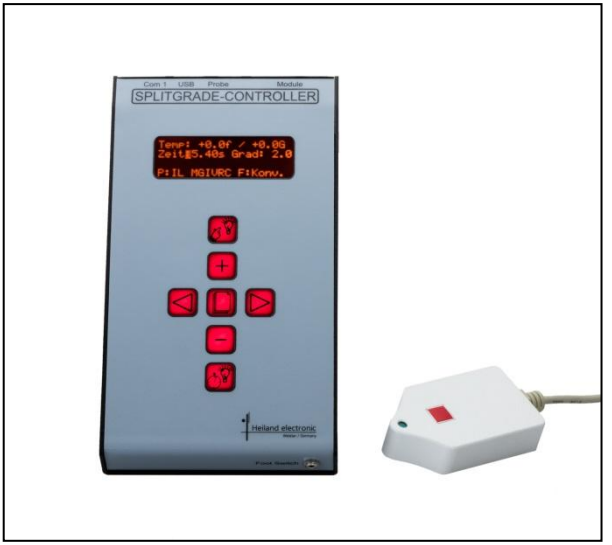
HEILAND VISION
GERMANY GMBH

Paper Gradation Management System

User´s manual V4.0



PRODUCT DESCRIPTION

Copyright

All programs stored in the controller as well as this manual are protected by copyright. The copyright belongs to Heiland electronic GmbH, Wetzlar, Germany with all rights reserved.
Under the copyright laws no part of the programs and no parts of this manual may be reproduced in any form without the prior written permission of Heiland electronic GmbH, Wetzlar, Germany.

Warranty

This instrument carries the manufacturer's warranty for the period of two years from the date of purchase. Proof of purchase is the invoice or receipt. Damage caused by improper handling or unauthorised access invalidates the guarantee. No warranty either expressed or implied is made of this instrument regarding its quality, performance, suitability or fitness for a particular purpose.
The manufacturer is not liable for direct, indirect, special, incidental or consequential damages arising of the use or inability to use this instrument or documentation even if advised of the possibility of such damages. In particular the manufacturer assumes no liability for any material including negatives or photographs used with this instrument including whatever costs of repairing, replacing or recovering such materials.
This instrument has been carefully manufactured and tested using flawless materials and state-of-the-art technology. In case of failure return the instrument to an authorised service agent accompanied by proof of purchase. Within the warranty period, the manufacturer assumes the cost of replacement parts and repair. The manufacturer reserves the right to replace the instrument in lieu of repairing at its discretion.

Valid for software rev. 4.0

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Technical Specifications of the control unit

Measuring probe	light sensor for intensity and contrast measurement resulting in a suggestion for exposure time and paper grade. Acoustic support by beeper and LED, diameter of reading point: ø3mm
Exposure control	built-in exposure timer and light shutter
Measuring range	0.01- 10 lx (10 f-stops)
Exposure time range	0.5 - 500 sec,
Resolution	0.01 sec
Time error	<0.5%, repeatability error <0.1%
Gradation input	automatic in 0.1 steps, after reading of the contrast
Manual grade setting	in 0.1 steps with automatic density control
Manual time setting	in1/10f-stops or 0.1 sec steps with constant grade
Grad table	factory adjusted for up to 28 papers of main brands and 6 films. Updates free of cost via our website.
Interfaces	light sensor, foot switch, RS232, USB
Display	illuminated LCD display with 4 lines
Voltage supply	100V … 240 V / 50…60 Hz
Dimensions (WxLxH)	160mm x 260mm x 80mm (Version 1...3) 120mm x 210mm x 70mm (Version 4)
Weight	approx. 1kg without accessories
Delivery content	controller, probe, footswitch, connecting cables, optional filter module or LED light source
Fuse	4A time lag

Factory calibrated paper types

Paper type	Display	Developer	Dilution/Time
ADOX MCP 310 RC	AD MCP310	MOERSCH Eco	1+9 / 75 s
ADOX Variotone FB	AD VARIOT	MOERSCH Eco	1+14/180 s
ADOX MCC FB	AD MCC	MOERSCH Eco	1+14/150 s
BERGGER Prestige Variable CB	BE PRVACB	MOERSCH Eco	1+14/180 s
FOMASPEED Variant 311 RC	FM S311RC	Adox Adotol	1+9 / 60 s
FOMABROM Variant 111 FB	FM B111FB	Adox Adotol	1+9 / 120 s
FOMATONE MG Classic 131 FB	FM C131FB	MOERSCH Eco	1+14/180 s
ILFORD Multigrade IV RC	IL MGIVRC	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade V RC	IL MGV RC	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade RC Warmtone	IL MGRCWT	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade RC Cooltone	IL MGRCCT	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigr.Portfolio RC New	IL RCPORT	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade IV FB	IL MGIVFB	ILFORD Multigrade	1+9 / 120 s
ILFORD Multigrade Classic	IL CLASS	ILFORD Multigrade	1+9/ 120 s
ILFORD Multigrade Art 300	IL ART300	Moersch Eco	1+14/180 s
ILFORD Multigrade FB Warmtone	IL MGFBWT	ILFORD Multigrade	1+9 / 120 s
ILFORD Multigrade FB Cooltone	IL MGFBCT	ILFORD Multigrade	1+9 / 120 s
KENTMERE VC Select RC	KE SE RC	ILFORD Multigrade	1+9 / 60 s
KENTMERE Fineprint VC FB (2012)	KE FP FB	ILFORD Multigrade	1+9 / 120 s
ROLLEI Vintage 311 RC	RO VIN311	MOERSCH SE4	1+9 / 60 s
Other papers**	Others		
Fixed grade papers***	Fixed		

Further calibration sets for papers which are no longer under production may be installed while doing a software upgrade.

* These papers have not been calibrated, but the mentioned settings may be used with good results.
** Three channels may be used to adapt other papers. Factory setting is made for low, normal and high sensitive paper. Calibration is done with general corrections (see page 21)
*** Exposure with white light, time and grade measurement is possible. There is no certain paper defined, the user adapts his favoured paper by offset values to the Splitgrade setting.

Please note: All factory settings assume fresh chemistry and paper as well as 20°C developer temperature!

Factory calibrated film types

Film type	Display*
Conventional Silver halide film	Conv.
ILFORD „XP2“ *	XP 2
ILFORD „XP2 Super“ *	XP2 S
KODAK „T400CN“ *	T400C
KODAK „Portra“ *	Portr
KONICA „VX400“ *	VX400
Silver halide film developed with Moersch Finol **	Finol
Silver halide film developed with Moersch Tanol **	Tanol
Silver halide film developed with Pyrogallol **	Pyro.

Notes:
* When a chromogenic B&W film is selected, an additional symbol will be displayed for the film speed selected during the exposure:
  + indicates 50 - 100 ASA
  N indicates 200 - 400 ASA
  - indicates 800 - 1000 ASA
** If you use developers giving a stain to the film, you may add additional offsets to compensate the stain. This is done independent of the paper offset values. For details please refer to page 21.

Delivery Contents

If any of the following items are missing or damaged, please contact your supplier immediately.

- The SPLITGRADE controller, used to analyse the measured values, calculate the appropriate paper grade and exposure time and to control various filter modules or LED cold light sources.
- The light sensor (probe) to scan the projected picture.
- A footswitch to start or stop the exposure.
- Cable set to connect the controller, enlarger and darkroom safe light
- Optional: An enlarger module with the motor-driven filter wheel or a LED cold light source with an addition LED control unit and a power supply.

Note: We recommend to keep the packaging of the instrument in case of the need for further shipment.

Features

SPLITGRADE is an electronic instrument intended to control the exposures and the contrast range of variable contrast papers (VC) during enlarging.

- By printing the picture in two steps using maximum filter setting for yellow and magenta, print results are greatly improved.
- The contrast range of variable contrast papers will be perfectly matched to the given contrast range of the negative.
- The characteristics of various variable contrast papers from AGFA, AMALOCO, BERGGER, FORTE, FOMA, ILFORD, KENTMERE, KODAK, MOERSCH,TETENAL and ORIENTAL are already stored in the SPLITGRADE controller unit or could be added to the basic calibration set.
- The composition and evaluation of the picture takes place under white light.
- The exposure time and the grade are calculated after a scan of the projected negative. The scan is supported by acoustic and optical signals. The darkest and the brightest spot detected determine the result.
- The exposure time and paper grade are automatically adapted, also if another paper type is selected after measurement.
- At any time the user might override the calculated values or just set the exposure time and paper grade without using the probe.
- Without an automatic filter module or light source, SPLITGRADE can be used as a high quality B&W analyser and exposure meter.
- The focus light will be automatically switched OFF after 5 minutes.
- The firmware is easily updated by a free download from our homepage. To do so, you need a PC with Windows, OS X or Linux operating system. If you own an older controller (serial no. starts with 02... or 03... you will need an additional USB-Serial converter to connect the serial interface of the controller to an USB port of the computer.
- SPLITGRADE is the comprehension of our practical experience acquired for more than 25 years

Conclusion

The usage of the SPLITGRADE system enables the production of high quality prints and fine art prints, with a speed and comfort never reached before by any other system.

As this printing system greatly improves printing efficiency, while saving time, chemistry and paper, every photographer will have much more time for creative printing.

Safety advice

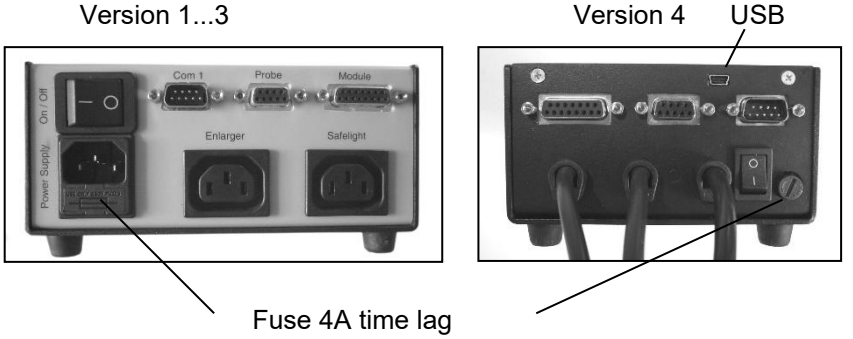
This instruction manual should be read prior to installation and first use.
The SPLITGRADE controller and module contained in this package are intended to operate only with the appropriate enlarger. The type of enlarger is specified on the front label of the package.
To prevent electric shock or fire hazard, remove the power cord from the AC supply prior to connecting or disconnecting any other connector and prior to replacing the fuse.
If one of the AC cables becomes damaged, refer servicing only to qualified personnel.
Should any liquid drop into the SPLITGRADE controller or modules, disconnect immediate the control unit from mains and have it checked by qualified personnel before operating it again.
Unplug the SPLITGRADE controller from the voltage supply, if it is not going to be used for several days or more. To disconnect the supply cable, pull it by the plug. Never pull at the cord. Otherwise the cable might be damaged.
Make sure that the mains voltage and frequency are in the range indicated on the identification label on the bottom of the instrument.
This instrument should only be connected to a properly installed voltage supply outlet that has been properly grounded to earth.
It is not permitted to exchange the power cables for any other without protected ground / earth wire and safety plug.
Always keep the instrument in a dry place and never immerse it in any kind of liquid.
To prevent electric shock do not open. There are no user-serviceable parts inside.
To avoid fire hazard, use only a fuse of the correct type, voltage and current rating as specified in technical data (see page 5).

INSTALLATION

Do not install the set in a hot or humid place or in a place subject to excessive dust. Take care that there is enough working space around the controller to operate it safely in the dark.
All filter modules or enlarger heads, supplied together with SPLITGRADE, are compatible to those of the enlarger manufacturer. Please refer to the user manual of the enlarger regarding the installation of the module or head.

Connecting the system

Fig. 2: Rear view of the SPLITGRADE Controller unit



The controller can be used at voltages according to the id label located at the bottom of the unit.
All connectors, the main switch and fuse are located at the rear side connector panel (see Fig. 2).

First, connect all components to the controller like filter module or filter head, the enlarger and the darkroom safelight. Secure the signal cables by fastening the screws carefully. Please do not apply brute force.
Finally connect the SPLITGRADE Controller to the main voltage supply.
If a motorised filter module is connected, the filters will be moved to an initial position after switching ON. The rotation of the motor may be audible.

Component	**Cable/Plug**	**Label at Controller**
Filter module	15-pin female	Module
Probe	9-pin female	Probe
Splitgrade Comfort	9-pin male	Com 1
Power plug of enlarger	Adapter cable	Enlarger
Darkroom safelight	Adapter cable	Safelight
Main Voltage Supply	Power cable	Power Supply
Foot switch	Jack plug 2.5mm	Foot Switch
PC (only for software update)	9-pin male (Ver 1..3) USB (Ver. 4)	Com 1

Table 1: Connections

Description of the push-buttons

The functions are controlled by push-buttons, the buttons marked by * have an auto repeat function.
One short press changes the value in one step, a longer press will result in a repeated change of the value.

Focus ON/OFF switches the enlarger light on/off,
for setting the enlarger and scanning the picture with the probe.

Start/Stop, starts (or stops) the exposure time shown in the display. The remaining time is still stored and can be recalled by pressing the start button again. If during exposure any button other than the start button is pressed, the exposure will stop and the time will be cancelled. Splitgrade controllers of the first generation are using the upper symbol, those of the second generation the second symbol.

Plus* increases the value marked by the cursor by one step or alters the function.

Minus* reduces the value marked by the cursor by one step or changes the function.

Cursor moves the cursor in the direction of the arrow or to the next line.

Page switches between the pages of the LCD display. Press the key briefly to move forward and longer to move backward.

Foot switch starts (or stop) the exposure.
Probe switch starts and stops the density measurement

Display

All data important for the working of the system are shown in the 4-lines display. The contrast is adjusted by turning a screw (potentiometer), which is accessible through a tiny hole at the left rear side of the controller.

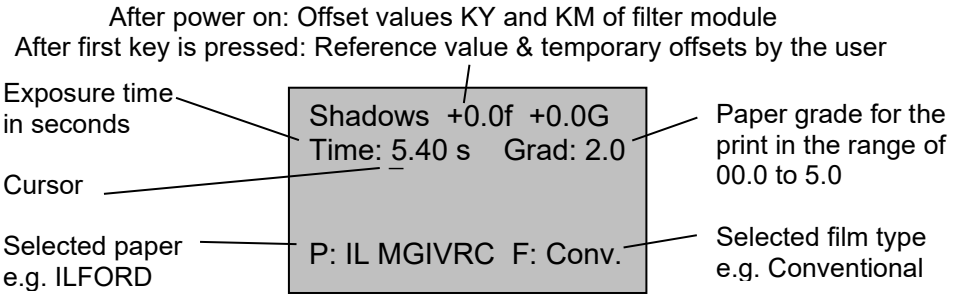
THE QUICK PATH TO HIGH QUALITY PRINTS

In order to profit from the SPLITGRADE system very quickly, please proceed as follows:

Preparation

- Connect the controller following the safety advice on page 9.
- Use a paper and matching chemistry as indicated on page 6 of this manual using only fresh paper and chemistry.
- Do not use old paper or used chemistry.
- Switch on the controller.
  If the filter module and the probe are connected properly, the controller displays the following information for a short while:
  1. Software release
  2. Type of enlarger

Next after the display will look similar like that:



- If you like to change the paper type, move the cursor to P: by pressing the ▷ or ◁ button.

- Start the selection of the paper type by pressing the + or − button. Each time you press the button, another paper brand will appear. Continue pressing or simply hold the “+” or “-“ button until your preferred paper is displayed. Accept the selection by pressing the button ⧉.

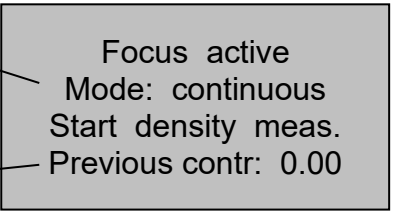
- If necessary, move the cursor to “F”: and change the type of film the same way.

Printing

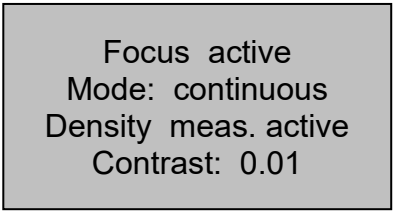
- Put the negative into the negative carrier.
- Switch on focus light by pressing the button
- The following display appears:

Indicates the selected measurement mode (refer to page 16)

The contrast of the previous measured negative

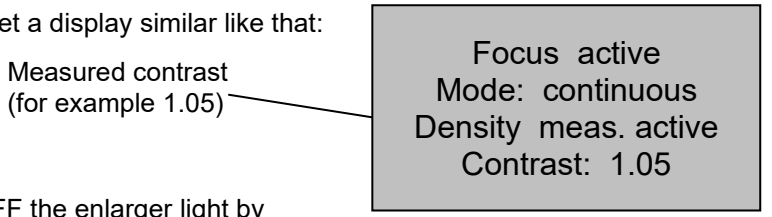


- Set up the magnification and focus the image. Then stop down the f-stop of the enlarger lens.
  Measurement is always done at working f-stop.
- Place the probe into any part of the projected image, taking care that the green window on top of the photo sensor is not covered.
- Start the measuring procedure by briefly pressing the red button on the probe, An intermittent signal sounds and you will have the following display:



- Move the probe over the projected image while looking for the darkest and the brightest areas until the signal stops. Maximum probe movement velocity is 5cm/sec, which is similar to the movement of a computer mouse. The displayed contrast will increase.
  We recommend **not** to measure very small spots like lamps and candle lights, as their contribution is not important for the overall impression of the print but can falsify the measurement resulting in a too soft grade.
- No sound for a longer time indicates that the scan is complete. To stop the measurement, press the red button on the sensor again.

- You will get a display similar like that:



- Switch OFF the enlarger light by pressing the button .
  The display shows the exposure time and the paper grade as calculated by the controller for the selected paper and film type.
  If the beeper sounds 3 times, please check the display and refer to the detailed description in chapter "Warnings".
- After a successful measurement put the paper on the enlarging easel and start the exposure by pressing the button.
- Process the paper.

Result

The lightest and darkest portions of the negative, which have been measured, result in about 90% of the max. density and a light grey print tone. This is what we call a technical correct print. It will satisfy your requirements for a good start in most cases.
The last executed exposure setting is stored during power off.

MANUAL CHANGES

To modify the print according to your taste in art, you may either change the grade and or the exposure time temporary with the buttons ⊞ or ⊟ . The modifications are displayed in the first line of the LCD, so you might return at any time to the original values. A new measurement overrides the changes.

Changing the exposure time

Move the cursor to position Time: to make the print lighter or darker.
Factory setting affects changes in steps of1/10 f-stop, re calculating the exposure time considering the reciprocity failure.
To change that default setting to a linear change in units of seconds please refer to chapter ‘user preferences’.

Changing the grade

Move the cursor to position Grad: and modify the contrast in steps of 1/10 grade. The exposure time will be adjusted automatically to achieve constant

lights, mid grey or shadows – whatever you set in the user preferences.

Fast selection of paper grade 00 or 5

For burning and dodging procedures in the main menu place the cursor in position “Grad.:” Now you may fast change the paper grade to 00.0 by pressing simultaneously the buttons ◁ and −.

A value of 5.0 is selected by pressing simultaneously ▷ and +.

WARNINGS DURING MEASUREMENT

Out of range failures during or after measuring will be announced by a 3 beep signal and displayed as follows:

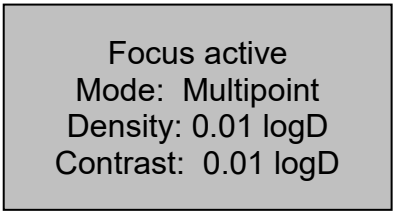
Too much light Start meas. again	The intensity is too bright for the light sensor. Close f-stop and start measuring again
Too little light Start meas. again	The intensity is too low for the sensor. Open the f-stop and start measuring again
Time too long Start meas. again	Calculated exposure time is too long, open the f-stop and start measuring again
Time too short Start meas. again	The exposure time is too short, close the f-stop and start measuring again
Check contrast	The measured contrast is out of the ISO-R range of the selected paper. If you proceed, the print may loosen details, because the paper grade could not get less 00 or more than 5. Another reason might be, that you covered the light sensor or you moved it outside the negative (e.g. to the base plus fog area) while measuring. This results also in a large contrast.

FURTHER MEASUREMENT MODES

To adapt the system best to your needs, there are two more modes available. To select the proper mode switch on the Focus light, then press button +

Multipoint mode and density measurement

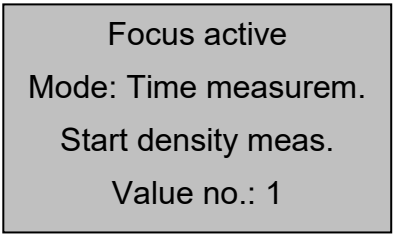
This mode enables a more individual scan, as the measurement is active only when you press or hold the red button in the sensor. So you might continue the measurement in a different area of the print.
First place the sensor at the lightest point of the negative with details, then press the red button of the sensor for about half a second. You will get a display like this:



The 3rd line displays the density in reference to this first point, the last line displays the contrast that is taken into calculation for the paper grade. To check the density of other areas in the negative simply move the probe to these points and read density in line 3. To consider the selected point for the paper grade calculation, press the red button of the probe for a short while. You may also measure larger areas while moving the probe and simultaneously holding down the red button.
To calculate the exposure, release the red button and press .

Time measurement

If there is a lack of black and/or white tones in the negative, you might select time measurement. According to the setting of the reference point (refer to chapter 'User preferences') the system calculates the exposure times to achieve at the measured point(s) either
- lights with small details
- mid grey
- 90% maximum density selected



The paper grade is not modified by the measurement and might be preset before or altered after the measurement.

Suggestions for settings in special cases

Portraits
- Reference: Mid Grey
- Measurement mode: Time measurement
- Paper grade: Set manually

White egg on white plate
- Reference: Lights
- Measurement mode: Time measurement
- Paper grade: Set manually

Black dog on black coal
- Reference: Shadows
- Measurement mode: Time measurement
- Paper grade: Set manually

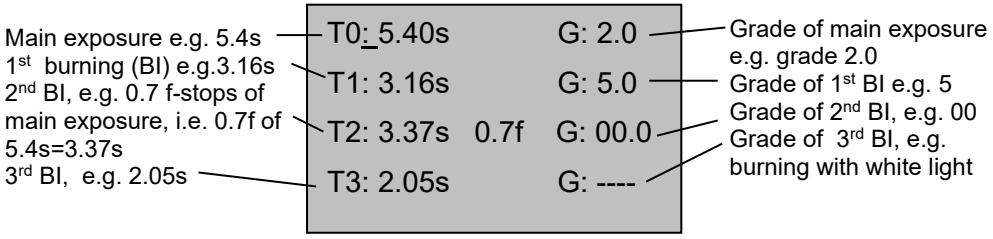
Same tone range for different enlargement scales
If you like to get the same tonal range for pictures of different magnification, you should always select the same points while measuring.
If you clip a part of the negative and the darkest and the brightest points are not situated in the area to be printed, please measure also outside the baseboard to secure correct reference values for calculation of the paper grade and the exposure time.

DODGING AND BURNING / FLASHING AND FOGGING

Your SPLITGRADE has a very useful burning function. It enables you to store up to 7 independent burning times, thus building up an exposure sequence together with the main exposure time. The main exposure is automatically followed by the burning exposure.

Setting Up

To enter the proper menu, press the key ⧉ several times. If the controller is in the main menu, you need to press that key only once.



In line 1 (T0) the calculated (main) exposure time and grade are listed.
If you change these values, please pay attention to the fact that the time and grade in menu 1 are also altered accordingly.
To select the time or grade of a burning time move the cursor to the entry by pressing the ◁ or ▷ button until the cursor appears in the desired position. The display toggles automatically between Times 0 to 3 and 4 to 7 while moving the cursor.

Altering the values of the time and grade is done by pressing ⊕ ⊖or
By pressing both keys simultaneous, you alter the mode of the burning time, which is actually marked by the cursor. You may decide if the time should be independent of the main exposure (in the above example T1 and T3) or should be adapted to the main exposure in units of 1/10 f-stop (in the above example T2). This feature could be selected for any of the burning times. The advantage of the adapted f-stop method is, that after a change of the enlargement scale, you only have to measure the main exposure time again and the whole burning sequence is adapted to this new time.

If you have entered all the times and grades for a special sequence, set the cursor to the first unused burning exposure time. Press and hold ⊖the button in order to change this time to 0.00s or 0.0f-stop. This signals the end of defining the exposure sequence to the controller.

Exposing

Example: You like to use the main exposure and two additional burning times as well. The values T0 and G0 are the main exposure, values T1 / G1 are the first burning and T2 / G2 are the second burning time. Define these values first. Then set T3 to 0.00s.

Go back to time T0, by using button ◁. To start the exposure sequence press the button. . After any exposure, the cursor moves on to the next line and the according burning time can be started by pressing again.

The whole sequence is terminated after the last programmed (maximum 7) exposure has been executed. Then the cursor moves back to time T0.

You may stop and continue an exposure by pressing again or you can terminate the whole sequence at any time (also while exposing) by pressing any other button.

Between the single steps of the sequence you may turn in the red (safe light) filter in front of the lens and switch on the focus light in order to search for areas that should be dodged. The focus mode will not terminate the exposure/burning sequence.

Of course, you may also select only one of the burnin times and start it by pressing the button. To quit the burning function press the button

All settings will be stored automatically when you leave the burning menu.

Burning with white light

For any of the burning times 1-7 you may select white light exposures by setting the paper grade between 5.0 and 00. The display "---" indicates the while light mode. To return VC mode select any paper grade.

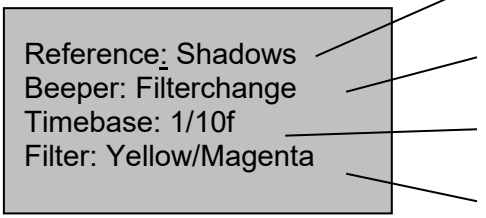
Flashing and fogging

By using an optional light source supplied by Heiland you may flash and fog the paper. This system can be added to all controllers starting with serial no. 03 and higher. To start the function please press buttons ◁ and ▷ simultaneous. In the next menu choose the exposure in units of 1/10 f-stop and use button to start and interrupt the exposure. The button serves to quit the paper flasher function, while all other buttons stop a running exposure.

USER PREFERENCES

You may change the settings of the controller according to your needs. The actual setup will be stored when you leave the menu.

For modification press the button, until you get the following display :



Selects the reference point for manual changes of paper grade

Changes the beeper mode to Metronome, Filterchange or Off

Toggles the time base between 1/10 f-stops and units of one second

Changes the filter sequence from Yellow/Magenta to Magenta/Yellow

To move the cursor to an entry please use or , while buttons or change the setting

Reference point

Before you change the paper grade please determine which tonal value area shall stay stable.

Shadows: The shadows will stay constant at about 90% Dmax (default)
M*id grey:* The mid grey value (approx. zone V) will stay constant
Lights: The light portions of the print will be unchanged

Beeper

Metronome: While the exposure time is elapsing, a short signal is emitted every second.
Filter change: 1 sec. before the filter changes a long signal is produced.
Off: No signal during the exposure time

Time base

The time base can be altered between 1/10 f-stop and units of a second. Using the f-stop mode, the increase in print density for every 1/10 f-stop change is always the same, independent of the start time. Moreover, changes are faster if the exposure time is long. Changing the time in units of a second adapts the step size dynamic to the exposure time and uses step sizes of 0.01 / 0.1 / 1 second, depending on the absolute exposure time. A quick change of exposure time is possible, by pressing and holding the **+** or **–** button. This mode is provided for photographers, who do not like to work with 1/10 f-stops.

Filter sequence

Altering the sequence of filters is very helpful for burning and dodging purposes. You might change between Yellow/Magenta and Magenta/Yellow. In case of using a LED cold light sources Green/Blue and Blue/Green are also available. This enables to locate the area that should be dodged in one light phase and to start dodging after the colour changes.

PERMANENT OFFSETS FOR EXPOSURE

Press the button until you get the following display:

Please note, that line 3 and 4 are displayed only when a film developer causing stain is selected in the main menu

Exposure time

If, due to changes in the paper emulsion, your darkroom conditions, the kind of images or your perception of your prints are generally looking too bright or too dark, you may compensate this by adapting the exposure time. Press the or button until the cursor is at position: **Offset Time**.
Press the button or to change the exposure time in 1/10 f-stops. For special applications like “Lith printing” the range of exposure time offset is +/- 4 f-stops. The setting for the grade is not affected by these changes.

Paper grade

In case your prints are in general too hard or too soft, you may change the grade setting.
Press the ◁ or the ▷ button until the cursor is at position: **Offset Grad.**
Using the + or the − button you can change the setting in 0.1 grade steps.

Films with a stain

To compensate for the stain, you might increase the paper grade and the exposure time. Just not to mix up these offset values with the paper specific offsets, another two lines are displayed, when choosing 'Tanol', 'Finol' or 'Pyrogallol" developed films. The entered offset values are added to the paper specific offset values, e.g. the total exposure time is calculated by adding 'Offset Time' and 'Comp.Stain' to the measured exposure.

Please note:

- All offsets are stored, when you leave the menu by pressing ▯
- For every paper separate offsets could be chosen. Resetting the values to factory calibration is done by selecting 0.0.
- By using these offsets, you can easily adapt Splitgrade to your personal requirements or to modified paper processing.

TEST STRIP MODES

To print a test strip, enter the menu by pressing the button several times.

SPLITGRADE offers 3 different test strip modes for various purposes. One mode alters the paper grade and two others alter the time by using separate exposures or additive exposure times.

You may choose between centering the exposure around the preset values or just creating a test strip which is only lighter or only darker than the preset value.

Within every test strip mode you have the flexibility of setting the total number of test strips (parameter 'Count') as well as the step size or width.

Modes 'Time Separate'

Each exposure is done by the complete calculated time. That mod requires the masking of all but the exposed step or to use single strips of paper. The paper grade is unchanged. Available modes are:

Time sep-: Test strip created from a light exposure up to the preset value
Time sep : Test strip centered to the preset value
Time sep+: Test strip starting at the preset value with increasing time

Mode 'Time Additive'

The first exposure illuminates the whole test strip, then the user places the mask and shifts it from left to the right for any subsequent exposure. The paper grade is fixed to the preset value. Available modes are:

Time add-: The most right area of the strip represent the preset exposure, all others are lighter
Time add : Test strip with the preset value in the center of the strip
Time add+: Test strip starting at the preset value with increasing time

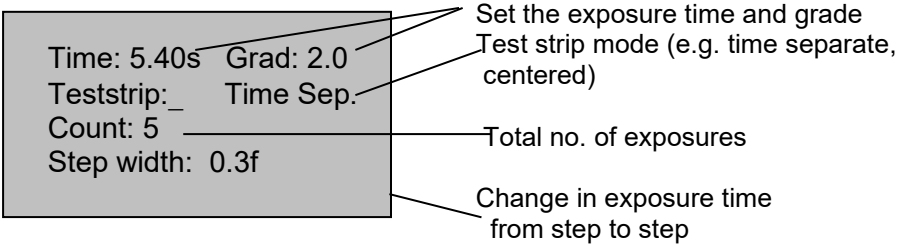
Mode 'Grade'

Each exposure will vary the contrast by the setting of "Step width" . This mode requires the masking of all but the exposed step or using single strips. The exposure adjusted according to the reference point set in user preferences. Available modes are:

Grad- : Test strip created by paper grades softer and equal to the preset grade
Grad : Test strip with the preset grade in the center of the strip
Grad+: Test strip starts at the preset value and increasing the grade with any subsequent exposure.

As in any other menu move the cursor by using the buttons
Alter the value that is indicated by the cursor with buttons.

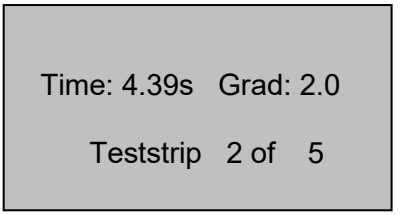
Example



After you have defined all necessary values, and press the button to start the first exposure.
The display will show the actual time and grade while exposing.

In the example five strips are generated with a paper grade of 2.0 and the following times: (first exposure) 3.40s / 4.29s / 5.40s / 6.80s / 8.57s (last exposure). Each exposure will be started after pressing the button .

While doing the various exposures, the controller display is similar to that:



Switching on the focus light with the button could be useful to check the position of the mask, of course with the red filter moved in front of the lens.

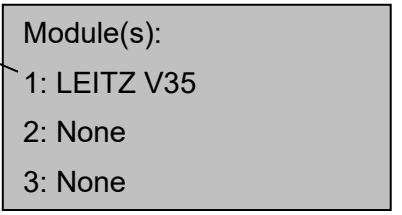
The whole exposure sequence of the test strip is cancelled by pressing any other button. While leaving the menu you can enter the number of the correct test strip and Splitgrade calculates immediate the proper exposure values.

CONTROLLING UP TO THREE DIFFERENT ENLARGERS

You may use different types of enlargers / modules with only one controller. To set up and select the module type, please proceed as follows:

1) Switch off the controller and connect the new filter module.
2) Press the button while switching on. Hold it until the following display appears.

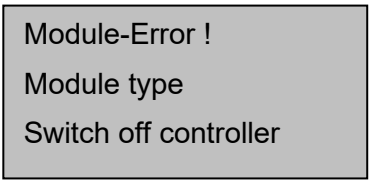
In the first line the original delivered module is displayed, e.g. Leitz V35.



3) Move the cursor to one of the three lines by using buttons and select the module type with the button or .
ATTENTION: Modules for enlargers AGFA Varioscope, Leitz Ic and IIc may use Dunco or Kienzle light sources, so please select the appropriate one in that case.

4) By pressing the button you may toggle between the described menu and a menu that enables to enter filter offset values for yellow (green) and magenta (blue) filters. If you have so far used values in % or you do not know the offset values, please contact Heiland electronic to receive the values in units of 1/10 f-stop. Furthermore you may enter delays from switching on the enlarger output until the shutter is opened and vice versa. One application might be the usage of a stabilised transformer which needs more than 0.5 sec. until the lamp switches on.

5) Finally select the required enlarger or module type by moving the cursor in the corresponding line and press the button . If Splitgrade should be used as a timer only, select the module type “None”.
In case the controller displays an error message please check if the correct module is connected and selected and repeat power on procedure.



USING THE CONTROLLER AS AN ANALYSER (SPL-M1)

The controller of the SPLITGRADE system can used as a B&W analyser and timer in conjunction with enlargers for which there is at present no motorised filter module. The version with order code SPL-M1 is already set to this manual split exposure mode.
Prior to working, the controller need to be calibrated in reference to your enlarger. An instruction for calibration is available from the manufacturer. Please mention the type of enlarger and light source when ordering. To use the manual split exposure, proceed as follows:

- Install and set up the controller according to the description on page 9.
- If you have not purchased the SPL-M1 version, follow the instruction on page 25 to set the enlarger type to ‘Manual’.
- Select paper and film type.
- If using a colour or multigrade head on the enlarger, set to white light. Otherwise remove all filters from the light path.
- Switch the enlarger light ON by pressing the button
- Select the f-stop in order to achieve a exposure time of at least 5s. This will reduce the effect of lamp start-up and after-glow on the exposure
- Measure the exposure and grade as described on page 13
- Terminate the measurement by pressing the button again
- Press the button and select the displayed filter type. On the colour or multigrade head dial maximum magenta or yellow; otherwise insert grade 5 or grade 00 filter in the light path.
- Start the first exposure by pressing the button
- Remove the inserted filter or select filter position 0 and select the second filter as displayed in the controller display
- Start the second exposure by pressing the button again.
- The image has been exposed by using two different filter settings according to the split grade method.

CARE AND MAINTENANCE

CAUTION:

To prevent electric shock do not open the instrument. There are no user serviceable parts inside.

Any unauthorised opening or servicing invalidates the guarantee.

Changing the fuse

The fuse is located in a fuse carrier on the rear side of the instrument (please refer to Fig. 2, Page 10 . To change the fuse, remove the main power supply connector and open the fuse carrier by using a small screwdriver.

!!! Use only fuses with a rating of 4A time lag!!!

Care of instrument

The case should be cleaned with a lightly dampened soft cloth or chamois only, if necessary with the addition of a mild cleaner.
Do not use solvents or abrasive materials.
The probe should be cleaned only with a soft brush or compressed air to remove the dust. Otherwise the light sensor might be damaged permanently.
Unplug the instrument when not in use for long periods of time.
For necessary repairs send the instrument to the manufacturer or authorised service centre.

APPENDIX: DETAILS OF FILM AND PAPER PROGRAMS

The controller is factory-equipped with programs controlling the exposure time and grade for a given combination of variable contrast paper and negatives of a certain kind.
These programs may be adjusted from time to time according to the current characteristics of commercially available papers and films.

Program adjustment for films

Classic B&W films: The setting 'Conv.´ covers all conventional silver halide films as long as the film base does not show any peculiar colour, which could influence the measurement of the time and the grade.

Chromogenic B&W films: These films are modified colour films, processed in C41 chemistry mostly by professional labs.

Detailed tests show that despite the strictly standard C41 developing process, the tint of the film might differ. As these differences can imply non-predictable differences in exposure time and grade, the measured values can only be a clue which should be adjusted if necessary.

Another peculiarity of chromogenic film is its reaction to different exposures. In the same way as for silver halide films, the best results are obtained when the exposure is done with enough light. The reduction of the ASA setting by about a half or a quarter improves the details in the shadow areas of the print and yields finer grain.

The contrast of the negative changes with the exposure value: with increasing exposure the contrast becomes higher with the result that doubling or quadrupling the ASA value yields negatives which are hard to print.

For all these reasons the programs for chromogenic films are provided with a compensation for the different modes in which the film was exposed. They are collected in the groups **”N”** for normally exposed film, **“+”** for longer and **“–“** for shorter exposures.

If you do not know the exposure mode for a given film, start with the adjustment **“N”**. If the result is too light try again with the **“+”** setting , if they are too dark, try it with the **“–“** setting. If you are not able to get satisfactory results, try to use the "General corrections” (see page 21).

Films containing a stain
Fine art printers appreciate the improved details in the highlight sections of a print caused by the stain of the film. Special developers like Pyrogallol, Tanol and Finol may be used to get that stain.
On the other hand, the photographer needs to adjust the selected paper grade and exposure time to get acceptable print results. In most cases it is necessary to raise the paper grade by approx. +0.5 to +1.0 and to increase the exposure time by about half of an f-stop.
No exact values could be recommended here, but every photographer will know the approximate values for his process. These offsets could be entered separate from the basic paper specific settings if the users selects either 'Finol', Tanol' or 'Pyrogallol' as the film type. Of course we know, this is not a film type, but the selection of these special developers fit best in the section of film types. Please refer to page 22 for details.

Paper programs

The papers listed in Table 1 have been tested with glossy surface and were developed in a tray, strictly following the recommendations of the manufacturers, including the kind of chemicals used and developing time. The prints were dried with hot air at 60°C.
Papers with a matt surface share the same emulsion as glossy papers. Never the less, you might add small offsets to adjust the appearance of the print according to the reduced maximum density.

Note: The use of long stored materials, paper or developer, or varying the instructions of the manufacturers, may change the results you can expect.

FURTHER PRODUCTS OF HEILAND ELECTRONIC

Densitometer
High precision monochrome densitometers useful for all tasks in general B&W photography, Microfilm applications and repro companies.

TAS film processor
Processes your film tank by revolving and inverting the film tank followed by a phase of stand still. That kind of processing is identical to the classic film processing and ensures best results. Setup of the parameters is very simple, thus the TAS could be adapted to the users preferred process.

LED cold light source
Useful for B&W and colour processes. This modern light source is available for almost all enlargers and negative sizes from 35mm up to 20x24 inch.
Various control units are available adapting to Splitgrade and any given Analyser or timer.

If you like to receive further information about our products, please refer to our website https://heiland-vision.com

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