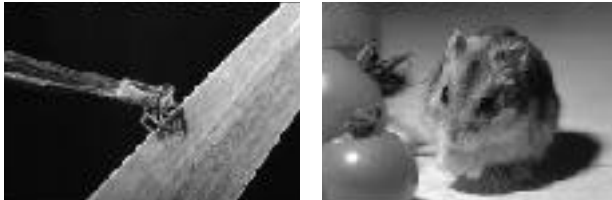
F Without arm



If a close subject is illuminated from the side using arms, strong shadows can occur. Strong flash illumination from behind the subject can cause flare. This condition may occur with a 50mm f/2.8 Macro lens with flashtubes mounted on arms.

## EXAMPLES OF TWIN FLASH PHOTOGRAPHY

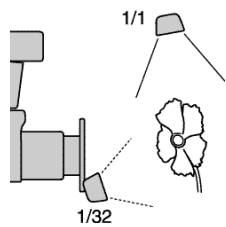
Examples of top illumination



### Setting Different Power Levels (Manual Flash Only)



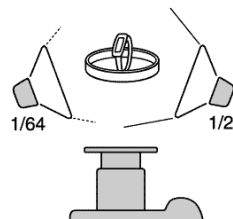
Different power level settings are possible using manual flash operation (p. 35).



Top flash fires at full power (1/1), while the other flash adds fill at 1/32 power.



With diffusers mounted, the right flash provides the main illumination (1/2), while the left is used as a fill light at the 1/64 setting.



## EXAMPLES OF RING FLASH PHOTOGRAPHY



The ring flash's four flashtubes render fine detail and are extremely effective for scientific or medical applications. When the subject is close, the use of one flashtube creates shadows which can add dimension to the subject.



All flashtubes



Left flashtube



All flashtubes



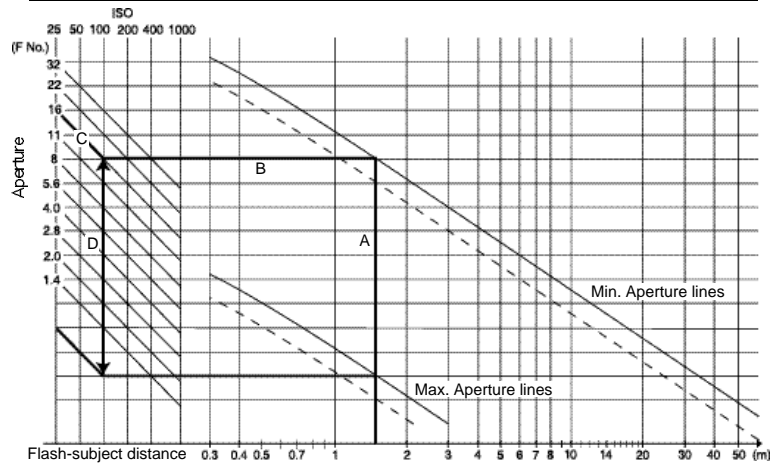
Top flashtube

RING FLASH EXAMPLES

## APERTURE RANGE GRAPH (TWIN FLASH)

The aperture range for macro lenses is displayed on page 30 (TTL), and page 38 (Manual flash). The aperture ranges described here are for lenses other than macro lenses, or when the subject distance is great.

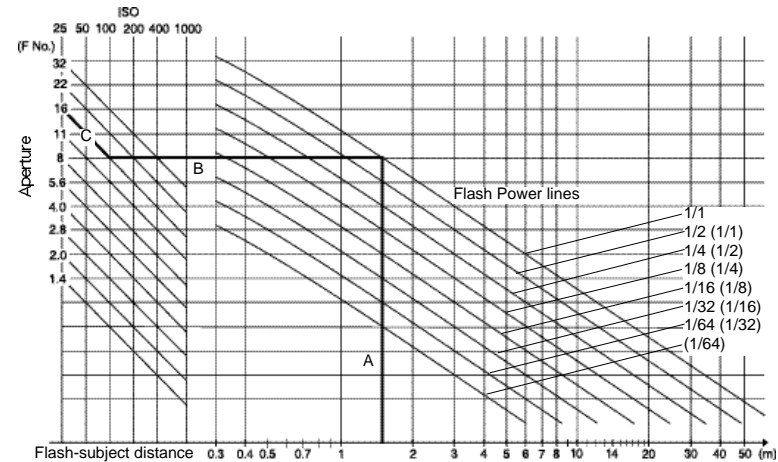
### TTL flash metering



1. Draw a vertical line from the flash-subject distance until it reaches the min. aperture line (A).
  2. Draw a horizontal line from the intersection of step 1 until it reaches a vertical film speed line corresponding to the film used (B).
  3. Draw a diagonal line from the intersection of step 2. The result indicates the minimum aperture that can be used (C).
    - The maximum aperture can be obtained in the same way by using the max. aperture line. The results of both calculations will give the usable aperture range (D).
    - The dotted lines are employed when only one twin flash unit is used.
- Example: at 1.5m flash to subject distance and with ISO 100 film, the usable aperture range will be larger than f/16. The limit to the usable aperture range will be the aperture range of the lens.

60

### Manual flash metering



1. Draw a vertical line from the flash-subject distance until it reaches the flash power line which corresponds to power level set (A).
  2. Draw a horizontal line from the intersection of step 1 until it reaches a vertical film speed line corresponding to the film used (B).
  3. Draw a diagonal line from the intersection of step 2. The result indicates the aperture needed (C).
    - The figures in parenthesis are employed when only one twin flash unit is used.
- Example: at 1.5m flash-subject distance, with a power level of 1/1, and ISO 100 film, the aperture required for a proper exposure is f/16.

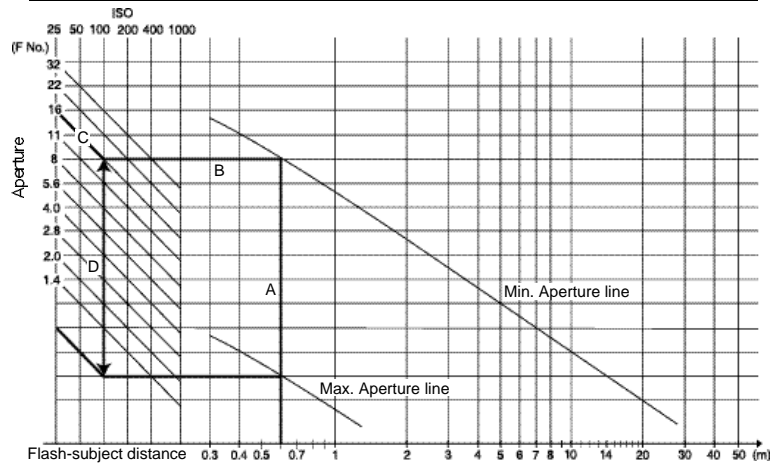
APERTURE RANGE

61

## APERTURE RANGE GRAPH (RING FLASH)

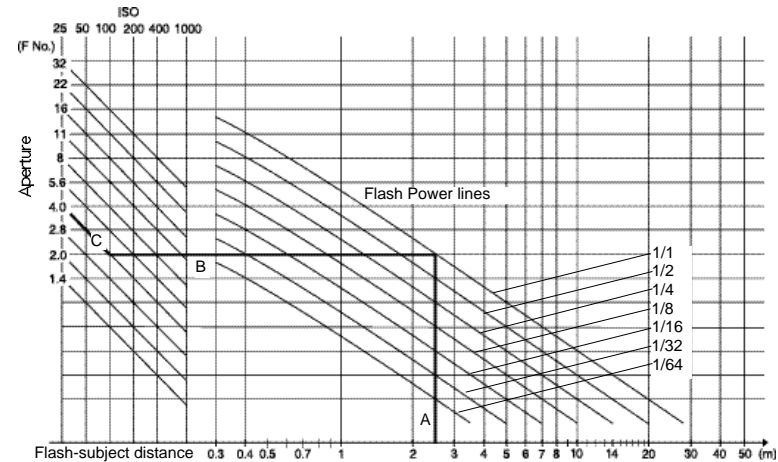
The aperture range for macro lenses is displayed on page 30 (TTL), and page 38 (Manual flash). The aperture ranges described here are for lenses other than macro lenses, or when the subject distance is great.

### TTL flash metering



1. Draw a vertical line from the flash-subject distance until it reaches the min. aperture line (A).
  2. Draw a horizontal line from the intersection of step 1 until it reaches a vertical film speed line corresponding to the film used (B).
  3. Draw a diagonal line from the intersection of step 2. The result indicates the minimum aperture that can be used (C).
    - The maximum aperture can be obtained in the same way by using the max. aperture line. The results of both calculations will give the usable aperture range (D).
    - This graph can be used regardless if one or four flashtubes are used.
- Example: at 0.6m flash to subject distance and with ISO 100 film, the usable aperture range will be larger than f/16. The limit to the usable aperture range will be the aperture range of the lens.

### Manual flash metering



1. Draw a vertical line from the flash-subject distance until it reaches the flash power line which corresponds to power level set (A).
  2. Draw a horizontal line from the intersection of step 1 until it reaches a vertical film speed line corresponding to the film used (B).
  3. Draw a diagonal line from the intersection of step 2. The result indicates the aperture needed (C).
    - This graph can be used regardless if one or four flashtubes are used.
- Example: at 2.5m flash-subject distance, with a power level of 1/4, and ISO 100 film, the aperture required for a proper exposure is f/4.



## COMPATIBILITY WITH OTHER PRODUCTS

### Camera

- If you are using Maxxum/Minolta 9000, 7000, or 5000, the optional Flash Shoe Adapter FS-1200 is necessary. See the FS-1200 manual for details.

### Lenses

- Macro Twin Flash 2400 contains adapter rings for 49mm and 55mm diameter lenses. To use a 72mm diameter lens such as an AF 200mm f/4 Macro Apo G, the optional 72mm Twin Flash Adapter Ring (AR-T72) is required. If you use a 62mm diameter lens, both the 72mm adapter ring and the 62mm to 72mm step-up ring are required.
- Macro Ring Flash 1200 contains adapter rings for 49mm and 55mm diameter lenses. To use an AF 200mm f/4 Macro Apo G, the optional Macro Flash Adapter (for 200mm Macro) is required. Other lenses cannot be used.

For both the Twin Flash and Ring Flash:

- Lenses whose barrels rotate when autofocus cannot be used.
- Lens diameters of 46mm (V 50mm f/3.5 Macro) require the 46mm to 49mm step-up ring.

For the Twin Flash only:

The holder may vignette the picture if a wide focal-length lens is used. Do not use lenses whose focal length is shorter than 24mm. Contact an authorized Minolta Service Facility if the focal length is between 24mm and 27mm.

For the Ring Flash only:





The flash may vignette the picture if a wide focal-length lens is used. Do not use lenses whose focal length is shorter than 50mm.

## CARE AND STORAGE

### During Photography

- This flash unit generates strong light, and should therefore not be used in front of the eyes.


### Batteries

- Do not store the macro flash controller with the alkaline batteries inside it. Leakage from the batteries may damage the battery chamber.
- Due to the characteristics of alkaline batteries, temperature, and storage conditions, the lamp  may glow temporarily. The displayed battery level will be restored to the correct value after the flash has been used a few times. When the lamp  blinks to indicate that the flash cannot be used, pressing the flash on/off button in number of times may result in recovery of the battery. Replace the battery if it does not recover.
- When using the lithium batteries, if the batteries become hot due to high temperature or successive use, the lamp  may blink and the flash may not be able to use for a while. Wait until the batteries become cold before using the flash again.
- Nickel-metal hydride batteries can lose power suddenly. If the lamp  starts to glow or flash can no longer be used while taking pictures, change or recharge the batteries.
- Depending on the time elapsed since manufacture of the battery, the recycling time and number of flashes for new batteries may differ from the values shown in the table.

## CARE AND STORAGE

### **Temperature**

---

- This product may be used over a temperature range of  $-20^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ .
- Do not leave this product exposed extremely high temperatures (eg. direct sunlight inside motor vehicles), or in conditions of high humidity.
- To prevent condensation from forming, place the product in a sealed plastic bag when bringing it from cold environment to a warm environment. Allow it to come to room temperature before removing it from the bag.
- Battery capacity decreases at colder temperatures. Keep your flash and spare batteries in a warm inside pocket when shooting in cold weather. The lamp  may glow even when there is some power left in the batteries in cold weather. Batteries will regain some of their capacity when warmed to normal operating temperature.
- This product is not waterproof. Care is therefore required to ensure that it does not come into contact with water or sand when used near water. Contact with water, sand, dust, or salt content may result in a malfunction.

### **Maintenance**

---

- Clean by wiping with a soft, clean cloth. If the product has been in contact with sand, wiping will damage the surface, and it should therefore be cleaned gently using a blower.
- Do not use cleaners containing organic solvents (eg. thinners or benzene) under any circumstances.

### **Questions and Service**

---

- If you have questions about this product, contact your local camera dealer or write to the Minolta distributor in your area.
- Before shipping your product, please contact an authorized Minolta Service Facility for details.

## SPECIFICATIONS

### Guide Number

#### Twin flash (ISO 100)

| Power level | 1 tube | 2 tubes | Wide-angle adapter | Diffuser |
|-------------|--------|---------|--------------------|----------|
| 1/1         | 17     | 24      | 11                 | 7        |
| 1/2         | 12     | 17      | 8                  | 5        |
| 1/4         | 8.5    | 12      | 5.6                | 3.5      |
| 1/8         | 6      | 8.5     | 4                  | 2.5      |
| 1/16        | 4.2    | 6       | 2.8                | 1.8      |
| 1/32        | 3      | 4.2     | 2                  | 1.3      |
| 1/64        | 2.1    | 3       | 1.4                | 0.9      |

Wide angle adapter and diffuser is for one tube.

#### Ring flash (ISO 100)

| Power level | 1 tube | 4 tubes |
|-------------|--------|---------|
| 1/1         | 12     | 10      |
| 1/2         | 8.5    | 7       |
| 1/4         | 6      | 5       |
| 1/8         | 4.2    | 3.5     |
| 1/16        | 3      | 2.5     |
| 1/32        | 2.1    | 1.8     |
| 1/64        | 1.5    | 1.3     |

### Recycling time/Number of flashes

|                      | Alkaline   | Lithium     | Nickel-hydride |
|----------------------|------------|-------------|----------------|
| Recycling time (sec) | 0.2~6      | 0.2~6       | 0.2~5          |
| Number of flashes*   | 200 ~ 4000 | 500 ~ 10000 | 150 ~ 3000     |

\* For every new battery set

### Flash coverage

|            | Twin flash | Wide-angle Adapter | Diffuser | Ring flash |
|------------|------------|--------------------|----------|------------|
| Vertical   | 45°        | 60°                | 90°      | 80°        |
| Horizontal | 60°        | 78°                | 90°      | 80°        |

### Continuous flash performance

40 continuous cycles of 5 flashes per second  
(Power level 1/32, nickel-metal hydride battery)

### Flash control

TTL direct metering, manual flash, or flash control using a pre-flash (only used with certain Minolta digital cameras)

### Size (W x H x D)

Controller 68 x 123 x 91 mm / 2.7 x 4.8 x 3.6 in.  
Twin flash 43 x 41 x 37 mm / 1.7 x 1.6 x 1.5 in.  
Ring flash 98 x 121 x 22 mm / 3.9 x 4.8 x 0.9 in.

### Weight

Controller 245 g / 8.6 oz. (without batteries)  
Twin flash 30 g / 1.1 oz. (per twin flash unit)  
Ring flash 120 g / 4.2 oz.

Specifications are based on the latest information available at the time of printing and are subject to change without notice.

## MACRO FLASH SETS & ACCESSORIES

### Macro Flash Sets

#### Macro Flash Controller

| <u>Contents</u>                          | <u>Qty.</u> |
|--|-------------|
| Macro Flash Controller MFC-1000 (w/caps) | 1           |
| Case                                     | 1           |

#### Macro Twin Flash 2400 (Lighting Set)

| <u>Contents</u>          | <u>Qty.</u> |
|--------------------------|-------------|
| Twin Flash Unit T-2400   | 2           |
| Adapter Ring (49mm/55mm) | 1 each      |
| Holder                   | 1           |
| Arm                      | 2           |
| Cord Reel                | 2           |
| Wide-Angle Adapter       | 2           |
| Diffuser                 | 2           |
| Case                     | 1           |

#### Macro Ring Flash 1200 (Lighting Set)

| <u>Contents</u>          | <u>Qty.</u> |
|--------------------------|-------------|
| Ring Flash Unit R-1200   | 1           |
| Adapter Ring (49mm/55mm) | 1 each      |
| Bag                      | 1           |

### Accessories

#### Controller Accessories

Caps For Macro Flash Controller MFC-1000  
 Contains 2 Twin Socket Caps, 1 Ring Socket Cap, and 1 DC Terminal Cap  
 Case for Macro Flash Controller  
 (Case for Program Flash 3600HS(D))

#### Twin Flash Accessories

Twin Flash Unit T-2400  
 Twin Flash Adapter Ring 49mm AR-T49  
 Twin Flash Adapter Ring 55mm AR-T55  
 Twin Flash Adapter Ring 72mm AR-T72  
 Twin Flash Holder TH-240  
 Twin Flash Arm TA-240  
 Twin Flash Cord Reel CR-240  
 Twin Flash Wide-Angle Adapter TW-240  
 Twin Flash Diffuser TD-240  
 Case For Macro Twin Flash 2400

#### Ring Flash Accessories

Ring Flash Unit R-1200  
 1200AF Adapter Ring 49mm  
 1200AF Adapter Ring 55mm  
 Macro Flash Adapter (for AF 200mm Macro)  
 Bag For Macro Ring Flash 1200

|  |  |
|--|--|
| Minolta Co., Ltd.                              | 3-13, 2-Chome, Azuchi-Machi, Chuo-Ku, Osaka 541-8556, Japan  |
| Minolta Europe GmbH<br>Reparatur/Repair        | Minolafang 11, D-30855 Langenhagen, Germany<br>Senator-Heimken-Strasse 1, D-28197 Bremen, Germany                    |
| Minolta France S.A.                            | 365 Route de Saint-Germain, F-78420 Carrières-Sur-Seine, France  |
| Minolta (UK) Limited                           | 7 Tanners Drive, Bletchlands, Milton Keynes, MK14 5BU, England   |
| Minolta Austria Ges. m.b.H.                    | Amalienstrasse 99-61, A-1131 Wien, Austria   |
| Minolta Camera Benelux B.V.<br>Belgian Branch  | Zonnebaan 39, P.O. Box 6000, NL-3600 HA Maarssen, The Netherlands<br>Prins Boudeuwijnlaan 1, B-2590 Kontich, Belgium |
| Minolta (Schweiz) AG                           | Fledstrasse 6, CH-8953 Dietikon, Switzerland   |
| Minolta Svenska AB<br>Finnish Branch           | Åbygatan 114, S-171 54 Solna, Sweden<br>Nittymäki 6 PL 37, SF-02201 Espoo, Finland                                   |
| Minolta Portugal Limitada                      | Avenida Brasil 33-A, P-1700 Lisboa, Portugal   |
| Minolta Corporation<br>Head Office             | 101 Williams Drive, Ramsey, New Jersey 07446, U.S.A.   |
| Los Angeles Branch                             | 11150 Hope Street Cypress, CA 90630, U.S.A.  |
| Minolta Canada Inc.<br>Head Office             | 369 Britannia Road East, Mississauga, Ontario L4Z 2H5, Canada  |
| Vancouver Branch                               | 230-3771 Jacobs Road, Richmond, B.C. V6V 2L9, Canada   |
| Minolta Hong Kong Limited                      | Room 208, 2/F, Eastern Center, 1065 King's Road, Quarry Bay Hong Kong  |
| Minolta Singapore (Pte) Ltd.                   | 10, Teban Gardens Crescent, Singapore 608923   |
| Shanghai Minolta Optical<br>Products Co., Ltd. | 368 Minolta Road, Songjiang, Shanghai, China   |

© 2000 Minolta Co., Ltd. under the Berne  
Convention and universal Copyright Convention