KARON lettero
for color and printing

lettero color matching

Fogra cert
Viewing Cabinet | 31431

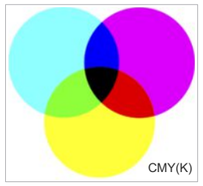
our devices have FOGRA certificate confirming ISO standards

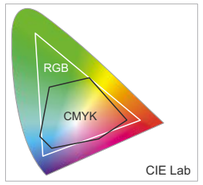
ISO

Manufacturer: KARON
Lazisko 116, 97-200 Tomaszow Maz., Poland
ph. +48 44 724 26 19, office@karon.eu, www.lettero.com.pl

LETTERO COLOR MATCHING

The program LETTERO COLOR MATCHING provides optimal conditions for assessing and measuring of color on all types of workstations in accordance with the requirements of ergonomics and ISO lighting standards.





COLOR MANAGEMENT

The color impression is formed by the stimulation of the eye cells by light of different wavelengths corresponding to the three additive primary colors of RGB color model.

In the printing process a color image is created in the devices which are a source of light themselves (monitors) and on analog prints viewed in reflected light. In the former case, the color impression is formed under the influence of light emitted by the device of the above-mentioned three colors of RGB color model, i.e. the so-called **RGB color space**. In the latter case under the influence of achromatic light (R=G=B), filtered through complementary CMY colors and achromatic black (K), in the so-called **CMYK color space**.

Within each of such spaces it is possible to obtain a different range of colors, known as color gamut. Also, each device and each printing technique is characterized by its own limited color gamut, resulting from technical parameters (eg. the properties of the printing substrate). For instance gamuts of monitors are poorer than the range of colors distinguished by the human eye, and gamuts of the printing devices (CMYK) are poorer than the color gamut of RGB monitors. For this reason, it is not possible to achieve the perfect color reproduction, but only the most similar colors.

For optimal color reproduction all the colors that the human eye can recognize are defined in the device-independent color space CIE Lab whereas ICC (International Color Consortium) introduced the tables called **color profiles** associated with each device and printing technology to allow the color conversion between the gamuts of different devices and matching with the most similar counterpart.

Color management technique is used for converting by CMM modules (color management modules) the colors between the color spaces of individual devices via the Lab (PCS). **This technique is not perfect and there are always differences between the original colors and the colors of reproduction.**

COLOR MATCHING

We can see an analog image (e.g. print on paper) because it reflects the light from another source. How we perceive a color depends not only on the properties of such an analog image but also on the composition of the incident light. It affects even the impression of colors displayed on the monitor screens illuminated by a spot light. If the same image is illuminated by the light of different composition (different color), every time the reflected light will also be different therefore every time we will perceive different colors of the same image.

Even the best color management technology does not automatically ensure a perfect color reproduction, and there is always a need to assess the differences between the original colors and the colors of the test print and make adjustments before starting the print-run. This process is called **color matching**. The assessment of differences is performed visually and with the help of measuring instruments. The principle of color matching is making comparisons of the color under the same conditions at all stages of printing production.

Since in practical applications the parameter defining the spectral composition of the light source is its color temperature, the only solution that provides professional color quality control is to illuminate all workstations with the light that is identical with the test color temperature and to isolate such workstations from the influence of other incident light sources.

The figures show the same photograph illuminated with white light, and three light sources with a slightly altered color temperature.

Lettero and ISO norms

The following illuminants are installed in the lettero devices:

- D50 daylight 5000 K,
- D65 daylight 6500 K,
- A incandescent light 2800 K,
- TL84 fluorescent light 4000 K
- UV ultraviolet light.

The standards for lighting were established over decades by the International Commission on Illumination (CIE). The market now includes a new generation of LED light sources with different characteristics causing the differences causing differences mainly in the evaluation of metamerism.

All of the light source used in the color matching lettero meet the requirements of ISO 3664 and 11664-2, as well as industry standards applicable in the EU and are painted in neutral colors according to the recommendations of these standards (N7 or N8 Munsell scale).

Lettero devices can be equipped with remote control (RC - remote control).

N7	N8

Illuminators PVB

Profi view box (PVB) illuminators allow an objective assessment of the color on the analog originals and test prints (proof) in the computer image processing and printing products designing and are used for work at computer stations which are not protected from incident external lighting.

All models of the PVB illuminators are equipped with light sources of the test temperature of 5000 K, 5500 K, 6500 K (D50/D55/D65), depending on the model, with the lighting regulation and side curtains protecting the evaluated original from incident external light. The curtains can be dismantled. PVB LED 501/3 C can be delivered with carrying bag (optional).

The offer includes models from the simplest PVB with mechanical switch for fully professional models equipped with 3 light sources, smooth light intensity adjustment, side curtains, height and tilt adjustment and light source use time counter (full offer at www.lettero.com.pl).

The following table shows examples of PVB models.

PVB 501/3 PRO

PVB 501/3 C PRO have FOGRA certificate confirming ISO standards

PROFI VIEW BOX ILUMINATORS - PVB		
PVB LED 151 ONE	D65, mechanical switch	190x200x340
PVB LED 151 C	D50 or D65, membrane switch, side curtains	190x200x340
PVB LED 251/1 C	D50 or D65, membrane switch, side curtains	325x200x430
PVB LED 251/2 C	D50 + D65, smooth light intensity adj., membrane switch, side curtains	325x200x430
PVB LED 501/3 C	D50 + D55 + D65, smooth light intensity adj., membrane switch, side curtains, height and tilt adjustment	480x200x440

PVB LED 151 ONE | PVB LED 151 C | PVB LED 251/1 C | PVB LED 251/3 PRO | PVB LED 501/3 C

PVB control panels with one, two or three light sources and adjustable light intensity.
Models PVB PRO have light source use time counter.

Color Matching Boxes CMB

Color matching box (CMB) Illuminator are used for evaluating the colors of the objects, eg in design studios, laboratories and sales departments in the consumer goods industry, and above all in the of packaging and processing ennobling, CMB are equipped with five light sources:

- D50 daylight 5000 K,
- D65 daylight 6500 K,
- A incandescent light 2800 K,
- TL84 fluorescent light 4000 K,
- UV ultraviolet light.

CMB 70 has FOGRA certificate confirming ISO standards.

E - electronic control panel with LCD display

Remote control (optional)

Control panels for CMB

CMB LED 100/5

CMB LED 70/5E

CMB LED 100/5E
CBU 13 SL 100
K/SSR on rack

CBU13 (A3), CBU14 (A4)

CBU23 (A3), CBU24 (A4)

CCS-CMB 160
CCS station with CMB

Color Match Box - CMB Illuminators		
CMB LED 70/3	3 light sources, LED indicator of light sources wear	700x450x600
CMB LED 100/3	3 light sources, LED indicator of light sources wear	1000x500x600
CMB LED 70/5	5 light sources, LED indicator of light sources wear	700x450x600
CMB LED 100/5	5 light sources, LED indicator of light sources wear	1000x500x600
CMB LED 70/5 E	5 light sources, electronic control panel	700x450x600
CMB LED 100/5 E	5 light sources, electronic control panel	1000x500x600
Accessories (optional)		
CBU13 (A3), CBU14 (A4)	hinged worktops	angle (0, 20, 45, 50)
CBU23 (A3), CBU24 (A4)	hinged worktops	angle (-15, 0, 15, 30, 45, 60, 75)
S 100	rack for CMB 100	1000x600x700/1200

Racks symbols: K - frame on wheels; SSR - height adjustment

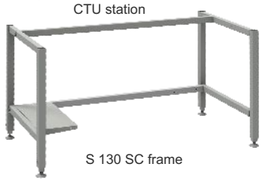
Computer workstation CTU

CTU color control unit stations are designed to work in a seated position in the design studios and computer imaging studies and preparation of publications, where the constant evaluation and comparison of the colors of the analog originals or a test print (proof) with colors generated on computer screens is most important. Optimal working conditions are ensured by the illumination of the test temperature and the possibility of almost total isolation of the working space from incident spot light.

CTU units are intended to be mounted on existing standard desks and worktables or with dedicated space for computer.

Options: C - curtains, UM - monitor holder, S - frame, SK - frame with keyboard tray, SC - computer shelf, SSR - feet with adjustable height, E - electronic control panel with LCD display

CTU station



S 130 SC frame

Control panels for CTU stations

CTU LED 130 E C/S130/SC/SK

Model	CTU LED 130	CTU LED 160	S 130	S 160
Dimensions SxGxW	1300x810x1060	1600x810x1060	1300x760x720	1600x760x720
Working table	1290x650	1590x650	height	height
Light temperature	5000 K	5000 K	adjustment	adjustment
Light source	D50	D50	every 50mm	every 50mm
Side curtain (optional)	+	+		

Measuring Tables

Options:
SC
SK
BP
UM
SSR
SM

CCS-P 130 SC/SK/BP/UM

Options:
SC
SK
BB
SSR

STP 130 SC/SK/BB/SSR

CCS-P measurement stations are simplified CCS stations designed to work in rooms lit by light sources with a tested color temperature (eg lettero LCL).

Model	CCS-P 100	CCS-P 130	CCS-P 160	ST-P 130	ST-P 160
SxGxW	1010x810x1200/1500	1300x910x1200/1500	1600x1040x1200/1500	1300x810x750	1600x810x750

Color Control Station CCS

CCS color control stations are designed for stand-up work and control of the printing process normally performed in print halls (but also in research laboratories, textiles, cosmetics, dyes, etc.). Optimal working conditions provides light at the tested temperature (D50 and/or D65, fluorescent light source or LED) and the possibility of almost completely isolating the work area from the influence of local lighting.

CCS stations are equipped with numerous accessories and are mounted on the racks and drawer or cabinet bases.

Options: C - side curtains, UM - holder for a computer monitor, BM - standard worktop, S - frames, „A", „B", „C" - bases, SK - keyboard tray, SC - computer shelf, US - spectrophotometer holder, OUS - rotating holder for X-Rite spectrophotometer, E - electronic control panel with LCD display

CCS LED 130 E "C"/C/BPB-1/2/US/UM/SK
CCS 130 stations have FOGRA certificate

Two-modules control station
CCS-D-SZ on cabinet base with
inclined top and spectrometer carriage

Two-modules control station CCS-D-ST
on frame with shelf

BU
hinged worktop

BP
measuring worktop

BS
inclined worktop
with full backlight BSB 1
with half backlight BSB-1/2

BPB
measuring worktop
with ifull backlight BPB 1
with half backlight BPB-1/2

Holder for Minolta meter

Station with inclined
worktop BS on rack

Station with hinged
worktop BU on rack
with a drawer and shelves

Station with measuring
worktop BP on rack

Station on base "A"
with inclined worktop

Station with hinged
worktop on base "B"

Station with hinged
worktop on base "C"
with front courtain CF

Model	CCS LED 100	CCS LED 130	CCS LED 160	CCS LED-D-ST	CCS LED-D-SZ
External dimensions	1010x810x2090	1300x910x2130	1600x1040x2090	2570x1350x2090	2570x1350x2090
Board	950x890	1240x890	1540x890		
Working table	950x690	1240x790	1540x910		
Source of light	D50/D65	D50/D65	D50/D65	D50/D65	D50/D65

CCS LED 130 stations have FOGRA certificate confirming ISO standards.

CCS-SP large format control and measuring stations

CCS-SP color control station is designed for visual assessment and color measurement using a spectrometer on the prints of different format sizes made in any printing technology.

The station consists of lamp (lamps) with a test temperature of 5000K (D50 - LED or fluorescent lamp), inclined worktop which allows comfortable work in a standing position, trolley with removable handles for different types of spectrometer, holder for the computer monitor connected to a spectrometer and several versions of frame.

CCS-SP color control stations are produced in four sizes with different width of the worktop. Calibration holes in the worktop are only required for older types of spectrometers and are available on request.

The frame is equipped with levelling feet or wheels (front wheels with brakes). Drawer sections B1 can be mounted in the frame.

Equipment:

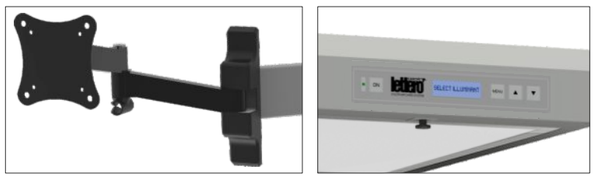
K - wheels; US - holder for spectrofotometer, OUS - holder for spectrofotometer X-Rite, LD - lower lamp, C -side courtain, C - side sourtain, E - electronic control panel with LCD display

CCS and CCS-SP control panels

CCS-SP LED 1600 E SS-B1-3/K/OUS

Rotated spectrophotometer holder for X-Rite exact

Monitor holder

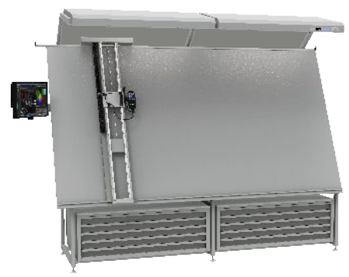


Lamp control panel

CCS-SP LED 1600 KC

CCS-SP LED 1800 C/SS-3

CCS-SP LED 2200 K/SS-2



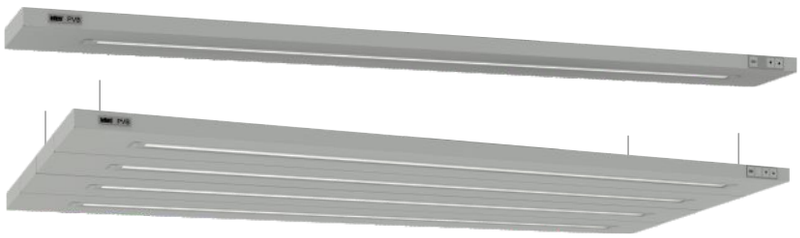
CCS-SP LED 2800 2xSS-5

Model	CCS-SP LED 1600	CCS-SP LED 1800	CCS-SP LED 2200	CCS-SP LED 2800
Working table	1600x1500	1800x1500	2200x1500	2790x1500
Measuring field	1200x1500	1400x1500	1800x1500	2400x1500
Height	2345	2345	2345	2345
Light	D50	D50	D50	D50

Versions of frames:
- CCS-SP frame
- CCS-SP-SS frame with drawers
- CCS-SP-K frame with wheels
- CCS-SP-K/SS frame with wheels and drawers

Wall and ceiling lamps

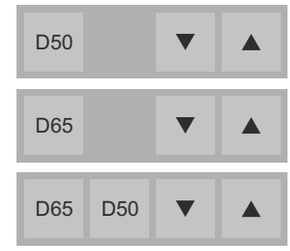
General lighting lamps are used to illuminate entire rooms, workplaces or production lines.



Modular lamps LML LED				
Symbol	Dim. W/D/H	Power	Sets	Vol. adjusting
LML LED 100	1000x100x25	50 W	up to 6 modules	+
LML LED 130	1300x100x25	75 W	up to 6 modules	+
LML LED 160	1600xx100x25	112,5 W	up to 6 modules	+

LML LED

LML LEDs are modular LEDs lamps designed for creating sets and be hanged under the ceiling or on wall consoles.



LML LED and LWL LED control panels

Remote control (optional)

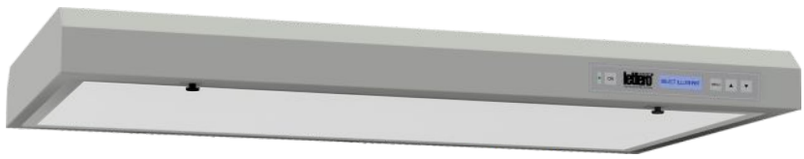
LWL LED

LWL LED lamps are designed for wall mounting and lighting of wall work stations, as well as information boards and exhibits. Optional fittings include side curtain isolators and metal display boards.

LWL LED wall lamps			
Symbol	Dim. W/D/H	Illuminant	Vol. adjusting
LWL LED 100	1000x600x25/120	D50/D65	+
LWL LED 130	1300x600x25/120	D50/D65	+
LWL LED 160	1600x600x25/120	D50/D65	+
Height of the lamp/lamp with bracket			
Whiteboards MWB			
Symbol	Dim. W/D/H		
MWB 100	1000x700x35		
MWB 130	1300x900x35		
MWB 160	1600x1150x35		
Side courtains C			
C 100 - 600x700, C 130 - 600x900, C 160 - 600x1150			

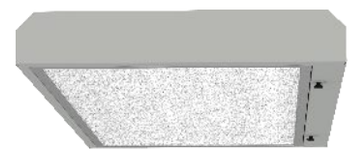
LCL / LCL LED

LCL lamps are compact lamps equipped with fluorescent tubes or LED strips of the tested color temperature of light, designed to hang from the ceiling.

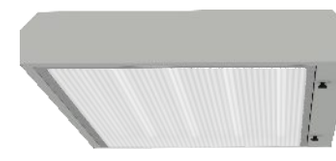


LCL control panels

LCL compact ceiling lamps			
Symbol	Dim. W/D/H	Difuser	Power adj.
LCL 130	1240x650x90	tube	+
LCL 160	1540x650x90	tube	+
LCL LED 100	950x650x90	prism	+
LCL LED 130	1240x750x90	prism	+
LCL LED 160	1540x750x90	prism	+



LCL with prism diffuser for LED lamps



LCL with tube diffuser for fluorescent lamps