Thank you very much for purchasing the "FUJIMOTO" G70 Computer Enlarger. Please read this instruction manual thoroughly before you use the equipment, so that you can fully take advantage of its superb performance.

CONTENTS

SPECIFICATION & PERFORMANCE .......................... 2
PROGRAM FOR REFERENCE PRINT .......................... 4
MANUAL PREPARATION OF REFERENCE PRINT ............. 4
STANDARD NEGATIVE ...................................... 4
FILM WITH COLOR FAILURE ................................. 5
CONSOLIDATION OF PRINTING SYSTEM ..................... 5
COLORS VARY DEPENDING ON A PRODUCTION BATCH OF PAPER .......... 6
CONSOLIDATION OF NORMALLY USED FILM ................. 6
STARTING DATA (REFERENCE) ............................. 6
N-P AND P-P METHODS .................................... 7
PROCEDURE OF ASSEMBLAGLE .............................. 8
COLOR ANALYSIS PROGRAM (IT CAN BE ALSO CONDUCTED IN A BRIGHT ROOM.) ............ 11
EXPOSURE TIME PROGRAM (IT SHOULD BE CONDUCTED IN A DARK ROOM.) ................... 12
COLOR ANALYSIS (IT CAN BE ALSO CONDUCTED IN A BRIGHT ROOM.) ......................... 14
MEASUREMENT OF EXPOSURE TIME (IT SHOULD BE CONDUCTED IN A DARK ROOM.) .......... 16
SPECIFICATION & PERFORMANCE

Film Size: 6 x 7, 6 x 6, 6 x 4.5, 35mm, Split 35mm, 110 sizes
Lens Used: 90mm, 80mm, 75mm, 50mm, 38mm (LEICA mount)
Lens Board: Bayonet Mount Lens Board with Lock
Magnification Change System: Arm-elevation sliding system with Balancer
Light source: (JCR) 12V/100W Halogen lamp
Illumination System: Diffusion System & Condenser Diffusion System
Both Illumination systems in one unit.
Focusing: Rack-and-pinion system for coarse and micro-motion
Color Filter: C.M.Y. dichroic filters, UV filter
Filter scales: 0 to 200 each C.M.Y. with scale lighting
Power Supply: Exclusive-use for 120V/230V;
Output: 12V
Filter Cut: Illumination cut for white light
Illumination Dimmer (High & Low): Illumination dimmed about 1/3 at low position
Distortion: at focusing stage
Magnifications: Neg. Size Lens Magnifications
(On Baseboard) Split 35mm 38mm
35mm 50mm 2.4 - 16
6 x 6cm 75mm 1 - 10
6 x 7cm 80mm 1.3 - 9
6 x 7cm 90mm 1.6 - 8

Extra large enlargement: Projection on the floor or wall is possible
Copy stand: Usable with camera adapter
Weight: 12.7kgs
Column: 1,110 x 60 x 30mm
Baseboard: 590 x 490mm
Max. overall length: 1,255mm

COMPUTER SECTION:

Photometric System: Incident-light Photometric system
Color Analysis: Average Photometry (Photodiode 6 pcs.)
Exposure Analysis: Spot Photometry (Cds)
Exposure Time: 0-111 sec.
Timer Accuracy: Repeatability within 1%
Color Analysis System: N-P (Negative-Positive Print System)
P-P (Positive-Positive Print System)
2 Modes can be selected by a selector switch.
Power Source: AC12V 50/60Hz 5W
1. Light box cap  
2. Light box  
3. Body  
4. Filter knob C.M.Y.  
5. Neg. carrier  
6. Color analyzing lamp  
7. Bellows  
8. Enlarging Lens (Optional)  
9. Red Filter  
10. Column  
11. Column socket  
12. Baseboard  
13. Counter balancer  
14. Filter unit set screw  
15. Illumination dimmer knob  
16. Carriage  
17. Filter release lever  
18. Filter unit  
19. Elevating grip  
20. Focusing knob  
21. Filter unit cord  
22. Power supply  
23. Tilting lock knob  
24. Lens board fastening screw  
25. Distortion fixing screw  
26. Exposure-measuring  
27. Mode changing switch  
28. M-program knob  
29. Y-program knob  
30. D-program knob  
31. Timer/Focus switch  
32. 10 sec timer dial  
33. 1 sec timer dial  
34. Fine dial  
35. Exposure switch
PLEASE READ THROUGHLY BEFORE USING THE EQUIPMENT

PROGRAM FOR REFERENCE PRINT

In order to use a computer, firstly, make test print with a standard negative by manual operation and make a normal-colored reference print which came out perfectly well balanced. Then, the same balance of colors and exposure time as those of the reference print must be programmed. Both N-P and P-P methods are required for the program.

MANUAL PREPARATION OF REFERENCE PRINT

Since the photo, which is analyzed and printed by the computer, should come out the same as the programmed reference print, if there is shear in the colors and density of the reference print, the photo comes out in a bad condition. Be sure to pay adequate attention to the preparation of the reference print. Prepare the reference print by a manual operation, repeating trial printings. The filter and the timer of the G70 computer can be manually used, even if the reference print has not been programmed.

STANDARD NEGATIVE

The standard negative is a film into which abundant colors were equally photographed with a proper exposure outdoors where light conditions were correct.

A negative where one color dominates the most part of the film is not suitable for the standard one.
FILM WITH COLOR FAILURE

This is a state in which one color occupies the most of film area. In other words, the area ratio of color is one-sided and it is called "color failure". If a color-failed film is analyzed with the standard negative already programmed, the colors naturally comes out off-balanced due to different conditions. This is an unavoidable phenomenon to analyzers which measure a color analysis by means of average photometry. It is because conditions are different between a film to be analyzed and the standard negative.

CONSOLIDATION OF PRINTING SYSTEM

The printing system means equipments and sensitive materials to be used for printing.

Printing System

Among these group classifications, the difference of only one group causes a color failure. Be sure to set the same conditions without fail between a system in which the reference print was programmed and a system in which an analysis and printing are to be executed.
COLORS VARY DEPENDING ON A PRODUCTION BATCH OF PAPER

The condition of each paper varies depending on a production batch, even if the paper was made by the same manufacturer. Note this point carefully.

When having purchased new paper of a different production, it is required to make another reference print out of the new paper and reprogram it.

CONSOLIDATION OF NORMALLY USED FILM

Since a film has different characteristics depending on each manufacturer, if possible, use one manufacturers and using only his films is one of the conditions to operate the computer smoothly.

STARTING DATA (REFERENCE)

This table is the starting data of test prints for the preparation of the reference print in the N-P method. When making test prints based on this data, a result is to be obtained close to best condition. Accordingly, based on this data, repeat fine adjustment and prepare the perfect reference print.

As the paper used for this data belongs to another batch of production, desirable colors cannot be obtained by only one operation because the condition of each paper is different.

This data is only for your reference and is not an absolute one.

P-P System

<table>
<thead>
<tr>
<th>Kodak Ektaflex (Ektachrome Film)</th>
<th>C-20</th>
<th>f=4.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M-20</td>
<td>20 sec</td>
</tr>
<tr>
<td>Kodak Ektaflex (Kodachrome Film)</td>
<td>C-20</td>
<td>f=4.0</td>
</tr>
<tr>
<td></td>
<td>Y-20</td>
<td>20 sec</td>
</tr>
</tbody>
</table>
N-P System

<table>
<thead>
<tr>
<th>Material</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriental RP III M-40</td>
<td>2.5 sec</td>
</tr>
<tr>
<td>Oriental Color Developing Kit Y-120</td>
<td></td>
</tr>
<tr>
<td>Kodak Ektacolor 78 M-20</td>
<td>2.0 sec</td>
</tr>
<tr>
<td>Minolta NP-1 Y-130</td>
<td></td>
</tr>
<tr>
<td>Kodak Ektaflex M-80 Y-85</td>
<td>5.0 sec</td>
</tr>
</tbody>
</table>

When printing in the diffused light method, adjust an exposure time 1.5 times as much.

Note:
Please acknowledge a case that the sensitivity of paper may be changed without a prior notice due to the circumstances of the manufacturer of sensitive materials.

This starting data is based on the printing under the following conditions. If these conditions are not accepted, there will be considerable difference in colors and density. Note it carefully.

Printing method: Common for both diffused light and condenser light methods
Light quantity control: High
Enlarging size: Large cabinet size (130mm x 180mm)
Negative film: 35mm size II type color negative
Enlarging lens: Lucky F4.5 ~ 50mm, lens opening F. 8

N-P AND P-P METHODS

The N-P method is to obtain a positive print out of a negative film. The P-P method is to obtain a positive print out of a positive film (reversible slide film).

The G70 computer has these two modes (N-P and P-P) and either mode can be selected by a mode selector switch.

This mode selection is for the analyzing capability of the computer, not for the program.

Even if the power for the computer is turned off, it still keeps a programmed state.
PROCEDURE OF ASSEMBLAGE

Since the enlarger is precision machine, be careful in handling it according to the procedure of assemblage.

TOOLS AND BOLTS

1. Position the upright column and the column socket as shown in the photograph, set two 6mm hexagon socket headed bolts in the holes of the column socket, fit the longer shaft of the attached hexagonal wrench key to each bolt head, and tighten the bolts by turning the shorter shaft of the hexagonal wrench key clockwise until the bolts cannot be turned by hand.

**Note:** Do not make use of pliers or the like to turn the hexagonal wrench key, but be sure to drive both of the bolts evenly by fingers.

2. Then, insert the shorter shaft of the hexagonal wrench key into each bolt head, and holding its longer shaft, turn it clockwise by 1/4 turn. Do not turn it more than 1/4 turn.

**Note:** Be sure to fasten the upright column by even force since uneven tightening of two bolts will unfavorably affect the parallelism between the upright column and the column socket.
3. Insert the column fastening bolt from the rear side of the baseboard, and fasten the column socket on the baseboard. Position the upright column with the scale on the column turned toward the front side as shown in the photograph. Tighten the column fastening bolt sufficiently with the attached spanner.

4. Hold the light box with the cap on the upside and insert it into the body with the mark, "Condenser System" or "Diffusion System", of the light box positioned as shown in the photograph.

Note: Set the light box gently with care so that a shock may not be given to it.

5. Remove two filter unit set screws indicated by the arrow heads in the photograph, and take the filter unit out of the body.

6. Insert the halogen lamp bulb into the socket in the unit straight so that the edge of lamp, shade may touch slightly on the bottom of the unit. If the bulb is inclined due to the lamp base, adjust it by four screws indicated by the arrow heads in the photograph so that it is straight.

Note: Do not soil the bulb with fingers.
7. Fit the attached negative carrier to the enlarger. Fasten up the cord from the filter unit at the cord hook on the carriage.

8. Mount an enlarging lens (with the Leica screw mount) on the lens board attached to the enlarger. Tighten the lens board fastening screw slightly to fasten the lens board.

9. Connect a cord coming out of the back of the base plate to the connector of the transformer. Connect a cord coming out of the transformer to the AC power source. Leave the switch of the transformer OFF.

10. Connect the cord plug of the exposure measurement light sensor to the connector shown in the photograph.

Wiring Panel on the Back of the Base Plate

If a AE foot switch interlocking plug is used, it interlocks with the foot switch.
1. Insert a standard negative into the enlarger. Set the color head filter to the same condition as when the reference print was prepared. (Example: M60, Y90) Adjust the enlargement lens to the same lens opening (example: F8) as in case of the reference print. The location of the bellows (light sensor) should be positioned at the same focal as in case of the reference print.

2. In case of the N-P method, turn the mode selector switch to N-P. Turn it to P-P in case of the P-P method.

3. Press the focus switch to light up the enlarger. Turn the M program knob to the position where both LEDs of the color analysis display "C→M" may be lit up.

4. Turn the Y program knob so that both LEDs of the color analysis display "C→Y" may be lit up.
5. If the four LEDs of the color analysis display are all lit up, the program for the color analysis of the reference print has been completed. For the case the program is changed afterwards, note the scale values of the M and Y program knobs. After having ended the program for the color analysis, press the focus switch to light off the enlarger.

EXPOSURE TIME PROGRAM (IT SHOULD BE CONDUCTED IN A DARK ROOM.)

When the reference print is of a cabinet size with the enlarging lens at F 8 and an exposure of 3 seconds, and when a proper density is obtained, program the display brightness and exposure time of this state.

1. Confirm that the color head filter is set to the same condition as when the reference print was prepared. (Example: M60, Y90) Adjust an enlargement size, focal point and lens opening to the same condition as in case of the reference print. Set timer dial to 3 seconds (example) with the other timer dials to 0.

2. The G70 computer has three kinds of timers; one with the unit of 10 seconds, another one with the unit of 1 second and the last one up to 1 second without a step. The exposure time consists of the addition of these three timer.
3. Darken a room and press the focus switch to light up the enlarger. Put the exposure measurement light sensor on the easel mask and place the spot hole of the light sensor on the brightest part of the projected image. (Both N-P and P-P methods) In case of the N-P method, measure the light on the shadowy part for the hair of a subject or a landscape as shown in the photograph.

4. Turn the D program knob so that the red and green LEDs of the light sensor may be lit up. Adjust carefully because the programming is done with an overexposure time when only the red LED is lit up, and it is done with an underexposure time when only green LED is lit up.

The above-mentioned procedure has programmed the density of the reference print.

Note down the scale value of the D program knob and fit the cover. Then, turn off the enlarger.
After having programmed, beautiful prints can be obtained only by conducting the photometric analysis of the projected image, if the film and printing system are of the same conditions as the standard negative.

COLOR ANALYSIS (IT CAN BE ALSO CONDUCTED IN A BRIGHT ROOM.)

1. Insert a negative to be printed into the negative carrier of the enlarger.

2. An analysis can be conducted more correctly when the location of the same bellows (light sensor) is positioned approximately to the same position as when the reference print was programmed.

3. Set the color head filter to the same value as in case of the reference print. It is because a correction value is to be close to that for the reference print, even if negatives are changed. It saves a trouble of starting the filter from "0".

4. Press the focus switch to light up the enlarger. First, turn the color head M filter knob and keep a balance so that both LEDs of the color analysis display "C M" may be lit up.
5. Next, turn the Y filter knob and adjust a balance so that both LEDs of the color analysis display "C→Y" may be lit up.

6. The analysis display of the M filter tends to be off-balanced due to the effect of the Y filter. In that case, adjust the M filter knob again to keep the balance of the color analysis display "C→M".

7. Thus, adjusting the M and Y filter knobs by turns, repeat this step so that the four LEDs of the color analysis displays "C→M and C→Y" may be lit up with their balance even. Every time the adjustment is repeated, the balances of the four LEDs get closer.

8. If the four LEDs are lit up in the same light quantity with the balances even, the color analysis is over. When conducting all exposures at the same time afterward, note down the filter value and film number in this state.

1. (M lit up) 2. Increase the scale of the M filter.
3. (C lit up) 4. Decrease the scale of the M filter.
5. (Y lit up) 6. Increase the scale of the Y filter.
7. (C lit up) 8. Decrease the scale of the Y filter.
9. Color balances OK

After having ended the color analysis, press the focus switch once to light off the enlarger.
MEASUREMENT OF EXPOSURE TIME (IT SHOULD BE CONDUCTED IN A DARK ROOM.)

1. When printing the film on which all color corrections were previously measured in a bright room, insert the film into the enlarger and set the enlarger to the M and Y correction values which were previously taken down. When printing the film immediately after the color analysis, measure in the state as it is because the correction filter and film have been already set in the enlarger.

2. Press the focus switch and project onto the easel mask. Adjust a focus and decide an enlargement magnification and the composition of the image. Next, stop down the enlarging lens opening. Although it is normally F 8, adjust it to F 8 ± 1 ~ 2 in accordance with the brightness of the projected image.

3. Put the exposure measurement light sensor on the easel and shift its spot hole onto the brightest part of the projected image.
4. Set the three timer dials to 0. Turn the 1-second-unit dial gradually to the right and search a position where the red and green LEDs of the light sensor light up. When only the green LED is lit up, a set timer shows an underexposure, and when only the red LED is lit up, it shows an overexposure.

5. When the red LED does not light up, even if the 1-second-unit dial was fully turned to the right, return the dial to the left and set the 10-second-unit dial to 10 seconds or more, and then turn the 1-second-unit dial to the right again. Finally, perform fine adjustment with the 1-second stepless dial.

6. When the red and green LEDs are both lit up, a proper exposure time has been set. Remove the light sensor from the easel mask and press the focus switch to turn light off the enlarger. Insert photographic paper into the easel mask and press the exposure button. Thus, a measured exposure time can be provided.
7. If exposed paper is developed, it comes out as well as the reference print.
For the development, be sure to keep the same conditions constantly as in case of the reference print without fail. If a developer and a time frequently change, it may cause difference in the color balances and density. Attention should be adequately paid to the fatigue of the developer and supply additional one, if necessary.
When printing monochrome with this equipment, to "0" position, you can set each filter dial.