

The new standard in LED fixture systems



ECO**UNLIMITED**®

 **hato**®
LIGHTING SOLUTIONS

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Our vision

Supplying respected lighting solutions worldwide, ensuring progress for our customers and partners.



Paul Obers: 'Innovation is key'

Director Paul Obers believes that innovation is the key factor to Hato's success: 'My ambition is to connect our lighting solutions with different applications. It is my passion to create the optimal lighting environment. We can only realize this with continuous and intelligent innovation'.

EcoUnlimitLed (EUL) is the state-of-the-art LED technology, which is not only energy saving, but also guarantees an optimal and smooth light emission and light spreading.

Using EUL for illuminated and wayfinding sign applications there is no inconvenient over-radiation and/or striping effect, even when applying reduced frame depths; because the fixture has an uninterrupted 360° all around radiation.

Therefor EUL is also perfectly suitable as ceiling fixture and for retrofit applications (fluorescent tube replacements).

EUL has no length restrictions (customized lengths) but is also available in a number of standard lengths.

This documentation supplies insight in all EUL technical background, supported by extensive test results, international certificates and added availability of parts and accessories.

We have a complete in-house test environment for all types of products and applications and gladly think along with your possible light-concepts including advice with no obligations.

Dutch design & development

EcoUnlimitLed (EUL) is a Dutch invention in cooperation with international partners, test environments and production companies.

However, the overall supervision and quality is controlled by the Dutch headquarters in Sittard, with production facilities in Korea and China, and with our own supervisors in our Chinese production- and assembly-facility.

The major benefits of EcoUnlimitLed (EUL)

Compared to other systems and applications the major benefits of EUL are:

- no length restrictions due to the unique construction
- also available in a variety of standard lengths
- more than 60% reduction on energy costs and
- a coherent reduction of CO2 emission
- minimal 100,000 burning hours
- after 70,000 burning hours minimal 70% light output guaranteed (founded by independent tests see page 10 - 12)
- unique diffuser system results in a 360° all around light radiation
- high light output and smooth radiation
- dimmable (with energy reduction)
- almost no warmth radiation due to warmth-discharge system
- moisture resistant according to IP 63 standard
- fast installation and montage
- creative freedom for designers and architects

The most important applications of EcoUnlimitLed (EUL)

- both replacement and newly fitted
- retrofit replacement of fluorescent tubes
- wayfinding
- illuminated signs
- building identification
- ceiling fixtures
- based on standard lengths or
- customized lengths

The colour of EcoUnlimitLed (EUL)

EUL is standard available in colour temperatures 4200 and 6500K.
Other colours available on request.

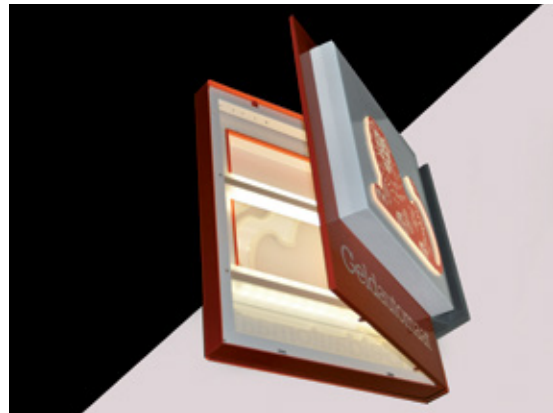
EcoUnlimitLed best practice

The proof of the pudding is in the eating.

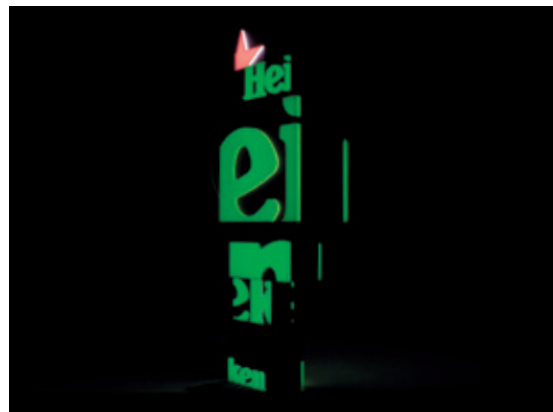
On these and the following pages please find a selection of the many EUL best practice examples:



Illuminated sign ING ATM



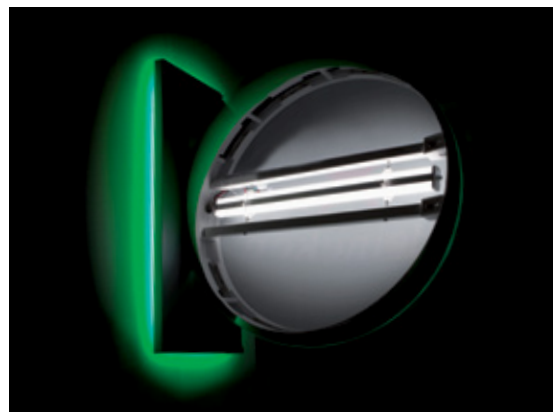
Emergency signage Schiphol Long Parking



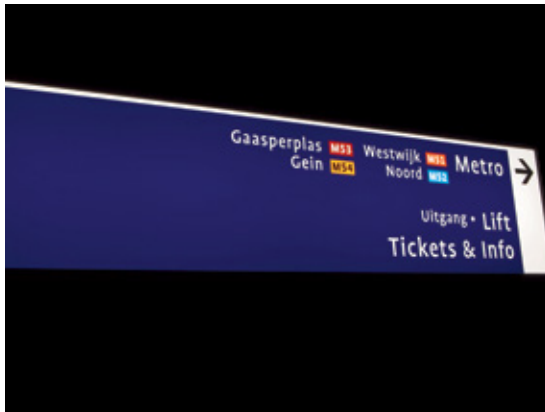
*Heineken Blocks
(1 EUL fixture, 360° all around lighting)*



Heineken Iconic Outdoor Sign (1 EUL fixture, 360° all around lighting)



EcoUnlimitLed best practice (continued)



Amsterdam Metro station (1 EUL fixture, double sided frame dimensions 200x48x21cm)



Schiphol Wayfinding (only 3 EUL fixtures, double sided frame dimensions 186x70x21cm)

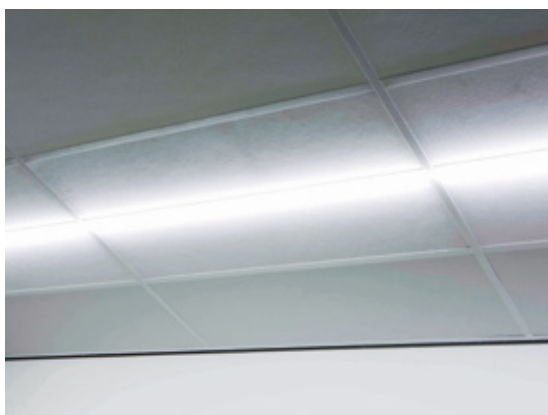
EcoUnlimitLed best practice (continued)



*EUL in ceiling fixtures
(1 on 1 replacement of fluorescent tubes)*



EUL as free mounted ceiling fixture



EUL integrated in suspended ceiling



EUL as free suspending design fixture



EUL as free suspending design fixture



EUL as free suspending design fixture (detail)

Testing certificates

EUL has been granted the following testing certificates:

- KEMA/ENEC
- CE
- UL (USA, Canada, E356565)

Technical constructions and specifications

The table below shows the technical EUL specifications for both colour temperature 4200 and 6500K.

Description components 4200 and 6500K

LED information	
LED Manufacturer:	Seoul Semiconductor
Colour rendering (CRI):	> 80 (Ra)
Colour consistency:	x,y decline < 0,004 after 70,000 burning hours
Lux-consistency:	70% light output after 70,000 burning hours
Colour variables:	4200K: +/- 200K, 6500K: +/- 500K

EUL lengths

Maximum length EUL consisting of 1 element (including lamp holders, see A in drawing below).

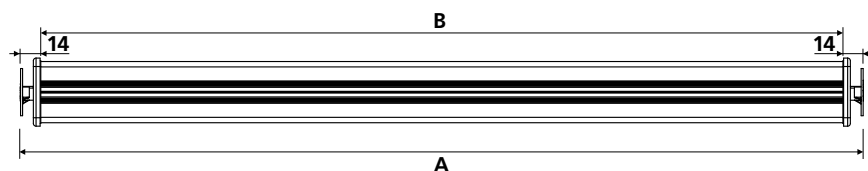
Power input from one side up to maximum 2,8 mtr.

Power input from 2 sides 5,0 mtr.

Minimum length EUL (including lamp holders, see A in drawing below) 0,22 mtr.

Minimum signage frame depth:

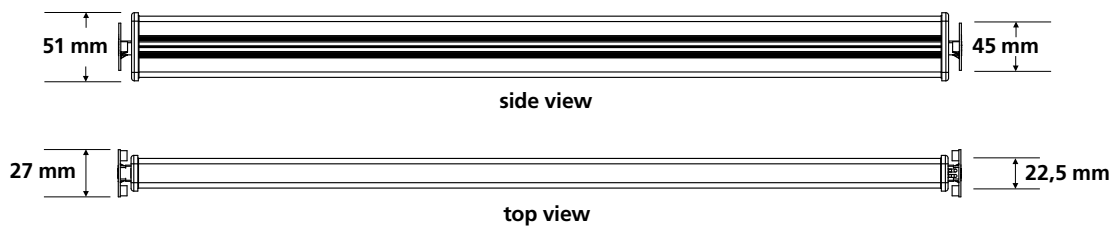
Depending on colour and transparency of the front plate, from 50 mm for a single sided version to 60 mm for a double sided version.



Dimensions EUL fixtures

EUL height (center):	45 mm
EUL height (end cap):	51 mm
EUL width (center):	22,5 mm
EUL width (end cap):	27 mm

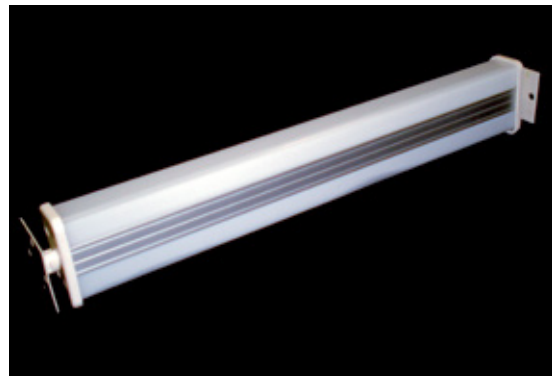
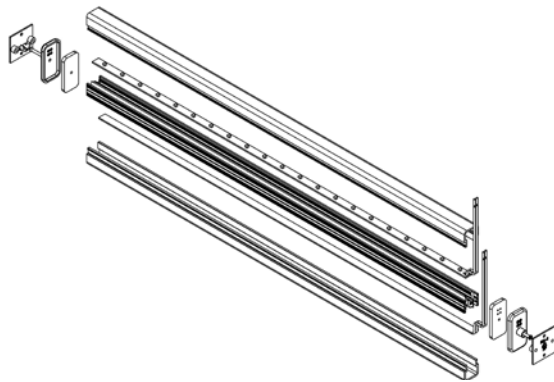
Standard EUL lengths (TL replacements); all lengths for EUL including lamp holders)
(T8 length + 2x 13mm for lamp holders, EUL spring holder required, because different lamp holders can have different thicknesses):



Electrical specifications:

Nominal power 24V DC, nominal energy consumption 12,5 W/mtr.

Dimmable, maintaining luminosity and smoothness.



Download an Excel spreadsheet for a specified estimate application or order at www.hatolightingsolutions.com

Endurance test EcoUnlimitLed

Hato Lighting Solutions submitted the EUL LED-lamp to an endurance test with the independent institute Olino. On this and the following pages you will find the specifics and results of this test, which has been running for over 40,000 hours, and is still running.

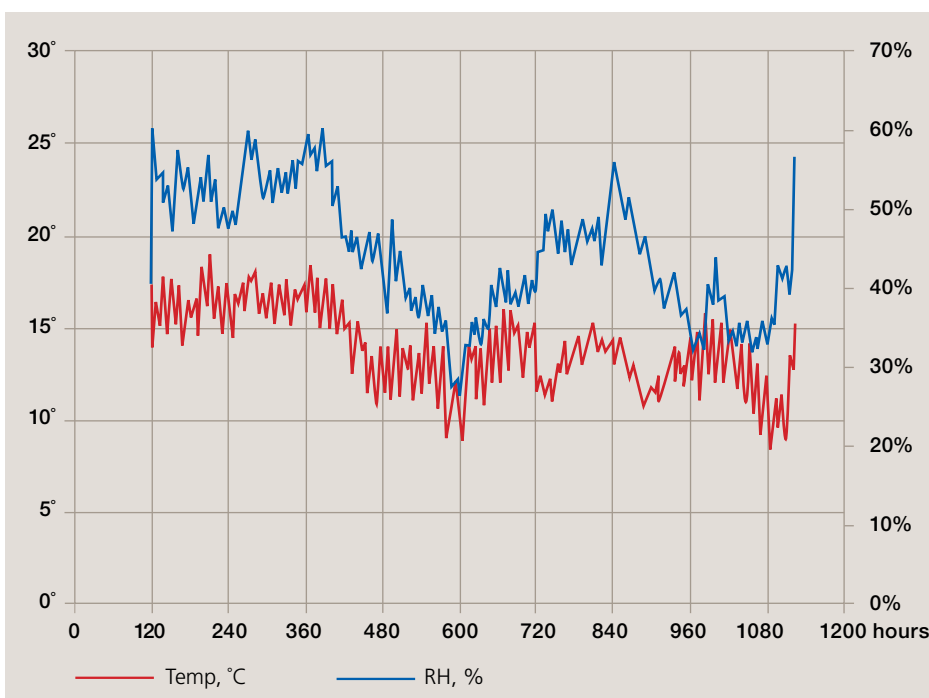
Summary measurement data

parameter	initially	after endurance	remarks
Colour Temperature	3914 K	3953 K	Neutral white
Luminous Intensity I _v	113 Cd	112 Cd	
Beam Angle	360 deg	360 deg	
Power P	14.2 W	13.6 W	
Power Factor	0.93	0.93	Test was done with a PS that was delivered with the lamp.
Luminous Flux	683 lm	668 lm	
Luminous Efficacy	48 lm/W	49 lm/W	Measured on the diffuser
CRI_Ra	> 80	> 80	
Coordinates Chromaticity Diagram	x=0.3870 and y=0.3899	x=0.3849 and y=0.3879	

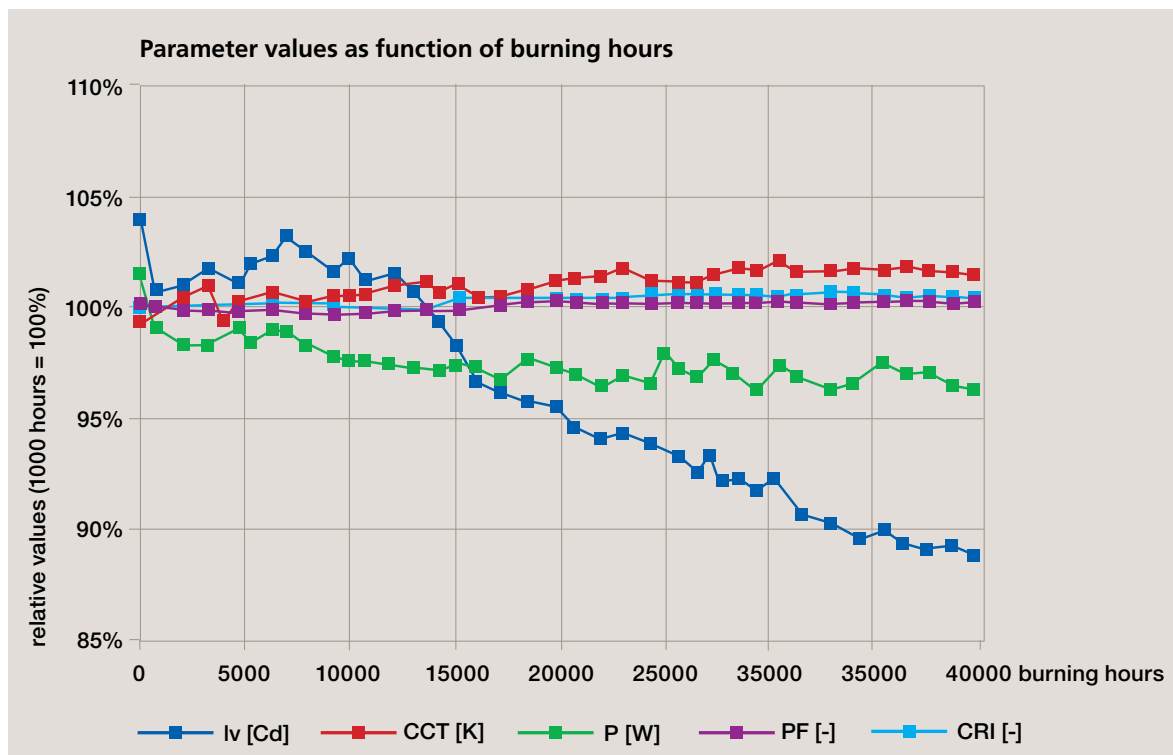
Test duration and test environment

The lamp endurance test began on 26th April 2011 and still continues.

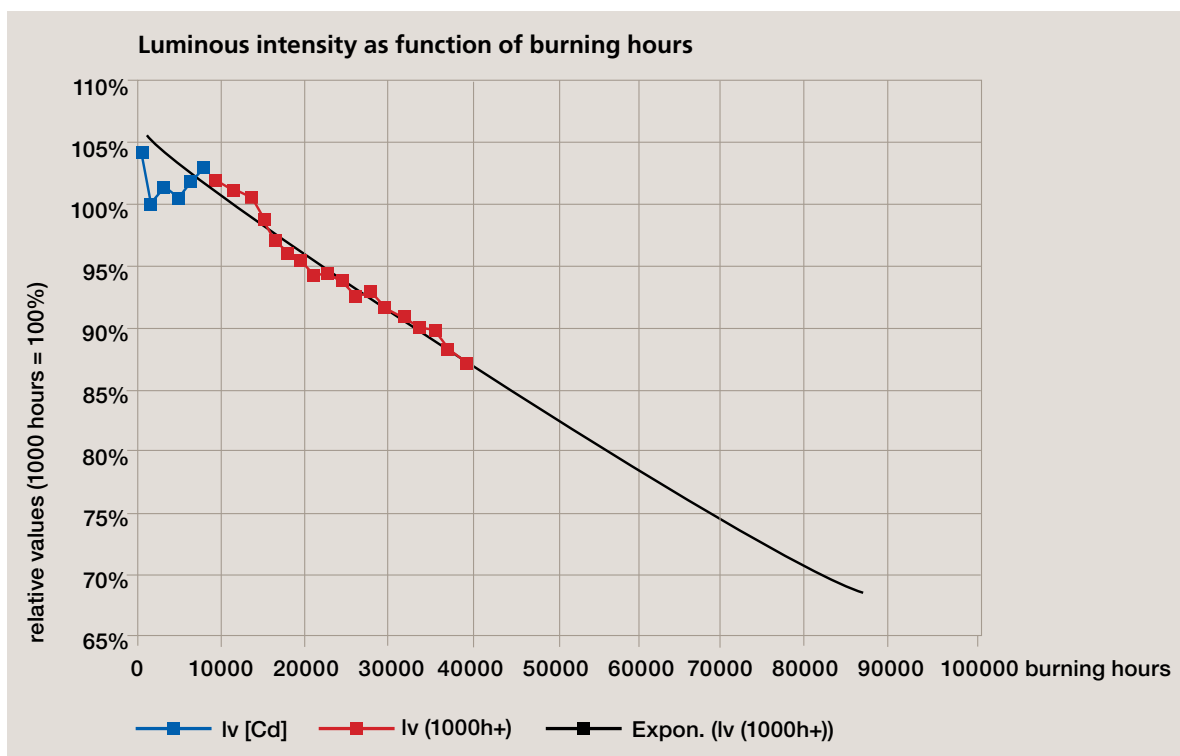
Below an example from a series of graphics showing the ambient temperature and relative humidity. Within the lamp proximity the ambient temperature varied between 10 – 20°C, and the relative humidity between 20 – 45%. These are constant value tolerances during the complete test period.



Variables of lamp parameters



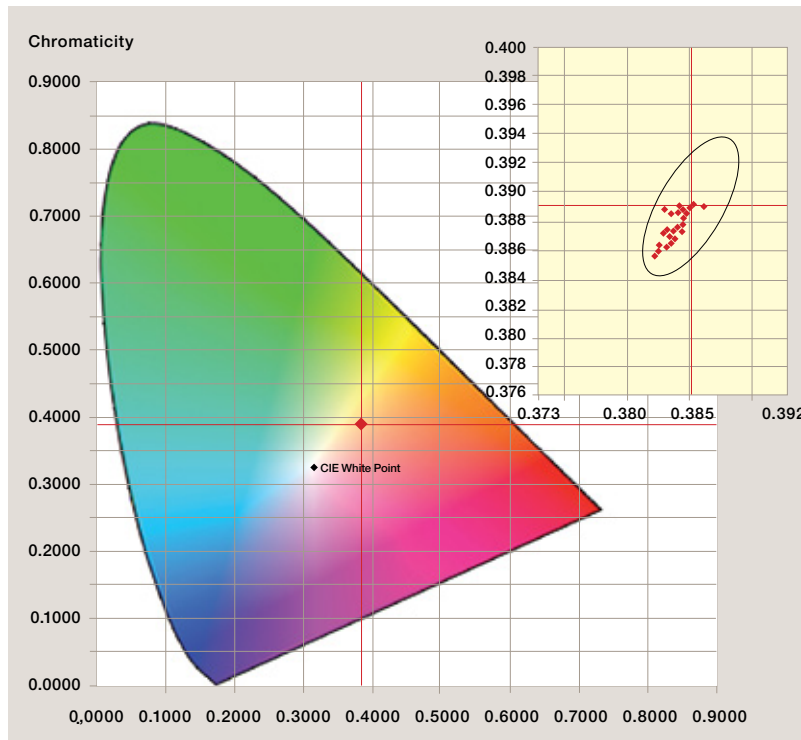
The graphic above shows the variables of the various lamp parameters during the test period. The test proves that the light intensity has hardly decreased during the test period of over 40,000 hours.



The graphic above shows that extrapolation up to 80,000 burning hours a light intensity of 70% still remains.

Colour change

During the test the colour change has also been tested, and is illustrated in the graphic below.



The graphic above shows the colour coordinates representing the colours during the endurance test.

The x- and y-colour coordinates are in red and based on 1,000 burning hours.

The drawn ellipse around these coordinates is the s.c. 2-step McAdams ellipse.

The fact that the colours, even after 40,000 burning hours, stay within this ellipse, indicates that no visible colour change can be observed.

This is a very good result with regard to the colour consistency.

Parts and accessories

Below an overview of the parts and accessories that are available for the EUL lamp fixtures.



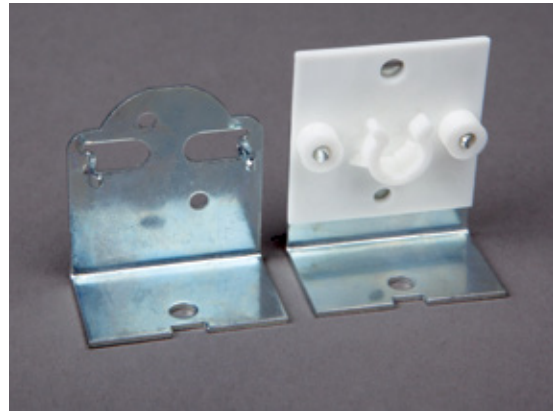
lamp holder standard, thickness 2 mm



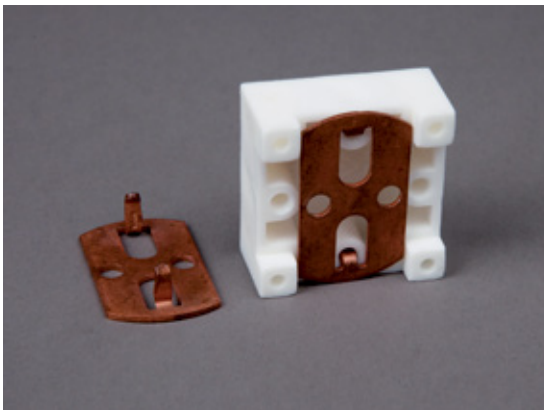
lamp holder, thickness 9 mm



lamp holder, thickness 17 mm



lamp holder 2 mm with alum FC connector



lamp holder 17 mm with alum FC connector



seal (water resistant IP 63)

Parts and accessories (continued)



end cap (silver coloured)



end cap (frosted transparent)



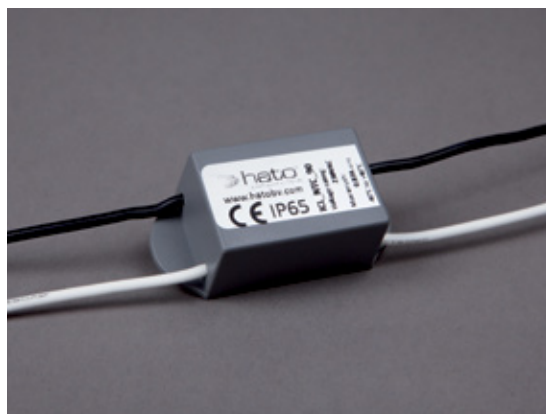
mounting clip for free suspending design fixture



power driver class 2, available in 16, 25, 40 and 90W

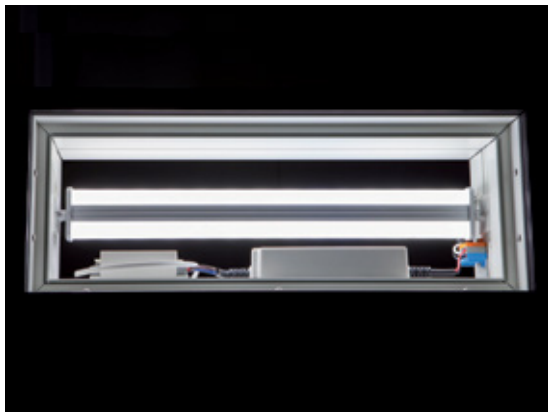


dim unit 0 – 100%, 24V DC, max. 10A (240W)



peak current limiter

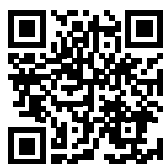
Parts and accessories (continued)



installation example



installation example (detail)



demo movie



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