Instruction Manual

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RHAMSTINE*

ELECTROPHOT

MODEL M-S

Employing the New Rhamstine* Batteryless Photo-Cell

Instruction Manual

for the

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ELECTROPHOT

Model M-S

The Automatic Photo Electric Exposure Meter, for Movies and Still Pictures

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READING—ELECTROPHOT will read consistently and correctly if rightly used. It will accurately indicate the **amount** of light falling **on** the sensitive surface of the photo cell and will translate that light directly into the terms of the U. S. or "f" stop markings used on practically every lens now found on amateur or professional cameras. In using ELECTROPHOT, it is only necessary to understand how the light sensitive cell functions with respect to any object or scene at which the meter is pointed, certainly not a difficult requirement in view of the fact that it gives directly the exact lens setting to use, without further calculation or adjustment.

In taking a reading, it is not necessary to "sight" through a tube or other eyepiece, or to rely upon the reaction of the eye in any way. It will be found that the most convenient way to hold the meter is in both hands with the dial in a horizontal position, somewhat as a box camera is held.

To take a reading, all that is necessary is to remove the cap, locate the scene or object in the reflex view-finder, the pointer on the dial which forms the face of the meter will then give the exposure directly in stop numbers.

There are two scales shown on the dial. The top scale is for movies at 1/32 second and the lower for stills at 1/25 second. The movie scale is for panchromatic film in daylight. The still scale is for Plenochrome or Verachrome film in daylight.

It is this capability of ELECTROPHOT for rapid reading that is one of its points of superiority for cine photographic use. Other meters must be looked through, adjusted and correlated in order to get the lens setting; often the opportunity for a good picture escapes while this is being done. ELECTROPHOT reads **instantly**—and directly. There are no eye reactions to consider, or scales to adjust. ELECTROPHOT may be read a dozen times within the interval it takes to operate other types of meters.

In directing ELECTROPHOT at object or scene, remember that the photo cell will be affected by **all** the light or shade that the scene contains. This simple point is the one most important factor in gaining the best photographic results from ELECTROPHOT readings. The reading given is a correct average of the light reflected from and light absorbed by **all** the objects composing the scene. In taking a reading, therefore, bear in mind that the meter will not differentiate between important and unimportant objects in this scene. This is for you to do, for you only can designate which are the objects that are important. For example, if you are taking a picture of an individual in sunlight against a large mass of dark foliage, the meter will be influenced by the dark background as well as by the brilliantly lit object. So, if the meter reading is taken from a distant viewpoint—perhaps next to the camera itself—the exposure given will be an average of the bright and dark parts of the scene. But what you probably want in such scene is the correct exposure on the principal object of interest, which is the person himself; probably his face. Therefore, to get the proper reading for this result, approach the subject **more closely** so that he will appear larger in the field of the meter, and so that the effect of the dark background will not be so greatly felt.

Another example: You are to take a picture through a window from an inside room and are therefore at some distance from this window, which frames a bright view outside. From the inner viewpoint, the meter will combine the ex-

posure needed for the large, dark shadow mass which surrounds the window, with that needed for the bright outside scene. The result will be a correct compromise between the two, but a picture taken at the lens setting indicated would probably show an over-exposed effect on the view outside the window, simply because the meter has estimated for the dark parts of the scene as well as the light. Since the outside view is the important part of the picture, while the rest is just dark "framing", the **correct** practice in this case would be actually to carry the meter to the window and point it out towards the brighter scene outside.

Conversely, in taking a picture of a low-flying aeroplane against the sky, it is obvious that the principal object of interest is so far away that it will appear on the film only as a small point against a large, bright area. An ELECTROPHOT reading taken on such a subject will give the correct reading for the bright sky area, because the darker plane is too far away to affect the reading seriously. Thus, the meter will give a stop opening which agrees with the best photographic practice in making a scene of this nature.

The best photographic results follow when a scene is recorded which does not contain glaring extremes in exposure; that is, large areas of darkness together with large, brilliant patches of light. If you cannot avoid such a condition, and if your scene contains one subject of more importance than the rest, approach this subject and take a "closeup" ELECTROPHOT reading.

How close to approach for this kind of a reading depends on the subject. For a face only, a distance of three to five feet will be satisfactory; for a larger object, a greater distance in proportion will be advisable.

For a landscape or similar scene in which all objects are of equal importance in forming the picture, the ELECTROPHOT reading may be taken from a position beside the camera.

In taking closeup exposures where the camera is also to be close to the subject, the meter reading may be accepted as correct. In making "backlighted" or "rim lighted" portrait shots, the ELECTROPHOT is especially valuable, giving an accurate exposure reading under these usually uncertain conditions. If a reflector is used, ELECTROPHOT will compensate for the added source of light. Be careful, however, that direct light does not shine in ELECTROPHOT when making these shots.

IMPORTANT—Do not point the meter directly into the face of the sun. This will never be necessary for purposes of exposure, as no successful picture can be taken in this way. Sudden exposure to a tremendously brilliant light of this kind may damage the meter by throwing the needle over to the right too hard. However, late in the day, when atmospheric haze has dimmed the sun's rays, or for a sunset effect, ELECTROPHOT reading can be secured by this means.

FILTERS—FOR MOTION PICTURE CAMERAS

The ELECTROPHOT is particularly valuable for use with filters, as it will indicate when they should, or should not, be used. It also provides for a quick method of setting the proper stop for use with the filter.

When using filters, the principal thing to remember is that they **hold back** a certain amount of light from the film, so that the lens diaphragm has to be opened up to compensate for this. The amount of this compensation is indicated by the filter **factor,** which varies with the kind of film used. Before employing a filter with any kind of film, the user should know the proper factor of that filter as related to the film in the camera. A filter may have a factor of 8X with orthochromatic emulsion; 4X with ordinary panchromatic and only 2X with superspeed panchromatic. Filters vary in their factors and the only sure way is to ascertain the factor from the filter maker, for whatever kind of film used.

Knowing the filter factor, the rest is easy with ELECTROPHOT. A convenient table for use with filters is shown herein. Take the exposure in the usual way. Note the reading. Locate this reading on the upper horizontal line of the Chart. Follow down in the column directly beneath this reading until a point is reached opposite the filter **factor** (in the left-hand vertical column). This is the stop at which your lens should be set when using the filter in question.

TABLE FOR ALTERED CAMERA SPEEDS AND FILTERS										
ELECTROPHOT READING	f:1.5	1.9	2.8	3.5	4	4.5	5.6	8	11	16
8 SPEED (HALF)	2.1	2.7	4	5	5.6	6.3	8	11	16	22
24 SPEED OR 1½X FILTER		1.5	2.3	2.8	3.3	3.7	4.5	6.5	9	13
32 SPEED OR 2X FILTER		1.3	2	2.5	2.8	3.2	4	5.6	7.7	11
48 SPEED OR 3X FILTER			1.6	2	2.3	2.6	3.2	4.6	6.3	9
64 SPEED OR 4X FILTER				1.7	2	2.2	2.8	4	5.5	8

Much might be set forth concerning the effectiveness of filters for many purposes, but a full knowledge of this is best acquired from other sources, as space in a Manual is too limited. Briefly, the filter is used to best advantage on every scene containing brilliant light and color; for landscapes, distant shots and skies. Filters are not used for closeups of persons. A filter is particularly valuable when taking pictures involving a large area of sky, and when ELECTROPHOT reading indicates a stop of f:22 or f:32 (which are not found on the usual short focus cine lenses) the use of a 2X or 4X filter to cut down some of the superfluous light is thus definitely indicated.

COLOR—ELECTROPHOT furnishes a highly convenient and dependable method for determining whether or not it is feasible to take pictures in color under any given light condition. If the pointer reads from f:5.6 to f:8, color pictures may be taken at half speed. If from f:8 to f:11, pictures in color may be taken at normal speed. If the reading is from f:11 to f:16, the neutral density filter should be used, or a camera speed of 32 may be used without N. D. filter.

SUPERSENSITIVE FILM—Since ELECTROPHOT is calculated to read for a normal exposure duration of 1/32 sec. with standard cine panchromatic emulsions, it follows that the lens stop will have to be altered when using supersensitive emulsions in daylight. With this "fast" type of film, such an alteration is a very easy matter, as all that is necessary is to take the next **higher** numerical reading than is indicated on ELECTROPHOT dial. Thus, with superspeed film, set lens at f:11 instead of f:8; f:4 instead of f:2.8, etc. It is interesting to know that ELECTROPHOT scale is designed to give a graphic representation of the lens stop system; each number above the scale represents a regular variation in the amount of light the lens admits to the film. For instance, f:8 admits half as much light as f:5.6, etc. The use of filters with the supersensitive emulsions often produces unusual results and is a subject the serious worker will investigate.

Supersensitive panchromatic film in artificial light takes the same setting as panchromatic film in daylight, i. e., read the top scale direct. In **artificial** light with regular panchromatic read meter 1 stop to left.

ALTERED CAMERA SPEEDS—It is equally easy to use ELECTROPHOT readings as a basis for camera speeds other than the normal 16 frames per second. The combined chart will supply the correct settings immediately. Simply locate the original ELECTROPHOT reading on the upper horizontal column and

follow down vertically (as with filters) until opposite the camera speed desired. Set lens at this stop for this speed.

DATA FOR STILL PICTURES

CONVERSION TABLE—The RHAMSTINE* ELECTROPHOT has been designed with but one purpose in mind—SIMPLICITY. Many meters on the market today, while giving correct comparisons of one "f" value to another, give time factors of useless speeds such as 1/8 sec. or 1/65 sec.; speeds which the modern shutter of today does not have. The ELECTROPHOT has been worked out on the Chrome Film at 1/25 part of a second, the most popular film at the most used shutter speed.

Conversion to higher speeds with correct lens aperture are had at a glance by reference to the conversion table. While the meter can be used by the most advanced amateur for conversion to the very finest degree, it has been primarily designed to be of the greatest convenience to the amateur who wishes correct results without bother of any sort.

Since both "f" systems of lens markings are involved, the blending of each into the system would result in odd fractions of seconds, such as the difference between 1/25 and 1/10 or 1/5 and 1/2 and such speeds are not designated on the present shutters and are consequently of value to none. Shutter speeds or lens apertures must be doubled or halved before they attain any importance whatsoever. In the true "f" or Standard lens system of marking, the series is so arranged that each smaller aperture requires double the exposure required by the next smaller aperture.

Example f.5.6 at 1/100 part of second is equal to f.8 at 1/50 part of a second, or f.16 at 1/25 part of second is equal to f.11 at 1/50 part of second.

The shutter of today offers speeds that are double or one half of each other, making a combination that is readily used with the true "f" system. While some Continental lenses use irregular aperture markings such as f.3.5, 4.5 or 6.3, but expressing the true ratio of the diameter of the aperture to the focal length, they usually describe the full working aperture of the lens, they then follow through with the "f" system. However it is easy to find the ratio between Continental and the "f" system with the ELECTROPHOT by the use of the line separating the "f" systems.

Example: Should you have a diaphram opening of f.5.6 at 1/100 part of a second, f.6.3 would be the difference between f.5.6 at 1/100 and f.8 at 1/50 or 1/75 part of a second at f.6.3.

One can readily see, however, that should he wish to use f.6.3 with f.5.6 reading 1/25 and f.8 reading 1/10 that the result would be a factor not found on shutters and consequently of no value to him. In such a case, choose the speed that will be of the best advantage to the subject photographed. As stated before, time or aperture must be doubled or halved before attaining any importance whatsoever.

Due to the fact that no two manufacturers of films or plates will compare their series of emulsions to one another by H. and D., Scheiner or other systems, but will give on request the relative sensitivity of one plate to another of their own make, by ratings or degrees, we offer an easy means that has worked most satisfactorily for us. With the speed plates use the next shutter reading

to the left but retain same lens aperture; with super speed plates or films use second column to left but retain lens aperture. Example: f.8-1/25 with Chrome film; use f.8-1/50 with speed plates and f/8-1/100 with super speed. It is the relative sensitivity to different light values and colors that is of prime importance and for this reason many manufacturers refuse to offer H. and D. or other types of ratings. It is a factor over which they have no control.

The secret of good pictures is to use the slowest time possible with the smallest aperture thereby gaining in depth of focus and greatest possible detail. It will be noticed that the meter works at 1/25 part of a second which is the slowest speed that a camera can be held in the hand with success. Speed factors are dictated by the objects photographed.

f: 1	1.4	2	2.8	3.5	4	4.5	5.6	6.3	8	11	16	22	32
					1600		800		400	200	100	50	1/25
			1600		800		400		200	100	50	1/25	1/10
		1600	800		400		200		100	50	1/25	1/10	1/5
	1600	800	400		200		100		50	1/25	1/10	1/5	1/2
1600	800	400	200		100		50		1/25	1/10	1/5	1/2	1
800	400	200	100		50		1/25		1/10	1/5	1/2	1	2
400	200	100	50		1/25		1/10		1/5	1/2	1	2	4
200	100	50	1/25		1/10		1/5		1/2	1	2	4	8
100	50	1/25	1/10		1/5		1/2		1	2	4	8	16
1/50	1/25	1/10	1/5		1/2		1		2	4	8	16	32
1/25	1/10	1/5	1/2		1		2		4	8	16	32	1'4"

CONVERSION TABLE FOR STOPS AND SPEEDS.

Example: Suppose the meter when sighted on a scene reads f: 2.8 and since depth of field is desired or 2.8 is not shown on your lens, the lens opening of f:8 is to be used, hence by the chart, reading **down** the 2.8 column to 1/25 and following **across** that line to the f:8 column we find 1/2 sec. at which speed the shutter must work.

Another Example: Suppose you are taking sports or fast action scenes. The needle on the meter reads f:5.6 at 1/25 sec. and you wish to use a shutter speed of 1/100 sec. By the chart, f: 5.6 column, 1/25 sec. is on the same line of 1/100 in the f.2.8 column.

COLOR PLATES

The color plates have much slower emulsions and require 30 to 60 times normal exposure. Example: the meter reads f.16-1/25 part of second with Chrome film. The color plates state 30 times normal rate using the old regular film or 60 times normal rate using the Chrome film; therefore the exposure would be f.16 at 1/25x60 equals 60/25 or 2.4 seconds at f.16, but by use of the table one could make the exposure at f.4-1/10 sec.

FILTERS

One of the most common mistakes made today in photograph work is the taking for granted the numbers marked on filters are the number of times the exposure should be increased. We offer a table that has worked very successfully.

Eastman Kodak Verichrome with Eastman Filters

K1	increase	exposure	by	4X
K1	1/2 "	"	"	5X
K2	"	"	"	8X
K3	"	"	"	11X
G	"	"	"	16X

Agfa Plenachrome with Agfa Filters

0	Increase	exposures	by	1 1/2X
1	"	"	"	2X
3	"	"	"	5X
4	"	"	"	6X
5	"	"	"	8X

Example: Using Eastman Kodak Verichrome and our exposure is f.8 at 1/100. With an Eastman K1 filter our filter calls for an increasage of 4 times or 4x1/100 equals 4/100 or 1/25 with filter at f.8. Using Agfa Plenachrome and our exposure is f.4-1/50. With an agfa filter No. 1 the filter calls for 2 times or 2x1/50 or 1/25 at f.4.

DEPTH OF FOCUS TABLES.

FEET	f: 4.5	5.6	8	11	16	22
∞	80-∞	63-∞	44-∞	32-∞	22-∞	16-∞
50	31-132	28-122	23-∞	20-∞	16-∞	12-∞
25	19-36	18-41	16-56	14-∞	12-∞	10-∞
12	10.5-14	10-15	9.6-16	9-19	8-25	7.6-43
8	7.3-9	7.2-9.1	6.8-10	6.6-10.1	6-12	7-43
6	5.6-6.6	5.5-6.7	5.2-7	5.1-7.3	5-8	4-9
5	4.9-5.4	4.9-5.5	4.5-5.8	4.4-5.9	4.2-6	4-7
4	3.1-4.3	3.1-4.5	3.8-4.5	3.8-4.8	3.4-5	3.2-5

2 1/4 x 3 1/4 -#1 CAMERAS 4 1/8" LENS

FEET	f: 4.5	5.6	8	11	16	22
∞	93-∞	75-∞	52-∞	38-∞	26-∞	19-∞
25	19.8-34	18.8-37	17-47	15-70	12.9-∞	10.9-∞
12	10.7-13.7	10.4-14.2	9.8-15.4	9.2-17.3	8.3-21.5	7.5-30
8	7.4-8.7	7.3-8.9	7-9.3	6.7-10	6.2-11	5.7-13
6	5.7-6.4	5.6-6.5	5.4-6.8	5.3-7	4.9-7.7	4.7-8.4
5	4.8-5.3	4.7-5.3	4.6-5.5	4.4-5.7	4.3-6.1	4.-6.7
4	3.8-4.2	3.8-4.2	3.8-4.3	3.7-4.4	3.5-4.7	3.2-4.8

2½ X 4¼ - #2A CAMERAS - 4½" LENS.

FEET	f: 4.5	5.6	8	11	16	22
∞	131-∞	105-∞	73-∞	53-∞	36-∞	26-∞
60	41.2-110	38.3-138	33-318	28-∞	23-∞	18.6-∞
30	24.4-38.7	23.4-41.7	21.4-50	19.3-67	16.7-152	14.2-∞
15	13.5-17	13.1-17.4	12.5-18.7	11.7-20.7	10.7-24.7	9.7-33
8	7.5-8.5	7.5-8.5	7.2-8.9	7-9.3	6.7-10	6.2-11
6	5.7-6.3	5.7-6.3	5.6-6.5	5.4-6.7	5.2-7	5-7.6
5	4.8-5.1	4.8-5.1	4.7-5.3	4.6-5.5	4.4-5.7	4.2-6
4	3.9-4	3.9-4	3.8-4.1	3.7-4.2	3.7-4.4	3.5-4.5

3¼ X 4¼ CAMERAS - 5¼" LENS

Depth of Focus Tables

These depth of focus tables were selected as being of the most use to the amateur. They comprise the generally selected focal length on lenses used on 2-1/4x3-1/4, 2-1/2x4-1/4 and 3-1/4x4-1/4 cameras. By careful reading one can readily see the depth at each given footage for the "f" opening used. Those objects under 10 feet require better judgement as to distance than those over 10 feet, as the depth of focus decreases the closer one comes to an object. It is noted by the tables that the depth increases as the diaphram is closed and since the average pictures require the greatest possible depth, depth can only be obtained by stopping down, which requires an increase in exposure. The longest possible exposure that can be successfully made with the camera held in the hand 1/25 part of a second. The RHAMSTINE* ELECTROPHOT automatically lends itself to this feature as it is set for 1/25 part of a second.

Artificial Light

The RHAMSTINE* ELECTROPHOT may be used with artificial lighting merely by taking the reading in the ordinary way and then using the third stop or diaphram opening to the left as the exposure for the shot to be made.

Example: In a room lighted with electric bulbs, point the meter at the subject, thereby getting a reading of f.5.6. The correct reading then would be f.2 at 1/25. By the use of the conversion table one could use f.8 at 1 second, etc.

One must remember that if you want the detail in the shadows take your reading in the shadows for there is where the exposure is to be made and

let the high lights take care of themselves. It is a rule as old as photography itself.

Speed Photography

In speed photography remember the angle at which the shot is to be made. An object traveling towards you or directly away from you (I) requires less shutter speed than one on an angle (/) but one on such an angle requires less shutter speed than an object directly across (—).

Example: Our shot calls for normal moving traffic both men and automobiles at a distance of 50 to 75 feet. This would be the case if we put ourselves in the above position to make the shots.

I 1/50 part of second.
/ 1/100 " " "
— 1/200 " " "

It will be noted that the speed doubles itself as to the angle increase. It is natural to have greater shutter speeds on objects close up than on the same object moving at the same speed but at a greater distance due to the fact that they must cover a great distance within the same angle.

Example: Aeroplanes at a great distance may be stopped in motion with speeds as slow as 1/50 while traveling at 150 miles per hour, yet automobiles traveling at the comparatively slow speed of 40 miles per hour would require a shutter speed of 1/200 to stop motion due to the close proximity of the camera. One can readily see how speed pictures require a little fore thought before exposure to get the finest results.

LEICA CAMERA SPEEDS

Users of Leica Camera will find the following useful in calculating the diaphram stops for the Leica practical shutter speeds.

which circumstances the instrument should be sent to us for repair. Clean the protecting lens with tissue or with a soft silk handkerchief. If the cap is replaced after reading and ordinary care used, the lens will not require cleaning.

IMPORTANT—Do not take the ELECTROPHOT apart. While it is sturdily made it cannot be carelessly handled. Dropping or throwing around may damage its meter or photo cell.

In the event of damage to the ELECTROPHOT or failure to respond in service, pack it carefully and send parcel post to the factory for attention.

Manufactured by

J. THOS. RHAMSTINE★

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