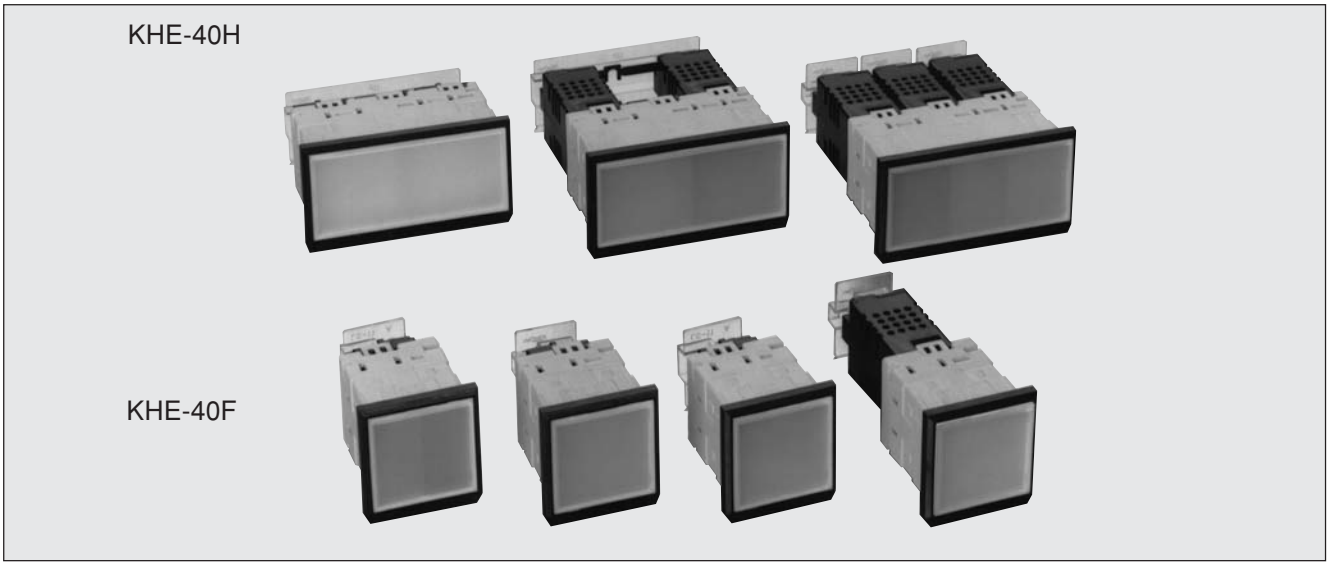
LED Square Lights

KHE-40F/H Series



■ Features

- The LED unit is commonly used under AC and DC. The 48V specification has been standardized as well as the 24V specification.
- Five vivid lighting colors available: Milky white, red, green, orange and yellow.
- The LED unit is of the detachable structure and can be easily replaced from the front surface.
- Using the dedicated converter realizes wide range of applicable voltage.
- Inclined lighting surface unit is available for installation at overhead locations. (KHE-40HN)
- The terminal protection cover can be attached. (Optional)
- RoHS directive compliant.

NOTICE

- The LED works on a few mill amperes. Measures are taken to this product against induction problems, however, be aware in the circuit designing that the LED may be unintentionally lit if used in a circuit with significant induced or leakage current.
- The 48V LED unit is used for the 110V and 220V lights. The 24V unit cannot be used.
- Lighting colors can be changed by replacing the LED unit and color filter, but not by replacing only the color filter.
- For the full window lighting of KHE-40H, two of the two-split same color units should be used.
- The mounting clamp (CA-12) must be used at the opposing corners. (Recommended torque: 0.4 ~ 0.5N·m)
- Do not short-circuit the output of the converter EC-40 with the voltage applied across the input. Doing so may cause internal heating.
- Because a semiconductor element is used in the converter EC-40, it may be deteriorated or damaged when used in a circuit with switching or induced surges. For the countermeasures, a surge protection element such as a varistor or a surge absorber should be connected across the terminals.
- Unless otherwise mentioned, all dimensions are indicated in “mm” in this book.

■ Model Designation/40F

KHE-40F ※1 - ※2 ※3

- ※3 — Lighting Color
- ※2 — Rated Voltage
- ※1 — Lighting Method
- KHE-40F — Model Name

※1

Code	Lighting method
A	Single-color lighting for one full window
B	Two-split lighting for left/right on one full window with a separator
C	Two-color lighting for one full window in combination of red with another color

※2

Code	Rated Voltage	Remark
4	24V	All-voltage type
6	48V	
8	110V	With converter (EC-40)
U	220V	

※3

Code	Lighting Color
HW	Milky white*
HR	Red
HG	Green
HO	Orange
HY	Yellow
H□+H□	Lighting method B
HR/H□	Lighting method C Red and another color

* The milky white is the similar color to that of incandescent lamps.

- Only 110V DC is available for the two-split or two-color lighting with converter.
- Simultaneous lighting on the right and left sides is disenabled with the two-split light (Lighting method B) with converter.
- Simultaneous lighting in two colors is disenabled with the two-color light (Lighting method C).
- The LED unit with converter is of the 48V voltage specifications.

●Designating lighting colors

Lighting method A: Designate (by **HW**: Milky white, **HR**: Red, **HG**: Green, **HO**: Orange, or **HY**: Yellow) for the lighting color.

Lighting method B: **HW+HR**

- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the lighting color on the right as viewed from the lighting surface.
- Designate by the "+" symbol for the Lighting method B.
- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the lighting color on the left as viewed from the lighting surface.

Lighting method C: **HR/HG**

- Designate (by **HW**, **HG**, **HO** or **HY**) for the lighting color other than Red.
- Designate by the "/" symbol for the Lighting method C.
- Red (**HR**) only.

■ Ratings / 40F

Rated Voltage			24V AC/DC	48V AC/DC	110V AC/DC With Converter (EC-40-8)	220V AC With Converter (EC-40-U)
Operating Voltage Range			21.6 ~ 26.4V	43.2 ~ 52.8V	90 ~ 121V	180 ~ 242V
Rated Current	Full Window	Single-color (Lighting method A)	15mA			
		Two-color (Lighting mehtod C)	15mA			————
		Two-split (Lighting method B)	15mA × 2		————	

■ Specifications / 40F

Insulation Resistance	100MΩ or more between live parts and ground measured by 500V DC megohmmeter
Withstand Voltage	2000V AC for 1 minute between live parts and ground
Temperature Resistance	For 1 hour at normal temperatures after 2 hours at -40°C, and 1 hour at normal temperatures after 2 hours at 70±3°C
Humidity Resistance	Normal insulation resistance and withstand voltage after being left for 24 hours in a cycle of 55±2°C and 25±3°C under 93%RH
Vibration Resistance	3-dimensional vibration of amplitude 1.5mm and frequency ranging 10 ~ 55Hz for 1 hour with a sweep time of 1 minute
Shock Resistance	3-dimensional shock of 500m/s^2 to 6 surfaces, 5 times
Operating Environment	Temperature: -10 ~ 40°C, humidity: 45 ~ 85%RH (No freezing or condensation)
Reverse Voltage	400V
Lighting Method	Single-color, two-split, two-color lighting by LED
Lighting Color	Milky white, red, green, orange, yellow
Panel Thickness	1 ~ 10mm
Wiring	M3.5 × 8 screws (Recommended torque: 0.7 ~ 1.0N·m)

■ Materials / 40F

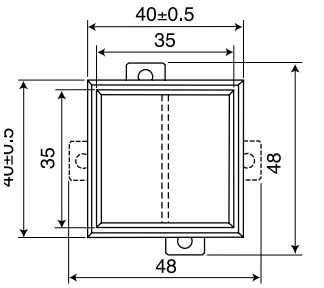
Lens	Polycarbonate resin	(Transparent)	UL94V-0
Lens Frame	PBT resin	(Black)	UL94V-0
Legend Plate	Methacryl resin	(Milky white)	
Filter	Methacryl resin	(Transparent, red, green orange, yellow)	
Case	PBT resin	(White)	UL94V-0
Reflector	Polycarbonate resin	(White)	UL94V-2
Terminal Screw	Carbon steel		
Terminal Protection Cover	Polycarbonate resin	LC-11	UL94V-2

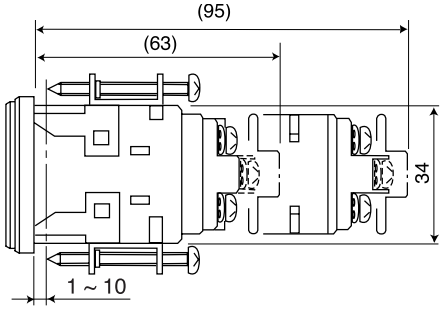
● Installation

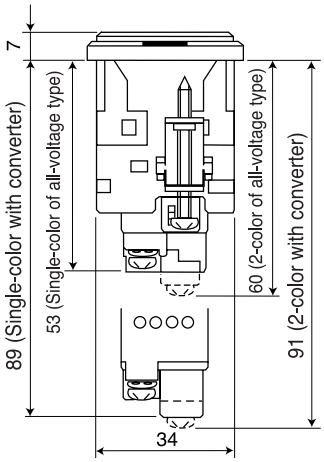
Insert the main body through the front panel surface, and fix with the mounting clamp (CA-12) at the rear face. (Recommended torque: 0.4 ~ 0.5N·m)

■ Dimensions

● KHE-40F



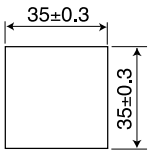




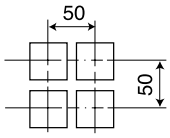
Legend plate size	32 × 32mm
Lighting surface area	35 × 35mm
Legend plate thickness	1mm
Engraving space	30 × 30mm

● Panel cut dimensions

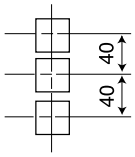
▼Mounting single unit



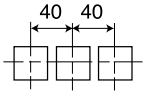
▼Mounting multiple units



Minimum pitch



Minimum pitch for vertical mounting



Minimm pitch for horizontal mounting

●Weight (Unit: g)

Model	Lighting Method	Weight
KHE-40F	Single-color for full window	Approx. 44
	Two-color for full window	Approx. 48
	Two-split lighting	Approx. 48
	Single-color for full window with converter	Approx. 64
	Two-color or two-split with converter	Approx. 68

■ LED Unit Model Designation / 40F

UN-40F ※1 - ※2 ※3

- ※3 — Lighting Color
- ※2 — Rated Voltage
- ※1 — Lighting Method
- UN-40F — Model Name

※1

Code	Lighting Method
A	1-color lighting for one full window
B	Two-split lighting for left/right on one full window
C	2-color lighting for one full window

※2

Code	Rated Voltage
4	24V
6	48V (common to 110V and 220V)

※3

Code	Lighting Color
HW	Milky white*
HR	Red
HG	Green
HO	Orange
HY	Yellow
H□+H□	Two-split lighting.
HR/H□	2-color lighting in red and another color

* The milky white is the similar color to that of incandesent lamps.

● Designating lighting colors

Single-color lighting: Designate (by **HW**: Milky white, **HR**: Red, **HG**: Green, **HO**: Orange, or **HY**: Yellow) for the lighting color.

Two-split lighting:

HW+HR

- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the lighting color on the right as viewed from the lighting surface.
- Designate by the "+" symbol for the two-split lighting.
- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the lighting color on the left as viewed from the lighting surface

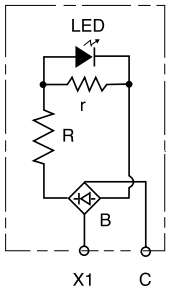
Two-color lighting:

HR / HG

- Designate (by **HW**, **HG**, **HO** or **HY**) for the lighting color other than Red.
- Designate by the "/" symbol for the two-color lighting.
- Red (**HR**) only.

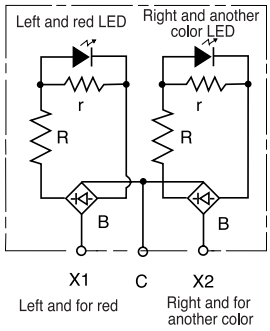
● LED Unit circuit diagram

Single-color lighting



LED: Light emitting diode
R, r: Resistor
B: Rectification bridge

Two-split and two-color lighting



* Left/right as viewed from the front for the two-split lighting.
Red in the left, another color in the right for the two-color lighting.

■ Model Designation / 40H

KHE-40H ※1 ※2 - ※3 ※4

- ※4 — Lighting Color
- ※3 — Rated Voltage
- ※2 — Lighting Method
- ※1 — Surface Shape
- KHE-40H — Model Name

※1

Designate "N" for the inclined lighting surfacea only.

※2

Code	Lighting Method
A	Single-color lighting for one full window
B	Two-split lighting for left/right on one full window with a separator
C	Two-color lighting for one full window in combination of red with another color
D	Two-split lighting over one full window, two colors or single color over two half surfaces, with separator
E	Three-split single-color lighting on one full window with a separator

※3

Code	Rated Voltage	Remark
4	24V	All-voltage type
6	48V	
8	110V	With converter (EC-40)
U	220V	

- Two-color lighting is available with C and D types only.
- Two-color lighting with converter is available with the 110V DC specifications.
- Two-color simultaneous lighting is not available with the two-color lighting method.
- The LED unit voltage with converter is 48V.

※4

Code	Lighting Color
HW	Milky white*
HR	Red
HG	Green
HO	Orange
HY	Yellow
H□+H□	Two-split lighting.
HR/H□	2-color lighting in red and another color

*The milky white is the similar color to that of incandescent lamps.

● Designating lighting colors

Lighting method A: Designate (by **HW**: Milky white, **HR**: Red, **HG**: Green, **HO**: Orange, or **HY**: Yellow) for the lighting color.

Lighting method B: **HW+HR**

- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the lighting color on the right as viewed from the lighting surface·
- Designate by the "+" symbol for the Lighting method B.
- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the lighting color on the left as viewed from the lighting surface.

Lighting method C: **HR / HG**

- Designate (by **HW**, **HG**, **HO** or **HY**) for the lighting color other than Red.
- Designate by the "/" symbol for the Lighting method C.
- Red (**HR**) only.

Lighting method D: **HR / HG+HR / HO**

- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the single-color or for the two-color lighting (by **HR**/□) on the right as viewed from the lighting surface.
- Designate by the "+" symbol for the Lighting method D.
- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the single-color or for the two-color lighting (by **HR**/□) on the left as viewed from the lighting surface.

Lighting method E: **HW + HR + HG**

- Designate (by **HW**, **HR**, **HG**, **HO** or **HY**) for the □+□+□ in order from the left as viewed from the lighting surface.
- Designate by the "+" symbol each for the Lighting method E.

Example of lighting method D

● Example of designating HR/HG+HR/HO

The left side lights in red and green with the two-split lighting, and the right side lights in red and orange.

● Example of designating HR/HG+HO

The left side lights in red and green with the two-split lighting, and the right side lights in orange only.

■ Ratings / 40H

Rated Voltage		24V AC/DC		48V AC/DC	110V AC/DC With Converter (EC-40-8)	220V AC With Converter (EC-40-U)
Operating Voltage Range		21.6 ~ 26.4V		43.2 ~ 52.8V	90 ~ 121V	180 ~ 242V
Rated Current	Full Window/ Two-split	Another color	30mA × 2	15mA × 2		
		Red	15mA × 2			
	Three-split	15mA × 3				

■ Specifications / 40H

Insulation Resistance	100MΩ or more between live parts and ground measured by 500V DC megohmmeter
Withstand Voltage	2000V AC for 1 minute between live parts and ground
Temperature Resistance	For 1 hour at normal temperatures after 2 hours at -40°C, and 1 hour at normal temperatures after 2 hours at 70±3°C
Humidity Resistance	Normal insulation resistance and withstand voltage after being left for 24 hours in a cycle of 55±2°C and 25±3°C under 93%RH
Vibration Resistance	3-dimensional vibration of amplitude 1.5mm and frequency ranging 10 ~ 55Hz for 1 hour with a sweep time of 1 minute
Shock Resistance	3-dimensional shock of 500m/s^2 to 6 surfaces, 5 times
Operating Environment	Temperature: -10 ~ 40°C, humidity: 45 ~ 85%RH (No freezing or condensation)
Reverse Voltage	400V
Lighting Method	Single-color, two-split, two-color lighting by LED
Lighting Color	Milky white, red, green, orange, yellow
Panel Thickness	1 ~ 10mm
Wiring	M3.5 × 8 screws (Recommended torque: 0.7 ~ 1.0N·m)

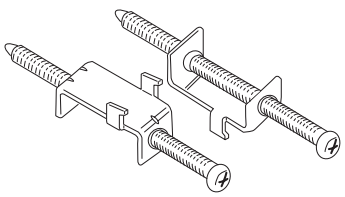
■ Materials / 40H

Lens	Polycarbonate resin	(Transparent)	UL94V-0
Lens Frame	PBT resin	(Black)	UL94V-0
Legend Plate	Methacryl resin	(Milky white)	
Filter	Methacryl resin	(Transparent, red, green orange, yellow)	
Case	PBT resin	(White)	UL94V-0
Reflector	Polycarbonate resin	(White)	UL94V-2
Terminal Screw	Carbon steel		
Terminal Protection Cover	Polycarbonate resin	LC-11 (for three-split), LC-12 (for full window, two-split)	UL94V-2

● Installation

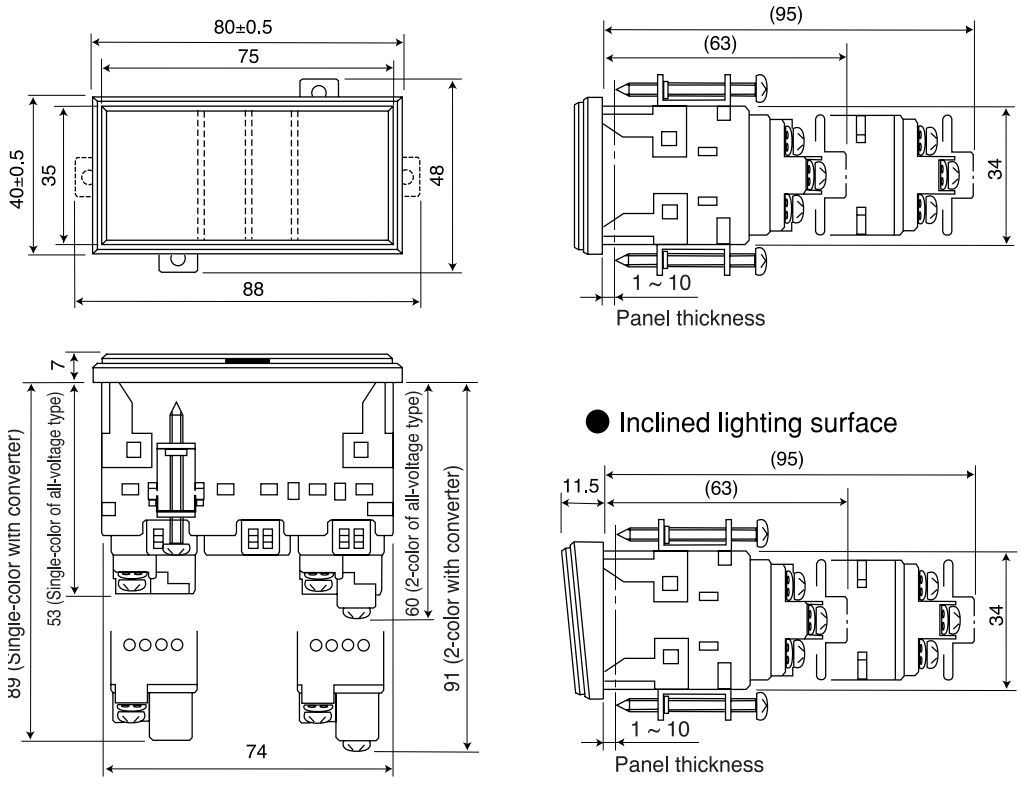
Insert the main body through the front panel surface, and fix with the mounting clamp at the rear face.
(Recommended torque: 0.4 ~ 0.5N·m)

▼ CA-12



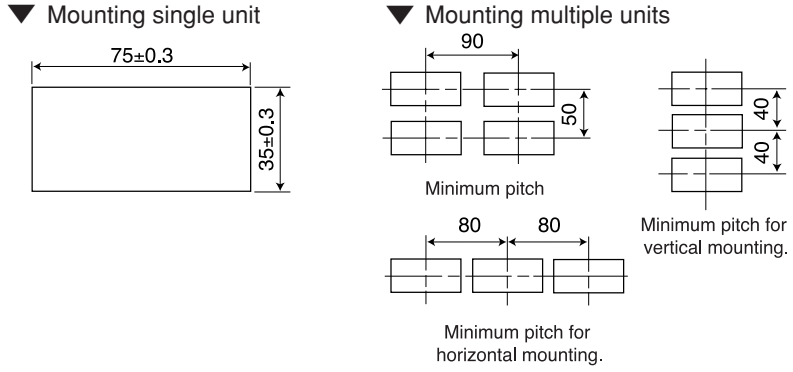
■ Dimensions

● KHE-40H



Legend plate size	32 × 72mm
Lighting surface area	35 × 75mm
Legend plate thickness	1mm
Engraving space	30 × 70mm

● Panel cut dimensions



● Weight (Unit: g)

Model	Lighting Method	Weight
KHE-40H	Single-color for full window or two-split	Approx. 86
	Two-color for full window or two-split	Approx. 97
	Three-split lighting	Approx. 98
	Single-color for full window or two-split with converter	Approx. 124
	Two-color for full window or two-split with converter	Approx. 137
	Three-split with converter	Approx. 153

■ LED Unit Model Designation / 40H

UN-40H ※1 - ※2 ※3

- ※3 — Lighting Color
- ※2 — Rated Voltage
- ※1 — Size
- UN-40H — Model Name

※1

Code	Size
2	For full window lighting or two-split lighting
3	For three-split lighting

※2

Code	Rated Voltage
4	24V
6	48V (common to 110V and 220V)

- Enquire to us about the common use between 110V and 220V in case of "6".
- For the full window lighting, two of the LED for two-split lighting but of the same color are used.

※3

Code	Lighting Color
HW	Milky white*
HR	Red
HG	Green
HO	Orange
HY	Yellow
HR/H□	2-color lighting in red and another color

* The milky white is the similar color to that of incandescent lamps.

● Designating lighting colors

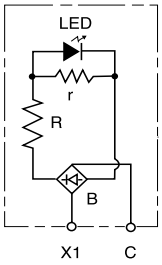
Single-color lighting: Designate (by **HW**: Milky white, **HR**: Red, **HG**: Green, **HO**: Orange, or **HY**: Yellow) for the lighting color.

Two-color lighting:

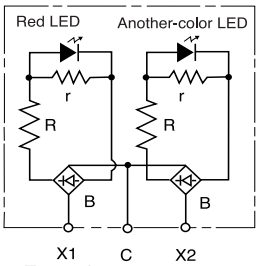
HR / HG

- HG — Designate (by **HW**, **HG**, **HO** or **HY**) for the lighting color other than Red.
- / — Designate by the "/" symbol for the two-color lighting.
- HR — Red (**HR**) only.

● LED Unit circuit diagram



LED: Light emitting diode
R, r: Resistor
B: Rectification bridge



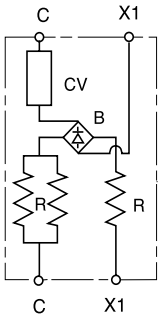
* Red in the left and another color in the right for the two-color lighting.

■ Converter Specifications for LED Lights

Item \ Model Name		EC-40-8A	EC-40-8C	EC-40-UA
Input Side	Rated Voltage	110V AC/DC	110V DC	220V AC
	Rated Input Current	15mA or less		
	Allowable Voltage Variance	90 ~ 121V AC / 90 ~ 150V DC		180 ~ 242V AC
	Frequency	50/60Hz (AC only)		
	Inrush Current	0.3A or less		0.5A or less
	Rated Output Voltage	48V DC		
	Rated Output Current	15mA or less		
Insulation Resistance		100MΩ or more between live parts and ground measured by 500V DC megohmmeter		
Withstand Voltage		2000V AC for 1 minute between live parts and ground		
Operating Environment		-10 ~ 40°C, 45 ~ 85%RH (No freezing or condensation)		
Storage Temperature and Humidity Range		-30 ~ 70°C, 45 ~ 85%RH (No freezing or condensation)		
Wiring		M3.5 × 8 screws (Recommended torque: 0.7 ~ 1.0N·m)		
Weight		28g	32g	28g

● Converter circuit diagram

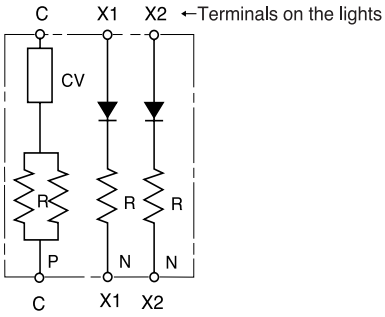
EC-40-□A



R: Resistor
CV: Current limiter circuit
B: Rectification bridge

The converter is equipped with a rectifier. Therefore, in use of EC-40-□A in DC, the polarities can be disregarded.

EC-40-8C



In use of EC-40-8C, be aware that "C" is positive and X1, X2 each is negative.

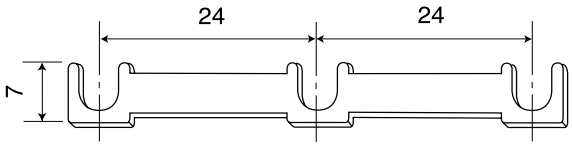
● Converter compatibilities

Converter \ Model	KHE-40F	KHE-40H
EC-40-8A EC-40-UA	Lighting method A	Lighting method A / B / E Lighting method D - Single-color lighting
EC-40-8C	Lighting method B / C	Lighting method C Lighting method D - 2-color lighting

Optional

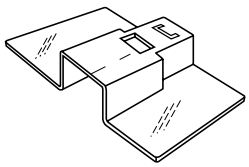
■ Short-circuiting Bar

▼J-48A



■ Terminal Protection Cover

▼LC-11 (For KHE-40F, for three-split with 40H)



▼LC-12 (For full window or two-split with KHE-40H)