

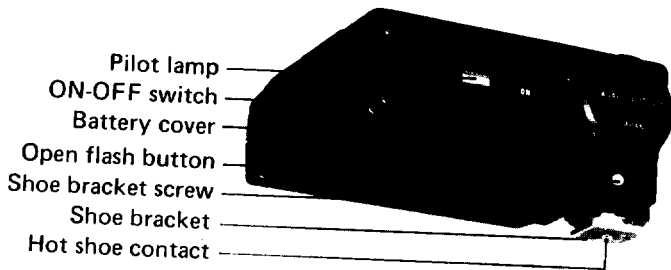
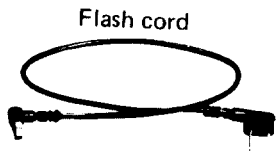
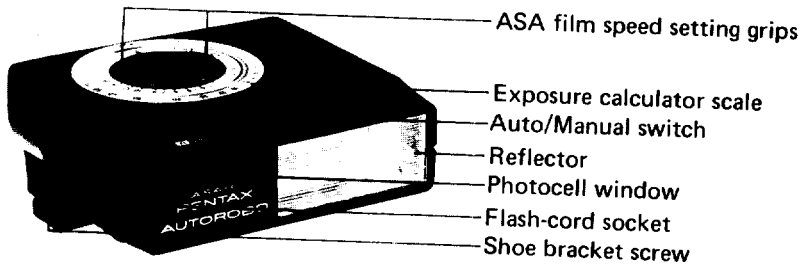
**ASAHI
PENTAX**

AUTOROBO

**AUTOMATIC
ELECTRONIC
FLASH**



KNOW YOUR AUTOROBO



SPECIFICATIONS

Type: Shoe-mounting clip-on type (with hot-shoe connection).

Flash control: SCR direct control

Guide number: 24 (meters) for ASA 100 — (manual setting).

Angular spread: 50° vertically, 65° horizontally.

Flash duration: App. 1/1300 sec. (to half peak, manual). App. 1/30000 sec. (to half peak, on auto at minimum separation).

Color temperature: Equivalent to daylight.

Flash control range: 0.5 — 6 m for F/4 and ASA 100 on the BLUE switch setting. 0.5 — 3 m for F/8 and ASA 100 on the RED switch setting.

Photocell acceptance angle: 18° (silicon photo-diode)

Power source: 4 penlight batteries (1.5V)

Other features: Open flash button provided.

Automatic light output stabilizer (Audible signal for full charging). Two-step pilot lamp indication (dim at 85% and bright at 100% charge).

Dimensions: Width 104 mm x height 38.5 mm x depth 99.5 mm.

Weight: 316 g (without batteries).

Accessories: Flash cord and carrying case.

FLASH FREQUENCY AND TOTALS

(using fresh batteries)

		High performance batteries	Alkali/manganese batteries
Flash frequency	Manual	7 ~ 13 sec.	7 ~ 13 sec.
	Auto	Less than 1 sec.	Less than 1 sec.
Total flashes	Manual	App. 40	App. 150
	Auto	App. 500	App. 2000

*AUTO figures are for F/4 at ASA 100 and a distance of 0.5m.

Note: The figures given in the table will change slightly depending upon the type and freshness of the batteries, and for different manufacturers. Be sure to use batteries which are as fresh as possible.

SPECIAL AUTOROBO FEATURES

The Autorobo is in the great Asahi Pentax tradition of unique products. Compact, its high performance is the ideal complement to Asahi Pentax cameras, adding electronic flash capabilities for more effective picture taking.

The Autorobo has an electronic 'eye' which measures the light reflected from the subject, and automatically controls the flash brilliance for perfect exposures. No more complicated fussing - anyone can get perfect flash pictures every time. And unlike flashbulbs which are used once and thrown away, the Autorobo gives cost-saving convenience with only an occasional change of batteries.

The flash contacts in the K2, KX, KM, ES, ESII, Spotmatic F and Spotmatic II cameras and the hot shoe on the Auto-

robo give automatic connection without trailing flash cords. Use accessory clip type II for SP1000, SL, and older models.

AUTO FLASH CONTROL

The Autorobo uses an SCR (silicon control resistor) to give direct, automatic control of the brilliance of the flash, with two-level brilliance switching.

Within the operating range, there is no need to change F-number for different camera-to-subject distances: all will receive optimum exposure.

For flashes under auto control at the minimum distance, recharging is completed in less than a second, with no fear of blurring even with movement too fast for the human eye to detect. With auto operation there is no waste of battery charge: only the necessary minimum is used for ideal exposures, with many more

flashes from the same batteries than is possible on MANUAL.

WIDE, EVEN SPREAD OF LIGHT

The Autorobo is designed for use with the wide-angle lenses commonly used indoors, and is not limited, as with so many competitive products, to the narrower spread of light suitable for standard lenses. It is suitable not only for standard lenses, but also for 28mm lenses (35mm cameras) or 55mm lenses (6 x 7 cameras), without hot spots or edge fall-off.

STABILIZED FLASH POWER

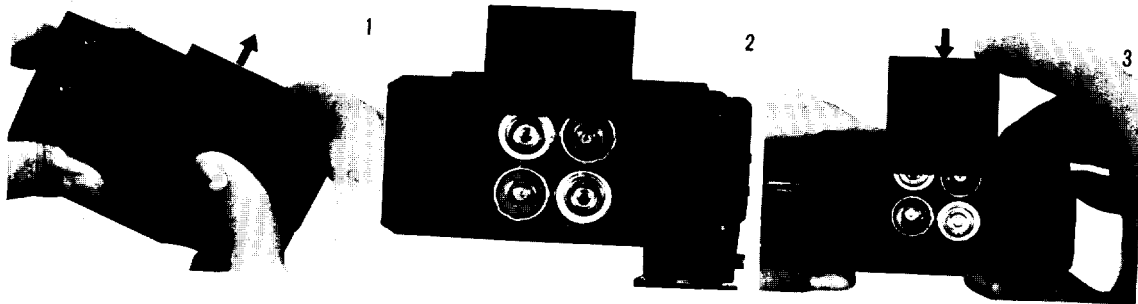
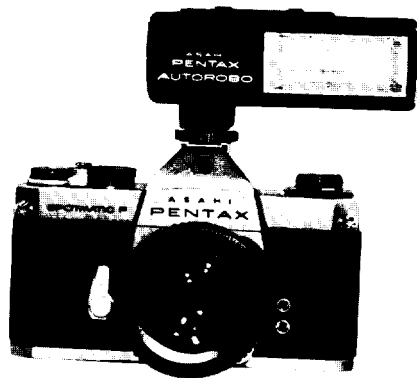
The Autorobo features stabilized flash power. The highly stable flash brilliance, low battery consumption, two-stage pilot lamp indication, and audible signal for full-charge indication, are outstanding features of the Autorobo stroboscopic flash unit.



PREPARING THE AUTOROBO FOR USE

Inserting the batteries

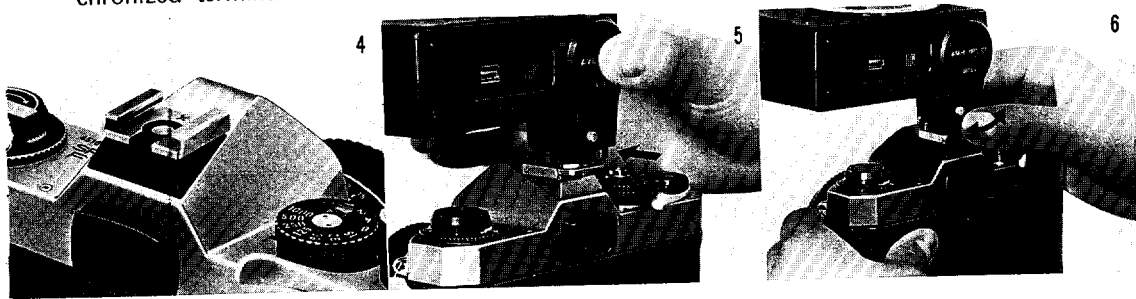
- 1) Slide the battery cover shown in the photograph up and out as far as it will go.
- 2) Insert four penlight batteries as shown by the symbols on the inside of the battery chamber.
- 3) Close the battery cover firmly by sliding it back into position as you slightly depress the batteries.



4) K series cameras, ES, ESII, Spotmatic F and Spotmatic II cameras have hot shoes suitable for direct connection of the Autorobo as it is. With these hot-shoe automatic X-contacts there is no need for the flash cord. When such contacts are not provided, the flash cord should be used to connect the Autorobo flash-cord socket to the camera X-synchronized terminal.

5) Slacken the shoe bracket screw, and push the shoe home into the accessory bracket. It will slide into position easily with finger pressure.
6) Tighten the screw down clockwise as shown in the photograph to lock the unit in position.

To remove, slacken the screw and pull out smoothly and evenly, gripping around the finder.





HOW TO GET THE BEST OUT OF YOUR AUTOBOBO



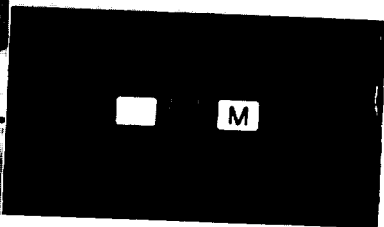
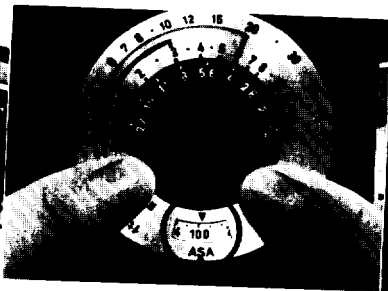
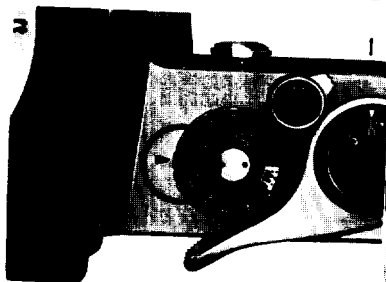
OPERATION

1) Set the shutter speed dial at 'X'. *No speed faster than the 'X' speed can be used.*

2) Turn the ASA film speed setting grips as shown in the photograph until the triangular mark points to the ASA speed of the film you are using.

3) Select the appropriate setting, M (manual), blue or red (auto), for the conditions under which photographs are to be taken, as shown in the photo.

4) When the main switch on the back of the unit is put ON a faint whistle will indicate that charging is taking place. The sound cuts off at full charge. Indication is also given by the pilot lamp at the rear.



5) The red and blue lines on the exposure calculator scale indicate the range of distances covered by automatic operation (in meters and feet). For instance, with ASA 100 film:

F/4 0.5 ~ 6 m (auto switch set to BLUE)

F/8 0.5 ~ 3 m (auto switch set to RED)

For manual operation the F-number corresponding to the distance between Autorobo and the subject should be read off the exposure calculator scale and set on the camera.

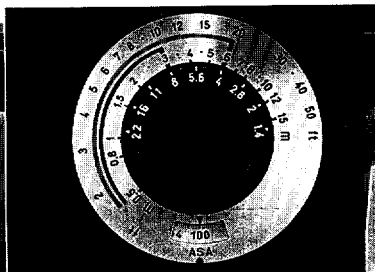
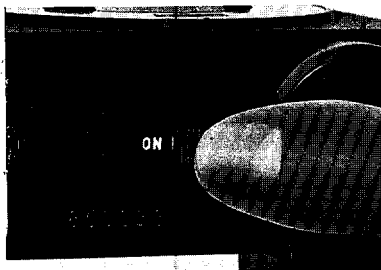
For instance, with an ASA 100 film

and a distance of 1.5 m, the scale indicates number 16, so the setting should be F/16.

6) The F setting with the auto switch at BLUE is the F-number opposite the blue line at 6 m, and for RED it is the number opposite the red line at 3 m.

For instance, with an ASA 100 film: For BLUE auto the lens aperture is F/4, and for RED auto it will be F/8.

This only applies during auto operation. For manual the actual F-number indicated by the calculator scale should be set as the lens aperture.



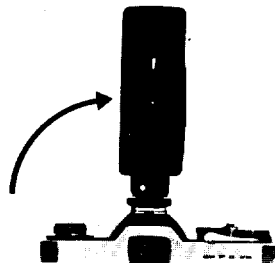
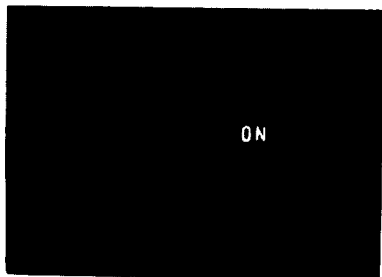
7) Check that the indicator lamp is lit, adjust the focus, and press the shutter release. When the shutter is released the indicator lamp goes out and the next charging cycle commences immediately. After some seconds it will come on again. When taking a succession of photographs *always check that the lamp is lit before taking the next photograph.*

The lamp may re-light in less than a second on auto, but wherever possible

wait for at least one second before operating the flash again. It can shorten the life of the stroboscope flash tube if it is flashed too frequently (i.e. at intervals of less than one second).

8) The Autorobo may be used in both vertical and horizontal positions. Simply turn through 90° as shown.

9) Film can be wound on with the Autorobo in position, and batteries can be readily changed.



HELPFUL POINTERS

- Only use the Autorobo in the horizontal position with Pentax cameras. More effective use of the light output is obtained in the vertical position with half-frame cameras.
- When it is difficult to judge the distance of the subject by eye, focus the camera and read the distance from the distance scale of the lens.
- When the pilot lamp first lights, charging is 85% complete. Charging is complete when the lamp becomes suddenly brighter and the charging noise cuts out. To get the full 100% flash brightness, wait until the light has brightened and the charging noise cuts out. Any intermittent charging noise recurring after initial cut-out is topping up the charge lost through natural discharge.
- When the Autorobo is not to be used for some time, be sure to put the main switch OFF. It is better for the capacitor if the switch is turned OFF *after* fully charging but *without* flashing.
- *When the Autorobo is not to be used for a long time, all batteries should be removed and stored separately. Battery liquid can cause serious internal damage if they leak.*

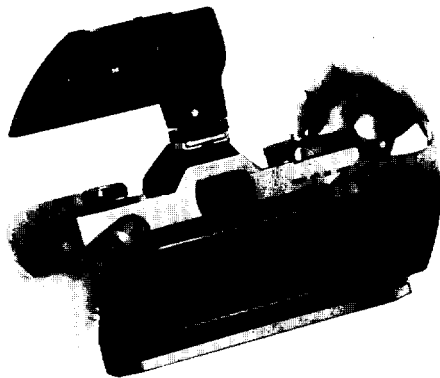
TEST FLASH SYNCHRONIZATION BEFORE FILM LOADING

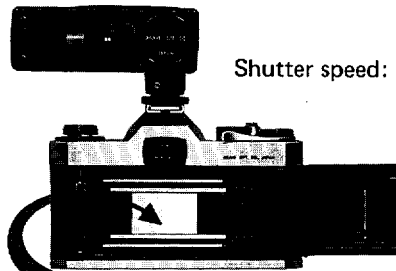
- Please check that the unit will flash when the shutter is operated by fitting it and releasing the shutter once or twice before loading a film.
- Before proceeding to actual photography, check the synchronization of the camera.

Place a sheet of white paper on a desk or table, remove the lens from the camera, and open the camera back. With the Autorobo mounted on the camera, aim at the white paper and release the shutter. Synchronization is satisfactory if the flash illuminates the whole area of the film frame.

With focal plane shutters, full synchronization is obtained at all speeds below the 'X' speed, but at higher speeds only a part of the frame will be illuminat-

ed. Synchronization is also impossible with the FP terminals. It may be helpful in remembering correct usage to deliberately check unsynchronized operation.

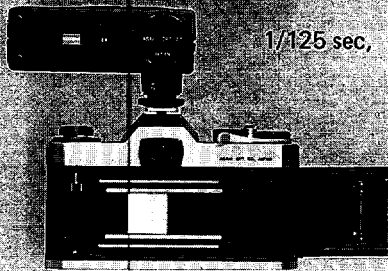




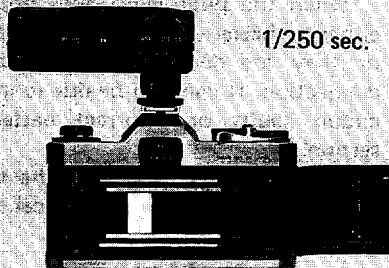
Shutter speed: X

FULLY SYNCHRONIZED

PARTIALLY EXPOSED



1/125 sec.

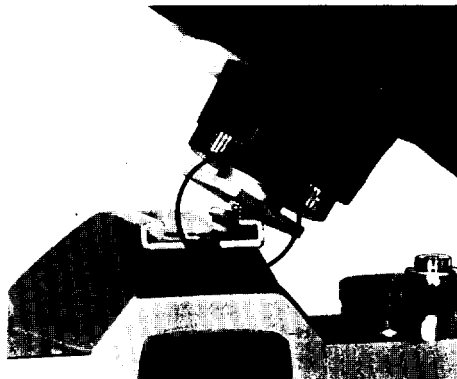


1/250 sec.

● *When the Autorobo fails to operate:*
Short the hot shoe contacts on the underside of the shoe bracket as shown. If there is no flash even though the pilot lamp is lit, the unit is defective. If there is a flash, it is the connection to the camera which is faulty, or the contacts on the camera.

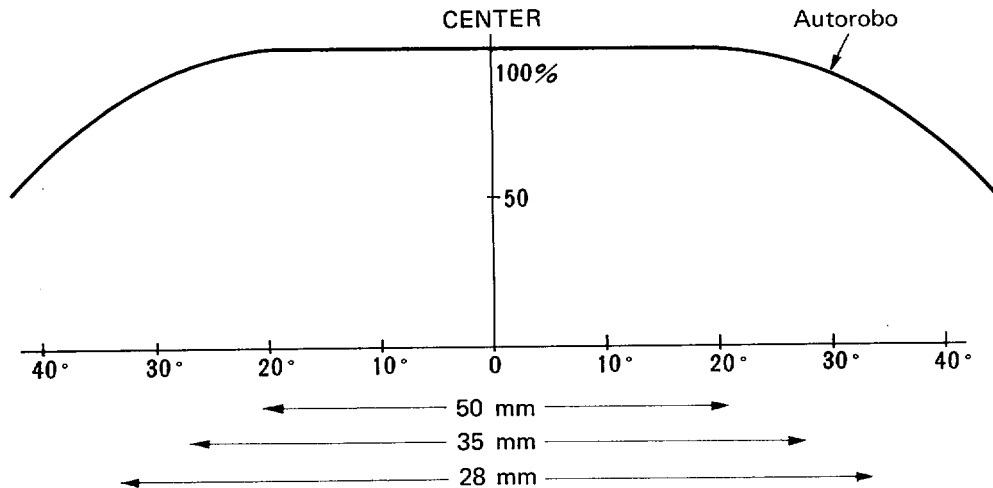
When the pilot lamp does not light, either the batteries have not been inserted, or they are dead, or there is a poor connection. It can also be due to internal circuit faults or incorrect battery insertion.

When you are sure that the unit is faulty, please contact your local service shop.



LIGHT DISTRIBUTION

Horizontal Angle of View Lenses



DIFFERENT WAYS OF USING YOUR AUTOROBO

As the Main Light Source

[Auto and Manual Operation Possible]

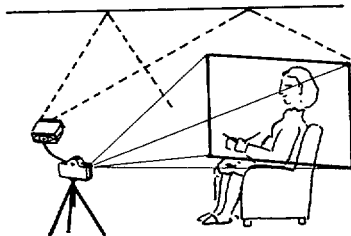
Mount the Autorobo on your camera or only slightly separated from it for most general use. When the unit is not directly on the camera the F-number for auto operation may be used unchanged. With manual operation, however, the distance from the subject to the unit - not the camera - should be used to read off the aperture setting.

The optimum exposure under fully automatic flash control is affected by extremely bright - or dark - backgrounds. When the subject has a largely white center-piece, there will be underexposure, and blacks will lead to overexposure. Stop down by one half to one aperture stop for dark backgrounds, and open up by a similar amount for bright backgrounds, for best results.



B Bounce Flash [Manual Operation]

When photographing indoors, the flash from the Autorobo set to MANUAL can be bounced from white ceilings and walls for a softer, more general spread of light, and a different photographic 'mood.' Aperture settings will depend upon the reflectivity of the walls, etc., but a good general rule is to open up two stops brighter than the F-setting indicated on the calculator scale.



C **Fill-In Flash** [Manual Operation]

The Autorobo enables particularly fine photographs to be taken against the sun, in the shade of trees, or when a background of scenery is taken from within a room or car. The Autorobo is used to 'fill-in' light against the bright backgrounds.

Suitable shutter speeds for this kind of use vary with the camera:

ES, ESII, KX, KM	1/60 sec.
Spotmatic series	1/60 sec.
K2	1/125 sec.
SV, S2	"X" (approx. 1/45 sec.)

The exposure should of course be based on these shutter speeds. Let us examine a high-contrast situation as an example. Assume that a dark figure is to be photographed against a bright background, and that the following exposures

would give correct results.

(A) For background . . . 1/60 sec., F11

(B) For foreground figure
1/60 sec., F2.8

Setting (A) would underexpose the figure, while setting (B) would overexpose the background.

Under these conditions, use setting (A) with fill-in light from the flash for the foreground figure. If this supplementary light is too strong, however, the effect will be unnatural. Fill-in flash exposure should be 1 to 2 stops on the underexposed side. Note that the Autorobo gives a fixed amount of light in MANUAL operation, so the correct exposure must be obtained by varying the flash-to-object distance.

With F/11 aperture, 1 or 2 stops under

would be just F/8 or F/5.6, so the distance for either of these should be read from the calculator scale. This distance is the *optimum distance for taking the photograph*.

If this distance is inconveniently large, output from the unit can be cut to about one half by covering it with a handkerchief.

When using the Autorobo outdoors, the amount of natural lighting even in the shadowed areas should not be neglected, because it will be combined with the flash illumination.

To summarize: *choose the aperture for the background, adjust the distance from the foreground figures, and choose the best lighting level to achieve the desired effect.*

With the K2 or ES-series cameras, the exposure factor dial can be set at $\times 1/2$ and the F-stop chosen in accordance with the Autorobo guide number (in MANUAL operation). AUTO shutter exposure is also possible, provided that the shutter speed indicated in the viewfinder is lower than 1/60 sec in ES-series cameras, or lower than 1/125 sec. in the case of the K2. If at all possible, try to keep AUTO shutter speeds at or below 1/30 sec. for ES cameras, or 1/60 or below for K2 cameras. All you then have to do is press the shutter — the AUTO shutter will automatically provide good balance between fore- and background.

D **Open Flash**

[Both Manual and Auto Operation Possible]

The red button on the back of the mounting bracket can be used to fire the unit when it is not mounted on the camera. The camera shutter should be set to 'B' or an electronic flash-synchronized speed for open flash.

What is open flash?

(a) In very dark locations the camera can be left with the shutter open ('B' setting) without any fear of overexposure. A tripod should be used, and the shutter set open with B or T. With the Autorobo flashed from some convenient location, that location can be changed, and any number of flashes fired until the whole subject has been suitably illuminated.

Care should be taken to avoid reflection. Two flashes in the same direction give double the amount of light, so that an F-number one stop darker is indicated.

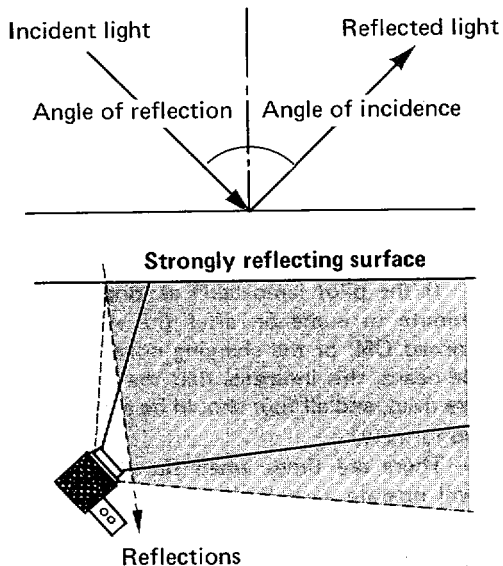
(b) With a location where exposure would normally take a second or more, and it is not possible to mount the unit on the camera, the normal B exposure can be made, and the flash unit fired from some suitable angle with the other hand. The exposure is complete as soon as the flash has fired, and the shutter can immediately be closed.

With practice, 1/2 or 1 sec. shutter speeds can be set and the open-flash button confidently operated while the shutter is open.

LOOK OUT FOR UNEXPECTED REFLECTIONS

The direction in which light is reflected from a reflecting object is shown in the diagram. It is not possible to actually see the reflections that will arise with flash, so particular thought must be given to them. If a photograph is taken directly facing a reflecting surface, there will inevitably be reflections into the camera. Even when photographs are taken at an angle as shown in the diagram, care should be taken to reduce the reflections likely to enter the camera.

When the reflection of the flash unit itself can be seen in a strongly reflecting surface such as glass, there will be very strong reflections unless care is taken.



When the Autorobo is not to be used for a long time, all batteries should be removed and stored separately. Battery liquids can cause serious internal damage if they leak.

Replacing Batteries

If the pilot lamp takes as long as one minute to come on after the switch is turned ON, or the charging noise cannot be heard, this indicates that the batteries are dead, and all four should be exchanged for new.

There are times when the Autorobo will operate even though the pilot lamp is not lit, but the brightness of the flash will be inadequate.

Battery Performance

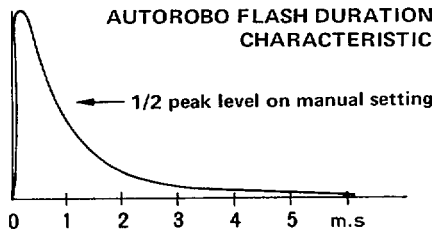
Battery performance deteriorates at temperatures below zero °C. At -10°C the performance is less than $2/3$ that at $+20^{\circ}\text{C}$. Performance will be restored as soon as the battery is restored completely to normal temperatures.

Again, even with the same type of battery, there can be considerable differences in the total number of flashes with different brands. Batteries also tend to deteriorate slightly after a shelf-life of six months.

FLASH DURATION AND LIGHT QUALITY (COLOR TEMP.)

The duration of the flash is only 1/1300 sec. to the half-peak value on the manual setting, so that even in the darkest locations the effective shutter speed will be 1/1300 sec. No hand-tremor will blur the razor-sharp images. When the unit is used to fill in shadowed areas in bright lighting, the 'X' shutter speed must be used (1/60 sec. with KX, KM, ES and Spotmatic type cameras and app. 1/45 sec. with SV cameras and app. 1/45 sec. with SV and S2 cameras), so care is needed to avoid camera shake.

The light from electronic flash is almost identical with daylight, and can be used with daylight-type color film without filters; the color temperature is 5,800°K (degrees Kelvin).



Color Temperature

Degrees Kelvin (°K) are an indication of the quality or color 'cast' of the light, corresponding to the temperature at which an object would radiate the same kind of light. Tungsten filament light bulbs have a temperature of 2,800°K and the evening sun some 3,200°K. 5,800°K is the temperature of normal daylight. Shooting with daylight film by tungsten filament light bulbs will give a reddish cast to the picture, but electronic flash will give a perfectly natural rendering.

DISTANCE/LIGHT INTENSITY


Brightness (light intensity) drops off as distance from the source increases, which is why the corners of a room away from the light bulb are darker.

Brightness drops off with the *square* of the distance, so if we call the brightness at a distance of one meter on the diagram below 'unity' it will have dropped to one *quarter* at two meters. An object two meters from the light will therefore require four times the exposure of one only a meter away, other things being equal.

GUIDE NUMBER

The guide number is a measure of the brightness of the flash as calculated below for ASA 100 film.

Guide number = Distance (m) x Aper-

LIGHT SOURCE	3" 1m	6" 2m	(DISTANCE)
	1	1/4	(INTENSITY)

ture (F-number)

If the distance in feet is used instead of meters, a different guide number will be obtained, but will of course indicate the same brightness.

There is no need to bother with this kind of calculation with the Autorobo because an exposure calculation scale is provided for convenience.

FOR USE WITH OTHER CAMERAS

When the Autorobo is used with other than Pentax cameras, those with focal plane shutters should only be used with shutter speeds corresponding to 'X' or slower.

For cameras with lens shutters, shutter speeds below 1/250 sec. should be used. Lens shutters are found on simple snapshot cameras, range-finder, and some large format cameras. If X and M synchronization is provided, the camera should be used with X settings.





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